If you plan to submit a bid directly to the Department of Transportation

PREQUALIFICATION

Any contractor who desires to become pre-qualified to bid on work advertised by IDOT must submit the properly completed pre-qualification forms to the Bureau of Construction no later that 4:30 p.m. prevailing time twenty-one days prior to the letting of interest. This pre-qualification requirement applies to first time contractors, contractors renewing expired ratings, contractors maintaining continuous pre-qualification or contractors requesting revised ratings. To be eligible to bid, existing pre-qualification ratings must be effective through the date of letting.

REQUESTS FOR AUTHORIZATION TO BID

Contractors downloading and/or ordering CD-ROM's and are wanting to bid on items included in a particular letting must submit the properly completed "Request for Authorization to Bid/or Not For Bid Status" (BDE 124INT) and the ORIGINAL, signed and notarized, "Affidavit of Availability" (BC 57) to the proper office no later than 4:30 p.m. prevailing time, three (3) days prior to the letting date.

WHO CAN BID ?

Bids will be accepted from only those companies that request and receive written **Authorization to Bid** from IDOT's Central Bureau of Construction.

WHAT CONSTITUTES WRITTEN AUTHORIZATION TO BID? When a prospective prime bidder submits a "Request for Authorization to Bid/or Not For Bid Status"(BDE 124INT) he/she must indicate at that time which items are being requested For Bidding purposes. Only those items requested For Bidding will be analyzed. After the request has been analyzed, the bidder will be issued a **Proposal Denial and/or Authorization Form**, approved by the Central Bureau of Construction, that indicates which items have been approved For Bidding. If **Authorization to Bid** cannot be approved, the **Proposal Denial and/or Authorization Form** will indicate the reason for denial.

ABOUT AUTHORIZATION TO BID: Firms that have not received an authorization form within a reasonable time of complete and correct original document submittal should contact the department as to status. This is critical in the week before the letting. These documents must be received three days before the letting date. Firms unsure as to authorization status should call the Prequalification Section of the Bureau of Construction at the number listed at the end of these instructions.

ADDENDA AND REVISIONS: It is the contractor's responsibility to determine which, if any, addenda or revisions pertain to any project they may be bidding. Failure to incorporate all relevant addenda or revisions may cause the bid to be declared unacceptable.

Each addendum will be placed with the contract number. Addenda and revisions will also be placed on the Addendum/Revision Checklist and each subscription service subscriber will be notified by e-mail of each addendum and revision issued.

The Internet is the Department's primary way of doing business. The subscription server e-mails are an added courtesy the Department provides. It is suggested that bidder check IDOT's website http://www.dot.il.gov/desenv/delett.html before submitting final bid information.

IDOT is not responsible for any e-mail related failures.

Addenda Questions may be directed to the Contracts Office at (217)782-7806 or D&Econtracts@dot.il.gov

Technical Questions about downloading these files may be directed to Tim Garman (217)524-1642 or Timothy.Garman@illinois.gov.

WHAT MUST BE INCLUDED WHEN BIDS ARE SUBMITTED?: Bidders need not return the entire proposal when bids are submitted. That portion of the proposal that must be returned includes the following:

1. All documents from the Proposal Cover Sheet through the Proposal Bid Bond
2. Other special documentation and/or information that may be required by the contract special provisions

All proposal documents, including Proposal Guaranty Checks or Proposal Bid Bonds, should be stapled together to prevent loss when bids are processed by IDOT personnel.

ABOUT SUBMITTING BIDS: It is recommended that bidders deliver bids in person to insure they arrive at the proper location prior to the time specified for the receipt of bids. Any bid received at the place of letting after the time specified will not be accepted.

WHO SHOULD BE CALLED IF ASSISTANCE IS NEEDED?

Questions Regarding	**Call**
Prequalification and/or Authorization to Bid	(217)782-3413
Preparation and submittal of bids	(217)782-7806
Mailing of plans and proposals	(217)782-7806
Electronic plans and proposals	(217)524-1642

ADDENDUMS AND REVISIONS TO THE PROPOSAL FORMS

Planholders should verify that they have received and incorporated the addendum and/or revision prior to submitting their bid. Failure by the bidder to include an addendum could result in a bid being rejected as irregular.

RETURN WITH BID

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Proposal Submitted By
Name
Address
City

Letting June 13, 2008

BIDDERS NEED NOT RETURN THE ENTIRE PROPOSAL
(See instructions inside front cover)

NOTICE TO PROSPECTIVE BIDDERS
This proposal can be used for bidding purposes by only those companies that request and receive written AUTHORIZATION TO BID from IDOT's Central Bureau of Construction.
(SEE INSTRUCTIONS ON THE INSIDE OF COVER)

Notice To Bidders, Specifications, Proposal, Contract and Contract Bond

Illinois Department of Transportation

Springfield, Illinois 62764

Contract No. 60E10
COOK County
Section 2008-001VB
Route FAP 351
Project ACNHF-HPP-0351(017)
District 1 Construction Funds

PLEASE MARK THE APPROPRIATE BOX BELOW:

☐ A Bid Bond is included.

☐ A Cashier's Check or a Certified Check is included

Prepared by

Checked by F

(Printed by authority of the State of Illinois)

INSTRUCTIONS

ABOUT IDOT PROPOSALS: All proposals issued by IDOT are potential bidding proposals. Each proposal contains all Certifications and Affidavits, a Proposal Signature Sheet and a Proposal Bid Bond required for Prime Contractors to submit a bid after written **Authorization to Bid** has been issued by IDOT's Central Bureau of Construction.

WHO CAN BID?: Bids will be accepted from only those companies that request and receive written **Authorization to Bid** from IDOT's Central Bureau of Construction. To request authorization, a potential bidder must complete and submit Part B of the Request for Authorization to Bid/or Not For Bid Status form (BDE 124 INT) and submit an original Affidavit of Availability (BC 57).

WHAT CONSTITUTES WRITTEN AUTHORIZATION TO BID?: When a prospective prime bidder submits a "Request for Proposal Forms and Plans" he/she must indicate at that time which items are being requested For Bidding purposes. Only those items requested For Bidding will be analyzed. After the request has been analyzed, the bidder will be issued a **Proposal Denial and/or Authorization Form**, approved by the Central Bureau of Construction, that indicates which items have been approved For Bidding. If **Authorization to Bid** cannot be approved, the **Proposal Denial and/or Authorization Form** will indicate the reason for denial. If a contractor has requested to bid but has not received a **Proposal Denial and/or Authorization Form**, they should contact the Central Bureau of Construction in advance of the letting date.

WHAT MUST BE INCLUDED WHEN BIDS ARE SUBMITTED?: Bidders need not return the entire proposal when bids are submitted. That portion of the proposal that must be returned includes the following:

1. All documents from the Proposal Cover Sheet through the Proposal Bid Bond

2. Other special documentation and/or information that may be required by the contract special provisions

All proposal documents, including Proposal Guaranty Checks or Proposal Bid Bonds, should be stapled together to prevent loss when bids are processed by IDOT personnel.

ABOUT SUBMITTING BIDS: It is recommended that bidders deliver bids in person to insure they arrive at the proper location prior to the time specified for the receipt of bids. Any bid received at the place of letting after the time specified will not be accepted.

WHO SHOULD BE CALLED IF ASSISTANCE IS NEEDED?

Questions Regarding	Call
Prequalification and/or Authorization to Bid	217/782-3413
Preparation and submittal of bids	217/782-7806
Mailing of CD-ROMS	217/782-7806

RETURN WITH BID

PROPOSAL

TO THE DEPARTMENT OF TRANSPORTATION

1. Proposal of _____

_____

Taxpayer Identification Number (Mandatory) _____

for the improvement identified and advertised for bids in the Invitation for Bids as:

Contract No. 60E10
COOK County
Section 2008-001VB
Project ACNHF-HPP-0351(017)
Route FAP 351
District 1 Construction Funds

This project consists of the staged construction of three railroad bridges, two highway bridges and numerous retaining wall systems to replace two Canadian National and METRA railroad viaducts. This project includes railroad related work of furnishing, constructing and removing railroad track, signal bridges, catenary structures, fiber optic communication cables and electric cables in conduit for railroad utility relocations. This project also includes reconstruction of U.S. Route 6 from Lexington Avenue to Fisk Avenue including storm sewer replacement, watermain relocation, traffic signal replacement and lighting.

2. The undersigned bidder will furnish all labor, material and equipment to complete the above described project in a good and workmanlike manner as provided in the contract documents provided by the Department of Transportation. This proposal will become part of the contract and the terms and conditions contained in the contract documents shall govern performance and payments.

3. **ASSURANCE OF EXAMINATION AND INSPECTION/WAIVER.** The undersigned further declares that he/she has carefully examined the proposal, plans, specifications, form of contract and contract bond, and special provisions, and that he/she has inspected in detail the site of the proposed work, and that he/she has familiarized themselves with all of the local conditions affecting the contract and the detailed requirements of construction, and understands that in making this proposal he/she waives all right to plead any misunderstanding regarding the same.

4. **EXECUTION OF CONTRACT AND CONTRACT BOND.** The undersigned further agrees to execute a contract for this work and present the same to the department within fifteen (15) days after the contract has been mailed to him/her. The undersigned further agrees that he/she and his/her surety will execute and present within fifteen (15) days after the contract has been mailed to him/her contract bond satisfactory to and in the form prescribed by the Department of Transportation, in the penal sum of the full amount of the contract, guaranteeing the faithful performance of the work in accordance with the terms of the contract.

5. **PROPOSAL GUARANTY.** Accompanying this proposal is either a bid bond on the department form, executed by a corporate surety company satisfactory to the department, or a proposal guaranty check consisting of a bank cashier's check or a properly certified check for not less than 5 per cent of the amount bid or for the amount specified in the following schedule:

Amount of Bid			Proposal Guaranty	Amount of Bid			Proposal Guaranty
Up to		$5,000	$150	$2,000,000	to	$3,000,000	$100,000
$5,000	to	$10,000	$300	$3,000,000	to	$5,000,000	$150,000
$10,000	to	$50,000	$1,000	$5,000,000	to	$7,500,000	$250,000
$50,000	to	$100,000	$3,000	$7,500,000	to	$10,000,000	$400,000
$100,000	to	$150,000	$5,000	$10,000,000	to	$15,000,000	$500,000
$150,000	to	$250,000	$7,500	$15,000,000	to	$20,000,000	$600,000
$250,000	to	$500,000	$12,500	$20,000,000	to	$25,000,000	$700,000
$500,000	to	$1,000,000	$25,000	$25,000,000	to	$30,000,000	$800,000
$1,000,000	to	$1,500,000	$50,000	$30,000,000	to	$35,000,000	$900,000
$1,500,000	to	$2,000,000	$75,000	over		$35,000,000	$1,000,000

Bank cashier's checks or properly certified checks accompanying proposals shall be made payable to the Treasurer, State of Illinois, when the state is awarding authority; the county treasurer, when a county is the awarding authority; or the city, village, or town treasurer, when a city, village, or town is the awarding authority.

If a combination bid is submitted, the proposal guaranties which accompany the individual proposals making up the combination will be considered as also covering the combination bid.

The amount of the proposal guaranty check is _____ $( ). If this proposal is accepted and the undersigned shall fail to execute a contract bond as required herein, it is hereby agreed that the amount of the proposal guaranty shall become the property of the State of Illinois, and shall be considered as payment of damages due to delay and other causes suffered by the State because of the failure to execute said contract and contract bond; otherwise, the bid bond shall become void or the proposal guaranty check shall be returned to the undersigned.

Attach Cashier's Check or Certified Check Here

In the event that one proposal guaranty check is intended to cover two or more proposals, the amount must be equal to the sum of the proposal guaranties which would be required for each individual proposal. If the guaranty check is placed in another proposal, state below where it may be found.

The proposal guaranty check will be found in the proposal for:

Item _____

Section No. _____

County _____

Mark the proposal cover sheet as to the type of proposal guaranty submitted.

6. **COMBINATION BIDS.** The undersigned further agrees that if awarded the contract for the sections contained in the following combination, he/she will perform the work in accordance with the requirements of each individual proposal comprising the combination bid specified in the schedule below, and that the combination bid shall be prorated against each section in proportion to the bid submitted for the same. If an error is found to exist in the gross sum bid for one or more of the individual sections included in a combination, the combination bid shall be corrected as provided in the specifications.

When a combination bid is submitted, the schedule below must be completed in each proposal comprising the combination.

If alternate bids are submitted for one or more of the sections comprising the combination, a combination bid must be submitted for each alternate.

Schedule of Combination Bids

Combination No.	Sections Included in Combination	Combination Bid Dollars	Cents

7. **SCHEDULE OF PRICES.** The undersigned bidder submits herewith, in accordance with the rules and instructions, a schedule of prices for the items of work for which bids are sought. The unit prices bid are in U.S. dollars and cents, and all extensions and summations have been made. The bidder understands that the quantities appearing in the bid schedule are approximate and are provided for the purpose of obtaining a gross sum for the comparison of bids. If there is an error in the extension of the unit prices, the unit prices shall govern. Payment to the contractor awarded the contract will be made only for actual quantities of work performed and accepted or materials furnished according to the contract. The scheduled quantities of work to be done and materials to be furnished may be increased, decreased or omitted as provided elsewhere in the contract.

8. **CERTIFICATE OF AUTHORITY.** The undersigned bidder, if a business organized under the laws of another State, assures the Department that it will furnish a copy of its certificate of authority to do business in the State of Illinois with the return of the executed contract and bond. Failure to furnish the certificate within the time provided for execution of an awarded contract may be cause for cancellation of the award and forfeiture of the proposal guaranty to the State.

ILLINOIS DEPARTMENT OF TRANSPORTATION
SCHEDULE OF PRICES
CONTRACT NUMBER - 60E10

State Job # - C-91-171-08
PPS NBR - 1-73912-0100
County Name - COOK- -
Code - 31 - -
District - 1 - -
Section Number - 2008-001VB

Project Number ACNHF-HPP-0351/017/

Route FAP 351

Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
A2000116	T-ACERX FREM AB 2	EACH	6.000				
A2004816	T-GLED TRI-I SK 2	EACH	1.000				
A2008116	T-TILIA CORD GS 2	EACH	7.000				
B2005716	T-PYRUS C CH TF 2	EACH	4.000				
MX030063	STORM SEW WM REQ 300	METER	128.000				
MX030064	STORM SEW WM REQ 450	METER	28.000				
MX030067	STORM SEW WM REQ 900	METER	72.000				
MX030103	STORM SEW WM REQ 525	METER	84.000				
MX030199	TEMP PAVEMENT	SQ M	1,484.000				
MX030207	CON ATS 50 GALVS PVC	METER	95.000				
MX030208	CON ATS 65 GALVS PVC	METER	22.000				
MX030300	CON ATS 25 GALVS PVC	METER	617.000				
MX030465	25MM PVC CT LT MT CON	METER	24.000				
MX032178	TEMP INFO SIGNING	SQ M	37.000				
MX032232	WATER MAIN REMOV 200	METER	2.000				

ILLINOIS DEPARTMENT OF TRANSPORTATION
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Section Number - 2008-001VB

Project Number ACNHF-HPP-0351/017/

Route FAP 351

Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
MX032233	WATER MAIN REMOV 300	METER	40.000				
MX032424	WATER MAIN REMOV 150	METER	70.000				
MX032723	PREFORM DETECT LOOP	METER	837.000				
MX032821	WATER SERV CONN 30	EACH	5.000				
MX032822	WATER SERV CONN 50	EACH	5.000				
MX033311	WATER MAIN REMOV 400	METER	218.000				
MX033480	DIWM CL52 POLY EN 150	METER	70.000				
MX033481	DIWM CL52 POLY EN 400	METER	218.000				
MX033482	STL SLV 750D OPN-CUT	EACH	44.000				
MX033483	TS/VL400X400/1.5T1FCL	EACH	2.000				
MX033738	DIWM CL52 POLY EN 300	METER	40.000				
MX033739	DIWM CL52 POLY EN 750	METER	210.000				
MX033740	DIWM CL52 POLY EN 200	METER	2.000				
MX033744	WATER MAIN REMOV 750	METER	210.000				
MX033745	STL SLV 300 9.5WT OC	METER	21.000				

ILLINOIS DEPARTMENT OF TRANSPORTATION
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Code - 31 - -
District - 1 - -
Section Number - 2008-001VB

Project Number ACNHF-HPP-0351/017/

Route FAP 351

Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
MX033746	STL SLV 600 11.9WT OC	METER	14.000				
MX033747	STL SLV 120 13WT OC	METER	66.000				
MX550161	TEMP STORM SEWER 300	METER	9.000				
MX816065	UD 3#6 #6G EPRRHW 25	METER	648.000				
MX873027	ELCBL C GROUND 6 1C	METER	385.000				
MZ001050	AGG SUBGRADE 300	SQ M	21,806.000				
MZ022800	FENCE REMOVAL	METER	222.000				
M2010110	TREE REMOV 6-15	UNIT	10.000				
M2010210	TREE REMOV OVER 15	UNIT	90.000				
M2011000	TEMPORARY FENCE	METER	460.000				
M2020010	EARTH EXCAVATION	CU M	15,400.000				
M2021200	REM & DISP UNS MATL	CU M	2,160.000				
M2070420	POROUS GRAN EMB SUBGR	CU M	2,160.000				
M2080150	TRENCH BACKFILL	CU M	4,196.000				
M2113100	TOPSOIL F & P 100	SQ M	7,650.000				

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Project Number ACNHF-HPP-0351/017/

Route FAP 351

Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
M2500210	SEEDING CL 2A	HA	0.400				
M2500400	NITROGEN FERT NUTR	KG	66.000				
M2500500	PHOSPHORUS FERT NUTR	KG	66.000				
M2500600	POTASSIUM FERT NUTR	KG	66.000				
M2510630	EROSION CONTR BLANKET	SQ M	4,050.000				
M2520110	SODDING SALT TOLERANT	SQ M	3,600.000				
M2520200	SUPPLE WATERING	UNIT	216.000				
M2800250	TEMP EROS CONTR SEED	KG	40.000				
M2800400	PERIMETER EROS BAR	METER	162.000				
M2820200	FILTER FABRIC	SQ M	4,000.000				
M3111100	SUB GRAN MAT B 100	SQ M	1,817.000				
M3540225	PCC BASE CSE W 225	SQ M	180.000				
M3550400	HMA BASE CSE 100	SQ M	1,817.000				
M3550500	HMA BASE CSE 200	SQ M	318.000				
M4021200	AGGREGATE-TEMP ACCESS	M TON	820.000				

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Section Number - 2008-001VB

Project Number ACNHF-HPP-0351/017/

Route FAP 351

Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
M4060100	BIT MATLS PR CT	LITER	1,817.000				
M4060300	AGG PR CT	M TON	8.000				
M4060982	HMA SURF REM BUTT JT	SQ M	88.000				
M4062125	LEV BIND MM N50	M TON	133.000				
M4062135	LEV BIND MM N70	M TON	11.000				
M4063080	HMA BC IL-19.0 N50	M TON	226.000				
M4063310	HMA SC "C" N50	M TON	290.000				
M4063595	P HMA SC "F" N90	M TON	21.000				
M4202265	PCC PVT 260 JOINTED	SQ M	20,056.000				
M4205200	PROTECTIVE COAT	SQ M	23,957.000				
M4230200	PCC DRIVEWAY PAVT 200	SQ M	75.000				
M4240125	PC CONC SIDEWALK 125	SQ M	1,544.000				
M4245000	TEMP SIDEWALK	SQ M	422.000				
M4400785	HMA SURF REM 85	SQ M	2,668.000				
M4402000	PAVEMENT REM	SQ M	16,370.000				

ILLINOIS DEPARTMENT OF TRANSPORTATION
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Code - 31 - -
District - 1 - -
Section Number - 2008-001VB

Project Number ACNHF-HPP-0351/017/

Route FAP 351

Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
M4402010	DRIVE PAVEMENT REM	SQ M	480.000				
M4402020	CURB REM	METER	112.000				
M4402040	COMB CURB GUTTER REM	METER	2,709.000				
M4402050	SIDEWALK REM	SQ M	902.000				
M4428025	CL D PATCH T1 225	SQ M	218.000				
M4428225	CL D PATCH T2 225	SQ M	218.000				
M4428325	CL D PATCH T3 225	SQ M	109.000				
M4428420	CL D PATCH T4 200	SQ M	100.000				
M5500420	STORM SEW CL A 2 200	METER	6.000				
M5502840	SS 1 RCP CL 4 300	METER	98.000				
M5502880	SS 1 RCP CL 4 600	METER	33.000				
M5502900	SS 1 RCP CL 3 750	METER	72.000				
M5502920	SS 1 RCP CL 3 900	METER	52.000				
M5503050	SS 2 RCP CL 3 300	METER	245.000				
M5503130	SS 2 RCP CL 3 900	METER	59.000				

ILLINOIS DEPARTMENT OF TRANSPORTATION
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PPS NBR - 1-73912-0100
County Name - COOK- -
Code - 31 - -
District - 1 - -
Section Number - 2008-001VB

Project Number: ACNHF-HPP-0351/017/
Route: FAP 351

Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
M5503340	SS 3 RCP CL 4 900	METER	285.000				
M5510010	STORM SEWER REM 150	METER	9.000				
M5510015	STORM SEWER REM 200	METER	30.000				
M5510020	STORM SEWER REM 250	METER	30.000				
M5510025	STORM SEWER REM 300	METER	290.000				
M6010605	PIPE UNDERDRAINS 100	METER	581.000				
M6020185	CB A 1.2M D T24F&G	EACH	13.000				
M6021410	MAN A 1.2D T1F CL	EACH	8.000				
M6021610	MAN A 1.5D T1F CL	EACH	15.000				
M6021810	MAN A 1.8D T1F CL	EACH	1.000				
M6022010	MAN A 2.1D T1F CL	EACH	1.000				
M6060070	CONC CURB TB	METER	86.000				
M6060500	COMB CC&G TB15.30	METER	53.000				
M6060700	COMB CC&G TB15.60	METER	2,904.000				
M6063620	CONC MEDIAN SURF 150	SQ M	156.000				

ILLINOIS DEPARTMENT OF TRANSPORTATION
SCHEDULE OF PRICES
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Code - 31 - -
District - 1 - -
Section Number - 2008-001VB

Project Number: ACNHF-HPP-0351/017/
Route: FAP 351

Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
M6370175	CONC BAR 1F 1065HT	METER	367.000				
M6370815	CONC BARRIER BASE	METER	367.000				
M6690100	BACKFILL PLUGS	CU M	30.000				
M6690200	NON SPL WASTE DISPOSL	CU M	5,791.000				
M6690400	SPL WAST GRD WAT DISP	LITER	91,000.000				
M7030100	SHORT-TERM PAVT MKING	METER	431.000				
M7030510	PAVT MARK TAPE T3 L&S	SQ M	20.000				
M7030520	PAVT MARK TAPE T3 100	METER	6,476.000				
M7030540	PAVT MARK TAPE T3 150	METER	246.000				
M7030580	PAVT MARK TAPE T3 600	METER	102.000				
M7030610	TEMP PT PAVT MK L&S	SQ M	10.000				
M7030620	TEMP PT PM LINE 100	METER	3,371.000				
M7030630	TEMP PT PM LINE 150	METER	95.000				
M7030650	TEMP PT PM LINE 600	METER	29.000				
M7031000	WORK ZONE PAVT MK REM	SQ M	379.000				

ILLINOIS DEPARTMENT OF TRANSPORTATION
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Section Number - 2008-001VB

Project Number: ACNHF-HPP-0351/017/
Route: FAP 351

Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
M7040100	TEMP CONC BARRIER	METER	266.000				
M7040200	REL TEMP CONC BARRIER	METER	337.000				
M7200100	SIGN PANEL T1	SQ M	1.000				
M7240310	REMOV SIGN PANEL T1	SQ M	3.000				
M7240320	REMOV SIGN PANEL T2	SQ M	1.000				
M7240710	RELOC SIGN PANEL T1	SQ M	7.000				
M7280100	TELES STL SIN SUPPORT	METER	90.000				
M7802000	POLYUREA PM T1 LTR&SY	SQ M	74.000				
M7802010	POLYUREA PM T1 LN 100	METER	3,863.000				
M7802015	POLYUREA PM T1 LN 150	METER	832.000				
M7802030	POLYUREA PM T1 LN 300	METER	117.000				
M7802060	POLYUREA PM T1 LN 600	METER	96.000				
M7830100	PAVT MARKING REMOVAL	SQ M	704.000				
M8100060	CON T 50 GALVS	METER	667.000				
M8100070	CON T 65 GALVS	METER	35.000				

ILLINOIS DEPARTMENT OF TRANSPORTATION
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State Job # - C-91-171-08
PPS NBR - 1-73912-0100
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Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
M8101050	CON P 50 GALVS	METER	89.000				
M8101090	CON P 100 GALVS	METER	89.000				
M8110160	CON AT ST 50 GALVS	METER	60.000				
M8130130	JBX SS AS 200X150X100	EACH	48.000				
M8130223	JBX SS AS 400X350X150	EACH	8.000				
M8160415	UD 3#2 #4G EPRRHW 40	METER	346.000				
M8170405	EC C EPR RHW 1C 2	METER	204.000				
M8170410	EC C EPR RHW 1C 4	METER	68.000				
M8170415	EC C EPR RHW 1C 6	METER	210.000				
M8170425	EC C EPR RHW 1C 10	METER	2,480.000				
M8170485	EC C EPR RHW 3-1C 10	METER	460.000				
M8170805	EC C EPR USE 3-1C 2	METER	83.000				
M8180120	A CBL 3-1C2 MESS WIRE	METER	2,100.000				
M8190200	TR & BKFIL F ELECT WK	METER	1,217.000				
M8305020	LT P A 14.5MH 2.5MA	EACH	19.000				

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Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
M8307290	LT P WD 15.24 CL 4	EACH	4.000				
M8307300	LP WD 15.24 CL4 4.5MA	EACH	19.000				
M8360100	LIGHT POLE FDN 600	METER	76.000				
M8380095	BKWY DEV TR B 381BC	EACH	19.000				
M8731210	ELCBL C SIGNAL 14 2C	METER	435.000				
M8731220	ELCBL C SIGNAL 14 3C	METER	470.000				
M8731240	ELCBL C SIGNAL 14 5C	METER	297.000				
M8731250	ELCBL C SIGNAL 14 7C	METER	520.000				
M8731300	ELCBL C LEAD 14 1PR	METER	210.000				
M8731810	ELCBL C SERV 6 3C	METER	26.000				
M8750510	TS POST GALVS 4.85	EACH	3.000				
M8770735	STL COMB MAA&P 8.53	EACH	1.000				
M8770745	STL COMB MAA&P 9.75	EACH	1.000				
M8770760	STL COMB MAA&P 11.58	EACH	1.000				
M8770770	STL COMB MAA&P 12.80	EACH	1.000				

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M8780100	CONC FDN TY A	METER	3.600				
M8780150	CONC FDN TY C	METER	1.200				
M8780400	CONC FDN TY E 750D	METER	18.400				
XX005978	GROUND ROD SYST INST	EACH	25.000				
XX006661	UNINTERRUPT POWER SUP	EACH	1.000				
X0320870	BRACED EXCAVATION	CU YD	9,670.900				
X0322061	TEMPORARY JUMP SPAN	L SUM	1.000				
X0322256	TEMP INFO SIGNING	SQ FT	33.000				
X0323236	TEMPORARY INLET	EACH	3.000				
X0323988	TEMP SOIL RETEN SYSTM	SQ FT	3,338.000				
X0324387	LUM SFTY C ASSEMBLY	EACH	23.000				
X0325346	RAILROAD TRACK	TRK FT	7,205.000				
X0325355	RAIL TRACK, REMOVE	TRK FT	8,903.000				
X0325737	TEMP TR SIGNAL TIMING	EACH	1.000				
X0326022	TEMP BRIDGE RAIL	FOOT	72.000				

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Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
X0326023	DUCT-METRA PWR & FBR	FOOT	13,572.000				
X0326024	CATENARY SUPPORT STR	EACH	11.000				
X0326025	CATENARY DEAD END STR	EACH	1.000				
X0326026	CATENARY BRIDGE STR	EACH	1.000				
X0326027	REM EX CATENARY POLE	EACH	2.000				
X0326028	REM EX SIGNAL BRIDGE	EACH	1.000				
X0326029	GRADING & SHAPING SPL	SQ FT	48,646.000				
X0326030	REM NO. 10 TURNOUT	EACH	1.000				
X0326031	RR TRACK SHIFT ASSIST	EACH	25.000				
X0326032	REL TEMP CN TRK NO 1	TRK FT	943.000				
X0326033	GUARD HSE REM & REPL	L SUM	1.000				
X0326034	ELEC CBL-METRA FIBER	FOOT	2,776.000				
X0326035	EC-METRA 4160V POWER	FOOT	6,066.000				
X0326036	EC-METRA 2400V POWER	FOOT	6,066.000				
X0326037	RE-USE DUCT-METRA PWR	FOOT	916.000				

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Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
X0326038	TEMP STRWY ACSS METRA	EACH	2.000				
X0326039	TEMP RAMP ACSS METRA	EACH	6.000				
X0326040	GRAN SURFACE MATERIAL	CU YD	180.000				
X0326041	METRA COND 4 GALV STL	FOOT	100.000				
X0326042	SIG MTRA 19C #14 CBL	FOOT	3,670.000				
X0326043	SIG MTRA-2 5C#6 SGCBL	FOOT	400.000				
X0326044	SIG MTRA-2C #6 TRKCBL	FOOT	600.000				
X0326045	SIG MTRA-3L CLRLT UNT	EACH	2.000				
X0326046	SIG MTRA-5C#9 PWR CBL	FOOT	1,800.000				
X0326047	SIG MTRA-AFO TRNSCVR	EACH	2.000				
X0326048	SIGNALS METRA-BTLEGS	EACH	8.000				
X0326049	SIG METRA-CASEWIRE 10	FOOT	1,350.000				
X0326050	SIG METRA-HTE LOCK CR	EACH	2.000				
X0326051	SIG MTRA-INS BNDSTRND	FOOT	500.000				
X0326052	SIG MTRA-INS JOINT KT	EACH	36.000				

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Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
X0326053	SIG MTRA-JBX SW LOCK	EACH	8.000				
X0326054	SIG MTRA-BTTRY FILTER	EACH	2.000				
X0326055	SIG METRA-EQUALIZER	EACH	8.000				
X0326056	SIG METRA-FUSE 30 AMP	EACH	13.000				
X0326057	SIG METRA-FUSE 40 AMP	EACH	2.000				
X0326058	SIG METRA-FUSE 6 AMP	EACH	2.000				
X0326059	SIG MTRA-LT ARRESTER	EACH	8.000				
X0326060	SIG METRA-NMBR BOARDS	EACH	2.000				
X0326061	SIG METRA-RCTFIER 20A	EACH	3.000				
X0326062	SIG METRA-RCTFIER 40A	EACH	1.000				
X0326063	SIG METRA-RESISTOR 5W	EACH	2.000				
X0326064	SIG METRA-W10 TRNSFMR	EACH	2.000				
X0326065	SIG METRA-RELAY CSE E	EACH	4.000				
X0326066	SIG METRA-SIG CSE FDN	EACH	8.000				
X0326067	SIG METRA-S CT CNTRLR	EACH	2.000				

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Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
X0326068	SIG METRA-TR RLY 5MIN	EACH	2.000				
X0326069	SIG METRA-TRCT RL CNR	EACH	8.000				
X0326070	SIG METRA-VPI RLY 500	EACH	8.000				
X0326071	SIG MTRA-VRLY21-150HD	EACH	1.000				
X0326072	SIG MTRA-VRLY21-250HD	EACH	1.000				
X0326073	SIG MTRA-VRFN27 FLSHR	EACH	1.000				
X0326074	SIG MTRA-VRM15S1588TR	EACH	1.000				
X0326075	SIG MTRA-VRM15S1989TR	EACH	1.000				
X0326076	SIG MTRA-VROA670 4FBR	EACH	5.000				
X0326077	SIG MTRA-VRSA 400 RLY	EACH	1.000				
X0326078	SIG MTRA-VRS13 PT RLY	EACH	1.000				
X0326079	TMP RM WWYSYS016-2755	L SUM	1.000				
X0326080	TMP RM WWYSYS016-2819	L SUM	1.000				
X0326081	TMP RM WWYSYS016-2822	L SUM	1.000				
X0326082	BR DECK TIE SPPRT SYS	L SUM	1.000				

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Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
X0326083	TVLSLV/V150VV1.2T1FCL	EACH	2.000				
X0326084	TVLSLV/V200VV1.2T1FCL	EACH	2.000				
X0326085	TVLSLV/V750VV2.1T1FCL	EACH	2.000				
X0326086	TVLSLV/V300VV1.2T1FCL	EACH	2.000				
X0326087	WATER SERV CONN 25MM	EACH	10.000				
X0326088	TEMP BALLAST RET SYS	FOOT	460.000				
X0712400	TEMP PAVEMENT	SQ YD	349.000				
X5121800	PERM STEEL SHT PILING	SQ FT	8,350.000				
X6700410	ENGR FLD OFF A SPL	CAL MO	38.000				
X8050015	SERV INSTALL POLE MT	EACH	1.000				
X8250085	LTG CONTR DUP CONS TY	EACH	2.000				
X8410118	MAINT TEMP LIGHT SYS	L SUM	1.000				
X8950080	REMOV EX LIGHTNG CONT	EACH	1.000				
Z0002400	BALLAST	TON	11,750.000				
Z0013798	CONSTRUCTION LAYOUT	L SUM	1.000				

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Item Number	Pay Item Description	Unit of Measure	Quantity	x	Unit Price	=	Total Price
Z0018500	DRAINAGE STR CLEANED	EACH	4.000				
Z0030020	IMP ATTEN FRD NAR TL2	EACH	2.000				
Z0030240	IMP ATTN TEMP NRD TL2	EACH	8.000				
Z0030340	IMP ATTN REL NRD TL2	EACH	6.000				
Z0048665	RR PROT LIABILITY INS	L SUM	1.000				
Z0069800	SUB-BALLAST	TON	4,545.000				
Z0076600	TRAINEES	HOUR	7,500.000		0.800		6,000.000
20101200	TREE ROOT PRUNING	EACH	1.000				
20200100	EARTH EXCAVATION	CU YD	3,128.000				
20201200	REM & DISP UNS MATL	CU YD	2,332.000				
20700220	POROUS GRAN EMBANK	CU YD	9,120.000				
20700400	POROUS GRAN EMB SPEC	CU YD	69.000				
20800150	TRENCH BACKFILL	CU YD	149.100				
21101615	TOPSOIL F & P 4	SQ YD	660.000				
25000310	SEEDING CL 4	ACRE	0.200				

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25000400	NITROGEN FERT NUTR	POUND	18.000				
25000500	PHOSPHORUS FERT NUTR	POUND	18.000				
25000600	POTASSIUM FERT NUTR	POUND	18.000				
25100630	EROSION CONTR BLANKET	SQ YD	660.000				
28000400	PERIMETER EROS BAR	FOOT	3,835.000				
28000500	INLET & PIPE PROTECT	EACH	2.000				
28000510	INLET FILTERS	EACH	48.000				
31101200	SUB GRAN MAT B 4	SQ YD	2,400.000				
35501300	HMA BASE CSE 4	SQ YD	2,400.000				
40201000	AGGREGATE-TEMP ACCESS	TON	158.000				
40603080	HMA BC IL-19.0 N50	TON	537.000				
40603310	HMA SC "C" N50	TON	269.000				
42001165	BR APPR PAVT	SQ YD	991.000				
42001700	FURNISH PROFILOGRAPH	L SUM	1.000				
44000100	PAVEMENT REM	SQ YD	2,986.000				

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44000500	COMB CURB GUTTER REM	FOOT	257.000				
50100300	REM EXIST STRUCT N1	EACH	1.000				
50100400	REM EXIST STRUCT N2	EACH	1.000				
50200100	STRUCTURE EXCAVATION	CU YD	10,408.400				
50300225	CONC STRUCT	CU YD	6,384.100				
50300255	CONC SUP-STR	CU YD	1,066.000				
50300260	BR DECK GROOVING	SQ YD	1,533.000				
50300300	PROTECTIVE COAT	SQ YD	1,683.000				
50400805	F & E P P CON I-BM 36	FOOT	2,120.100				
50500105	F & E STRUCT STEEL	L SUM	1.000				
50800105	REINFORCEMENT BARS	POUND	133,190.000				
50800205	REINF BARS, EPOXY CTD	POUND	1,591,870.000				
50800515	BAR SPLICERS	EACH	1,491.000				
50901720	BICYCLE RAILING	FOOT	1,280.000				
50901750	PARAPET RAILING	FOOT	330.000				

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50901765	PIPE HANDRAIL SPL	FOOT	928.000				
51500100	NAME PLATES	EACH	5.000				
51603000	DRILLED SHAFT IN SOIL	CU YD	2,739.000				
51604000	DRILLED SHAFT IN ROCK	CU YD	314.200				
52100010	ELAST BEARING ASSY T1	EACH	44.000				
52100520	ANCHOR BOLTS 1	EACH	96.000				
52100530	ANCHOR BOLTS 1 1/4	EACH	472.000				
55019500	SS 1 RCP CL 4 12	FOOT	645.000				
56400100	FIRE HYDNTS TO BE MVD	EACH	3.000				
56400820	FIRE HYD W/AUX V & VB	EACH	2.000				
56500600	DOM WAT SER BOX ADJ	EACH	5.000				
58000110	MEMBRANE WATERPRF SPL	SQ FT	19,736.500				
58700300	CONCRETE SEALER	SQ FT	2,141.000				
59100100	GEOCOMPOSITE WALL DR	SQ YD	2,776.200				
60109580	P UNDR FOR STRUCT 4	FOOT	565.000				

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60109582	P UNDR FOR STRUCT 6	FOOT	2,831.000				
60206905	CB TC T1F OL	EACH	5.000				
60207605	CB TC T8G	EACH	1.000				
60208240	CB TC T24F&G	EACH	35.000				
60218300	MAN TA 4 DIA T1F OL	EACH	2.000				
60218400	MAN TA 4 DIA T1F CL	EACH	2.000				
60250200	CB ADJUST	EACH	2.000				
60255500	MAN ADJUST	EACH	17.000				
60260100	INLETS ADJUST	EACH	3.000				
60265700	VV ADJUST	EACH	8.000				
60500040	REMOV MANHOLES	EACH	19.000				
60500050	REMOV CATCH BAS	EACH	17.000				
60500060	REMOV INLETS	EACH	19.000				
60500105	FILL MANHOLES	EACH	6.000				
60500205	FILL CATCH BAS	EACH	3.000				

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60604400	COMB CC&G TB6.18	FOOT	197.000				
66400570	CH LK FENCE 8 SPL	FOOT	140.000				
66410300	CH LK FENCE REMOV	FOOT	130.000				
66900200	NON SPL WASTE DISPOSL	CU YD	14,771.000				
66900450	SPL WASTE PLNS/REPORT	L SUM	1.000				
66900530	SOIL DISPOSAL ANALY	EACH	8.000				
67100100	MOBILIZATION	L SUM	1.000				
70101800	TRAF CONT & PROT SPL	L SUM	1.000				
70102550	TR CONT-PROT TEMP DET	EACH	1.000				
70103815	TR CONT SURVEILLANCE	CAL DA	1,280.000				
70106800	CHANGEABLE MESSAGE SN	CAL MO	68.000				
70300625	TEMP PT PVT M LINE 4	FOOT	405.000				
70400100	TEMP CONC BARRIER	FOOT	880.000				
70400200	REL TEMP CONC BARRIER	FOOT	831.000				
72400200	REMOV SIN PAN ASSY TB	EACH	1.000				

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72400500	RELOC SIN PAN ASSY TA	EACH	1.000				
72400600	RELOC SIN PAN ASSY TB	EACH	2.000				
78100100	RAISED REFL PAVT MKR	EACH	299.000				
80400100	ELECT SERV INSTALL	EACH	2.000				
80400200	ELECT UTIL SERV CONN	L SUM	1.000		10,000.000		10,000.000
81000600	CON T 2 GALVS	FOOT	2,457.000				
81001000	CON T 4 GALVS	FOOT	959.000				
81100600	CON AT ST 2 GALVS	FOOT	392.000				
81101000	CON AT ST 4 GALVS	FOOT	256.000				
81400100	HANDHOLE	EACH	12.000				
81400200	HD HANDHOLE	EACH	2.000				
81400300	DBL HANDHOLE	EACH	1.000				
82102310	LUM SV HOR MT 310W	EACH	23.000				
82102400	LUM SV HOR MT 400W	EACH	19.000				
82107100	UNDERPAS LUM 70W HPS	EACH	48.000				

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84100110	REM TEMP LIGHT UNITS	EACH	4.000				
84200500	REM EX LT UNIT SALV	EACH	30.000				
85000200	MAIN EX TR SIG INSTAL	EACH	1.000				
85700200	FAC T4 CAB	EACH	1.000				
86400100	TRANSCEIVER - FIB OPT	EACH	1.000				
88030020	SH LED 1F 3S MAM	EACH	4.000				
88030100	SH LED 1F 5S BM	EACH	4.000				
88030110	SH LED 1F 5S MAM	EACH	4.000				
88102710	PED SH LED 1F BM	EACH	6.000				
88102740	PED SH LED 2F BM	EACH	1.000				
88200100	TS BACKPLATE	EACH	8.000				
88500100	INDUCTIVE LOOP DETECT	EACH	9.000				
88700200	LIGHT DETECTOR	EACH	2.000				
88700300	LIGHT DETECTOR AMP	EACH	1.000				
88800100	PED PUSH-BUTTON	EACH	7.000				

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89000100	TEMP TR SIG INSTALL	EACH	1.000				
89502375	REMOV EX TS EQUIP	EACH	1.000				
89502380	REMOV EX HANDHOLE	EACH	5.000				
89502385	REMOV EX CONC FDN	EACH	8.000				

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THIS IS THE TOTAL BID **$** _____

NOTES:

1. **Each PAY ITEM should have a UNIT PRICE and a TOTAL PRICE.**
2. **The UNIT PRICE shall govern if no TOTAL PRICE is shown or if there is a discrepancy between the product of the UNIT PRICE multiplied by the QUANTITY.**
3. **If a UNIT PRICE is omitted, the TOTAL PRICE will be divided by the QUANTITY in order to establish a UNIT PRICE.**
4. **A bid may be declared UNACCEPTABLE if neither a unit price nor a total price is shown.**

RETURN WITH BID

STATE REQUIRED ETHICAL STANDARDS GOVERNING CONTRACT PROCUREMENT: ASSURANCES, CERTIFICATIONS AND DISCLOSURES

I. GENERAL

A. Article 50 of the Illinois Procurement Code establishes the duty of all State chief procurement officers, State purchasing officers, and their designees to maximize the value of the expenditure of public moneys in procuring goods, services, and contracts for the State of Illinois and to act in a manner that maintains the integrity and public trust of State government. In discharging this duty, they are charged by law to use all available information, reasonable efforts, and reasonable actions to protect, safeguard, and maintain the procurement process of the State of Illinois.

B. In order to comply with the provisions of Article 50 and to carry out the duty established therein, all bidders are to adhere to ethical standards established for the procurement process, and to make such assurances, disclosures and certifications required by law. By execution of the Proposal Signature Sheet, the bidder indicates that each of the mandated assurances has been read and understood, that each certification is made and understood, and that each disclosure requirement has been understood and completed.

C. In addition to all other remedies provided by law, failure to comply with any assurance, failure to make any disclosure or the making of a false certification shall be grounds for termination of the contract and the suspension or debarment of the bidder.

II. ASSURANCES

A. The assurances hereinafter made by the bidder are each a material representation of fact upon which reliance is placed should the Department enter into the contract with the bidder. The Department may terminate the contract if it is later determined that the bidder rendered a false or erroneous assurance, and the surety providing the performance bond shall be responsible for the completion of the contract.

B. Felons

1. The Illinois Procurement Code provides:

Section 50-10. Felons. Unless otherwise provided, no person or business convicted of a felony shall do business with the State of Illinois or any state agency from the date of conviction until 5 years after the date of completion of the sentence for that felony, unless no person held responsible by a prosecutorial office for the facts upon which the conviction was based continues to have any involvement with the business.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-10.

C. Conflicts of Interest

1. The Illinois Procurement Code provides in pertinent part:

Section 50-13. Conflicts of Interest.

(a) Prohibition. It is unlawful for any person holding an elective office in this State, holding a seat in the General Assembly, or appointed to or employed in any of the offices or agencies of state government and who receives compensation for such employment in excess of 60% of the salary of the Governor of the State of Illinois, or who is an officer or employee of the Capital Development Board or the Illinois Toll Highway Authority, or who is the spouse or minor child of any such person to have or acquire any contract, or any direct pecuniary interest in any contract therein, whether for stationery, printing, paper, or any services, materials, or supplies, that will be wholly or partially satisfied by the payment of funds appropriated by the General Assembly of the State of Illinois or in any contract of the Capital Development Board or the Illinois Toll Highway authority.

(b) Interests. It is unlawful for any firm, partnership, association or corporation, in which any person listed in subsection (a) is entitled to receive (i) more than 7 1/2% of the total distributable income or (ii) an amount in excess of the salary of the Governor, to have or acquire any such contract or direct pecuniary interest therein.

(c) Combined interests. It is unlawful for any firm, partnership, association, or corporation, in which any person listed in subsection (a) together with his or her spouse or minor children is entitled to receive (i) more than 15%, in the aggregate, of the total distributable income or (ii) an amount in excess of 2 times the salary of the Governor, to have or acquire any such contract or direct pecuniary interest therein.

(d) Securities. Nothing in this Section invalidates the provisions of any bond or other security previously offered or to be offered for sale or sold by or for the State of Illinois.

(e) Prior interests. This Section does not affect the validity of any contract made between the State and an officer or employee of the State or member of the General Assembly, his or her spouse, minor child or any combination of those persons if that contract was in existence before his or her election or employment as an officer, member, or employee. The contract is voidable, however, if it cannot be completed within 365 days after the officer, member, or employee takes office or is employed.

The current salary of the Governor is $171,000.00. Sixty percent of the salary is $102,600.00.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-13, or that an effective exemption has been issued by the Board of Ethics to any individual subject to the Section 50-13 prohibitions pursuant to the provisions of Section 50-20 of the Code and Executive Order Number 3 (1998). Information concerning the exemption process is available from the Department upon request.

D. Negotiations

1. The Illinois Procurement Code provides in pertinent part:

Section 50-15. Negotiations.

(a) It is unlawful for any person employed in or on a continual contractual relationship with any of the offices or agencies of State government to participate in contract negotiations on behalf of that office or agency with any firm, partnership, association, or corporation with whom that person has a contract for future employment or is negotiating concerning possible future employment.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-15, and that the bidder has no knowledge of any facts relevant to the kinds of acts prohibited therein.

E. Inducements

1. The Illinois Procurement Code provides:

Section 50-25. Inducement. Any person who offers or pays any money or other valuable thing to any person to induce him or her not to bid for a State contract or as recompense for not having bid on a State contract is guilty of a Class 4 felony. Any person who accepts any money or other valuable thing for not bidding for a State contract or who withholds a bid in consideration of the promise for the payment of money or other valuable thing is guilty of a Class 4 felony.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-25, and that the bidder has no knowledge of any facts relevant to the kinds of acts prohibited therein.

F. Revolving Door Prohibition

1. The Illinois Procurement Code provides:

Section 50-30. Revolving door prohibition. Chief procurement officers, associate procurement officers, State purchasing officers, their designees whose principal duties are directly related to State procurement, and executive officers confirmed by the Senate are expressly prohibited for a period of 2 years after terminating an affected position from engaging in any procurement activity relating to the State agency most recently employing them in an affected position for a period of at least 6 months. The prohibition includes, but is not limited to: lobbying the procurement process; specifying; bidding; proposing bid, proposal, or contract documents; on their own behalf or on behalf of any firm, partnership, association, or corporation. This Section applies only to persons who terminate an affected position on or after January 15, 1999.

2. The bidder assures the Department that the award and execution of the contract would not cause a violation of Section 50-30, and that the bidder has no knowledge of any facts relevant to the kinds of acts prohibited therein.

G. Reporting Anticompetitive Practices

1. The Illinois Procurement Code provides:

Section 50-40. Reporting anticompetitive practices. When, for any reason, any vendor, bidder, contractor, chief procurement officer, State purchasing officer, designee, elected official, or State employee suspects collusion or other anticompetitive practice among any bidders, offerors, contractors, proposers, or employees of the State, a notice of the relevant facts shall be transmitted to the Attorney General and the chief procurement officer.

2. The bidder assures the Department that it has not failed to report any relevant facts concerning the practices addressed in Section 50-40 which may involve the contract for which the bid is submitted.

H. Confidentiality

1. The Illinois Procurement Code provides:

Section 50-45. Confidentiality. Any chief procurement officer, State purchasing officer, designee, or executive officer who willfully uses or allows the use of specifications, competitive bid documents, proprietary competitive information, proposals, contracts, or selection information to compromise the fairness or integrity of the procurement, bidding, or contract process shall be subject to immediate dismissal, regardless of the Personnel code, any contract, or any collective bargaining agreement, and may in addition be subject to criminal prosecution.

2. The bidder assures the Department that it has no knowledge of any fact relevant to the practices addressed in Section 50-45 which may involve the contract for which the bid is submitted.

RETURN WITH BID

I. Insider Information

1. The Illinois Procurement Act provides:

Section 50-50. Insider information. It is unlawful for any current or former elected or appointed State official or State employee to knowingly use confidential information available only by virtue of that office or employment for actual or anticipated gain for themselves or another person.

2. The bidder assures the Department that it has no knowledge of any facts relevant to the practices addressed in Section 50-50 which may involve the contract for which the bid is submitted.

III. CERTIFICATIONS

A. The certifications hereinafter made by the bidder are each a material representation of fact upon which reliance is placed should the Department enter into the contract with the bidder. The Department may terminate the contract if it is later determined that the bidder rendered a false or erroneous certification, and the surety providing the performance bond shall be responsible for completion of the contract.

B. Bribery

1. The Illinois Procurement Code provides:

Section 50-5. Bribery.

(a) Prohibition. No person or business shall be awarded a contract or subcontract under this Code who:

(1) has been convicted under the laws of Illinois or any other state of bribery or attempting to bribe an officer or employee of the State of Illinois or any other state in that officer's or employee's official capacity; or

(2) has made an admission of guilt of that conduct that is a matter of record but has not been prosecuted for that conduct.

(b) Businesses. No business shall be barred from contracting with any unit of State or local government as a result of a conviction under this Section of any employee or agent of the business if the employee or agent is no longer employed by the business and:

(1) the business has been finally adjudicated not guilty; or

(2) the business demonstrates to the governmental entity with which it seeks to contract, and that entity finds that the commission of the offense was not authorized, requested, commanded, or performed by a director, officer, or high managerial agent on behalf of the business as provided in paragraph (2) of subsection (a) of Section 5-4 of the Criminal Code of 1961.

(c) Conduct on behalf of business. For purposes of this Section, when an official, agent, or employee of a business committed the bribery or attempted bribery on behalf of the business and in accordance with the direction or authorization of a responsible official of the business, the business shall be chargeable with the conduct.

(d) Certification. Every bid submitted to and contract executed by the State shall contain a certification by the contractor that the contractor is not barred from being awarded a contract or subcontract under this Section. A contractor who makes a false statement, material to the certification, commits a Class 3 felony.

2. The bidder certifies that it is not barred from being awarded a contract under Section 50.5.

C. Educational Loan

1. Section 3 of the Educational Loan Default Act provides:

§ 3. No State agency shall contract with an individual for goods or services if that individual is in default, as defined in Section 2 of this Act, on an educational loan. Any contract used by any State agency shall include a statement certifying that the individual is not in default on an educational loan as provided in this Section.

2. The bidder, if an individual as opposed to a corporation, partnership or other form of business organization, certifies that the bidder is not in default on an educational loan as provided in Section 3 of the Act.

D. Bid-Rigging/Bid Rotating

1. Section 33E-11 of the Criminal Code of 1961 provides:

§ 33E-11. (a) Every bid submitted to and public contract executed pursuant to such bid by the State or a unit of local government shall contain a certification by the prime contractor that the prime contractor is not barred from contracting with any unit of State or local government as a result of a violation of either Section 33E-3 or 33E-4 of this Article. The State and units of local government shall provide the appropriate forms for such certification.

(b) A contractor who makes a false statement, material to the certification, commits a Class 3 felony.

A violation of Section 33E-3 would be represented by a conviction of the crime of bid-rigging which, in addition to Class 3 felony sentencing, provides that any person convicted of this offense or any similar offense of any state or the United States which contains the same elements as this offense shall be barred for 5 years from the date of conviction from contracting with any unit of State or local government. No corporation shall be barred from contracting with any unit of State or local government as a result of a conviction under this Section of any employee or agent of such corporation if the employee so convicted is no longer employed by the corporation and: (1) it has been finally adjudicated not guilty or (2) if it demonstrates to the governmental entity with which it seeks to contract and that entity finds that the commission of the offense was neither authorized, requested, commanded, nor performed by a director, officer or a high managerial agent in behalf of the corporation.

A violation of Section 33E-4 would be represented by a conviction of the crime of bid-rotating which, in addition to Class 2 felony sentencing, provides that any person convicted of this offense or any similar offense of any state or the United States which contains the same elements as this offense shall be permanently barred from contracting with any unit of State or local government. No corporation shall be barred from contracting with any unit of State or local government as a result of a conviction under this Section of any employee or agent of such corporation if the employee so convicted is no longer employed by the corporation and: (1) it has been finally adjudicated not guilty or (2) if it demonstrates to the governmental entity with which it seeks to contract and that entity finds that the commission of the offense was neither authorized, requested, commanded, nor performed by a director, officer or a high managerial agent in behalf of the corporation.

2. The bidder certifies that it is not barred from contracting with the Department by reason of a violation of either Section 33E-3 or Section 33E-4.

E. International Anti-Boycott

1. Section 5 of the International Anti-Boycott Certification Act provides:

§ 5. State contracts. Every contract entered into by the State of Illinois for the manufacture, furnishing, or purchasing of supplies, material, or equipment or for the furnishing of work, labor, or services, in an amount exceeding the threshold for small purchases according to the purchasing laws of this State or $10,000.00, whichever is less, shall contain certification, as a material condition of the contract, by which the contractor agrees that neither the contractor nor any substantially-owned affiliated company is participating or shall participate in an international boycott in violation of the provisions of the U.S. Export Administration Act of 1979 or the regulations of the U.S. Department of Commerce promulgated under that Act.

2. The bidder makes the certification set forth in Section 5 of the Act.

F. Drug Free Workplace

1. The Illinois “Drug Free Workplace Act” applies to this contract and it is necessary to comply with the provisions of the “Act” if the contractor is a corporation, partnership, or other entity (including a sole proprietorship) which has 25 or more employees.

2. The bidder certifies that if awarded a contract in excess of $5,000 it will provide a drug free workplace by:

(a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensation, possession or use of a controlled substance, including cannabis, is prohibited in the contractor’s workplace; specifying the actions that will be taken against employees for violations of such prohibition; and notifying the employee that, as a condition of employment on such contract, the employee shall abide by the terms of the statement, and notify the employer of any criminal drug statute conviction for a violation occurring in the workplace no later than five (5) days after such conviction.

(b) Establishing a drug free awareness program to inform employees about the dangers of drug abuse in the workplace; the contractor’s policy of maintaining a drug free workplace; any available drug counseling, rehabilitation, and employee assistance programs; and the penalties that may be imposed upon employees for drug violations.

(c) Providing a copy of the statement required by subparagraph (1) to each employee engaged in the performance of the contract and to post the statement in a prominent place in the workplace.

(d) Notifying the Department within ten (10) days after receiving notice from an employee or otherwise receiving actual notice of the conviction of an employee for a violation of any criminal drug statute occurring in the workplace.

(e) Imposing or requiring, within 30 days after receiving notice from an employee of a conviction or actual notice of such a conviction, an appropriate personnel action, up to and including termination, or the satisfactory participation in a drug abuse assistance or rehabilitation program approved by a federal, state or local health, law enforcement or other appropriate agency.

(f) Assisting employees in selecting a course of action in the event drug counseling, treatment, and rehabilitation is required and indicating that a trained referral team is in place.

(g) Making a good faith effort to continue to maintain a drug free workplace through implementation of the actions and efforts stated in this certification.

G. Debt Delinquency

1. The Illinois Procurement Code provides:

Section 50-11 and 50-12. Debt Delinquency.

The contractor or bidder certifies that it, or any affiliate, is not barred from being awarded a contract under 30 ILCS 500. Section 50-11 prohibits a person from entering into a contract with a State agency if it knows or should know that it, or any affiliate, is delinquent in the payment of any debt to the State as defined by the Debt Collection Board. Section 50-12 prohibits a person from entering into a contract with a State agency if it, or any affiliate, has failed to collect and remit Illinois Use Tax on all sales of tangible personal property into the State of Illinois in accordance with the provisions of the Illinois Use Tax Act. The contractor further acknowledges that the contracting State agency may declare the contract void if this certification is false or if the contractor, or any affiliate, is determined to be delinquent in the payment of any debt to the State during the term of the contract.

H. Sarbanes-Oxley Act of 2002

1. The Illinois Procurement Code, Section 50-60(c), provides:

The contractor certifies in accordance with 30 ILCS 500/50-10.5 that no officer, director, partner or other managerial agent of the contracting business has been convicted of a felony under the Sarbanes-Oxley Act of 2002 or a Class 3 or Class 2 felony under the Illinois Securities Law of 1953 for a period of five years prior to the date of the bid or contract. The contractor acknowledges that the contracting agency shall declare the contract void if this certification is false.

I. Addenda

The contractor or bidder certifies that all relevant addenda have been incorporated in to this contract. Failure to do so may cause the bid to be declared unacceptable.

J. Section 42 of the Environmental Protection Act

The contractor certifies in accordance with 30 ILCS 500/50-12 that the bidder or contractor is not barred from being awarded a contract under this Section which prohibits the bidding on or entering into contracts with the State of Illinois or a State agency by a person or business found by a court or the Pollution Control Board to have committed a willful or knowing violation of Section 42 of the Environmental Protection Act for a period of five years from the date of the order. The contractor acknowledges that the contracting agency may declare the contract void if this certification is false.

K. Apprenticeship and Training Certification (Does not apply to federal aid projects)

In accordance with the provisions of Section 30-22 (6) of the Illinois Procurement Code, the bidder certifies that it is a participant, either as an individual or as part of a group program, in the approved apprenticeship and training programs applicable to each type of work or craft that the bidder will perform with its own forces. The bidder further certifies for work that will be performed by subcontract that each of its subcontractors submitted for approval either (a) is, at the time of such bid, participating in an approved, applicable apprenticeship and training program; or (b) will, prior to commencement of performance of work pursuant to this contract, begin participation in an approved apprenticeship and training program applicable to the work of the subcontract. The Department, at any time before or after award, may require the production of a copy of each applicable Certificate of Registration issued by the United States Department of Labor evidencing such participation by the contractor and any or all of its subcontractors. Applicable apprenticeship and training programs are those that have been approved and registered with the United States Department of Labor. The bidder shall list in the space below, the official name of the program sponsor holding the Certificate of Registration for all of the types of work or crafts in which the bidder is a participant and that will be performed with the bidder's forces. Types of work or craft work that will be subcontracted shall be included and listed as subcontract work. The list shall also indicate any type of work or craft job category that does not have an applicable apprenticeship or training program. **The bidder is responsible for making a complete report and shall make certain that each type of work or craft job category that will be utilized on the project as reported on the Construction Employee Workforce Projection (Form BC-1256) and returned with the bid is accounted for and listed.**

NA - FEDERAL

The requirements of this certification and disclosure are a material part of the contract, and the contractor shall require this certification provision to be included in all approved subcontracts. In order to fulfill this requirement, it shall not be necessary that an applicable program sponsor be currently taking or that it will take applications for apprenticeship, training or employment during the performance of the work of this contract.

L. Executive Order Number 1 (2007) Regarding Lobbying on Government Procurements

The bidder hereby warrants and certifies that they have complied and will comply with the requirements set forth in this Order. The requirements of this warrant and certification are a material part of the contract, and the contractor shall require this warrant and certification provision to be included in all approved subcontracts.

M. Disclosure of Business Operations in Iran

Public Act 95-0616 provides that each bid, offer, or proposal submitted for a State contract shall include a disclosure of whether or not the Company acting as the bidder, offer or, or proposing entity, or any of its corporate parents or subsidiaries, within the 24 months before submission of the bid, offer, or proposal had business operations that involved contracts with or provision of supplies or services to the Government of Iran, companies in which the Government of Iran has any direct or indirect equity share, consortiums or projects commissioned by the Government of Iran, or companies involved in consortiums or projects commissioned by the Government of Iran and either of the following conditions apply:

(1) More than 10% of the Company's revenues produced in or assets located in Iran involve oil-related activities or mineral-extraction activities; less than 75% of the Company's revenues produced in or assets located in Iran involve contracts with or provision of oil-related or mineral-extraction products or services to the Government of Iran or a project or consortium created exclusively by that government; and the Company has failed to take substantial action.

(2) The Company has, on or after August 5, 1996, made an investment of $20 million or more, or any combination of investments of at least $10 million each that in the aggregate equals or exceeds $20 million in any 12-month period, which directly or significantly contributes to the enhancement of Iran's ability to develop petroleum resources of Iran.

The terms “Business operations”, “Company”, “Mineral-extraction activities”, “Oil-related activities”, “Petroleum resources”, and “Substantial action” are all defined in the Act.

Failure to make the disclosure required by the Act shall cause the bid, offer or proposal to be considered not responsive. The disclosure will be considered when evaluating the bid, offer, or proposal or awarding the contract. The name of each Company disclosed as doing business or having done business in Iran will be provided to the State Comptroller.

Check the appropriate statement:

/___/ Company has no business operations in Iran to disclose.

/___/ Company has business operations in Iran as disclosed the attached document.

NOTICE

PA 95-0635 SUBSTANCE ABUSE PREVENTION PROGRAM (SAPP)
Effective January 1, 2008

This Public Act requires that all contractors and subcontractors have a SAPP, meeting certain requirements, in place before starting work.

The as read low bidder is required to submit a correctly completed SAPP Certification Form BC 261 within seven (7) working days after the Letting. The Department will not accept a SAPP that does not meet the seven day submittal requirement and the bid will be declared not responsive. In the event the bid is declared not responsive due to failure to comply the Department may elect to cause the forfeiture of the penal sum of the bidder's proposal guaranty, may deny authorization to bid the project if re-advertised for bids and may not allow the bidder to participate on subsequent Lettings.

Submittal and approval of the bidder's SAPP is a condition of award.

The SAPP is to be submitted to the Bureau of Design & Environment, Contracts Office, Room 326, 2300 South Dirksen Parkway, Springfield, IL 62764. Voice 217-782-7806. Fax 217-785-1141. It is the bidder's responsibility to obtain confirmation of delivery.

The requirements of this Public Act are a material part of the contract, and the contractor shall require this provision to be included in all approved subcontracts. The contractor shall submit the correctly completed SAPP Certification Form BC 261 for each subcontractor with the Request for Approval of Subcontractor Form BC 260A.

TO BE RETURNED WITH BID

IV. DISCLOSURES

A. The disclosures hereinafter made by the bidder are each a material representation of fact upon which reliance is placed should the Department enter into the contract with the bidder. The Department may terminate the contract if it is later determined that the bidder rendered a false or erroneous disclosure, and the surety providing the performance bond shall be responsible for completion of the contract.

B. Financial Interests and Conflicts of Interest

1. Section 50-35 of the Illinois Procurement Code provides that all bids of more than $10,000 shall be accompanied by disclosure of the financial interests of the bidder. This disclosed information for the successful bidder, will be maintained as public information subject to release by request pursuant to the Freedom of Information Act.

The financial interests to be disclosed shall include ownership or distributive income share that is in excess of 5%, or an amount greater than 60% of the annual salary of the Governor, of the bidding entity or its parent entity, whichever is less, unless the contractor or bidder is a publicly traded entity subject to Federal 10K reporting, in which case it may submit its 10K disclosure in place of the prescribed disclosure. If a bidder is a privately held entity that is exempt from Federal 10K reporting, but has more than 400 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any person or entity holding any ownership share that is in excess of 5%. The disclosure shall include the names, addresses, and dollar or proportionate share of ownership of each person making the disclosure, their instrument of ownership or beneficial relationship, and notice of any potential conflict of interest resulting from the current ownership or beneficial interest of each person making the disclosure having any of the relationships identified in Section 50-35 and on the disclosure form.

In addition, all disclosures shall indicate any other current or pending contracts, proposals, leases, or other ongoing procurement relationships the bidding entity has with any other unit of state government and shall clearly identify the unit and the contract, proposal, lease, or other relationship.

2. Disclosure Forms. Disclosure Form A is attached for use concerning the individuals meeting the above ownership or distributive share requirements. Subject individuals should be covered each by one form. In addition, a second form (Disclosure Form B) provides for the disclosure of current or pending procurement relationships with other (non-IDOT) state agencies. **The forms must be included with each bid or incorporated by reference.**

C. Disclosure Form Instructions

Form A: For bidders that have previously submitted the information requested in Form A

The Department has retained the Form A disclosures submitted by all bidders responding to these requirements for the April 24, 1998 or any subsequent letting conducted by the Department. The bidder has the option of submitting the information again or the bidder may check the following certification statement indicating that the information previously submitted by the bidder is, as of the date of submission, current and accurate. Before checking this certification, the bidder should carefully review its prior submissions to ensure the Certification is correct. If the Bidder checks the Certification, the Bidder should proceed to Form B instructions.

CERTIFICATION STATEMENT

I have determined that the Form A disclosure information previously submitted is current and accurate, and all forms are hereby incorporated by reference in this bid. Any necessary additional forms or amendments to previously submitted forms are attached to this bid.

_____
(Bidding Company)

☐ _____ _____
Signature of Authorized Representative Date

Form A: For bidders who have NOT previously submitted the information requested in Form A

If the bidder is a publicly traded entity subject to Federal 10K reporting, the 10K Report may be submitted to meet the requirements of Form A. If a bidder is a privately held entity that is exempt from Federal 10K reporting, but has more than 400 shareholders, it may submit the information that Federal 10K companies are required to report, and list the names of any person or entity holding any ownership share that is in excess of 5%. If a bidder is not subject to Federal 10K reporting, the bidder must determine if any individuals are required by law to complete a financial disclosure form. To do this, the bidder should answer each of the following questions. A "YES" answer indicates Form A must be completed. If the answer to each of the following questions is "NO", then the NOT APPLICABLE STATEMENT on the second page of Form A must be signed and dated by a person that is authorized to execute contracts for the bidding company. Note: These questions are for assistance only and are not required to be completed.

1. Does anyone in your organization have a direct or beneficial ownership share of greater than 5% of the bidding entity or parent entity? YES ___ NO___
2. Does anyone in your organization have a direct or beneficial ownership share of less than 5%, but which has a value greater than $102,600.00? YES ___ NO___
3. Does anyone in your organization receive more than $102,600.00 of the bidding entity's or parent entity's distributive income? (Note: Distributive income is, for these purposes, any type of distribution of profits. An annual salary is not distributive income.) YES ___ NO __
4. Does anyone in your organization receive greater than 5% of the bidding entity's or parent entity's total distributive income, but which is less than $102,600.00? YES ___ NO __

   (Note: Only one set of forms needs to be completed per person per bid even if a specific individual would require a yes answer to more than one question.)

A "YES" answer to any of these questions requires the completion of Form A. The bidder must determine each individual in the bidding entity or the bidding entity's parent company that would cause the questions to be answered "Yes". Each form must be signed and dated by a person that is authorized to execute contracts for your organization. **Photocopied or stamped signatures are not acceptable**. The person signing can be, but does not have to be, the person for which the form is being completed. The bidder is responsible for the accuracy of any information provided.

If the answer to each of the above questions is "NO", then the NOT APPLICABLE STATEMENT on page 2 of Form A must be signed and dated by a person that is authorized to execute contracts for your company.

Form B: Identifying Other Contracts & Procurement Related Information Disclosure Form B must be completed for each bid submitted by the bidding entity. *Note: Checking the NOT APPLICABLE STATEMENT on Form A does not allow the bidder to ignore Form B. Form B must be completed, checked, and dated or the bidder may be considered nonresponsive and the bid will not be accepted.*

The Bidder shall identify, by checking Yes or No on Form B, whether it has any pending contracts (including leases), bids, proposals, or other ongoing procurement relationship with any other (non-IDOT) State of Illinois agency. If "No" is checked, the bidder only needs to complete the check box on the bottom of Form B. If "Yes" is checked, the bidder must do one of the following:

Option I: If the bidder did not submit an Affidavit of Availability to obtain authorization to bid, the bidder must list all non-IDOT State of Illinois agency pending contracts, leases, bids, proposals, and other ongoing procurement relationships. These items may be listed on Form B or on an attached sheet(s). Do not include IDOT contracts. Contracts with cities, counties, villages, etc. are not considered State of Illinois agency contracts and are not to be included. Contracts with other State of Illinois agencies such as the Department of Natural Resources or the Capital Development Board must be included. Bidders who submit Affidavits of Availability are suggested to use Option II.

Option II: If the bidder is required and has submitted an Affidavit of Availability in order to obtain authorization to bid, the bidder may write or type "See Affidavit of Availability" which indicates that the Affidavit of Availability is incorporated by reference and includes all non-IDOT State of Illinois agency pending contracts, leases, bids, proposals, and other ongoing procurement relationships. For any contracts that are not covered by the Affidavit of Availability, the bidder must identify them on Form B or on an attached sheet(s). These might be such things as leases.

D. Bidders Submitting More Than One Bid

Bidders submitting multiple bids may submit one set of forms consisting of all required Form A disclosures and one Form B for use with all bids. Please indicate in the space provided below the bid item that contains the original disclosure forms and the bid items which incorporate the forms by reference.

- The bid submitted for letting item _____ contains the Form A disclosures or Certification Statement and the Form B disclosures. The following letting items incorporate the said forms by reference:

_____

_____

RETURN WITH BID/OFFER

ILLINOIS DEPARTMENT OF TRANSPORTATION

Form A
Financial Information & Potential Conflicts of Interest Disclosure

Contractor Name		
Legal Address		
City, State, Zip		
Telephone Number	Email Address	Fax Number (if available)

Disclosure of the information contained in this Form is required by the Section 50-35 of the Illinois Procurement Code (30 ILCS 500). Vendors desiring to enter into a contract with the State of Illinois must disclose the financial information and potential conflict of interest information as specified in this Disclosure Form. This information shall become part of the publicly available contract file. This Form A must be completed for bids in excess of $10,000, and for all open-ended contracts. **A publicly traded company may submit a 10K disclosure (or equivalent if applicable) in satisfaction of the requirements set forth in Form A. See Disclosure Form Instructions.**

DISCLOSURE OF FINANCIAL INFORMATION

1. Disclosure of Financial Information. The individual named below has an interest in the BIDDER (or its parent) in terms of ownership or distributive income share in excess of 5%, or an interest which has a value of more than $102,600.00 (60% of the Governor's salary as of 7/1/07). **(Make copies of this form as necessary and attach a separate Disclosure Form A for each individual meeting these requirements)**

FOR INDIVIDUAL (type or print information)

NAME: _____

ADDRESS _____

_____

Type of ownership/distributable income share:

stock _____ sole proprietorship _____ Partnership _____ other: (explain on separate sheet):

% or $ value of ownership/distributable income share: _____

2. Disclosure of Potential Conflicts of Interest. Check "Yes" or "No" to indicate which, if any, of the following potential conflict of interest relationships apply. If the answer to any question is "Yes", please attach additional pages and describe.

(a) State employment, currently or in the previous 3 years, including contractual employment of services. Yes ___ No __

If your answer is yes, please answer each of the following questions.

1. Are you currently an officer or employee of either the Capitol Development Board or the Illinois Toll Highway Authority? Yes ___ No __

2. Are you currently appointed to or employed by any agency of the State of Illinois? If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds $102,600.00, (60% of the Governor's salary as of 7/1/07) provide the name the State agency for which you are employed and your annual salary. _____
_____

3. If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds $102,600.00, (60% of the Governor's salary as of 7/1/07) are you entitled to receive (i) more than 7 1/2% of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of the salary of the Governor? Yes ___ No __

4. If you are currently appointed to or employed by any agency of the State of Illinois, and your annual salary exceeds $102,600.00, (60% of the Governor's salary as of 7/1/07) are you and your spouse or minor children entitled to receive (i) more than 15% in aggregate of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of 2 times the salary of the Governor? Yes ___ No __

(b) State employment of spouse, father, mother, son, or daughter, including contractual employment for services in the previous 2 years.

Yes ___No __

If your answer is yes, please answer each of the following questions.

1. Is your spouse or any minor children currently an officer or employee of the Capitol Development Board or the Illinois Toll Highway Authority? Yes ___No __

2. Is your spouse or any minor children currently appointed to or employed by any agency of the State of Illinois? If your spouse or minor children is/are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds $102,600.00, (60% of the Governor's salary as of 7/1/07) provide the name of the spouse and/or minor children, the name of the State agency for which he/she is employed and his/her annual salary. _____
_____

3. If your spouse or any minor children is/are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds $102,600.00, (60% of the salary of the Governor as of 7/1/07) are you entitled to receive (i) more than 71/2% of the total distributable income of your firm, partnership, association or corporation, or (ii) an amount in excess of the salary of the Governor? Yes ___ No __

4. If your spouse or any minor children are currently appointed to or employed by any agency of the State of Illinois, and his/her annual salary exceeds $102,600.00, (60% of the Governor's salary as of 7/1/07) are you and your spouse or any minor children entitled to receive (i) more than 15% in the aggregate of the total distributable income from your firm, partnership, association or corporation, or (ii) an amount in excess of 2 times the salary of the Governor?

Yes ___ No __

(c) Elective status; the holding of elective office of the State of Illinois, the government of the United States, any unit of local government authorized by the Constitution of the State of Illinois or the statutes of the State of Illinois currently or in the previous 3 years. Yes ___No __

(d) Relationship to anyone holding elective office currently or in the previous 2 years; spouse, father, mother, son, or daughter. Yes ___No __

(e) Appointive office; the holding of any appointive government office of the State of Illinois, the United State of America, or any unit of local government authorized by the Constitution of the State of Illinois or the statues of the State of Illinois, which office entitles the holder to compensation in excess of the expenses incurred in the discharge of that office currently or in the previous 3 years. Yes ___No __

(f) Relationship to anyone holding appointive office currently or in the previous 2 years; spouse, father, mother, son, or daughter. Yes ___No __

(g) Employment, currently or in the previous 3 years, as or by any registered lobbyist of the State government. Yes ___No __

RETURN WITH BID/OFFER

(h) Relationship to anyone who is or was a registered lobbyist in the previous 2 years; spouse, father, mother, son, or daughter. Yes ___ No __

(i) Compensated employment, currently or in the previous 3 years, by any registered election or reelection committee registered with the Secretary of State or any county clerk of the State of Illinois, or any political action committee registered with either the Secretary of State or the Federal Board of Elections.
Yes ___ No __

(j) Relationship to anyone; spouse, father, mother, son, or daughter; who was a compensated employee in the last 2 years by any registered election or re-election committee registered with the Secretary of State or any county clerk of the State of Illinois, or any political action committee registered with either the Secretary of State or the Federal Board of Elections.
Yes ___ No __

APPLICABLE STATEMENT

This Disclosure Form A is submitted on behalf of the INDIVIDUAL named on previous page.

Completed by: ☐ _____ _____
Signature of Individual or Authorized Representative — Date

NOT APPLICABLE STATEMENT

I have determined that no individuals associated with this organization meet the criteria that would require the completion of this Form A.

This Disclosure Form A is submitted on behalf of the CONTRACTOR listed on the previous page.

☐ _____ _____
Signature of Authorized Representative — Date

RETURN WITH BID/OFFER

ILLINOIS DEPARTMENT OF TRANSPORTATION

Form B
Other Contracts & Procurement Related Information Disclosure

Contractor Name		
Legal Address		
City, State, Zip		
Telephone Number	Email Address	Fax Number (if available)

Disclosure of the information contained in this Form is required by the Section 50-35 of the Illinois Procurement Act (30 ILCS 500). This information shall become part of the publicly available contract file. This Form B must be completed for bids in excess of $10,000, and for all open-ended contracts.

DISCLOSURE OF OTHER CONTRACTS AND PROCUREMENT RELATED INFORMATION

1. Identifying Other Contracts & Procurement Related Information. The BIDDER shall identify whether it has any pending contracts (including leases), bids, proposals, or other ongoing procurement relationship with any other State of Illinois agency: Yes ___ No __
If "No" is checked, the bidder only needs to complete the signature box on the bottom of this page.

2. If "Yes" is checked. Identify each such relationship by showing State of Illinois agency name and other descriptive information such as bid or project number (attach additional pages as necessary). SEE DISCLOSURE FORM INSTRUCTIONS:

THE FOLLOWING STATEMENT MUST BE CHECKED

☐ _____ _____
Signature of Authorized Representative Date

RETURN WITH BID

SPECIAL NOTICE TO CONTRACTORS

The following requirements of the Illinois Department of Human Rights' Rules and Regulations are applicable to bidders on all construction contracts advertised by the Illinois Department of Transportation:

CONSTRUCTION EMPLOYEE UTILIZATION PROJECTION

(a) All bidders on construction contracts shall complete and submit, along with and as part of their bids, a Bidder's Employee Utilization Form (Form BC-1256) setting forth a projection and breakdown of the total workforce intended to be hired and/or allocated to such contract work by the bidder including a projection of minority and female employee utilization in all job classifications on the contract project.

(b) The Department of Transportation shall review the Employee Utilization Form, and workforce projections contained therein, of the contract awardee to determine if such projections reflect an underutilization of minority persons and/or women in any job classification in accordance with the Equal Employment Opportunity Clause and Section 7.2 of the Illinois Department of Human Rights' Rules and Regulations for Public Contracts adopted as amended on September 17, 1980. If it is determined that the contract awardee's projections reflect an underutilization of minority persons and/or women in any job classification, it shall be advised in writing of the manner in which it is underutilizing and such awardee shall be considered to be in breach of the contract unless, prior to commencement of work on the contract project, it submits revised satisfactory projections or an acceptable written affirmative action plan to correct such underutilization including a specific timetable geared to the completion stages of the contract.

(c) The Department of Transportation shall provide to the Department of Human Rights a copy of the contract awardee's Employee Utilization Form, a copy of any required written affirmative action plan, and any written correspondence related thereto. The Department of Human Rights may review and revise any action taken by the Department of Transportation with respect to these requirements.

RETURN WITH BID

Illinois Department of Transportation

Contract No. 60E10
COOK County
Section 2008-001VB
Project ACNHF-HPP-0351(017)
Route FAP 351
District 1 Construction Funds

PART I. IDENTIFICATION

Dept. Human Rights # _____ Duration of Project: _____

Name of Bidder: _____

PART II. WORKFORCE PROJECTION

A. The undersigned bidder has analyzed minority group and female populations, unemployment rates and availability of workers for the location in which this contract work is to be performed, and for the locations from which the bidder recruits employees, and hereby submits the following workforce projection including a projection for minority and female employee utilization in all job categories in the workforce to be allocated to this contract:

TABLE A

TOTAL Workforce Projection for Contract													TABLE B: CURRENT EMPLOYEES TO BE ASSIGNED TO CONTRACT			
			MINORITY EMPLOYEES						TRAINEES							
JOB CATEGORIES	TOTAL EMPLOYEES		BLACK		HISPANIC		*OTHER MINOR.		APPREN-TICES		ON THE JOB TRAINEES		TOTAL EMPLOYEES		MINORITY EMPLOYEES	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
OFFICIALS (MANAGERS)																
SUPERVISORS																
FOREMEN																
CLERICAL																
EQUIPMENT OPERATORS																
MECHANICS																
TRUCK DRIVERS																
IRONWORKERS																
CARPENTERS																
CEMENT MASONS																
ELECTRICIANS																
PIPEFITTERS, PLUMBERS																
PAINTERS																
LABORERS, SEMI-SKILLED																
LABORERS, UNSKILLED																
TOTAL																

TABLE C

TOTAL Training Projection for Contract								
EMPLOYEES IN TRAINING	TOTAL EMPLOYEES		BLACK		HISPANIC		*OTHER MINOR.	
	M	F	M	F	M	F	M	F
APPRENTICES								
ON THE JOB TRAINEES								

*Other minorities are defined as Asians (A) or Native Americans (N).
Please specify race of each employee shown in Other Minorities column.

FOR DEPARTMENT USE ONLY

BC 1256 (Rev. 12/11/08)

Note: See instructions on page 2

PART II. WORKFORCE PROJECTION - continued

B. Included in "Total Employees" under Table A is the total number of **new hires** that would be employed in the event the undersigned bidder is awarded this contract.

The undersigned bidder projects that: (number) _____ new hires would be recruited from the area in which the contract project is located; and/or (number) _____ new hires would be recruited from the area in which the bidder's principal office or base of operation is located.

C. Included in "Total Employees" under Table A is a projection of numbers of persons to be employed directly by the undersigned bidder as well as a projection of numbers of persons to be employed by subcontractors.

The undersigned bidder estimates that (number) _____ persons will be directly employed by the prime contractor and that (number) _____ persons will be employed by subcontractors.

PART III. AFFIRMATIVE ACTION PLAN

A. The undersigned bidder understands and agrees that in the event the foregoing minority and female employee utilization projection included under **PART II** is determined to be an underutilization of minority persons or women in any job category, and in the event that the undersigned bidder is awarded this contract, he/she will, prior to commencement of work, develop and submit a written Affirmative Action Plan including a specific timetable (geared to the completion stages of the contract) whereby deficiencies in minority and/or female employee utilization are corrected. Such Affirmative Action Plan will be subject to approval by the contracting agency and the **Department of Human Rights**.

B. The undersigned bidder understands and agrees that the minority and female employee utilization projection submitted herein, and the goals and timetable included under an Affirmative Action Plan if required, are deemed to be part of the contract specifications.

Company _____ Telephone Number _____

_____

Address _____

NOTICE REGARDING SIGNATURE

The Bidder's signature on the Proposal Signature Sheet will constitute the signing of this form. The following signature block needs to be completed only if revisions are required.

Signature: ☐ _____ Title: _____ Date: _____

Instructions: All tables must include subcontractor personnel in addition to prime contractor personnel.

Table A - Include both the number of employees that would be hired to perform the contract work and the total number currently employed (Table B) that will be allocated to contract work, and include all apprentices and on-the-job trainees. The "Total Employees" column should include all employees including all minorities, apprentices and on-the-job trainees to be employed on the contract work.

Table B - Include all employees currently employed that will be allocated to the contract work including any apprentices and on-the-job trainees currently employed.

Table C - Indicate the racial breakdown of the total apprentices and on-the-job trainees shown in Table A.

RETURN WITH BID

ADDITIONAL FEDERAL REQUIREMENTS

In addition to the Required Contract Provisions for Federal-Aid Construction Contracts (FHWA 1273), all bidders make the following certifications.

A. By the execution of this proposal, the signing bidder certifies that the bidding entity has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action, in restraint of free competitive bidding in connection with the submitted bid. This statement made by the undersigned bidder is true and correct under penalty of perjury under the laws of the United States.

B. CERTIFICATION, EQUAL EMPLOYMENT OPPORTUNITY:

1. Have you participated in any previous contracts or subcontracts subject to the equal opportunity clause. YES _____ NO _____

2. If answer to #1 is yes, have you filed with the Joint Reporting Committee, the Director of OFCC, any Federal agency, or the former President's Committee on Equal Employment Opportunity, all reports due under the applicable filing requirements of those organizations? YES _____ NO _____

RETURN WITH BID

Contract No. 60E10
COOK County
Section 2008-001VB
Project ACNHF-HPP-0351(017)
Route FAP 351
District 1 Construction Funds

PROPOSAL SIGNATURE SHEET

The undersigned bidder hereby makes and submits this bid on the subject Proposal, thereby assuring the Department that all requirements of the Invitation for Bids and rules of the Department have been met, that there is no misunderstanding of the requirements of paragraph 3 of this Proposal, and that the contract will be executed in accordance with the rules of the Department if an award is made on this bid.

Firm Name _____

(IF AN INDIVIDUAL) Signature of Owner _____

Business Address _____

_____

Firm Name _____

By _____

(IF A CO-PARTNERSHIP) Business Address _____

_____

Name and Address of All Members of the Firm:

_____ _____

Corporate Name _____

By _____
Signature of Authorized Representative

(IF A CORPORATION)

_____
Typed or printed name and title of Authorized Representative

Attest _____
Signature

(IF A JOINT VENTURE, USE THIS SECTION FOR THE MANAGING PARTY AND THE SECOND PARTY SHOULD SIGN BELOW) Business Address _____

Corporate Name _____

By _____
Signature of Authorized Representative

(IF A JOINT VENTURE)

_____
Typed or printed name and title of Authorized Representative

Attest _____
Signature

Business Address _____

_____

If more than two parties are in the joint venture, please attach an additional signature sheet.

Illinois Department of Transportation

Return with Bid

Division of Highways
Proposal Bid Bond
(Effective November 1, 1992)

Item No. _____

Letting Date _____

KNOW ALL MEN BY THESE PRESENTS, That We _____

_____

as PRINCIPAL, and _____

_____ as SURETY, are held jointly, severally and firmly bound unto the STATE OF ILLINOIS in the penal sum of 5 percent of the total bid price, or for the amount specified in Article 102.09 of the "Standard Specifications for Road and Bridge Construction" in effect on the date of invitation for bids, whichever is the lesser sum, well and truly to be paid unto said STATE OF ILLINOIS, for the payment of which we bind ourselves, our heirs, executors, administrators, successors and assigns.

THE CONDITION OF THE FOREGOING OBLIGATION IS SUCH, that whereas, the PRINCIPAL has submitted a bid proposal to the STATE OF ILLINOIS, acting through the Department of Transportation, for the improvement designated by the Transportation Bulletin Item Number and Letting Date indicated above.

NOW, THEREFORE, if the Department shall accept the bid proposal of the PRINCIPAL; and if the PRINCIPAL shall, within the time and as specified in the bidding and contract documents, submit a DBE Utilization Plan that is accepted and approved by the Department; and if, after award by the Department, the PRINCIPAL shall enter into a contract in accordance with the terms of the bidding and contract documents including evidence of the required insurance coverages and providing such bond as specified with good and sufficient surety for the faithful performance of such contract and for the prompt payment of labor and material furnished in the prosecution thereof; or if, in the event of the failure of the PRINCIPAL to make the required DBE submission or to enter into such contract and to give the specified bond, the PRINCIPAL pays to the Department the difference not to exceed the penalty hereof between the amount specified in the bid proposal and such larger amount for which the Department may contract with another party to perform the work covered by said bid proposal, then this obligation shall be null and void, otherwise, it shall remain in full force and effect.

IN THE EVENT the Department determines the PRINCIPAL has failed to comply with any requirement as set forth in the preceding paragraph, then Surety shall pay the penal sum to the Department within fifteen (15) days of written demand therefor. If Surety does not make full payment within such period of time, the Department may bring an action to collect the amount owed. Surety is liable to the Department for all its expenses, including attorney's fees, incurred in any litigation in which it prevails either in whole or in part.

In TESTIMONY WHEREOF, the said PRINCIPAL and the said SURETY have caused this instrument to be signed by

their respective officers this _____ day of _____ A.D., _____ .

PRINCIPAL

_____ _____
(Company Name) (Company Name)

By: _____ By: _____
(Signature & Title) (Signature of Attorney-in-Fact)

Notary Certification for Principal and Surety

STATE OF ILLINOIS,

County of _____

I, _____ , a Notary Public in and for said County, do hereby certify that

_____ and _____
(Insert names of individuals signing on behalf of PRINCIPAL & SURETY)

who are each personally known to me to be the same persons whose names are subscribed to the foregoing instrument on behalf of PRINCIPAL and SURETY, appeared before me this day in person and acknowledged respectively, that they signed and delivered said instrument as their free and voluntary act for the uses and purposes therein set forth.

Given under my hand and notarial seal this _____ day of _____ A.D. _____

My commission expires _____ _____
Notary Public

In lieu of completing the above section of the Proposal Bid Form, the Principal may file an Electronic Bid Bond. By signing the proposal and marking the check box next to the Signature and Title line below, the Principal is ensuring the identified electronic bid bond has been executed and the Principal and Surety are firmly bound unto the State of Illinois under the conditions of the bid bond as shown above.

_____ _____ ☐ _____
Electronic Bid Bond ID# Company / Bidder Name Signature and Title

PROPOSAL ENVELOPE

Illinois Department of Transportation

PROPOSALS

for construction work advertised for bids by the
Illinois Department of Transportation

Item No.	Item No.	Item No.

Submitted By:

Name:
Address:
Phone No.

Bidders should use an IDOT proposal envelope or affix this form to the front of a 10” x 13” envelope for the submittal of bids. If proposals are mailed, they should be enclosed in a second or outer envelope addressed to:

Engineer of Design and Environment - Room 326
Illinois Department of Transportation
2300 South Dirksen Parkway
Springfield, Illinois 62764

NOTICE

Individual bids, including Bid Bond and/or supplemental information if required, should be securely stapled.

CONTRACTOR OFFICE COPY OF CONTRACT SPECIFICATIONS

NOTICE

None of the following material needs to be returned with the bid package unless the special provisions require documentation and/or other information to be submitted.

Contract No. 60E10
COOK County
Section 2008-001VB
Project ACNHF-HPP-0351(017)
Route FAP 351
District 1 Construction Funds

Illinois Department of Transportation

Illinois Department of Transportation

NOTICE TO BIDDERS

1. **TIME AND PLACE OF OPENING BIDS.** Sealed proposals for the improvement described herein will be received by the Department of Transportation at the Harry R. Hanley Building, 2300 South Dirksen Parkway, in Springfield, Illinois until 10:00 o'clock a.m., June 13, 2008. All bids will be gathered, sorted, publicly opened and read in the auditorium at the Department of Transportation's Harry R. Hanley Building shortly after the 10:00 a.m. cut off time.

2. **DESCRIPTION OF WORK**. The proposed improvement is identified and advertised for bids in the Invitation for Bids as:

   Contract No. 60E10
   COOK County
   Section 2008-001VB
   Project ACNHF-HPP-0351(017)
   Route FAP 351
   District 1 Construction Funds

This project consists of the staged construction of three railroad bridges, two highway bridges and numerous retaining wall systems to replace two Canadian National and METRA railroad viaducts. This project includes railroad related work of furnishing, constructing and removing railroad track, signal bridges, catenary structures, fiber optic communication cables and electric cables in conduit for railroad utility relocations. This project also includes reconstruction of U.S. Route 6 from Lexington Avenue to Fisk Avenue including storm sewer replacement, watermain relocation, traffic signal replacement and lighting.

3. **INSTRUCTIONS TO BIDDERS**. (a) This Notice, the invitation for bids, proposal and letter of award shall, together with all other documents in accordance with Article 101.09 of the Standard Specifications for Road and Bridge Construction, become part of the contract. Bidders are cautioned to read and examine carefully all documents, to make all required inspections, and to inquire or seek explanation of the same prior to submission of a bid.

   (b) State law, and, if the work is to be paid wholly or in part with Federal-aid funds, Federal law requires the bidder to make various certifications as a part of the proposal and contract. By execution and submission of the proposal, the bidder makes the certification contained therein. A false or fraudulent certification shall, in addition to all other remedies provided by law, be a breach of contract and may result in termination of the contract.

4. **AWARD CRITERIA AND REJECTION OF BIDS**. This contract will be awarded to the lowest responsive and responsible bidder considering conformity with the terms and conditions established by the Department in the rules, Invitation for Bids and contract documents. The issuance of plans and proposal forms for bidding based upon a prequalification rating shall not be the sole determinant of responsibility. The Department reserves the right to determine responsibility at the time of award, to reject any or all proposals, to readvertise the proposed improvement, and to waive technicalities.

By Order of the
Illinois Department of Transportation

Milton R. Sees, Secretary

INDEX
FOR
SUPPLEMENTAL SPECIFICATIONS
AND RECURRING SPECIAL PROVISIONS

Adopted January 1, 2008

This index contains a listing of SUPPLEMENTAL SPECIFICATIONS and frequently used RECURRING SPECIAL PROVISIONS.

ERRATA Standard Specifications for Road and Bridge Construction (Adopted 1-1-07) (Revised 1-1-08)

SUPPLEMENTAL SPECIFICATIONS

RECURRING SPECIAL PROVISIONS

The following RECURRING SPECIAL PROVISIONS indicated by an "X" are applicable to this contract and are included by reference:

TABLE OF CONTENTS

STATE OF ILLINOIS

SPECIAL PROVISIONS

The following Special Provisions supplement the "Standard Specifications for Road and Bridge Construction," adopted January 1, 2007 and Supplemental Specifications and Recurring Special Provisions, dated January 1, 2007 or January 1, 2008, (hereinafter referred to as the "Standard Specifications"); the latest edition of the "Manual on Uniform Traffic Control Devices for Streets and Highways" in effect on the date for invitation of bids; and the "Supplemental Specifications and Recurring Special Provisions" indicated on the Check Sheet included herein; all of which apply to and govern the construction of:

FAP Route 351 (U.S. Route 6 - 159th Street)
Project ACNHF-HPP-0351 (017)
Section: 2008-001VB
Contract No. 60E10
Cook County

In case of conflict with any part or parts of said documents, these Special Provisions shall take precedence and shall govern.

LOCATION OF PROJECT

The western improvement limit of FAP Route 351 (US Route 6) begins approximately 42 meters east of Lexington Avenue and extends east to a point approximately 13 meters west of Fisk Avenue, a total distance of approximately 0.42 kilometers in the City of Harvey, Cook County, Illinois.

DESCRIPTION OF PROJECT

This project consists of roadway reconstruction, bridge replacements, intersection improvements, drainage system replacement, roadway lighting, underpass lighting, and traffic signal replacements and all incidental and collateral work necessary to complete the improvements as shown on the plans and described herein.

MAINTENANCE OF ROADWAYS

Effective: September 30, 1985 Revised: November 1, 1996

Beginning on the date that work begins on this project, the Contractor shall assume responsibility for normal maintenance of all existing roadways within the limits of the improvement. This normal maintenance shall include all repair work deemed necessary by the Engineer, but shall not include snow removal operations. Traffic control and protection for maintenance of roadways will be provided by the Contractor as required by the Engineer.

items of work have not been provided in the contract, or otherwise specified for payment, such items, including the accompanying traffic control and protection required by the Engineer, will be paid for in accordance with Article 109.04 of the Standard Specifications.

STATUS OF UTILITIES TO BE ADJUSTED
Effective: January 30, 1987 Revised: July 1, 1994

Utility companies involved in this project have provided the following estimated dates:

Name of Utility	Type	Location						Estimated Dates For Start and Completion of Relocation or Adjustments
		#	Station	Offset	#	Station	Offset	
Commonwealth Edison Co. Mr. John D. Pribich Program Manager, Public Relocation ComEd Three Lincoln Centre Fourth Floor Oakbrook Terrace, IL 60181-4260 Mr. Ted Tolish Project Manager ComEd Three Lincoln Centre Fourth Floor Oakbrook Terrace, IL 60181-4260 Tel (630) 576-6140	Aerial & Underground Electric Lines	1	2+703.40	8.4 Lt	23	40+857.50	7 Lt	Prior to Start of construction
		2	2+742.50	11 Lt	24	40+936.0	6 Lt	
		3	2+743.90	5.8 Lt	25	40+941.0	13 Lt	
		4	2+746.0	12 Lt	26	41+123.0	13 Lt	
		5	2+751.30	11 Lt	27	50+877.10	5.8 Rt	
		6	2+756.90	11 Lt	28	50+916.40	4 Rt	
		7	2+800.0	11 Lt	29	50+926.0	6.3 Rt	
		8	2+803.50	11 Lt	30	50+928.0	7.3 Rt	
		9	2+833.90	8.9 Lt	31	50+962.0	9 Rt	
		10	2+859.80	8.8 Lt	32	50+966.30	1.5 Rt	
		11	2+881.70	8.8 Lt	33	51+042.0	5 Lt	
		12	2+909.90	9 Lt	34	51+098.50	6 Lt	
		13	2+951.0	9 Lt	35	51+098.50	11 Rt	
		14	2+956.50	9 Lt	36	51+112.0	7 Lt	
		15	2+958.0	10 Rt	37	51+146.50	9.5 Rt	
		16	2+985.40	8.8 Lt	38	51+172.0	8.4 Lt	
		17	2+987.0	10 Rt	39	51+192.0	9 Rt	
		18	3+004.30	8.2 Lt	40	51+193.60	7.7 Lt	
		19	3+013.90		41	51+207.80	7.7 Lt	
		20	3+020.0	13 Rt	42	51+208.90	Full width	
		21	3+055.0	9.3 Rt				
		22	3+089.40	8.2 Lt	43	51+208.90	6 Rt	
					44	51+255.70	8.8 Lt	
		Note: All conflicts are with proposed power poles, underground lines, or manholes.			45	51+390.0	12 Lt	
					46	70+791.0	15 Lt	
					47	71+118.50	9.2 Rt	
					48	71+152.50	8 Rt	
					49	40+975.0	9.2 Lt	
					50	41+011.5 to 41+200	center	

Name of Utility	Type	Location	Estimated Dates For Start and Completion of Relocation Or Adjustments
McLeod USA Paul Baumann 900 Commerce Drive, Suite 203 Oakbrook, IL 60523 Tel (630) 570-5174 Cell (312) 296-4825 Pager (877) 541-0267 Fax (630) 570-5005 Email: pbaumann@mcleodusa.com Curtis Champagne Project Planner Milford Engineering Company P.O. Box 60170 San Angelo, TX 76906 Tel (325) 223-9111 Cell (573) 489-5015 Fax (325) 944-4063 Email: curtis@milford-eng.com	Fiber Optic Telecommunications	Transverse crossing under U.S. 6 at eastern portion of bridge. To be relocated to east of new bridge structure SN 016-2754 and transverse crossing under U.S. Route 6. Previously moved.	N/A
Nicor Gas Ms. Constance Lane Utility Consultant NiCor Gas - Engineering 1844 Ferry Road Naperville, IL 60563-9600 Tel	Natural Gas Distribution and Service	# Station Offset 1 2+997.22 5.8m W/CL Center Street 2 2+997.22 (-0.12m) GRADE CUT 3 3+028.96 (0.62m) Depth of Excavation 4 3+031.8 (-0.58m) Grade cut over main 5 3+055 (-0.58m) Grade cut over main 6 41+10 (-0.60m) Grade Cut over main 7 41+025 (-0.60m) Grade Cut over main 8 41+050 (-0.38m) Grade Cut over main 9 41+062 (-0.25m) Grade Cut over main 10 50+875 (-0.17m) Grade Cut over main 11 50+878.40 (-0.22m) Grade Cut over main 12 50+900 (-0.47m) Grade Cut over main 13 50+912 (-0.88m) Grade Cut over main 14 50+925 (-1.12m) Grade Cut over main 15 50+950 (-0.36m) Grade Cut over main 16 50+975 (-0.51m) GRADE CUT 17 51+050 (-0.92m) Grade Cut over main 18 51+075 (-0.66m) Grade Cut over main 19 51+396.6 7.6m S/CL 157th Street	Moved prior to Start of construction

Name of Utility	Type	Location	Estimated Dates For Start and Completion of Relocation Or Adjustments
AT&T Mr. Carl Donahue AT&T 866 Rock Creek Rd. Plano, IL 60545 Tel	Aerial & Underground Telecommunications (Telephone, Internet)	# Station Offset 1 2+709. 6 Lt 2 2+710.4 6 Lt 3 2+715 7.8 Rt 4 Park SE 5 Park SW 6 3+016.4 7 50+890.6 8 50+928. 3.8 Rt Note: All conflicts without offsets involved buried cable and conduit and proposed road grade.	Moved prior to Start of construction
Comcast Ms. Martha Gieras Comcast Cable Communications, Inc. Right-Of-Way Department 688 Industrial Drive Elmhurst, IL 60126 Tel	Aerial & Underground Telecommunications (Television, Internet)	Various locations	Moved prior to Start of construction
360 Networks Inc. 9330 Corporate Dr., Ste 407 Selma, TX 78154 Tel: (210) 651-9901	Fiber Optic Communication in Conduit	Relocated to Station 2+956 crossing US Route 6 (159th Street) Previously Moved	N/A
City of Harvey Mr. Rufus Fisher Director of Public Works 15320 Broadway Avenue Harvey, IL. 60426 Tel: (708)210-5340	Public Utilities (San. Sewer, Storm Sewer, Water)	Various location of water main conflicts shown in detailed plan drawings. Various Sanitay Sewer crossings with no known conflicts.	Water main conflicts to be moved as part of this contract
Metropolitan Water Reclamation District of Greater Chicago 100 E. Erie Street, Chicago, IL 60611 Tel: (312) 751-5600	Storm Sewer, Sanitary Sewer, and Combined sewer	Various locations as noted on plans. No conflicts	All work connecting to combined or sanitary sewer must be in accordance with MWRDGC requirements.
Praxair, Inc. Mr. James Pieguss Praxaire, Inc. 4520 Kennedy Ave East Chicago, IN 46312 Tel: 219-391-5127 39 Old Ridgebury Road Danbury, CT 06810 Tel.: 1-800-PRAXAIR	Buried Nitrogen Pipeline	High Pressure Gas crossing at approximate Station 1+310. (Within limits of Contract 60774) No known conflict in this contract.	N/A

The above represents the best information available to the Department and is included for the convenience of the bidder. The applicable portions of Articles 105.07 and 107.31 of the Standard Specifications shall apply.

COMPLETION DATE PLUS WORKING DAYS

Effective: September 30, 1985 Revised: January 1, 2007

Revise Article 108.05 (b) of the Standard Specifications as follows:

"When a completion date plus working days is specified, the Contractor shall complete all contract items and safely open all roadways to traffic by 11:59 PM on May 31, 2011 except as specified herein.

The Contractor will be allowed to complete all clean-up work and punch list items within 20 working days after the completion date for opening the roadway to traffic. Under extenuating circumstances the Engineer may direct that certain items of work, not affecting the safe opening of the roadway to traffic, may be completed within the working days allowed for clean up work and punch list items. Temporary lane closures for this work may be allowed at the discretion of the Engineer.

(*The completion date for Shift of Railroad Tracks shall be September 30, 2009.)"
(*The completion date for Construction of Metra Two-Track Portion of SN 016-2755 shall be March 17, 2010.)"
(*The completion date for Construction of CN Two-Track Portion of SN 016-2755 shall be October 31, 2010.)"

Article 108.09 of the Standard Specifications or the Special Provision for Failure to Complete the Work on Time, if included in this contract, shall apply to both the completion date and the number of working days.

INTERIM COMPLETION DATE FOR SHIFT OF RAILROAD TRACKS

The Contractor shall complete all work required for construction of the temporary diversions of CN Tracks 1 and 2 and Metra Tracks 1 and 2 by September 30, 2009. All work that is to be performed by the Contractor as shown in the plans and/or specified in the contract specifications necessary to enable the CN and Metra to place and maintain rail traffic in full service on the temporary diversions for each of their respective tracks shall be completed by that date. That work shall include but not be limited to the following:

- Track construction
- Catenary structure construction
- Catenary DC system construction
- Construction of facilities required for the temporary relocation of railroad utilities including but not limited to AC distribution power, SCADA/communication, and railroad signal
- All other ancillary and supporting work within the Contractor's scope associated and needed to complete the construction of the temporary diversions.

This is necessary to minimize the duration that the CN and Metra will have to operate with reductions of speed once they shift any of their mainline tracks to the temporary diversions by enabling structure construction work to promptly begin during the fall of 2009 and continue through the winter of 2009-2010 without a cold-weather work shutdown period.

The shifting of existing CN Track 2 to its temporary diversion will not be permitted by the CN to be made until after the winter season of 2008-2009 and only after the roadbed and ballast is no longer frozen. The CN shall serve as the final authority in determining the temperature and forecasted temperature conditions that are considered suitable for the making of this track shift by its forces with support by the Contractor.

Construction of catenary support structures, the dead-end structure, and catenary bridge structure may continue through the winter season of 2008-2009 provided that work does not require track work or catenary system work to be performed that is unacceptable to the railroads during conditions of cold weather or frozen ground.

The Contractor shall coordinate with the CN and Metra to confirm what work under force account each railroad will have to also perform during this construction phase of the project concurrently or in series with the Contractor's work. The Contractor shall accurately assess and project the relationship and sequencing of this railroad force account work with respect to his work and the affect it will have on his proposed work schedule needed to meet the interim completion date.

The Contractor shall provide adequate contingency in his proposed schedule for construction of the diversion tracks to account for any differences between initial estimates provided by the two railroads of the time required by them to perform their work associated with construction of the temporary track diversions and the actual time they take. No extensions of time for the interim completion date will be allowed for any differences between any initial times estimated or projected to the Contractor by the Railroads and the actual time they use.

When developing a proposed schedule to meet this interim completion date, particular attention of the Contractor's is drawn to the amounts of time that will be required by Metra forces to install temporary turnouts; construct, shift, and place in service a temporary DC catenary system; and subsequently remove temporary turnouts and perform re-alignment for each diversion track. Attention is also drawn to the particular day of the week when these and other railroad force account work activities can be performed or begin to be performed.

The Contractor's attention is also drawn to cold weather limitations by the CN and Metra concerning when track work and catenary construction can be performed. The Contractor shall be responsible for coordinating with the Railroads to confirm and fully understand these railroad requirements and restrictions when developing a proposed schedule to meet this interim completion date. Generally, Metra and the CN will not allow track work to be performed when the ground is frozen. The railroads will serve as the final authority concerning what weather and ground conditions are acceptable for the Contractor to perform track related work and for the railroads' own forces to also perform track related work. Metra will serve as the final authority concerning what current and forecasted weather conditions are acceptable for its forces to perform catenary related work.

The track staging plans provide a preliminary list and sequence of work activities to be performed by the Contractor and those to be performed by the Railroads for track, catenary system, and structure construction. That list is not to be considered to be fully comprehensive, complete, or fixed in order of activities. The Contractor shall be responsible for coordinating with Metra and the CN and carefully evaluating this preliminary activity list to confirm the order of activities shown and to determine what additional activities not shown may also be required to be performed by the Contractor or Railroad and how much time those activities may also require. No extensions of time for the interim completion date will be allowed for any additional work activities or changes in order of activities.

The Contractor shall provide adequate contingency in his proposed schedule for construction of the diversion tracks to account for all interruptions, delays, and/or restrictions in work windows caused by rail traffic operating through or staged within the project limits and no extensions of time for the interim completion date will be allowed for these occurrences.

FAILURE TO COMPLETE SHIFT OF RAILROAD TRACKS ON TIME

Should the Contractor fail to complete the work on or before the completion date specified in the Special Provision for "Interim Completion Date for Shift of Railroad Tracks", the Contractor shall be liable to the Department in the amount of $2,550, not as a penalty but as liquidated damages, for each calendar day or portion thereof of overrun in this interim completion date.

In fixing the monetary damages as set out herein, the desire is to establish a certain mode of calculation for the work since the Railroads' actual loss, in the event of delay, cannot be predetermined, would be difficult to ascertain, and may become a matter of argument and unprofitable litigation. This said mode is an equitable rule for measurement of the Railroad's actual losses and fairly takes into account the costs associated with the delay in the ability of the Railroads to operate freight and passenger rail service at normal speeds if the project is delayed in completion. The Department shall not be required to obtain from the Railroads any actual loss in order to recover these liquidated damages provided herein, as said damages are very difficult to ascertain. Furthermore, no provision of this clause shall be construed as a penalty, as such is not the intention of the parties

A calendar day is every day shown on the calendar and starts at 12:00 midnight and ends at the following 12:00 midnight, twenty-four hours later.

INTERIM COMPLETION DATE FOR CONSTRUCTION OF METRA TWO-TRACK PORTION OF SN 016-2755

The Contractor shall complete all work associated with construction of the Metra two-track portion of structure SN 016-2755 by March 17, 2010. All work that is to be performed by the Contractor as shown in the plans and/or specified in the contract specifications that is necessary to enable Metra to begin shifting its tracks onto the newly constructed structure shall be completed by that date.

This is necessary to minimize the duration that both the CN and Metra will have to operate with reductions of speed when operating on temporary diversion tracks.

The Contractor shall coordinate with the CN and Metra to confirm what work under force account each Railroad may have to also perform with its own forces during this construction phase of the project, concurrently or in series with the Contractor's various work activities, that may affect his construction of structure SN 016-2755. The Contractor shall coordinate with the Railroads and accurately assess the relationship and sequencing of any railroad force account work with respect to the Contractor's own work activities and the affect this will have on his proposed work schedule that will be needed to meet the interim completion date.

The Contractor shall account for providing appropriate methods of structure construction during cold weather including use of heated forms to assure all associated requirements of the Standard Specifications are conformed to during construction of SN 016-2755. The Contractor shall account for all weather related disruptions and efficiencies associated with structure construction during cold weather and no extensions of time for the interim completion date will be permitted for actual weather conditions.

The Contractor shall provide adequate contingency in his proposed schedule to account for any differences between initial estimates provided by the two railroads of the time required by them to perform any force account work and the actual time they take. No extensions of time for the interim completion date will be allowed for any differences between any initial times estimated or projected to the Contractor by the Railroads and the actual time they use.

The Contractor shall provide adequate contingency in his proposed schedule for construction of the structure to account for all interruptions, delays, and/or restrictions in work windows caused by rail traffic operating through or staged within the project limits and no extensions of time for the interim completion date will be allowed for these occurrences.

FAILURE TO COMPLETE CONSTRUCTION OF METRA TWO-TRACK PORTION OF SN 016-2755 ON TIME

Should the Contractor fail to complete the work on or before the completion date specified in the Special Provision for "Interim Completion Date for Construction of Metra Two-Track Portion of SN 016-2755", the Contractor shall be liable to the Department in the amount of $2,550, not as a penalty but as liquidated damages, for each calendar day or portion thereof of overrun in this interim completion date.

In fixing the monetary damages as set out herein, the desire is to establish a certain mode of calculation for the work since the Railroads' actual loss, in the event of delay, cannot be predetermined, would be difficult to ascertain, and may become a matter of argument and unprofitable litigation. This said mode is an equitable rule for measurement of the Railroad's actual losses and fairly takes into account the costs associated with the delay in the ability of the Railroads to operate freight and passenger rail service at normal speeds if the project is delayed in completion. The Department shall not be required to obtain from the Railroads any actual loss in order to recover these liquidated damages provided herein, as said damages are very difficult to ascertain. Furthermore, no provision of this clause shall be construed as a penalty, as such is not the intention of the parties

A calendar day is every day shown on the calendar and starts at 12:00 midnight and ends at the following 12:00 midnight, twenty-four hours later.

INTERIM COMPLETION DATE FOR CONSTRUCTION OF CN TWO-TRACK PORTION OF SN 016-2755

The Contractor shall complete all work as shown in the plans and/or specified in the contract specifications associated with construction of the CN two-track portion of structure SN 016-2755 and required to enable shifting of rail traffic by the CN onto new tracks across that structure by October 31, 2010. That work shall include but not be limited to the following:

- Track shifts and removal of temporary Metra diversion tracks
- Catenary structure removal
- Removal of facilities for temporary relocation of Metra utilities including but not limited to AC distribution power, SCADA/communication, and railroad signal
- Removal of portions of existing railroad structure SN 016-0384
- Structure construction
- Construction of those portions of the permanent CN mainline tracks 1 and 2 across SN 016-2755 between points of tie-in to existing in-service tracks as shown on the plans.
- All other ancillary and supporting work within the Contractor's scope associated with and needed to complete the construction of the CN two-track portion of SN 016-2755 and placing of rail traffic on it.

This is necessary to minimize the duration that the CN will have to operate with reductions of speed when operating on temporary diversion tracks and the duration a road closure and detour is required for US Route 6 between Park Avenue and Center Street/West Avenue.

When developing a proposed schedule to meet this interim completion date, particular attention of the Contractor is drawn to the amount of time that will be required by Metra forces to construct new permanent track across its two-track portion of the new structure between points of tie-in to its diversion tracks; install temporary turnouts; construct, shift and restore to service the permanent DC catenary system; and subsequently remove temporary turnouts and perform re-alignment for each permanent track. Attention is also drawn to the particular day of the week when these and other railroad force account work activities by Metra can be performed or begin to be performed. The Contractor's attention is also drawn to cold weather limitations by Metra concerning when track work and catenary construction can be performed. The Contractor shall be responsible for coordinating with the Railroad to confirm and fully understand these requirements and restrictions when developing a proposed schedule to meet this interim completion date.

Particular attention of the Contractor is drawn is also drawn to the need during this phase of the project to work between active Metra rail traffic immediately to the west and active CN mainline rail traffic immediately to the east. Particular attention of the Contractor is also drawn is also drawn to the requirement that during structure construction for the CN two-track portion of SN 016-2755, crossing of the in-service Metra tracks will not be permitted.

The track staging plans provide a preliminary list and sequence of work activities to be performed by the Contractor and those to be performed by the Railroads for track, catenary system, and structure construction. That list is not to be considered to be fully comprehensive, complete, or fixed in order of activities. The Contractor shall be responsible for coordinating with Metra and the CN and carefully evaluating this preliminary activity list to confirm the order

of activities shown and to determine what additional activities not shown may also be required to be performed by the Contractor or Railroad and how much time those activities may also require. No extensions of time for the interim completion date will be allowed for any additional work activities or changes in order of activities.

The Contractor shall coordinate with the CN and Metra to confirm what work under force account each Railroad will have to also perform with its own forces during this construction phase of the project, concurrently or in series with the Contractor's various work activities that may affect his construction of structure SN 016-2755. The Contractor shall coordinate with the Railroads and accurately assess the relationship and sequencing of any railroad force account work with respect to the Contractor's own work activities and the affect this will have on his proposed work schedule that will be needed to meet the interim completion date.

The Contractor shall provide adequate contingency in his proposed schedule to account for any differences between initial estimates of time provided by the two railroads to perform their portions of force account work and the actual time they take. No extensions of time for the interim completion date will be allowed for any differences between any initial times estimated or projected to the Contractor by the Railroads and the actual time they use. This will include the time required by Metra with its forces to shift rail traffic from its temporary diversion tracks back to those of the permanent alignment, including all catenary system work. No extensions of time for the interim completion date will be allowed for any differences between any initial times estimated or projected to the Contractor by the Railroads and the actual time they will use.

The Contractor shall provide adequate contingency in this estimated time to perform all of his required work to account for all interruptions, delays, and/or restrictions in work windows caused by rail traffic operating through or staged within the project limits and no extensions of time for the interim completion date will be allowed for these occurrences.

FAILURE TO COMPLETE CONSTRUCTION OF CN TWO-TRACK PORTION OF SN 016-2755 ON TIME

Should the Contractor fail to complete the work on or before the completion date specified in the Special Provision for "Interim Completion Date for Construction of CN Two-Track Portion of SN 016-2755", the Contractor shall be liable to the Department in the amount of $2,550, not as a penalty but as liquidated damages, for each calendar day or portion thereof of overrun in this interim completion date.

In fixing the monetary damages as set out herein, the desire is to establish a certain mode of calculation for the work since the Railroads' and Department's actual loss, in the event of delay, cannot be predetermined, would be difficult to ascertain, and may become a matter of argument and unprofitable litigation. This said mode is an equitable rule for measurement of the Railroad's actual losses and fairly takes into account the costs associated with the delay in the ability of the Railroads to operate freight and passenger rail service at normal speeds if the project is delayed in completion. The Department shall not be required to obtain from the Railroads any actual loss in order to recover these liquidated damages provided herein, as said damages are very difficult to ascertain. Furthermore, no provision of this clause shall be construed as a penalty, as such is not the intention of the parties.

A calendar day is every day shown on the calendar and starts at 12:00 midnight and ends at the following 12:00 midnight, twenty-four hours later.

CONTRACTOR COOPERATION

The Contractor's attention is directed to the fact that a separate Contract will be under construction during the duration of this Contract and that the Contractor will be governed by Article 105.08 of the Standard Specifications.

The Contractor shall coordinate proposed project start dates and sequences of construction with the Engineer and other Contractors to present an effective and timely schedule for successful completion of the project. The other Contract will also be under IDOT jurisdiction.

No additional compensation will be allowed to the Contractor for the above requirements or for any delays or inconvenience resulting from the activities of other Contractors.

COORDINATION WITH ADJACENT AND/OR OVERLAPPING CONTRACTS

This contract abuts and/or overlaps with a concurrent Contract for the reconstruction of US Route 6 from I-294 to east of Lexington Avenue and from east of Fisk Avenue to east of IL Route 1. This Contract includes work items requiring close coordination between the Contractors regarding the sequence and timing for the project execution of such work items, and successful completion of the Contract.

WORK ZONE TRAFFIC CONTROL (LUMP SUM PAYMENT)

Effective: February 1, 1996 Revised: January 1, 2007

Specific traffic control plan details and Special Provisions have been prepared for this contract. This work shall include all labor, materials, transportation, handling and incidental work necessary to furnish, install, maintain and remove all traffic control devices required as indicated in the plans and as approved by the Engineer.

Method of Measurement: All traffic control (except traffic control pavement marking) indicated on the traffic control plan details and specified in the Special Provisions will be measured for payment on a lump sum basis. Traffic control pavement markings will be measured per foot (meter).

Basis of Payment: All traffic control and protection will be paid for at the contract lump sum price for TRAFFIC CONTROL AND PROTECTION (SPECIAL).

The cost for all traffic control required for construction and later removal of temporary access ramps from the east side of Park Avenue to Metra railroad tracks will be considered as included in the contract lump sum price for TRAFFIC CONTROL AND PROTECTION (SPECIAL).

The cost for all traffic control required for performing of patching work for the detour route will be considered as included in the contract lump sum price for TRAFFIC CONTROL AND PROTECTION (SPECIAL).

SHORT TERM PAVEMENT MARKING, TEMPORARY PAVEMENT MARKING and PAVEMENT MARKING TAPE TYPE III will be paid for separately.

TRAFFIC CONTROL PLAN
Effective: September 30, 1985 Revised: January 1, 2007

Traffic Control shall be according to the applicable sections of the Standard Specifications, the Supplemental Specifications, the "Illinois Manual on Uniform Traffic Control Devices for Streets and Highways", any special details and Highway Standards contained in the plans, and the Special Provisions contained herein.

Special attention is called to Article 107.09 of the Standard Specifications and the following Highway Standards, Details, Quality Standard for Work Zone Traffic Control Devices, Recurring Special Provisions and Special Provisions contained herein, relating to traffic control.

The Contractor shall contact the District One Bureau of Traffic at least 72 hours in advance of beginning work.

STANDARDS:

701301-02	LANE CLOSURE, 2L 2W, SHORT TIME OPERATIONS
701311-02	LANE CLOSURE, 2L 2W, MOVING DAY ONLY OPERATIONS
701501-04	URBAN LANE CLOSURE, 2L, 2W UNDIVIDED
701502-02	URBAN LANE CLOSURE, 2L, 2W WITH 2W WITH BIDRECTIONAL LEFT TURN LANE
701602-03	URBAN LANE CLOSURE, MULTILANE, 2W WITH BIDRECTIONAL LEFT TURN LANE
701606-05	URBAN LANE CLOSURE, MULTILANE 2W WITH MOUNTABLE MEDIAN
701701-05	URBAN LANE CLOSURE, MULTILANE INTERSECTION
701801-03	LANE CLOSURE, MULTILANE, 1W OR 2W CROSSWALK OR SIDEWALK CLOSURE
701901	TRAFFIC CONTROL DEVICES
704001-04	TEMPORARY CONCRETE BARRIER

DETAILS: TRAFFIC CONTROL AND PROTECTION FOR SIDEROADS, INTERSECTIONS AND DRIVEWAYS
TEMPORARY TERM PAVEMENT MARKING, LETTERS AND SYMBOLS
TEMPORARY INFORMATION SIGNING
SUGGESTED MAINTENANCE OF TRAFFIC PLAN SHEETS

SPECIAL PROVISIONS:
MAINTENANCE OF ROADWAYS
WORK ZONE TRAFFIC CONTROL (LUMP SUM PAYMENT)
TRAFFIC CONTROL AND PROTECTION FOR TEMPORARY DETOUR

TRAFFIC CONTROL AND PROTECTION FOR TEMPORARY DETOUR
Effective: September 1, 1995 Revised: January 1, 2007

When traffic is to be directed over a detour route, the Contractor shall furnish, erect, maintain and remove all applicable traffic control devices along the detour route according to the details shown in the plans.

Basis of Payment. This work will be paid for at the contract unit price each for TRAFFIC CONTROL AND PROTECTION FOR TEMPORARY DETOUR.

TEMPORARY INFORMATION SIGNING
Effective: November 13, 1996 Revised: January 2, 2007

Description.
This work shall consist of furnishing, installing, maintaining, relocating for various states of construction and eventually removing temporary informational signs. Included in this item may be ground mount signs, skid mount signs, truss mount signs, bridge mount signs, and overlay sign panels which cover portions of existing signs.

Materials.
Materials shall be according to the following Articles of Section 1000 - Materials:

	Item	Article/Section
a.)	Sign Base (Notes 1 & 2)	1090
b.)	Sign Face (Note 3)	1091
c.)	Sign Legends	1092
d.)	Sign Supports	1093
e.)	Overlay Panels (Note 4)	1090.02

Note 1. The Contractor may use 5/8 inch (16 mm) instead of 3/4 inch (19 mm) thick plywood.
Note 2. Type A sheeting can be used on the plywood base.
Note 3. All sign faces shall be Type A except all orange signs shall meet the requirements of Article 1106.01.
Note 4. The overlay panels shall be 0.08 inch (2 mm) thick.

GENERAL CONSTRUCTION REQUIRMENTS

Installation.
The sign sizes and legend sizes shall be verified by the Contractor prior to fabrication.

Signs which are placed along the roadway and/or within the construction zone shall be installed according to the requirements of Article 701.14 and Article 720.04. The signs shall be 7 ft (2.1 m) above the near edge of the pavement and shall be a minimum of 2 ft (600 mm) beyond the edge of the paved shoulder. A minimum of two (2) posts shall be used.

The attachment of temporary signs to existing sign structures or sign panels shall be approved by the Engineer. Any damage to the existing signs due to the Contractor's operations shall be repaired or signs replaced, as determined by the Engineer, at the Contractor's expense.

Signs which are placed on overhead bridge structures shall be fastened to the handrail with stainless steel bands. These signs shall rest on the concrete parapet where possible. The Contractor shall furnish mounting details for approval by the Engineer.

Method Of Measurement.
This work shall be measured for payment in square feet (square meters) edge to edge (horizontally and vertically).

All hardware, posts or skids, supports, bases for ground mounted signs, connections, which are required for mounting these signs will be included as part of this pay item.

Basis Of Payment.
This work shall be paid for at the contract unit price per square foot (square meter) for TEMPORARY INFORMATION SIGNING.

GENERAL ELECTRICAL REQUIREMENTS
Effective: January 1, 2007

Add the following to Article 801 of the Standard Specifications:

"Maintenance transfer and Preconstruction Inspection:

General. Before performing any excavation, removal, or installation work (electrical or otherwise) at the site, the Contractor shall request a maintenance transfer and preconstruction site inspection, to be held in the presence of the Engineer and a representative of the party or parties responsible for maintenance of any lighting and/or traffic control systems which may be affected by the work. The request for the maintenance transfer and preconstruction inspection shall be made no less than seven (7) calendar days prior to the desired inspection date. The maintenance transfer and preconstruction inspection shall:

Establish the procedures for formal transfer of maintenance responsibility required for the construction period.

Establish the approximate location and operating condition of lighting and/or traffic control systems which may be affected by the work

Marking of Existing Cable Systems. The party responsible for maintenance of any existing lighting and/or traffic control systems at the project site will, at the Contractor's request, mark and/or stake, once per location, all underground cable routes owned or maintained by the State. A project may involve multiple "locations" where separated electrical systems are involved (i.e. different controllers). The markings shall be taken to have a horizontal tolerance of at least 304.8 mm (one (1) foot) to either side.. The request for the cable locations and marking shall be made at the same time the request for the maintenance transfer and preconstruction inspection is made. The Contractor shall exercise extreme caution where existing buried cable runs are involved. The markings of existing systems are made strictly for assistance to the Contractor and this does not relieve

the Contractor of responsibility for the repair or replacement of any cable run damaged in the course of his work, as specified elsewhere herein. Note that the contractor shall be entitled to only one request for location marking of existing systems and that multiple requests may only be honored at the contractor's expense. No locates will be made after maintenance is transferred, unless it is at the contractor's expense.

Condition of Existing Systems. The Contractor shall conduct an inventory of all existing electrical system equipment within the project limits, which may be affected by the work, making note of any parts which are found broken or missing, defective or malfunctioning. Megger and load readings shall be taken for all existing circuits which will remain in place or be modified. If a circuit is to be taken out in its entirety, then readings do not have to be taken. The inventory and test data shall be reviewed with and approved by the Engineer and a record of the inventory shall be submitted to the Engineer for the record. Without such a record, all systems transferred to the Contractor for maintenance during construction shall be returned at the end of construction in complete, fully operating condition."

Delete Articles 801.11 and 801.12 of the Standard Specifications.

Revise the 6th paragraph of Article 801.05(a) of the Standard Specifications to read:

"Resubmittals. All submitted items reviewed and marked 'APPROVED AS NOTED', or 'DISAPPROVED' are to be resubmitted in their entirety with a disposition of previous comments to verify contract compliance at no additional cost to the state unless otherwise indicated within the submittal comments."

Revise Article 801.11(a) of the Standard Specifications to read:

"Lighting Operation and Maintenance Responsibility. The scope of work shall include the assumption of responsibility for the continuing operation and maintenance the of existing, proposed, temporary, sign and navigation lighting, or other lighting systems and all appurtenances affected by the work as specified elsewhere herein."

Add the following to Section 801.11(a) of the Standard Specifications:

"Energy and Demand Charges. The payment of basic energy and demand charges by the electric utility for existing lighting which remains in service will continue as a responsibility of the Owner, unless otherwise indicated. Unless otherwise indicated or required by the Engineer duplicate lighting systems (such as temporary lighting and proposed new lighting) shall not be operated simultaneously at the Owner's expense and lighting systems shall not be kept in operation during long daytime periods at the Owner's expense. Upon written authorization from the Engineer to place a proposed new lighting system in service, whether the system has passed final acceptance or not, (such as to allow temporary lighting to be removed), the Owner will accept responsibility for energy and demand charges for such lighting, effective the date of authorization. All other energy and demand payments to the utility shall be the responsibility of the Contractor until final acceptance."

Add the following to Section 801 of the Standard Specifications:

"Lighting Cable Identification. Each wire installed shall be identified with its complete circuit number at each termination, splice, junction box or other location where the wire is accessible."

"Lighting Cable Fuse Installation. Standard fuse holders shall be used on non-frangible (non-breakaway) light pole installations and quick-disconnect fuse holders shall be used on frangible (breakaway) light pole installations. Wires shall be carefully stripped only as far as needed for connection to the device. Over-stripping shall be avoided. An oxide inhibiting lubricant shall be applied to the wire for minimum connection resistance before the terminals are crimped-on. Crimping shall be performed in accordance with the fuse holder manufacturer's recommendations. The exposed metal connecting portion of the assembly shall be taped with two half-lapped wraps of electrical tape and then covered by the specified insulating boot. The fuse holder shall be installed such that the fuse side is connected to the pole wire (load side) and the receptacle side of the holder is connected to the line side."

Revise the 2nd and 3rd sentences of the second paragraph of Article 801.02 of the Standard Specifications to read:

"Unless otherwise indicated, materials and equipment shall bear the UL label, or an approved equivalent, whenever such labeling is available for the type of material or equipment being furnished."

ELECTRIC SERVICE INSTALLATION
Effective: January 1, 2007

Description. This item shall consist of all material and labor required to extend, connect or modify the electric services, as indicated or specified, which is over and above the work performed by the utility. Unless otherwise indicated, the cost for the utility work, if any, will be reimbursed to the Contractor separately under ELECTRIC UTILITY SERVICE CONNECTION. This item may apply to the work at more than one service location and each will be paid separately.

Materials. Materials shall conform to the corresponding material Articles for the materials being used under this pay item.

CONSTRUCTION REQUIREMENTS

General. The Contractor shall ascertain the work being provided by the electric utility and shall provide all additional material and work not covered by contract pay items required to complete the electric service work in complete compliance with the requirements of the utility.

No additional compensation will be allowed for work required for the electric service, even though not explicitly shown on the Drawings or specified herein

Method Of Measurement. Electric Service Installation shall be counted, each.

Basis Of Payment. This work will be paid for at the contract unit price each for **ELECTRIC SERVICE INSTALLATION** which shall be payment in full for the work specified herein.

LUMINAIRE
Effective: January 1, 2007

Add the following to first paragraph of Article 1067.01(c) of the Standard Specifications:

> "The reflector shall not be altered by paint or other opaque coatings which would cover or coat the reflecting surface. Control of the light distribution by any method other than the reflecting material and the aforementioned clear protective coating that will alter the reflective properties of the reflecting surface is unacceptable"

Add the following to Article 1067.01(e) of the Standard Specifications:

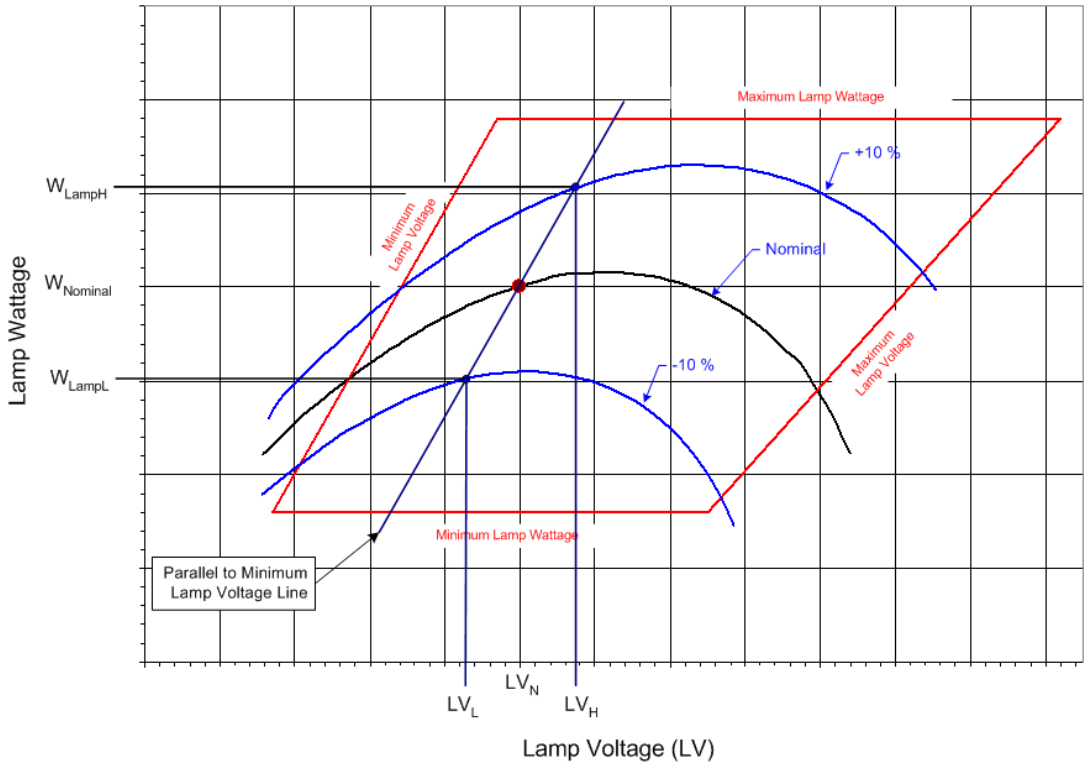
> "The ballast shall be a High Pressure Sodium, high power factor, constant wattage auto-regulator, lead type (CWA) for operation on a nominal 240 volt system."

Revise Article 1067.01(e)(1) of the Standard Specifications to read:

> "The high pressure sodium, auto-regulator, lead type (CWA) ballast shall be designed to ANSI Standards and shall be designed and rated for operation on a nominal 240 volt system. The ballast shall provide positive lamp ignition at the input voltage of 216 volts. It shall operate the lamp over a range of input voltages from 216 to 264 volts without damage to the ballast. It shall provide lamp operation within lamp specifications for rated lamp life at input design voltage range. Operating characteristics shall produce output regulation not exceeding the following values:

Nominal Ballast Wattage	Maximum Ballast Regulation
750	25%
400	26%
310	26%
250	26%
150	24%
70	18%

> For this measure, regulation shall be defined as the ratio of the lamp watt difference between the upper and lower operating curves to the nominal lamp watts; with the lamp watt difference taken within the ANSI trapezoid at the nominal lamp operating voltage point parallel to the minimum lamp volt line:



$$\text{Ballast Regulation} = \frac{W_{LampH} - W_{LampL}}{W_{LampN}} \times 100$$

where:
W_{LampH} = lamp watts at +10% line voltage when Lamp voltage = LV_H
W_{LampL} = lamp watts at - 10% line voltage when lamp voltage = LV_L
W_{lampN} = lamp watts at nominal lamp operating voltage = LV_N

Wattage	Nominal Lamp Voltage, LV_N	LV_L	LV_H
750	120v	115v	125v
400	100v	95v	105v
310	100v	95v	105v
250	100v	95v	105v
150	55v	50v	60v
70	52v	47v	57v

Ballast losses, based on cold bench tests, shall not exceed the following values:

Nominal Ballast Wattage	Maximum Ballast Losses
750	14.0%
400	17.0%
310	19.0%
250	19.0%
150	26.0%
70	34.0%

Ballast losses shall be calculated based on input watts and lamp watts at nominal system voltage as indicated in the following equation:

$$\text{Ballast Losses} = \frac{W_{Line} - W_{Lamp}}{W_{Lamp}} \times 100$$

where:
W_{line} = line watts at nominal system voltage
W_{lamp} = lamp watts at nominal system voltage

Ballast output to lamp. At nominal system voltage and nominal lamp voltage, the ballast shall deliver lamp wattage with the variation specified in the following table. Example: *For a 400w luminaire, the ballast shall deliver 400 watts ±2.5% at a lamp voltage of 100v for the nominal system voltage of 240v which is the range of 390w to 410w.*

Nominal Ballast Wattage	Output to lamp variation
750	± 2.0%
400	± 2.5%
310	± 2.5%
250	± 4.0%
150	± 4.0%
70	± 4.0%

Ballast output over lamp life. Over the life of the lamp the ballast shall produce average output wattage of the nominal lamp rating as specified in the following table. Lamp wattage readings shall be taken at 5-volt increments throughout the ballast trapezoid. Reading shall begin at the lamp voltage (L_V) specified in the table and continue at 5 volt increments until the right side of the trapezoid is reached. The lamp wattage values shall then be averaged and shall be within the specified value of the nominal ballast rating. Submittal documents shall include a tabulation of the lamp wattage vs. lamp voltage readings. Example: *For a 400w luminaire, the averaged lamp wattage reading shall not exceed the range of ±3% which is 388 to 412 watts*"

Nominal Ballast Wattage	LV Readings begin at	Maximum Wattage Variation
750	110v	± 3%
400	90v	± 3%
310	90v	± 3%
250	90v	± 4%
150	50v	± 4%
70	45v	± 5%

Add the following to Article 1067.01(f) of the Standard Specifications:

"Independent Testing. Independent testing of luminaires shall be required whenever the quantity of luminaires of a given wattage and distribution, as indicated on the plans, is 50 or more. For each luminaire type to be so tested, one luminaire plus one luminaire for each 50 luminaires shall be tested. Example: *A plan quantity of 75 luminaires would dictate that 2 to be tested; 135 luminaires would dictate that three be tested*." If the luminaire performance table is missing from the contract documents, the luminaire(s) shall be tested and the test results shall be evaluated against the manufacturer's published data. The test luminaire(s) results shall be equal to or better than the published data. If the test results indicated performance not meeting the published data, the test luminaire will be designated as failed and corrective action as described herein shall be performed.

The Contractor shall be responsible for all costs associated with the specified testing, including but not limited to shipping, travel and lodging costs as well as the costs of the tests themselves, all as part of the bid unit price for this item. Travel, lodging and other associated costs for travel by the Engineer shall be direct-billed to or shall be pre-paid by the Contractor, requiring no direct reimbursement to the Engineer or the independent witness, as applicable"

The Contractor shall select one of the following options for the required testing with the Engineer's approval:

a. Engineer Factory Selection for Independent Lab: The Contractor may select this option if the luminaire manufacturing facility is within the state of Illinois. The Contractor shall propose an independent test laboratory for approval by the Engineer. The selected luminaires shall be marked by the Engineer and shipped to the independent laboratory for tests.

b. Engineer Witness of Independent Lab Test: The Contractor may select this option if the independent testing laboratory is within the state of Illinois. The Engineer shall select, from the project luminaires at the manufacturer's facility or at the Contractor's storage facility, luminaires for testing by the independent laboratory.

c. Independent Witness of Manufacturer Testing: The independent witness shall select from the project luminaires at the manufacturers facility or at the Contractor's storage facility, the luminaires for testing. The Contractor shall propose a qualified independent agent, familiar with the luminaire requirements and test procedures, for approval by the Engineer, to witness the required tests as performed by the luminaire manufacturer.

The independent witness shall as a minimum meet the following requirements:

- Have been involved with roadway lighting design for at least 15 years.
- Not have been the employee of a luminaire or ballast manufacturer within the last 5 years.
- Not associated in any way (plan preparation, construction or supply) with the particular project being tested.
- Be a member of IESNA in good standing.
- Provide a list of professional references.

This list is not an all inclusive list and the Engineer will make the final determination as to the acceptability of the proposed independent witness.

d. Engineer Factory Selection and Witness of Manufacturer Testing: The Contractor may select this option if the luminaire manufacturing facility is within the state of Illinois. At the Manufacturer's facility, the Engineer shall select the luminaires to be tested and shall be present during the testing process. The Contractor shall schedule travel by the Engineer to and from the Manufacturer's laboratory to witness the performance of the required tests."

Add the following to Article 1067.02(a)(1) of the Standard Specifications:

"The beam of maximum candlepower for luminaires specified or shown to have a 'medium' distribution shall be at 70 degrees from the horizontal ± 2.5 degrees. Submittal information shall identify the angle."

Revise Article 1067.06(a)(1) of the Standard Specifications to read:

"The lamps shall be of the clear type and shall have a color of 1900° to 2200° Kelvin."

Revise Article 1067.06(a)(4) of the Standard Specifications to read:

Lamp Wattage	Initial Lumens	Mean Lumens	Rated Life (Hours)	Lamp Voltage
50	4,000	3,600	24,000	52
70	6,300	5,450	24,000	52
100	9,400	8,000	24,000	55
150	15,800	13,800	24,000	55
200	21,400	19,260	24,000	100
250	27,000	24,300	24,000	100
310	37,000	33,300	24,000	100
400	50,000	45,000	24,000	100
750	105,000	94,500	24,000	120

Add the following table(s) to Article 1067 of the Standard Specifications:

IDOT DISTRICT 1 LUMINAIRE PERFORMANCE TABLE

GIVEN CONDITIONS		
ROADWAY DATA	Pavement Width	16.5m
	Number of Lanes	4
	I.E.S. Surface Classification	R3
	Q-Zero Value	.07
LIGHT POLE DATA	Mounting Height	14.5m
	Mast Arm Length	2.5m
	Pole Set-Back From Edge of Pavement	2.5m
LUMINAIRE DATA	Lamp Type	310W HPS
	Lamp Lumens	37000
	I.E.S. Vertical Distribution	Medium
	I.E.S. Control Of Distribution	Full Cutoff
	I.E.S. Lateral Distribution	Type III
	Total Light Loss Factor	0.689
LAYOUT DATA	Spacing	70 m
	Configuration	Opposite
	Luminaire Overhang over edge of pavement	0 m

NOTE: Variations from the above specified I.E.S. distribution pattern may be requested and acceptance of variations will be subject to review by the Engineer based on how well the performance requirements are met.

PERFORMANCE REQUIREMENTS		

NOTE: These performance requirements shall be the minimum acceptable standards of photometric performance for the luminaire, based on the given conditions listed above.

ILLUMINATION	Ave. Horizontal Illumination, $\mathbf{E_{AVE}}$	1.3 fc
	Uniformity Ratio, $\mathbf{E_{AVE}/E_{MIN}}$	3.0:1

LUMINANCE	Average Luminance, L_{AVE}	0.9 Cd/m^2
	Uniformity Ratio, L_{AVE}/L_{MIN}	3.0:1 (Max)
	Uniformity Ratio, L_{MAX}/L_{MIN}	5.0:1(Max)
	Veiling Luminance Ratio, L_V/L_{AVE}	0.3:1 (Max)

IDOT DISTRICT 1 LUMINAIRE PERFORMANCE TABLE

GIVEN CONDITIONS

ROADWAY DATA	Pavement Width	6.6m
	Number of Lanes	2
	I.E.S. Surface Classification	R3
	Q-Zero Value	.07
LIGHT POLE DATA	Mounting Height	14.5m
	Mast Arm Length	4.5m
	Pole Set-Back From Edge of Pavement	1.82m (min)
LUMINAIRE DATA	Lamp Type	400W HPS
	Lamp Lumens	51000
	I.E.S. Vertical Distribution	Medium
	I.E.S. Control Of Distribution	Full Cutoff
	I.E.S. Lateral Distribution	Type III
	Total Light Loss Factor	0.689
LAYOUT DATA	Spacing	65 m
	Configuration	One Row, Far Side
	Luminaire Overhang over edge of pavement	2.68m

NOTE: Variations from the above specified I.E.S. distribution pattern may be requested and acceptance of variations will be subject to review by the Engineer based on how well the performance requirements are met.

PERFORMANCE REQUIREMENTS

NOTE: These performance requirements shall be the minimum acceptable standards of photometric performance for the luminaire, based on the given conditions listed above.

ILLUMINATION	Ave. Horizontal Illumination, E_{AVE}	1.3 fc
	Uniformity Ratio, E_{AVE}/E_{MIN}	3.0:1
LUMINANCE	Average Luminance, L_{AVE}	0.9 Cd/m^2
	Uniformity Ratio, L_{AVE}/L_{MIN}	3.0:1 (Max)
	Uniformity Ratio, L_{MAX}/L_{MIN}	5.0:1(Max)
	Veiling Luminance Ratio, L_V/L_{AVE}	0.3:1 (Max)

Guarantee. The Vendor shall provide a written guarantee for materials, and workmanship for a period of 6 months after final acceptable of the lighting system.

Documentation. All instruction sheets required to be furnished by the manufacturer for materials and supplies and for operation of the equipment shall be delivered to the Engineer.

The manufacturer shall have been incorporated for at least five years and shall have at least five years in the design and manufacturing of roadway underpass lighting. The manufacturer shall provide evidence of financial strength to finance the production of the project by submitting the name of at least three projects completed in the previous calendar year of greater than $250,000 each. All steel used in the project shall be certified to be provided domestically, and all fixture components used shall be manufactured domestically.

Method of Measurement. Luminaires shall be counted, each.

Basis of Payment**.** This item shall be paid at the contract unit price each for **LUMINAIRE, SODIUM VAPOR, HORIZONTAL MOUNT,** of specified wattage which shall be payment in full for the material and work described herein.

UNDERPASS LUMINAIRE, HPS, STAINLESS STEEL HOUSING

1. Description. This item shall consist of furnishing, testing as required, and installing a luminaire suitable for roadway underpasses as specified herein.

2. General.

2.1 The luminaire shall be optically sealed, mechanically strong and easy to maintain.

2.2 All wiring within the fixture shall have a minimum temperature rating of 125º C. In addition, the unit shall be designed to allow for a maximum supply wire rating of 90º C.

2.3 All hardware of the housing, reflector, and ballast assembly shall be captive

2.4 The luminaire shall be UL Listed for Wet Locations.

2.5 The underpass luminaire shall be suitable for lighting a roadway underpass at approximate mounting height of 16 feet from a position suspended directly above the roadway.

2.6 The luminaire shall be certified by the U.L. testing laboratory to meet the IP66 criteria of the International Electro technical Commission Standard 529.

3. Housing.

3.1 The housing shall be stainless steel and be made of 16 gauge minimum thickness stainless steel, Type 304, #2B finish.

3.2 Since the installed location of the luminaires has severe space limitations that prohibit servicing the luminaire from the top or side of the fixture, the luminaire must be serviceable from the bottom of the housing when in the installed position. Both ballast and optical compartments must be serviceable from the bottom of the fixture. Fixtures which open from the top or sides are not acceptable.

3.3 The housing shall have a maximum width of 13”

3.4 All internal and external hardware, unless specifically specified otherwise, shall be made of stainless steel.

3.5 Stainless Steel Housing

3.5.1 The stainless steel housing, and lens frame shall be made of 16 gauge minimum thickness stainless steel, Type 304 #2B.

3.5.2 All housing and frame components shall be cut within with a laser with a positioning accuracy of +/- .004” for assembly accuracy and machine welded to minimize irregularities in the weld joint.

3.5.3 All seams in the housing enclosure shall be welded by continuous welding. Stainless steel weld wire shall be used for all welds. A sample weld shall be submitted for review and approval.

3.5.4 The luminaire lens shall be flush, within 3.1 mm (0.122”), of the lens frame.

3.5.5 The lens frame shall be flat and the frame and luminaire housing shall not have any protruding flanges.

3.5.6 The lens frame assembly shall consist of a one-piece 16 gauge 304 stainless steel external frame with the lens facing toward the housing and a 16 gauge 304 stainless internal frame with the legs facing away from the housing. The internal frame shall have seam welded corners for added strength. The two panels will sandwich the glass lens and be fastened together with the use of no less than 10 #10 stainless steel fasteners.

3.5.7 The lens frame and the door frame shall each be secured through the use of two stainless steel draw latches secured to the fixture housing.

3.5.8 When in open position, it shall be possible to un-hinge and remove the lens frame for maintenance. The lens frame hinge shall be stainless steel and designed so that there must be a conscious action of the maintenance personnel to remove the lens frame. The frame hinging method shall not be designed so that bumping the frame accidentally could allow the frame to fall to the roadway surface. The removal method must be accomplished without the use of tools or hardware. The hinge pin shall be a minimum of 6.35 mm (0.250”) in diameter. The pin shall be spring loaded and retractable with a safety catch to hold the pin in the retracted position for ease of maintenance.

3.5.9 The suspended housing shall be divided into two compartments, one for the ballast and optical assembly, the other for wire connections. The optical chamber shall be sealed from the environment. The wire portal between compartments shall be sealed so as to prevent air exchange through the portal. There shall be an internally mounted breather mechanism to allow internal and external air pressure to equalize without permitting dust or water into the unit.

3.5.10 The ballast and all electrical equipment shall be mounted to a removable aluminum chassis with a minimum thickness of 3.175, (0.125"). The chassis shall be held in place with captive stainless steel hardware. The hardware shall include a bracket that can be loosened and shifted to allow the chassis to pivot away from fastened position for removal. The splice box shall include a heavy-duty 3 pole terminal block to accommodate #6 conductors and a KTK 2 amp fuse with HPC fuse holder or approved equal. Quick-connect power distribution terminal blocks shall be a molded thermoset plastic, rated 70A, 600V and hove 3 poles, each with (4) .250 quick connect terminals. Operating temperature rating to be 150º C. Input wire size shall accommodate #2-#14 AWG. Torque rating shall be 45 in./lb. Maximum. Agency approvals shall be UL E62622; CSA LR15364.

3.5.11 Ballast compartment surfaces shall be deburred and free of sharp edges, points or corners that may come in contact with installers or service personnel.

4. Gasketing:

4.1 The junction between the lens frame and the ballast housing door and the housing shall be sealed with a one-piece vulcanized or molded high temperature solid silicone rubber gasket with the equivalent of a 60 Shore A durometer rating. The gasket between the lens frame and the luminaire housing shall be securely attached by mechanical means, such a retaining lip to prevent the movement of the gasket. The gasket may not be secured by adhesive means exclusively. The lens and ballast housing doors shall be designed and constructed so they seal to the gasket on a flat surface. The frame shall not seal to the gasket using the edge of leg on a doorframe. The lens shall be sealed inside of the lens frame with the use of a one-piece solid silicone rubber gasket with ribbed flanges and a rating of 60 Shore A Durometer

4.2 The junction between conduit connections to the luminaire and the lens frame junction to the housing shall withstand entry of water when subjected to a water jet pressure of 207 kPa (30 lbs. Per sq. inch), tested under laboratory conditions. Submittal information shall include data relative to gasket thickness and density and the means of securing it in place.

5. Mounting Brackets

5.1 The brackets shall be properly sized to accommodate the weight of the luminaire with calculations or other suitable reference documentation submitted to support the material choice.

5.2 The luminaire shall have an opening in the housing for installation (by others) of a 28.1 mm (3/4 inch) diameter flexible conduit. The location of the opening will be determined by the Engineer during the shop drawing review.

6. Lamp Socket:

6.1 The lamp socket shall be a 4KV pulse rated mogul type, porcelain glazed enclosed, and be provided with grips, or other suitable means to hold the lamp against vibration. The rating of the socket shall exceed the lamp starting voltage, or starting pulse voltage rating.

6.2 If the lamp socket is of the sealed removable type, proper alignment of the socket shall be provided and molded into the socket assembly and indicated in a contrasting color.

6.3 If the lamp socket is adjustable, the factory setting must be indicated legibly in the luminaire housing.

7. ANSI Identification Decal:

A decal, complying to ANSI standard C136-15 for luminaire wattage and distribution type, shall be factory attached permanently to the luminaire. The information contained in the decal shall enable a viewer, from the ground level, to identify the lamp wattage and type of luminaire distribution.

8. Optical Assembly:

8.1 Lens and Lens Frame. The lens shall be made of crystal clear, impact and heat resistant tempered glass a minimum of 6.35 mm (0.25”) thick. The lens shall be held in such a manner as to allow for its expansion and contraction, due to temperature variation. The lens shall be a flat glass design.

8.2 Reflector:

8.2.1 The reflector shall be hydro formed aluminum, 0.063” thick, bright-dip and clear anodized finish.

8.2.2 The reflector shall be secured with a stainless steel aircraft cable during maintenance operations.

8.2.3 If the reflector has multiple light distribution positions, each position must have positive stop/mounting with the original factory distribution identified.

8.2.4 The luminaire shall be photometrically efficient. Luminaire efficiency, defined by the I.E.S. as "the ratio or luminous flux (lumens) emitted by a luminaire to that emitted by the lamp or lamps used within", shall not be less than 67%. Submittal information shall include published efficiency data.

8.2.5 The reflector, the refractor or lens, and the entire optical assembly shall not develop any discoloration over the normal life span of the luminaire.

8.2.6 The reflector shall not be altered by paint or other opaque coatings which would cover or coat the reflecting surface. Control of the light distribution by any method other than the reflecting material and the aforementioned clear protective coating that will alter the reflective properties of the reflecting surface is unacceptable

9. Ballast:

9.1 The ballast shall be a High Pressure Sodium, high power factor, lead type, Isolated Regulator Ballast (CWI) or a Constant Wattage Auto-regulator (CWA), for operation on a nominal 240 volt system.

9.2 The ballast shall be designed to furnish proper electrical characteristics for starting and operating a high pressure sodium vapor lamp of the specified rating at ambient temperatures of -29 degrees to +40 degrees C. The ballast windings shall be adequately impregnated and treated for protection against the entrance of moisture, insulated with Class H insulation, and able to withstand the NEMA standard dielectric test.

9.3 The ballast shall include an electronic starting assembly. The starter assembly shall be comprised of solid state devices capable of withstanding ambient temperatures of 85 degrees C. The starter shall provide timed pulsing with sufficient follow-through current to completely ionize and start all lamps. Minimum amplitude of the pulse shall be 2,500 volts, with a width of one (1) microsecond at 2,250 volts, and shall be applied within 20 electrical degrees of the peak of the open circuit voltage wave with a repetition rate as recommended by the lamp manufacturer for the 60 cycle wave. The lamp peak pulse current shall be a minimum of 0.2 amperes. Proper ignition shall be provided over a range of input voltage from 216 to 264 volts. The starter component shall be field replaceable and completely interchangeable with no adjustment necessary for proper operation. The starter component shall have push-on type electrical terminations to provide good electrical and mechanical integrity and ease of replacement. Terminal configuration shall preclude improper insertion of plug-in components. The starter circuit board shall be treated in an approved manner to provide a water and contaminant-resistant coating.

9.4 The ballast shall have an overall power factor of at least 0.9 when operated under rated lamp load.

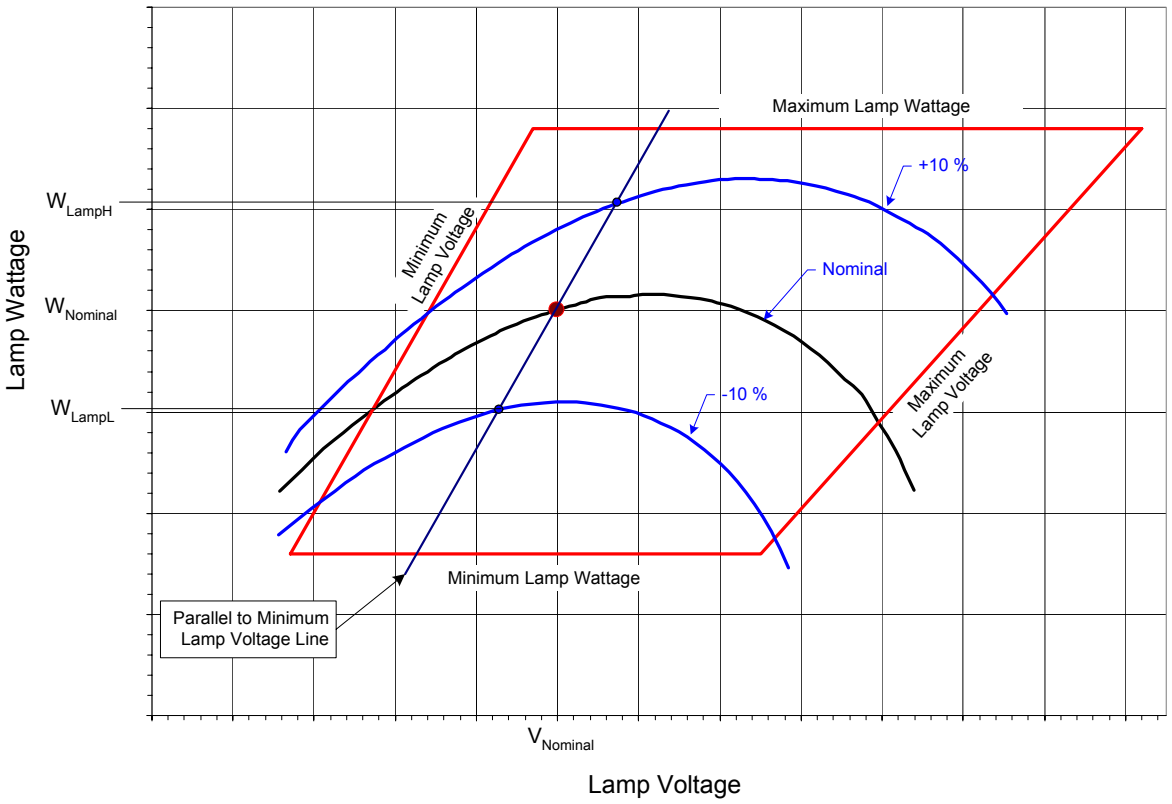
9.5 The ballast shall withstand a 2,500 volt dielectric test between the core and windings without damage to the insulation.

9.6 The ballast shall not subject the lamp to a crest factor exceeding 1.8 and shall operate the lamp without affecting adversely the lamp life and performance.

9.7 The ballast shall be designed to ANSI Standards and shall be designed and rated for operation on a nominal 240 volt system. The ballast shall provide positive lamp ignition at the input voltage of 216 volts. It shall operate the lamp over a range of input voltages from 216 to 264 volts without damage to the ballast. It shall provide lamp operation within lamp specifications for rated lamp life at input design voltage range. Operating characteristics shall produce output regulation not exceeding the following values:

Nominal Ballast Wattage	Maximum Ballast Regulation
750	25%
400	25%
310	26%
250	22%
150	22%
70	17%

For this measure, regulation shall be defined as the ratio of the lamp watt difference between the upper and lower operating curves to the nominal lamp watts; with the lamp watt difference taken within the ANSI trapezoid at the nominal lamp operating voltage point parallel to the minimum lamp volt line:



$$\text{Ballast Regulation} = \frac{W_{LampH} - W_{LampL}}{W_{LampN}} \times 100$$

where:
W_{LampH} = lamp watts at +10% line voltage (264v)
W_{LampL} = lamp watts at - 10% line voltage (216v)
W_{lampN} = lamp watts at 240v"

9.8 Ballast losses, based on cold bench tests, shall not exceed the following values:

Nominal Ballast Wattage	Maximum Ballast Losses
750	16.0%
400	16.0%
310	19.0%
250	17.5%
150	26.0%
70	34.0%

Ballast losses shall be calculated based on input watts and lamp watts at nominal system voltage as indicated in the following equation:

$$\text{Ballast Losses} = \frac{W_{Line} - W_{Lamp}}{W_{Lamp}} \times 100$$

where:
W_{line} = line watts at 240v
W_{lamp} = lamp watts at 240v

9.9 Ballast output to lamp. At nominal system voltage and a lamp voltage of 52v, the ballast shall deliver a lamp wattage within ±4% of the nominal lamp wattage. For a 70w luminaire, the ballast shall deliver 70 watts ±4% at a lamp voltage of 52v for the nominal system voltage of 240v.

9.10 Ballast output over lamp life. Over the life of the lamp the ballast shall produce an average of the nominal lamp rating ±5%. Lamp wattage readings shall be taken at 5-volt increments throughout the ballast trapezoid. The lamp wattage values shall then be averaged within the trapezoid and shall be within ±5% of the nominal ballast rating. Submittal documents shall include a tabulation of the lamp wattage vs. lamp voltage readings.

9.11 The ballast shall be integral to the luminaire. The ballast components shall be mounted on a removable door or on a removable mounting tray. The ballast tray or mounting door shall be manufactured with dissimilar metal conflicts kept to a minimum.

9.12 Ballast wiring and lamp socket wiring shall be connected by means of keyed plugs. Upon unplugging the ballast wiring the entire ballast assembly shall removable for maintenance. The plugs shall not be interchangeable to avoid improper connection of the assemblies.

9.13 The mounting adjustments and wiring terminals shall be readily accessible. The removable door or pad shall be secure when fastened in place and all individual components shall be secure upon the removable element. Upon ballast assembly removal, each component shall be readily removable for replacement.

9.14 The luminaire shall be completely wired. All wiring connections within the luminaire shall be made with insulated compression connectors or insulated terminal blocks. An insulated terminal block shall be provided to terminate the incoming supply wires. The terminal block shall be rated for 600 volts and shall accommodate wire sizes from #10 to #6 AWG. The use of “wire nuts” is unacceptable. A ground terminal shall be provided for the connection of a ground wire.

9.15 Ballast and lamp Leads shall not be smaller than #16 AWG conductors rated at a minimum temperature rating of 90º C.

9.16 All wires shall be coded by tagging and/or color coding for proper identification. A complete legible permanently attached wiring diagram (no smaller than 3” x 4” with a min. font size of 8 pts.) coordinated with the wire identifications shall be displayed

at the convenient location on the interior of the luminaire. The wiring diagram shall be oriented so that it is right side up and readable when the luminaire is in the installed position.

9.17 The ballast shall not be excessively noisy. Noticeable noisy ballasts, as determined by the Engineer, shall be replaced at no additional cost to the State.

9.18 The ballast shall provide lamp operation within lamp specifications for the rated lamp life at the input design voltage range. It shall have a 6 month operation capability with a cycling lamp.

9.19 Submittal information shall include manufacturer's literature and date to confirm compliance with all specified requirements including an ANSI Standard Ballast Characteristic Graph (Trapezoid) diagram, with all items clearly identified.

10. Photometric Performance:

10.1 The luminaire photometric performance shall produce results equal to or better than those listed in the included Luminaire Performance Table. Submittal information shall include computer calculations based on the controlling given conditions which demonstrate achievement of all listed performance requirements. The computer calculations shall be performed according to I.E.S. recommendations and the submitted calculations shall include point-by-point illuminance, luminance and veiling luminance as well as listings of all indicated averages and ratios as applicable. Acceptable programs to perform the calculations are: Micro-Site-Lite, Lumen Micro, and AGI32. The program used to perform the calculations shall be identified on the submittal. The submittal data shall also include all photometric calculations files (for either Micro-Site-Lite, Lumen Micro or AGI32) with the proposed photometric data on a CD ROM. The performance requirements shall define the minimum number of decimal places used in the calculations. Rounding of calculations shall not be allowed.

10.2 In addition to computer printouts of photometric performance, submittal information shall include: Descriptive literature; an Isofootcandle chart of horizontal lux (footcandles); Utilization curve; Isocandela diagram; Luminaire classification per ANSI designation; Candlepower values at every 2.5 degree intervals; Candlepower tables are to be provided on 3.5” diskette or CD ROM in the IES format as specified in IES publication LM-63.

IDOT DISTRICT 1 LUMINARIE PERFORMANCE TABLE
2 Lane Cross Section

GIVEN CONDITIONS		
ROADWAY DATA	Pavement Width	7.3m (24ft)
	Number of Lanes	2
	I.E.S. Surface Classification	R3
	Q-Zero Value	.07
LIGHT POLE DATA	Mounting Height	4.26m (14ft)
	Mast Arm Length	0 m (0 ft)
	Pole Set-Back From Edge of Pavement	n/a
LUMINARIE DATA	Lamp Type	70W HPS
	Lamp Lumens	4,400
	I.E.S. Vertical Distribution	Medium
	I.E.S. Control of Distribution	Cutoff
	I.E.S. Lateral Distribution	n/a
	Total Light Loss Factor	0.64
LAYOUT DATA	Spacing	13.7m (45ft)
	Configuration	Opposite Side
	Luminarie Overhang over edge of pavement	3m for walkway and 0m for center

NOTE: Variations from the above specified I.E.S. distribution pattern may be requested and acceptance of variations will be subject to review by the Engineer based on how well the performance requirements are met.

PERFORMANCE REQUIREMENTS

NOTE: These performance requirements shall be the minimum acceptable standards of photometric performance for the luminaire, based for the given condition listed above.

GRID # 1 STRAIGHT SECTION

ILLUMINATION	Ave. Horizontal Illumination, $\mathbf{E_{AVE}}$	18 Lux
	Uniformity Ratio, $\mathbf{E_{AVE}/E_{MIN}}$	2.5:1
LUMINANCE	Average Luminance, $\mathbf{L_{AVE}}$	1.2 Lux Cd/m2
	Uniformity Ratio, $\mathbf{L_{AVE}/L_{MIN}}$	2.5:1
	Uniformity Ratio, $\mathbf{L_{MAX}/L_{MIN}}$	4:01
	Veiling Luminance Ratio, $\mathbf{L_V/L_{AVE}}$	0.30:1

IDOT DISTRICT 1 LUMINARIE PERFORMANCE TABLE
3 Lane Cross Section

GIVEN CONDITIONS		
ROADWAY DATA	Pavement Width	10.6m (35ft)
	Number of Lanes	3
	I.E.S. Surface Classification	R3
	Q-Zero Value	.07
LIGHT POLE DATA	Mounting Height	4.26m (14ft)
	Mast Arm Length	0 m (0 ft)
	Pole Set-Back From Edge of Pavement	n/a
LUMINARIE DATA	Lamp Type	70W HPS
	Lamp Lumens	4,400
	I.E.S. Vertical Distribution	Medium
	I.E.S. Control of Distribution	Cutoff
	I.E.S. Lateral Distribution	n/a
	Total Light Loss Factor	0.64
LAYOUT DATA	Spacing	10.7 m (35 ft)
	Configuration	Opposite Side
	Luminarie Overhang over edge of pavement	3m for walkway and 0m for center

NOTE: Variations from the above specified I.E.S. distribution pattern may be requested and acceptance of variations will be subject to review by the Engineer based on how well the performance requirements are met.

PERFORMANCE REQUIREMENTS

NOTE: These performance requirements shall be the minimum acceptable standards of photometric performance for the luminaire, based for the given condition listed above.

GRID # 1 STRAIGHT SECTION

ILLUMINATION	Ave. Horizontal Illumination, $\mathbf{E_{AVE}}$	18 Lux
	Uniformity Ratio, $\mathbf{E_{AVE}/E_{MIN}}$	2.5:1
LUMINANCE	Average Luminance, $\mathbf{L_{AVE}}$	1.2 Cd/m2
	Uniformity Ratio, $\mathbf{L_{AVE}/L_{MIN}}$	2.5:1
	Uniformity Ratio, $\mathbf{L_{MAX}/L_{MIN}}$	4:01
	Veiling Luminance Ratio, $\mathbf{L_V/L_{AVE}}$	0.30:1

11. Independent Testing:

11.1 Independent testing of luminaires shall be required whenever the quantity of luminaires of a given wattage and distribution, as indicated on the plans, is 50 or more. For each luminaire type to be so tested, one luminaire plus one luminaire for each 50 luminaires shall be tested. Example: *A plan quantity of 75 luminaires would dictate that 2 to be tested; 135 luminaires would dictate that three be tested*.

11.2 The Contractor shall be responsible for all costs associated with the specified testing, including but not limited to shipping, travel and lodging costs as well as the costs of the tests themselves, all as part of the bid unit price for this item. Travel, lodging and other associated costs for travel by the Engineer shall be direct-billed to or shall be pre-paid by the Contractor, requiring no direct reimbursement to the Engineer or the independent witness, as applicable.

11.3 Commitment to test. The Vendor shall select one of the following options for the required testing with the Engineer's approval:

a. Engineer Factory Selection for Independent Lab: The Contractor may select this option if the luminaire manufacturing facility is within the state of Illinois. The Contractor shall propose an independent test laboratory for approval by the Engineer. The selected luminaires shall be marked by the Engineer and shipped to the independent laboratory for tests.

b. Engineer Witness of Independent Lab Test: The Contractor may select this option if the independent testing laboratory is within the state of Illinois. The Engineer shall select, from the project luminaires at the manufacturer's facility or at the Contractor's storage facility, luminaires for testing by the independent laboratory.

c. Independent Witness of Manufacturer Testing: The independent witness shall select from the project luminaires at the manufacturer's facility or at the Contractor's storage facility, the luminaires for testing. The Contractor shall propose a qualified independent agent, familiar with the luminaire requirements and test procedures, for approval by the Engineer, to witness the required tests as performed by the luminaire manufacturer. The independent witness shall:

- Have been involved with roadway lighting design for at least 15 years.
- Not have been the employee of a luminaire or ballast manufacturer within the last 5 years.
- Be a member of IESNA in good standing.
- Provide a list of professional references.

d. Engineer Factory Selection and Witness of Manufacturer Testing: The Contractor may select this option if the manufacturing facility is within the state of Illinois. At the manufacturer's facility, the Engineer shall select the luminaires to be tested and shall be present during the testing process.

The Contractor shall schedule travel by the Engineer to and from the Manufacturer's laboratory to witness the performance of the required tests.

In all cases, the selection of luminaires shall be a random selection from the entire completed lot of luminaires required for the contract. Selections from partial lots will not be allowed. The selection of the testing option shall be presented with the information submitted for approval. The proposed independent laboratory or independent witness shall be included with that information. The selection of the testing option shall be presented with the information submitted for approval. The proposed independent laboratory or independent witness shall be included with that information.

11.4 The testing performed shall include photometric, electrical, heat and water jet testing.

11.5 Photometric testing shall be in accordance with IES recommendations except that the selected luminaire(s) shall be tested as manufactured without any disassembly or modification and, as a minimum shall yield an isofootcandle chart, with max candela point and half candela trace indicated, an isocandela diagram, maximum plane and cone plots of candela, a candlepower table (house and street side), a coefficient of utilization chart, a luminous flux distribution table, and complete calculations based on specified requirements and tests.

11.6 Electrical testing shall conform to NEMA and ANSI standards and as a minimum, shall yield a complete check of wiring connections, a ballast dielectric test, total ballast losses in watts and percent of input, a lamp volt-watt trace, regulation data, a starter test, lamp current crest factor, power factor (minimum over the design range of input voltage at nominal lamp voltage) and, a table of ballast characteristics showing input amperes, watts and power factor, output volts, amperes, watts and lamp crest factor as well as ballast losses over the range of values required to produce the lamp volt-watt trace. Ballast test data shall also be provided in an electronic format acceptable to the Engineer to demonstrate compliance with sections 9.7, 9.8, 9.9 and 9.10.

11.7 Heat Testing. Heat testing shall be conducted to ensure that the luminaire complies with UL 1572 An ambient temperature of 40 degrees centigrade (104 degrees F) shall be used for the test.

11.8 Water spray test. The luminaires must pass the following water spray test.:

A spray apparatus consisting of four spray nozzles set at an angle of 30 degrees from the vertical plane space 30 inches apart on a 2 inch pipe, each delivering 12 gallons of water per minute at a minimum of 100 psi at each nozzle in a 90 degree cone. A water pressure gauge shall be installed at the first nozzle.

The luminaires shall be mounted in a ceiling configuration and with each nozzle set a distance of 18 inches below the fixture in the vertical plane and 18 inches away in the horizontal plane from the fixture lens, apply spray for a duration of 3 minutes at a minimum of 100 psi. When opened, the fixture shall not show any signs of leakage.

The above test shall be repeated in the opposite horizontal plane from the fixture lens with no signs of leakage.

The summary report and the test results shall be certified by the independent test laboratory or the independent witness, as applicable, and shall be sent by certified mail directly to the Engineer. A copy of this material shall be sent to the Contractor and luminaire manufacturer at the same time.

11.9 Should any of the tested luminaires of a given distribution type and wattage fail to satisfy the specifications and perform according to approved submittal information, the luminaire of that distribution type and wattage shall be unacceptable and be replaced by alternate equipment meeting the specifications with the submittal and testing process repeated in their entirety; or corrections made to achieve required performance. In the case of corrections, the Vendor shall advise the Engineer of corrections made and shall request a repeat of the specified testing and, if the corrections are deemed reasonable by the Engineer, the testing process shall be repeated. The number of luminaires to be tested shall be the same quantity as originally tested. Luminaires which are not modified or corrected shall not be re-tested without prior approval from the Engineer.

Coordination shall be the Vendor's responsibility. Failure to coordinate arrangements and notice shall not be grounds for additional compensation or extension of time.

Submittal information shall include a statement of intent to provide the testing as well as a request for approval of the chosen laboratory.

12. Installation.

12.1 Underpass luminaires shall be either attached to structures (such as piers, etc.) or suspended from structures (such as bridge decks) as indicated or implied by the configuration on the Plans. Mounting, including all hardware and appurent items, shall be included as part of this item.

12.2 Unless otherwise indicated, suspended underpass luminaires shall be installed one-inch above the lowest underpass beam and shall be mounted using vibration dampening assemblies. All mounting hardware shall be corrosion resistant and shall be stainless steel unless otherwise indicated.

12.3 The Engineer reserves the right to select the final light distribution pattern, luminaire aiming angle and change it as deemed necessary to produce the proper pavement luminance.

12.4 Surface mounted luminaires, all luminaires not mounted on suspension rods, shall have one-inch thick stainless steel spacers installed between the luminaire and the deck or wall.

13. Guarantee.

The Vendor shall provide a written guarantee for materials and workmanship for a period of 6 months after final acceptance of the lighting system.

14. Documentation.

All instruction sheets required to be furnished by the manufacturer for materials and supplies and for operation of the equipment shall be delivered to the Engineer.

The manufacturer shall have been incorporated for at least five years and shall have at least five years in the design and manufacturing of roadway underpass lighting. The manufacturer shall provide evidence of financial strength to finance the production of the project by submitting the name of at least three projects completed in the previous calendar year of greater than $250,000 each. All steel used in the project shall be certified to be provided domestically, and all fixture components used shall be manufactured domestically.

15. Method of Measurement. Luminaires shall be counted, each.

16. Basis of Payment. This item shall be paid at the contract unit price each for **UNDERPASS LUMINAIRE**, of the wattage specified, **HIGH PRESSURE SODIUM VAPOR, STAINLESS STEEL HOUSING** which shall be payment in full for the material and work described herein.

WIRE AND CABLE
Effective: January 1, 2007

Revise the second sentence of the first paragraph of Article 1066.02(a) to read:

"The cable shall be rated at a minimum of 90°C dry and 75°C wet and shall be suitable for installation in wet and dry locations, and shall be resistant to oils and chemicals."

Revise the second paragraph of Article 1066.02(b) to read:

"Uncoated conductors shall be according to ASTM B3, ICEA S-95-658/NEMA WC70, and UL Standard 44. Coated conductors shall be according to ASTM B 33, ASTM B 8, ICEA S-95-658/NEMA WC70 and UL Standard 44."

Revise the third paragraph of Article 1066.02(b) to read:

"All conductors shall be stranded. Stranding meeting ASTM B 8, ICEA S-95-658/NEMA WC70 and UL Standard 44. Uncoated conductors meeting ASTM B 3, ICEA S-95-658/NEMA WC70 and UL Standard 44."

Revise the first sentence of Article 1066.03(a)(1) to read:

"General. Cable insulation designated as XLP shall incorporate cross-linked polyethylene (XLP) insulation as specified and shall meet or exceed the requirements of ICEA S-95-658, NEMA WC70, U.L. Standard 44."

Add the following to Article 1066.03(a)(1) of the Standard Specifications:

"The cable shall be rated 600 volts and shall be UL Listed Type RHH/RHW/USE."

Revise the Aerial Electric Cable Properties table of Article 1066.03(a)(3) to read:

Aerial Electric Cable Properties

Phase Conductor				Messenger wire	
Size AWG	Stranding	Average Insulation Thickness		Minimum Size AWG	Stranding
		mm	mils		
6	7	1.1	(45)	6	6/1
4	7	1.1	(45)	4	6/1
2	7	1.1	(45)	2	6/1
1/0	19	1.5	(60)	1/0	6/1
2/0	19	1.5	(60)	2/0	6/1
3/0	19	1.5	(60)	3/0	6/1
4/0	19	1.5	(60)	4/0	6/1

Revise the first paragraph of Article 1066.03(b) to read:

"EPR Insulation. Cable insulation shall incorporate ethylene propylene rubber (EPR) as specified and the insulation shall meet or exceed the requirements of ICEA S-95-658, NEMA Standard Publication No. WC70, and U.L. Standard 44, as applicable."

Add the following to Article 1066.03(b) of the Standard Specifications:

"Cable sized No. 2 AWG and smaller shall be U.L. listed Type RHH/RHW and may be Type RHH/RHW/USE. Cable sized larger than No. 2 AWG shall be U.L. listed Type RHH/RHW/USE."

Revise Article 1066.04 to read:

"Aerial Cable Assembly. The aerial cable shall be an assembly of insulated aluminum conductors according to Section 1066.02 and 1066.03. Unless otherwise indicated, the cable assembly shall be composed of three insulated conductors and a steel reinforced bare aluminum conductor (ACSR) to be used as the ground conductor. Unless otherwise indicated, the code word designation of this cable assembly is "Palomino". The steel reinforced aluminum conductor shall conform to ASTM B-232. The cable shall be assembled according to ANSI/ICEA S-76-474."

Revise the second paragraph of Article 1066.05 to read:

"The tape shall have reinforced metallic detection capabilities consisting of a woven reinforced polyethylene tape with a metallic core or backing."

Revise Article 1066.08 to read:

"Electrical Tape. Electrical tape shall be all weather vinyl plastic tape resistant to abrasion, puncture, flame, oil, acids, alkalies, and weathering, conforming to Federal Specification MIL-I-24391, ASTM D1000 and shall be listed under UL 510 Standard. Thickness shall not be less than 0.215 mm (8.5 mils) and width shall not be less than 20 mm (3/4-inch)."

TRENCH AND BACKFILL FOR ELECTRICAL WORK
Effective: January 1, 2007

Revise the first sentence of Article 819.03(a) of the Standard Specifications to read:

"Trench. Trenches shall have a minimum depth of 30 in. (760 mm) or as otherwise indicated on the plans, and shall not exceed 12 in. (300 mm) in width without prior approval of the Engineer."

FOUNDATIONS
Effective: January 1, 2007

Light Pole Foundation:

Delete the third sentence of Article 836.03(a) of the Standard Specifications. Ground Rods will be paid for under a separate pay item.

Tower Foundation:

Delete the third paragraph of Article 837.03 of the Standard Specifications. Ground Rods will be paid for under a separate pay item.

EXPOSED RACEWAYS
Effective: January 1, 2007

Revise the first paragraph of Article 811.03(a) of the Standard Specifications to read:

"General. Rigid metal conduit installation shall be according to Article 810.03(a). Conduits terminating in junction and pull boxes shall be terminated with insulated and gasketed watertight threaded NEMA 4X conduit hubs. The hubs shall be Listed under UL 514B. The insulated throat shall be rated up to 105º C. When PVC coated conduit is utilized, the aforementioned hubs shall also be PVC coated."

Add the following to Article 811.03(b) of the Standard Specifications:

"Where PVC coated conduit is utilized, all conduit fittings, couplings and clamps shall be PVC coated. All other mounting hardware and appurtenances shall be stainless steel."
"The personnel installing the PVC coated conduit must be trained and certified by the PVC coated conduit Manufacturer or Manufacturer's representative to install PVC coated conduit. Documentation demonstrating this requirement must be submitted for review and approval."

Revise Article 1088.01(a) of the Standard Specifications to read:

"Couplings and fittings shall meet ANSI Standard C80.5 and U.L. Standard 6. Elbows and nipples shall conform to the specifications for conduit. All fittings and couplings for rigid conduit shall be of the threaded type. All conduit hubs shall be gasketed and watertight with an integral O-ring seal."

Revise Article 1088.01(a)(3) of the Standard Specifications to read:

"a. PVC Coated Steel Conduit. The PVC coated rigid metal conduit shall be UL Listed (UL 6). The PVC coating must have been investigated by UL as providing the primary corrosion protection for the rigid metal conduit. Ferrous fittings for general service locations shall be UL Listed with PVC as the primary corrosion protection. Hazardous location fittings, prior to plastic coating shall be UL listed.

b. The PVC coating shall have the following characteristics:

Hardness:	85+ Shore A Durometer
Dielectric Strength:	400V/mil @ 60 Hz
Aging:	1,000 Hours Atlas Weatherometer
Temperature	The PVC compound shall conform at 0º F. to Federal Specifications PL-406b, Method 2051, Amendment 1 of 25 September 1952 (ASTM D 746)
Elongation:	200%

c. The exterior and interior galvanized conduit surface shall be chemically treated to enhance PVC coating adhesion and shall also be coated with a primer before the PVC coating to ensure a bond between the zinc substrate and the PVC coating. The bond strength created shall be greater than the tensile strength of the plastic coating.

d. The nominal thickness of the PVC coating shall be 1 mm (40 mils). The PVC exterior and urethane interior coatings applied to the conduit shall afford sufficient flexibility to permit field bending without cracking or flaking at temperatures above -1°C (30°F).

e. An interior urethane coating shall be uniformly and consistently applied to the interior of all conduit and fittings. This internal coating shall be a nominal 2 mil thickness. The interior coating shall be applied in a manner so there are no runs, drips, or pinholes at any point. The coating shall not peel, flake, or chip off after a cut is made in the conduit or a scratch is made in the coating.

f. Conduit bodies shall have a tongue-in-groove gasket for maximum sealing capability. The design shall incorporate a positive placement feature to assure proper installation. Certified test results confirming seal performance at 15 psig (positive) and 25 in. of mercury (vacuum) for 72 hours shall be submitted for review when requested by the Engineer.

g. The PVC conduit shall pass the following tests:

Exterior PVC Bond test RN1:

Two parallel cuts 13 mm (1/2 inch) apart and 40 mm (1 1/2 inches) in length shall be made with a sharp knife along the longitudinal axis. A third cut shall be made perpendicular to and crossing the longitudinal cuts at one end. The knife shall then be worked under the PVC coating for 13 mm (1/2 inch) to free the coating from the metal.

Using pliers, the freed PVC tab shall be pulled with a force applied vertically and away from the conduit. The PVC tab shall tear rather than cause any additional PVC coating to separate from the substrate.

Boil Test:

Acceptable conduit coating bonds (exterior and interior) shall be confirmed if there is no disbondment after a minimum average of 200 hours in boiling water or exposure to steam vapor at one atmosphere. Certified test results from an independent testing laboratory shall be submitted for review and approval. The RN1 Bond Test and the Standard Method for Measuring Adhesion by Tape Test shall be utilized.

Exterior Adhesion. In accordance with ASTM D870, a 6" length of conduit test specimen shall be placed in boiling water. The specimen shall be periodically removed, cooled to ambient temperature and immediately tested according to the bond test (RN1). When the PVC coating separates from the substrate, the boil time to failure in hours shall be recorded.

Interior Adhesion. In accordance with ASTM D3359, a 6" conduit test specimen shall be cut in half longitudinally and placed in boiling water or directly above boiling water with the urethane surface facing down. The specimen shall be periodically removed,

cooled to ambient temperature and tested in accordance with the Standard Method of Adhesion by Tape Test (ASTM D3359). When the coating disbonds, the time to failure in hours shall be recorded.

Heat/Humidity Test:

Acceptable conduit coating bonds shall be confirmed by a minimum average of 30 days in the Heat and Humidity Test. The RN1 Bond Test and the Standard Method for Measuring Adhesion by Tape Test shall be utilized.

Exterior Adhesion. In accordance with ASTM D1151, D1735, D2247 and D4585, conduit specimens shall be placed in a heat and humidity environment where the temperature is maintained at 150°F (66°C) and 95% relative humidity. The specimens shall be periodically removed and a bond test (RN1) performed. When the PVC coating separates from the substrate, the exposure time to failure in days shall be recorded.

Interior Adhesion. In accordance with ASTM D3359, conduit specimens shall be placed in a heat and humidity environment where the temperature is maintained at 150°F (66°C) and 95% relative humidity. When the coating disbonds, the time to failure in hours shall be recorded.

Add the following to Article 1088.01(a)(4) of the Standard Specifications:

"All liquid tight flexible metal conduit fittings shall have an insulated throat to prevent abrasion of the conductors and shall have a captive sealing O-ring gasket. The fittings shall be Listed under UL 514B. The insulated throat shall be rated up to 105º C."

Revise Article 811.05 of the Standard Specifications to read:

"811.05 Basis of Payment. This work will be paid for at the contract unit price per meter (foot) for **CONDUIT ATTACHED TO STRUCTURE**, of the diameter specified, **RIGID GALVANIZED STEEL** or **CONDUIT ATTACHED TO STRUCTURE**, of the diameter specified, **RIGID GALVANIZED STEEL, PVC COATED."**

LUMINAIRE SAFETY CABLE ASSEMBLY
Effective: January 1, 2007

Description: This item shall consist of providing a luminaire safety cable assembly as specified herein and as indicated in the plans.

Materials. Materials shall be according to the following:

Wire Rope. Cables (wire rope) shall be manufactured from Type 304 or Type 316 stainless steel having a maximum carbon content of 0.08 % and shall be a stranded assembly. Cables shall be 3.18 mm (0.125") diameter, 7x19 Class strand core and shall have no strand joints or strand splices.

Cables shall be manufactured and listed for compliance with Federal Specification RR-W-410 and Mil-DTL-83420.

Cable terminals shall be stainless steel compatible with the cable and as recommended by the cable manufacturer. Terminations and clips shall be the same stainless steel grade as the wire rope they are connected to.

U-Bolts. U-Bolts and associated nuts, lock washers, and mounting plates shall be manufactured from Type 304 or Type 316 stainless steel.

CONSTRUCTION REQUIREMENTS

General. The safety cable assembly shall be installed as recommended by the manufacturer. One end of the cable assembly shall have a loop fabricated from a stainless steel compression sleeve. The other end of the cable assembly shall be connected with stainless steel wire rope clips as indicated. Slack shall be kept to a minimum to prevent the luminaire from creeping off the end of the mast arm.

Basis of Payment: This work shall be paid for at the contract price each for **LUMINAIRE SAFETY CABLE ASSEMBLY**, which shall be payment for the work as described herein and as indicated in the plans.

ELECTRIC UTILITY SERVICE CONNECTION (COMED)

Effective: January 1, 2002 Revised February 1, 2005

Description. This item shall consist of payment for work performed by ComEd in providing or modifying electric service as indicated. THIS MAY INVOLVE WORK AT MORE THAN ONE ELECTRIC SERVICE. For summary of the Electrical Service Drop Locations see the schedule contained elsewhere herein.

CONSTRUCTION REQUIREMENTS

General. It shall be the Contractor's responsibility to contact ComEd. The Contractor shall coordinate his work fully with the ComEd both as to the work required and the timing of the installation. No additional compensation will be granted under this or any other item for extra work caused by failure to meet this requirement. **Please contact ComEd, New Business Center Call Center, at 866 NEW ELECTRIC (1-866-639-3532) to begin the service connection process. The Call Center Representatives will create a work order for the service connection. The representative will ask the requestor for information specific to the request. The representative will assign the request based upon the location of project.**

The Contractor should make particular note of the need for the earliest attention to arrangements with ComEd for service. In the event of delay by ComEd, no extension of time will be considered applicable for the delay unless the Contractor can produce written evidence of a request for electric service within 30 days of execution.

Method Of Payment. The Contractor will be reimbursed to the exact amount of money as billed by ComEd for its services. Work provided by the Contractor for electric service will be paid separately as described under ELECTRIC SERVICE INSTALLATION. No extra compensation shall be paid to the Contractor for any incidental materials and labor required to fulfill the requirements as shown on the plans and specified herein.

For bidding purposes, this item shall be estimated as $10,000

Basis Of Payment. This work will be paid for at the contract lump sum price for **ELECTRIC UTILITY SERVICE CONNECTION** which shall be reimbursement in full for electric utility service charges.

MAINTENANCE OF LIGHTING SYSTEMS

Effective: January 1, 2007

Replace Article 801.11 and 801.12 of the Standard Specifications with the following:

Effective the date the Contractor's activities (electrical or otherwise) at the job site begin, the Contractor shall be responsible for the proper operation and maintenance of all existing and proposed lighting systems which are part of, or which may be affected by the work until final acceptance or as otherwise determined by the Engineer.

Before performing any excavation, removal, or installation work (electrical or otherwise) at the site, the Contractor shall initiate a request for a maintenance transfer and preconstruction inspection, as specified elsewhere herein, to be held in the presence of the Engineer and a representative of the party or parties responsible for maintenance of any lighting systems which may be affected by the work. The request for the maintenance preconstruction inspection shall be made no less than seven (7) calendar days prior to the desired inspection date.

Existing lighting systems, when depicted on the plans, are intended only to indicate the general equipment installation of the systems involved and shall not be construed as an exact representation of the field conditions. It remains the Contractor's responsibility to visit the site to confirm and ascertain the exact condition of the electrical equipment and systems to be maintained.

Maintenance of Existing Lighting Systems

Existing lighting systems. Existing lighting systems shall be defined as any lighting system or part of a lighting system in service prior to this contract. The contract drawings indicate the general extent of any existing lighting, but whether indicated or not, it remains the Contractor's responsibility to ascertain the extent of effort required for compliance with these specifications and failure to do so will not be justification for extra payment or reduced responsibilities.

Extent of Maintenance.

Partial Maintenance. Unless otherwise 'indicated, if the number of circuits affected by the contract is equal to or less than 40% of the total number of circuits in a given controller and the controller is not part of the contract work, the Contractor needs only to maintain the affected circuits. The affected circuits shall be isolated by means of in-line waterproof fuse holders as specified elsewhere and as approved by the Engineer.

Full Maintenance. If the number of circuits affected by the contract is greater than 40% of the total number of circuits in a given controller, or if the controller is modified in any way under the contract work, the Contractor shall maintain the entire controller and all associated circuits.

Maintenance of Proposed Lighting Systems

Proposed Lighting Systems. Proposed lighting systems shall be defined as any lighting system or part of a lighting system which is to be constructed under this contract.

The Contractor shall be fully responsible for maintenance of all items installed under this contract. Maintenance shall include, but not be limited to, any equipment failures or malfunctions as well as equipment damage either by the motoring public, Contractor operations, or other means. The potential cost of replacing or repairing any malfunctioning or damaged equipment shall be included in the bid price of this item and will not be paid for separately.

Lighting System Maintenance Operations

The Contractor's responsibility shall include all applicable responsibilities of the Electrical Maintenance Contract, State of Illinois, Department of Transportation, Division of Highways, District One. These responsibilities shall include the maintenance of lighting units (including sign lighting), cable runs and lighting controls. In the case of a pole knockdown or sign light damage caused by normal vehicular traffic, the Contractor shall promptly clear the lighting unit and circuit discontinuity and restore the system to service.

Responsibilities shall also include weekly night-time patrol of the lighting system, with patrol reports filed immediately with the Engineer and with deficiencies corrected within 24 hours of the patrol. Patrol reports shall be presented on standard forms as designated by the Engineer. Uncorrected deficiencies may be designated by the Engineer as necessitating emergency repairs as described elsewhere herein.

The following chart lists the maximum response, service restoration, and permanent repair time the Contractor will be allowed to perform corrective action on specific lighting system equipment.

INCIDENT OR PROBLEM	SERVICE RESPONSE TIME	SERVICE RESTORATION TIME	PERMANENT REPAIR TIME
Control cabinet out	1 hour	4 hours	7 Calendar days
Hanging mast arm	1 hour to clear	na	7 Calendar days
Radio problem	1 hour	4 hours	7 Calendar days
Motorist caused damage or leaning light pole 10 degrees or more	1 hour to clear	4 hours	7 Calendar days
Circuit out – Needs to reset breaker	1 hour	4 hours	na
Circuit out – Cable trouble	1 hour	24 hours	21 Calendar days
Outage of 3 or more successive lights	1 hour	4 hours	na
Outage of 75% of lights on one tower	1 hour	4 hours	na
Outage of light nearest RR crossing approach, Islands and gores	1 hour	4 hours	na
Outage (single or multiple) found on night outage survey or reported to EMC	na	na	7 Calendar days
Navigation light outage	na	na	24 hours

- **Service Response Time** -- amount of time from the initial notification to the Contractor until a patrolman physically arrives at the location.

- **Service Restoration Time** – amount of time from the initial notification to the Contractor until the time the system is fully operational again (In cases of motorist caused damage the undamaged portions of the system are operational.)

- **Permanent Repair Time** – amount of time from initial notification to the Contractor until the time permanent repairs are made if the Contractor was required to make temporary repairs to meet the service restoration requirement.

Failure to provide this service will result in liquidated damages of $500 per day per occurrence. In addition, the Department reserves the right to assign any work not completed within this timeframe to the Electrical Maintenance Contractor. All costs associated to repair this uncompleted work shall be the responsibility of the Contractor. Failure to pay these costs to the Electrical Maintenance Contractor within one month after the incident will result in additional liquidated damages of $500 per month per occurrence. Unpaid bills will be deducted from the cost of the Contract. Repeated failures and/or a gross failure of maintenance shall result in the State's Electrical Maintenance Contractor being directed to correct all deficiencies and the resulting costs deducted from any monies owed the contractor.

Damage caused by the Contractor's operations shall be repaired at no additional cost to the Contract.

Operation of Lighting

The lighting shall be operational every night, dusk to dawn. Duplicate lighting systems (such as temporary lighting and proposed new lighting) shall not be operated simultaneously. Lighting systems shall not be kept in operation during long daytime periods. The contractor shall demonstrate to the satisfaction of the Engineer that the lighting system is fully operational prior to submitting a pay request. Failure to do so will be grounds for denying the pay request.

Basis of Payment. Maintenance of lighting systems shall be paid for at the contract unit price per calendar month or fraction thereof for **MAINTENANCE OF LIGHTING SYSTEM**, which shall include all work as described herein.

GROUND ROD
Effective: January 1, 2007

Description. This item shall consist of furnishing, installing and connecting ground rods for the grounding of service neutral conductors and for supplementing the equipment grounding system via connection at poles or other equipment throughout the system. All materials and work shall be in accordance with Article 250 of the NEC.

Materials. Materials shall be according to the following Articles of Section 1000 - Materials

Item	Article/Section
(a) Grounding Electrodes	1087.01(b)
(b) Grounding Electrode Conductors	1087.01(a)
(c) Access Well	1087.01(c)

CONSTRUCTION REQUIREMENTS

General. All connections to ground rods, structural steel or fencing shall be made with exothermic welds. Where such connections are made to insulated conductors, the connection shall be wrapped with at least 4 layers of electrical tape extended 152.4 mm (six inches) onto the conductor insulation.

Ground rods shall be driven so that the tops of the rod are 609.6 mm (24 inches) below finished grade. Where indicated, ground wells shall be included to permit access to the rod connections.

Where indicated, ground rods shall be installed through concrete foundations.

Where ground conditions, such as rock, preclude the installation of the ground rod, the ground rod may be deleted with the approval of the Engineer.

Where a ground field of "made" electrodes is provided, such as at control cabinets, the exact locations of the rods shall be documented by dimensioned drawings as part of the Record Drawings.

Ground rod connection shall be made by exothermic welds. Ground wire for connection to foundation steel or as otherwise indicated shall be stranded uncoated bare copper in accordance the applicable requirements of ASTM Designation B-3 and ASTM Designation B-8 and shall be included in this item. Unless otherwise indicated, the wire shall not be less than No. 2 AWG.

Where connections are made to epoxy coated reinforcing steel, the epoxy coating shall be sufficiently removed to facilitate the exothermic weld.

Method of Measurement. Ground rods shall be counted, each. Ground wires and connection of ground rods at poles shall be included in this pay item.

Basis of Payment. This item shall be paid at the contract unit price each for **GROUND ROD**, of the diameter and length indicated which shall be payment in full for the material and work described herein.

TRAFFIC SIGNAL SPECIFICATIONS

Effective: May 22, 2002 Revised: January 1, 2007

These Traffic Signal Special Provisions and the "District One Standard Traffic Signal Design Details" supplement the requirements of the State of Illinois "Standard Specifications for Road and Bridge Construction." The intent of these Special Provisions is to prescribe the materials and construction methods commonly used for traffic signal installations. All material furnished shall be new. The locations and the details of all installations shall be as indicated on the Plans or as directed by the Engineer. The work to be performed under this contract consists of furnishing and installing all traffic signal work as specified in the Plans and as specified herein in a manner acceptable and approved by the Engineer.

SECTION 720 SIGNING

MAST ARM SIGN PANELS

Add the following to Section 720.02 of the Standard Specifications:

Signs attached to poles or posts (such as mast arm signs) shall have mounting brackets and sign channels which are equal to and completely interchangeable with those used by the District Sign Shops. Signfix Aluminum Channel Framing System is currently recommended, but other brands of mounting hardware are acceptable based upon the Department's approval.

DIVISION 800 ELECTRICAL

INSPECTION OF ELECTRICAL SYSTEMS

Add the following to Article 801.10 of the Standard Specifications:

All cabinets including temporary traffic signal cabinets shall be assembled by an approved equipment supplier in District One. The Department reserves the right to request any controller and cabinet to be tested at the equipment supplier facilities prior to field installation, at no extra cost to this contract. All railroad interconnected (including temporary railroad interconnect)

controllers and cabinets shall be new, built, tested and approved by the controller equipment vendor, in the vendor's District One facility, prior to field installation. The vendor shall provide the technical equipment and assistance as required by the Engineer to fully test this equipment.

DAMAGE TO TRAFFIC SIGNAL SYSTEM

Add the following to Article 801.12(b) of the Standard Specifications to read:

Any damaged equipment or equipment not operating properly from any cause whatsoever shall be repaired with new equipment provided by the Contractor at no additional cost to the Contract and or owner of the traffic signal system, all as approved by the Engineer. Final repairs or replacement of damaged equipment must meet the approval of the Engineer prior to or at the time of final inspection otherwise the traffic signal installation will not be accepted. Cable splices outside the controller cabinet shall not be allowed.

RESTORATION OF WORK AREA

Add to Section 801 of the Standard Specifications:

Restoration of the traffic signal work area shall be included in the related pay items such as foundation, conduit, handhole, trench and backfill, etc. All roadway surfaces such as shoulders, medians, sidewalks, pavement, etc. shall be replaced in kind. All damage to mowed lawns shall be replaced with an approved sod, and all damage to unmowed fields shall be seeded. Restoration of the work area shall be included in the contract without any extra compensation allowed to the Contractor.

SUBMITTALS

Revise Article 801.05 of the Standard Specifications to read:

The Contractor shall provide:

a. All material approval requests shall be submitted at the preconstruction meeting, including major traffic signal items listed in the table in Article 801.05..
b. All material or equipment which are similar or identical shall be the product of the same manufacturer, unless necessary for system continuity. Traffic signal materials and equipment shall bear the U.L. label whenever such labeling is available.
c. Seven (7) copies of a letter from the Traffic Signal Contractor on company letterhead listing the contract number or permit number, project location/limits, pay item description, pay code number, manufacturer's name and model numbers of the proposed equipment and stating that the proposed equipment meets all contract requirements. The letter will be reviewed by the Traffic Design Engineer to determine whether the equipment to be used is approvable.
d. Seven (7) copies of shop drawings for mast arm poles and assemblies, including combination mast arm poles, are required. A minimum of two (2) copies of all other material catalog cuts are required. Submittals for equipment and materials shall be complete. Partial or incomplete submittals will be returned without review.
e. Certain non-standard mast arm poles and assemblies will require additional review from IDOT's Central Office. Examples include ornamental/decorative and non-standard length mast arm pole assemblies. The Contractor shall account for the additional review time in his schedule.

f. The contract number or permit number, project location/limits and corresponding pay code number must be on each sheet of the letter, material catalog cuts and mast arm poles and assemblies drawings.
g. Where certifications and/or warranties are specified, the information submitted for approval shall include certifications and warranties. Certifications involving inspections, and/or tests of material shall be complete with all test data, dates, and times.
h. After the Engineer reviews the submittals for conformance with the design concept of the project, the Engineer will stamp the drawings indicating their status as 'Approved', 'Approved-As-Noted', 'Disapproved', or 'Information Only'. Since the Engineer's review is for conformance with the design concept only, it is the Contractor's responsibility to coordinate the various items into a working system as specified. The Contractor shall not be relieved from responsibility for errors or omissions in the shop, working, layout drawings, or other documents by the Department's approval thereof. The Contractor must still be in full compliance with contract and specification requirements.
i. All submitted items reviewed and marked 'APPROVED AS NOTED', or 'DISAPPROVED' are to be resubmitted in their entirety, unless otherwise indicated within the submittal comments, with a disposition of previous comments to verify contract compliance at no additional cost to the contract.
j. Exceptions, Deviations and Substitutions. In general, exceptions to and deviations from the requirements of the Contract Documents will not be allowed. It is the Contractor's responsibility to note any deviations from Contract requirements at the time of submittal and to make any requests for deviations in writing to the Engineer. In general, substitutions will not be acceptable. Requests for substitutions must demonstrate that the proposed substitution is superior to the material or equipment required by the Contract Documents. No exceptions, deviations or substitutions will be permitted without the approval of the Engineer.

MAINTENANCE AND RESPONSIBILITY

Revise Article 801.11 of the Standard Specifications to read:

a) Existing traffic signal installations and/or any electrical facilities at all or various locations may be altered or reconstructed totally or partially as part of the work on this Contract. The Contractor is hereby advised that all traffic control equipment, presently installed at these locations, may be the property of the State of Illinois, Department of Transportation, Division of Highways, County, Private Developer, or the Municipality in which they are located. Once the Contractor has begun any work on any portion of the project, all traffic signals within the limits of this contract or those which have the item "Maintenance of Existing Traffic Signal Installation," "Temporary Traffic Signal Installation(s)" and/or "Maintenance of Existing Flashing Beacon Installation," shall become the full responsibility of the Contractor. The Contractor shall supply the engineer and the Department's Electrical Maintenance Contractor a 24-hour emergency contact name and telephone number.

b) When the project has a pay item for "Maintenance of Existing Traffic Signal Installation," "Temporary Traffic Signal Installation(s)" and/or "Maintenance of Existing Flashing Beacon Installation," the Contractor must notify both the Area Traffic Signal Maintenance

and Operations Engineer at (847) 705-4424 and the Department's Electrical Maintenance Contractor, of their intent to begin any physical construction work on the Contract or any portion thereof. This notification must be made a minimum of seven (7) working days prior to the start of construction to allow sufficient time for inspection of the existing traffic signal installation(s) and transfer of maintenance to the Contractor. If work is started prior to an inspection, maintenance of the traffic signal installation(s) will be transferred to the Contractor without an inspection. The Contractor will become responsible for repairing or replacing all equipment that is not operating properly or is damaged at no cost to the owner of the traffic signal. Final repairs or replacement of damaged equipment must meet the approval of the Engineer prior to or at the time of final inspection otherwise the traffic signal installation will not be accepted.

c) Contracts such as pavement grinding or patching which result in the destruction of traffic signal loops do not require maintenance transfer, but require a notification of intent to work and an inspection. A minimum of seven (7) working days prior to the loop removal, the Contractor shall notify the Area Traffic Signal Maintenance and Operations Engineer at (847) 705-4424 and the Department's Electrical Maintenance Contractor, at which time arrangements will be made to adjust the traffic controller timing to compensate for the absence of detection. See additional requirements in these specifications under Inductive Loop Detector.

d) The Contractor is advised that the existing and/or temporary traffic signal installation must remain in operation during all construction stages, except for the most essential down time. Any shutdown of the traffic signal installation, which exceeds fifteen (15) minutes, must have prior approval of the Engineer. Approval to shutdown the traffic signal installation will only be granted during the period extending from 10:00 a.m. to 3:00 p.m. on weekdays. Shutdowns shall not be allowed during inclement weather or holiday periods.

e) The Contractor shall be fully responsible for the safe and efficient operation of the traffic signals. Any inquiry, complaint or request by the Department, the Department's Electrical Maintenance Contractor or the public, shall be investigated and repairs begun within one hour. Failure to provide this service will result in liquidated damages of $500 per day per occurrence. In addition, the Department reserves the right to assign any work not completed within this timeframe to the Electrical Maintenance Contractor. All costs associated to repair this uncompleted work shall be the responsibility of the Contractor. Failure to pay these costs to the Electrical Maintenance Contractor within one month after the incident will result in additional liquidated damages of $500 per month per occurrence. Unpaid bills will be deducted from the cost of the Contract. The District's Electrical Maintenance Contractor may inspect any signalizing device on the Department's highway system at any time without notification.

TRAFFIC SIGNAL INSPECTION (TURN-ON)

Revise Article 801.15(b) of the Standard Specifications to read:

It is the intent to have all electric work completed and equipment field tested by the vendor prior to the Department's "turn-on" field inspection. If in the event the Engineer determines work is not complete and the inspection will require more than two (2) hours to complete, the inspection

shall be canceled and the Contractor will be required to reschedule at another date. The maintenance of the traffic signals will not be accepted until all punch list work is corrected and re-inspected.

When the road is open to traffic, except as otherwise provided in Section 850 of the Standard Specifications, the Contractor may request a turn-on and inspection of the completed traffic signal installation at each separate location. This request must be made to the Area Traffic Signal Maintenance and Operations Engineer at (847) 705-4424 a minimum of seven (7) working days prior to the time of the requested inspection. The Department will not grant a field inspection until notification is provided from the Contractor that the equipment has been field tested and the intersection is operating according to Contract requirements. The Department's facsimile number is (847) 705-4089. The Contractor must invite local fire department personnel to the turn-on when Emergency Vehicle Preemption (EVP) is included in the project. The Contractor must notify the SCAT Consultant of the turn-on schedule, as well as stage changes and phase changes during construction.

The Contractor must have all traffic signal work completed and the electrical service installation connected by the utility company prior to requesting an inspection and turn-on of the traffic signal installation. The Contractor shall be responsible to provide a police officer to direct traffic at the time of testing.
The Contractor shall provide a representative from the control equipment vendor's office to attend the traffic signal inspection for both permanent and temporary traffic signal turn-ons. Upon demonstration that the signals are operating and all work is completed in accordance with the Contract and to the satisfaction of the Engineer, the Engineer will then allow the signals to be placed in continuous operation. The Agency that will be responsible for the maintenance of each traffic signal installation will assume the maintenance upon successful completion of this inspection.

The District requires the following from the Contractor at traffic signal turn-ons.

1. One set of signal plans of record with field revisions marked in red ink.
2. Notification from the Contractor and the equipment vendor of satisfactory field testing.
3. A knowledgeable representative of the controller equipment supplier shall be required at the traffic signal turn-on. The representative shall be knowledgeable of the cabinet design and controller functions.
4. A copy of the approved material letter.
5. One (1) copy of the operation and service manuals of the signal controller and associated control equipment.
6. Five (5) copies 11" x 17" (280 mm X 430 mm) of the cabinet wiring diagrams.
7. The controller manufacturer shall supply a printed form, not to exceed 11" x 17" (280 mm X 430 mm) for recording the traffic signal controller's timings; backup timings; coordination splits, offsets, and cycles; TBC Time of Day, Week and Year Programs; Traffic Responsive Program, Detector Phase Assignment, Type and Detector Switching; and any other functions programmable from the keyboard. The form shall include a location, date, manufacturer's name, controller model and software version. The form shall be approved by the Engineer and a minimum of three (3) copies must be furnished at each turn-on. The manufacturer must provide all programming information used within the controller at the time of turn-on.

Acceptance of the traffic signal equipment by the Department shall be based upon inspection results at the traffic signal "turn on." If approved, traffic signal acceptance shall be verbal at the "turn on" inspection followed by written correspondence from the Engineer. The Contractor shall be responsible for all traffic signal equipment and associated maintenance thereof until Departmental acceptance is granted.

All equipment and/or parts to keep the traffic signal installation operating shall be furnished by the Contractor. No spare traffic signal equipment is available from the Department.

All punch list work shall be completed within two (2) weeks after the final inspection. The Contractor shall notify the Electrical Maintenance Contractor to inspect all punch list work. Failure to meet these time constraints shall result in liquidated damage charges of $500 per month per incident.

All cost of work and materials required to comply with the above requirements shall be included in the pay item bid prices, under which the subject materials and signal equipment are paid, and no additional compensation will be allowed. Materials and signal equipment not complying with the above requirements shall be subject to removal and disposal at the Contractor's expense.

LOCATING UNDERGROUND FACILITIES

Revise Section 803 to the Standard Specifications to read:

If this Contract requires the services of an Electrical Contractor, the Contractor shall be responsible at his/her own expense for locating existing IDOT electrical facilities prior to performing any work. If this Contract does not require the services of an Electrical Contractor, the Contractor may request one free locate for existing IDOT electrical facilities from the District One Electrical Maintenance Contractor prior to the start of any work. Additional requests may be at the expense of the Contractor. The location of underground traffic facilities does not relieve the Contractor of their responsibility to repair any facilities damaged during construction at their expense.

The exact location of all utilities shall be field verified by the Contractor before the installation of any components of the traffic signal system. For locations of utilities the local Counties or Municipalities may need to be contacted, in the City of Chicago contact D.I.G.G.E.R. at (312) 744-7000 and for all other locations contact J.U.L.I.E. at 1-800-892-0123.

ELECTRIC SERVICE INSTALLATION

Revise Section 805 of the Standard Specifications to read:

Description.
This work shall consist of all materials and labor required to install, modify, or extend the electric service installation. All installations shall meet the requirements of the details in the "District One Standard Traffic Signal Design Details" and applicable portions of the Specifications.

General.
The electric service installation shall be the electric service disconnecting means and it shall be identified as suitable for use as service equipment.

The electric utility contact information is noted on the plans and represents the current information at the time of contract preparation. The Contractor must request in writing for service and/or service modification within 10 days of contract award and must follow-up with the electric utility to assure all necessary documents and payment are received by the utility. The Contractor shall forward copies of all correspondence between the contractor and utility company. The service agreement and sketch shall be submitted for signature to the Traffic Program's engineer.

Materials.

a. General. The completed control panel shall be constructed in accordance with UL Std. 508A, Industrial Control Panel, and carry the UL label. Wire terminations shall be UL listed.

b. Enclosures.
    a. Pole Mounted Cabinet. The cabinet shall be UL 50, NEMA Type 4X, unfinished single door design, fabricated from minimum 0.080-inch (2.03 mm) thick Type 5052 H-32 aluminum. Seams shall be continuous welded and ground smooth. Stainless steel screws and clamps shall secure the cover and assure a watertight seal. The cover shall be removable by pulling the continuous stainless steel hinge pin. The cabinet shall have an oil-resistant gasket and a lock kit shall be provided with an internal O-ring in the locking mechanism assuring a watertight and dust-tight seal. The cabinet shall be sized to adequately house all required components with extra space for arrangement and termination of wiring. A minimum size of 14-inches (350 mm) high, 9-inches (225 mm) wide and 8-inches (200 mm) in depth is required. The cabinet shall be channel mounted to a wooden utility pole using assemblies recommended by the manufacturer.

    b. Ground Mounted Cabinet. The cabinet shall be UL 50, NEMA Type 3R unfinished single door design with back panel. The cabinet shall be fabricated from Type 5052 H-32 aluminum with the frame and door 0.125-inch (3.175 mm) thick, the top 0.250-inch (6.350 mm) thick and the bottom 0.500-inch (12.70 mm) thick. Seams shall be continuous welded and ground smooth. The door and door opening shall be double flanged. The door shall be approximately 80% of the front surface, with a full length tamperproof stainless steel .075-inch (1.91 mm) thick hinge bolted to the cabinet with stainless steel carriage bolts and nylocks nuts. The locking mechanism shall be slam-latch type with a keyhole cover. The cabinet shall be sized to adequately house all required components with extra space for arrangement and termination of wiring. A minimum size of 40-inches (1000 mm) high, 16-inches (400 mm) wide and 15-inches (375 mm) in depth is required. The cabinet shall be mounted upon a square Type A concrete foundation as indicated on the plans. The foundation is paid for separately.

c. Surge Protector. Overvoltage protection, with LED indicator, shall be provided for the 120 volt load circuit by the means MOV and thermal fusing technology. The response time shall be <5n seconds and operate within a range of –40C to +85C. The surge protector shall be UL 1449 Listed.

d. Circuit Breakers. Circuit breakers shall be standard UL listed molded case, thermal-magnetic bolt-on type circuit breakers with trip free indicating handles. 120 volt circuit breakers shall have an interrupting rating of not less than 65,000 rms symmetrical amperes. Unless otherwise indicated, the main disconnect circuit breaker for the traffic signal controller shall be rated 60 amperes, 120 V and the auxiliary circuit breakers shall be rated 10 amperes, 120 V.

e. Fuses, Fuseholders and Power Indicating Light. Fuses shall be small-dimensional cylindrical fuses of the dual element time-delay type. The fuses shall be rated for 600 V AC and shall have a UL listed interrupting rating of not less than 10,000 rms symmetrical amperes at rated voltage. The power indicating light shall be LED type with a green colored lens and shall be energized when electric utility power is present.

f. Ground and Neutral Bus Bars. A single copper ground and neutral bus bar, mounted on the equipment panel shall be provided. Ground and neutral conductors shall be separated on the bus bar. Compression lugs, plus 2 spare lugs, shall be sized to accommodate the cables with the heads of the connector screws painted green for ground connections and white for neutral connections.

g. Utility Services Connection. The Contractor shall notify the Utility Company marketing representative a minimum of 30 working days prior to the anticipated date of hook-up. This 30 day advance notification will begin only after the Utility Company marketing representative has received service charge payments from the Contractor. Prior to contacting the Utility Company marketing representative for service connection, the service installation controller cabinet and cable must be installed for inspection by the Utility Company.

h. Ground Rod. Ground rods shall be copper-clad steel, a minimum of 10 feet (3.0m) in length, and 3/4 inch (20mm) in diameter. Ground rod resistance measurements to ground shall be 25 ohms or less. If necessary additional rods shall be installed to meet resistance requirements at no additional cost to the contract.

Installation.

a. General. The Contractor shall confirm the orientation of the traffic service installation and its door side with the engineer, prior to installation. All conduit entrances into the service installation shall be sealed with a pliable waterproof material.

b. Pole Mounted. Brackets designed for pole mounting shall be used. All mounting hardware shall be stainless steel. Mounting height shall be as noted on the plans or as directed by the Engineer.

c. Ground Mounted. The service installation shall be mounted plumb and level on the foundation and fastened to the anchor bolts with hot-dipped galvanized or stainless steel nuts and washers. The space between the bottom of the enclosure and the top of the foundation shall be caulked at the base with silicone.

Basis of Payment.
The service installation shall be paid for at the contract unit price each for SERVICE INSTALLATION of the type specified which shall be payment in full for furnishing and installing the service installation complete. The type A foundation which includes the ground rod shall be paid for separately. SERVICE INSTALLATION, POLE MOUNTED shall include the 3/4 inch (20mm) grounding conduit, ground rod, and pole mount assembly. Any charges by the utility companies shall be approved by the engineer and paid for as an addition to the contract according to Article 109.05 of the Standard Specifications.

GROUNDING OF TRAFFIC SIGNAL SYSTEMS

General.
All traffic signal systems, equipment and appurtenances shall be properly grounded in strict conformance with the NEC. See IDOT District One Traffic Signal detail plan sheets for additional information.

The grounding electrode system shall include a ground rod installed with each traffic signal controller concrete foundation and all mast arm and post concrete foundations. An additional ground rod will be required at locations were measured resistance exceeds 25 ohms. Ground rods are included in the applicable foundation pay item and will not be paid for separately.

Testing shall be according to Article 801.13 (a) (4) and (5).

(a) The grounded conductor (neutral conductor) shall be white color coded. This conductor shall be bonded to the equipment grounding conductor only at the Electric Service Installation. All power cables shall include one neutral conductor of the same size.

(b) The equipment grounding conductor shall be green color coded. The following is in addition to Article 801.04 of the Standard Specifications.

1. Equipment grounding conductors shall be bonded to the grounded conductor (neutral conductor) only at the Electric Service Installation. The equipment grounding conductor is paid for separately and shall be continuous. The Earth shall not be used as the equipment grounding conductor.

2. Equipment grounding conductor*s* shall be bonded, using a Listed grounding connector, to all traffic signal mast arm poles, traffic signal posts, pedestrian posts, pull boxes, handhole frames and covers and other metallic enclosures throughout the traffic signal wiring system, except where noted herein. Bonding shall be made with a splice and pigtail connection, using a sized compression type copper sleeve, sealant tape, and heat-shrinkable cap. A Listed electrical joint compound shall be applied to all conductors' terminations, connector threads and contact points.

3. All metallic and non-metallic raceways containing traffic signal circuit runs shall have a continuous equipment grounding conductor, except raceways containing only detector loop lead-in circuits, circuits under 50 volts and/or fiber optic cable will not be required to include an equipment grounding conductor.

4. Individual conductor splices in handholes shall be soldered and sealed with heat shrink. When necessary to maintain effective equipment grounding, a full cable heat shrink shall be provided over individual conductor heat shrinks.

(c) The grounding electrode conductor shall be similar to the equipment grounding conductor in color coding (green) and size. The grounding electrode conductor is used to connect the ground rod to the equipment grounding conductor and is bonded to ground rods via exothermic welding, listed pressure connectors, listed clamps or other approved listed means.

HANDHOLES

Add the following to Section 814 of the Standard Specifications:

All handholes shall be concrete, poured in place, with inside dimensions of 21-1/2 inches (549mm) minimum. Frames and lid openings shall match this dimension. The cover of the handhole frame shall be labeled “Traffic Signals" with legible raised letters.

For grounding purposes the handhole frame shall have provisions for a 7/16 inch (15.875mm) diameter stainless bolt cast into the frame. The covers shall have a stainless steel threaded stint extended from the eye hook assembly for the purpose of attaching the grounding conductor to the handhole cover.

The minimum wall thickness for heavy duty hand holes shall be 12 inches (300mm).

All conduits shall enter the handhole at a depth of 30 inches (760mm) except for the conduits for detector loops when the handhole is less than 5 feet (1.52 m) from the detector loop. All conduit ends should be sealed with a waterproof sealant to prevent the entrance of contaminants into the handhole.

Steel cable hooks shall be coated with hot-dipped galvanization in accordance with AASHTO Specification M111. Hooks shall be a minimum of 1/2 inch (12.7 mm) diameter with two 90 degree bends and extend into the handhole at least 6 inches (150 mm). Hooks shall be placed a minimum of 12 inches (300 mm) below the lid or lower if additional space is required.

FIBER OPTIC TRACER CABLE

The cable shall meet the requirements of Section 817 of the "Standard Specifications," except for the following:

Add the following to Article 817.03 of the Standard Specifications:

In order to trace the fiber optic cable after installation, the tracer cable shall be installed in the same conduit as the fiber optic cable in locations shown on the plans. The tracer cable shall be continuous, extended into the controller cabinet and terminated on a barrier type terminal strip mounted on the side wall of the controller cabinet. The barrier type terminal strip and tracer cable shall be clearly marked and identified. The tracer cable will be allowed to be spliced at the handholes only. All tracer cable splices shall be kept to a minimum and shall incorporate maximum lengths of cable supplied by the manufacturer. The tracer cable splice shall use a Western Union Splice soldered with resin core flux. All exposed surfaces of the solder shall be

smooth. Splices shall be soldered using a soldering iron. Blow torches or other devices which oxidize copper cable shall not be allowed for soldering operations. The splice shall be covered with WCSMW 30/100 heat shrink tube, minimum length 4 inches (100 mm) and with a minimum 1 inch (25 mm) coverage over the XLP insulation, underwater grade.

Add the following to Article 817.05 of the Standard Specifications:

Basis of Payment.
The tracer cable shall be paid for separately as ELECTRIC CABLE IN CONDUIT, TRACER, NO. 14 1C per foot (meter), which price shall include all associated labor and material for installation.

GROUNDING CABLE

The cable shall meet the requirements of Section 817 of the "Standard Specifications," except for the following:

Add to Article 817.02 (b) of the Standard Specifications:

Unless otherwise noted on the Plans, traffic signal grounding conductor shall be one conductor, #6 gauge copper, with a green color coded XLP jacket.

The traffic signal grounding conductor shall be bonded, using a Listed grounding connector (Burndy type KC/K2C, as applicable, or approved equal), to all proposed and existing traffic signal mast arm poles and traffic/pedestrian signal posts, including push button posts. The grounding conductor shall be bonded to all proposed and existing pull boxes, handhole frames and covers and other metallic enclosures throughout the traffic signal wiring system and noted herein and detailed on the plans. Bonding to existing handhole frames and covers shall be paid for separately.

Add the following to Article 817.05 of the Standard Specifications:

Basis of Payment.
Grounding cable shall be measured in place for payment in foot (meter). Payment shall be at the contract unit price for ELECTRIC CABLE IN CONDUIT, GROUNDING, NO. 6, 1C, which price includes all associated labor and material including grounding clamps, splicing, exothermic welds, grounding connectors, and other hardware.

RAILROAD INTERCONNECT CABLE

The cable shall meet the requirements of Section 817 of the "Standard Specifications," except for the following:

Add to Article 817.02 of the Standard Specifications:

The railroad interconnect cable shall be three conductor stranded #14 copper cable in a clear polyester binder, shielded with #36 AWG tinned copper braid with 85% coverage, and insulated with .016” polyethylene (black, blue, red). The jacket shall be black 0.045 PVC or polyethylene.

Add the following to Article 817.05 of the Standard Specifications:

Basis of Payment.
This work shall be paid for at the contract unit price per foot (meter) for ELECTRIC CABLE IN CONDUIT, RAILROAD, NO. 14 3C, which price shall be payment in full for furnishing, installing, and making all electrical connections in the traffic signal controller cabinet. Connections in the railroad controller cabinet shall be performed by railroad personnel.

MAINTENANCE OF EXISTING TRAFFIC SIGNAL INSTALLATION

Revise Section 850 of the Standard Specifications to read:

The energy charges for the operation of the traffic signal installation shall be paid for by others. Full maintenance responsibility shall start as soon as the Contractor begins any physical work on the Contract or any portion thereof.

The Contractor shall have on staff electricians with IMSA Level II certification to provide signal maintenance.

This item shall include maintenance of all traffic signal equipment at the intersection, including emergency vehicle pre-emption equipment, master controllers, uninterruptible power supply (UPS and batteries), telephone service installations, communication cables and conduits to adjacent intersections.

The maintenance shall be according to District One revised Article 801.11 and the following contained herein.

The Contractor shall check all controllers every two (2) weeks, which will include visually inspecting all timing intervals, relays, detectors, and pre-emption equipment to ensure that they are functioning properly. This item includes, as routine maintenance, all portions of emergency vehicle pre-emption equipment. The Contractor shall maintain in stock at all times a sufficient amount of materials and equipment to provide effective temporary and permanent repairs.

The Contractor shall provide immediate corrective action when any part or parts of the system fail to function properly. Two far side heads facing each approach shall be considered the minimum acceptable signal operation pending permanent repairs. When repairs at a signalized intersection require that the controller be disconnected, and power is available, the Contractor shall place the traffic signal installation on flashing operation. The signals shall flash RED for all directions unless a different indication has been specified by the Engineer. The Contractor shall be required to place stop signs (R1-1-36) at each approach of the intersection as a temporary means of regulating traffic. The Contractor shall furnish and equip all their vehicles assigned to the maintenance of traffic signal installations with a sufficient number of stop signs as specified herein. The Contractor shall maintain a sufficient number of spare stop signs in stock at all times to replace stop signs which may be damaged or stolen.

The Contractor shall provide the Engineer with a 24 hour telephone number for the maintenance of the traffic signal installation and for emergency calls by the Engineer.

Traffic signal equipment which is lost or not returned to the Department for any reason shall be replaced with new equipment meeting the requirements of these Specifications.

The Contractor shall respond to all emergency calls from the Department or others within one hour after notification and provide immediate corrective action. When equipment has been damaged or becomes faulty beyond repair, the Contractor shall replace it with new and identical equipment. The cost of furnishing and installing the replaced equipment shall be borne by the Contractor at no additional charge to the contract. The Contractor may institute action to recover damages from a responsible third party. If at any time the Contractor fails to perform all work as specified herein to keep the traffic signal installation in proper operating condition or if the Engineer cannot contact the Contractor's designated personnel, the Engineer shall have the State's Electrical Maintenance Contractor perform the maintenance work required. The State's Electrical Maintenance Contractor shall bill the Contractor for the total cost of the work. The Contractor shall pay this bill within thirty (30) days of the date of receipt of the invoice or the cost of such work will be deducted from the amount due the Contractor. The Contractor shall allow the Electrical Maintenance Contractor to make reviews of the Existing Traffic Signal Installation that has been transferred to the Contractor for Maintenance.

Basis of Payment.
This work shall be paid for at the contract unit price each for MAINTENANCE OF EXISTING TRAFFIC SIGNAL INSTALLATION.

TRAFFIC ACTUATED CONTROLLER

Add the following to Article 857.02 of the Standard Specifications:

Controllers shall be NEMA TS2 Type 1, Econolite ASC/2S-1000 or Eagle/Siemens M41 unless specified otherwise on the plans or elsewhere on these specifications. Only controllers supplied by one of the District One approved closed loop equipment manufacturers will be allowed. The controller shall be the most recent model and software version supplied by the manufacturer at the time of the approval. The traffic signal controller shall provide features to inhibit simultaneous display of a circular yellow ball and a yellow arrow display. Individual load switches shall be provided for each vehicle, pedestrian, and right turn over lap phase. The controller shall prevent phases from being skipped during program changes and after all preemption events.

MASTER CONTROLLER

Revise Articles 860.02 - Materials and 860.03 - Installation of the Standard Specifications to read:

Only controllers supplied by one of the District approved closed loop equipment manufacturers will be allowed. Only NEMA TS 2 Type 1 Eagle/Siemens and Econolite closed loop systems shall be supplied. The latest model and software version of master controller shall be supplied.

Functional requirements in addition to those in Section 863 of the Standard Specification include:

The system commands shall consist of, as a minimum, six (6) cycle lengths, five (5) offsets, three (3) splits, and four (4) special functions. The system commands shall also include commands for free or coordinated operation.

Traffic Responsive operation shall consist of the real time acquisition of system detector data, data validation, and the scaling of acquired volumes and occupancies in a deterministic fashion so as to cause the selection and implementation of the most suitable traffic plan.

Upon request by the Engineer, each master shall be delivered with up to three (3) complete sets of the latest edition of registered remote monitoring software with full manufacture's support. Each set shall consist of software on CD, DVD, or other suitable media approved by the Engineer, and a bound set of manuals containing loading and operating instruction. One copy of the software and support data shall be delivered to the Agency in charge of system operation, if other than IDOT. One of these two sets will be provided to the Agency Signal Maintenance Contractor for use in monitoring the system.

The approved manufacturer of equipment shall loan the District one master controller and two intersection controllers of the most recent models and the newest software version to be used for instructional purposes in addition to the equipment to be supplied for the Contract.

The Contractor shall arrange to install a standard voice-grade dial-up telephone line to the master controller. This shall be accomplished through the following process utilizing District One staff. This telephone line may be coupled with a DSL line and a phone filter to isolate the dial-up line. An E911 address is required.

The cabinet shall be provided with an Outdoor Network Interface for termination of the telephone service. It shall be mounted to the inside of the cabinet in a location suitable to provide access for termination of the telephone service at a later date.

Full duplex communication between the master and its local controllers is recommended, but at this time not required. The data rate shall be 1200 baud minimum and shall be capable of speeds to 38,400 or above as technology allows. The controller, when installed in an Ethernet topology, may operate non-serial communications.
The cabinet shall be equipped with a 9600 baud, auto dial/auto answer modem. It shall be a US robotics 33.6K baud rate or equal.

As soon as practical or within one week after the contract has been awarded, the Contractor shall contact (via phone) the Administrative Support Manager in the District One Business Services Section at (847) 705-4011 to request a phone line installation.

A follow-up fax transmittal to the Administrative Support Manager (847-705-4712) with all required information pertaining to the phone installation is required from the Contractor as soon as possible or within one week after the initial request has been made. A copy of this fax transmittal must also be faxed by the Contractor to the Traffic Signal Systems Engineer at (847) 705-4089. The required information to be supplied on the fax shall include (but not limited to): A street address for the new traffic signal controller (or nearby address); a nearby existing telephone number; what type of telephone service is needed; the name and number of the Contractor's employee for the telephone company to contact regarding site work and questions.

The usual time frame for the activation of the phone line is 4-6 weeks after the Business Services Section has received the Contractor supplied fax. It is, therefore, imperative that the phone line conduit and pull-string be installed by the Contractor in anticipation of this time frame. On jobs which include roadway widening in which the conduit cannot be installed until this widening is completed, the Contractor will be allowed to delay the phone line installation request to the Business Services Section until a point in time that is 4-6 weeks prior to the anticipated completion of the traffic signal work. The contractor shall provide the Administrative Support Manager with an expected installation date considering the 4-6 week processing time.

The telephone line shall be installed and activated one month before the system final inspection.

All costs associated with the telephone line installation and activation (not including the Contract specified conduit installation between the point of telephone service and the traffic signal controller cabinet) shall be paid for by the District One Business Services Section (i.e., this will be an IDOT phone number not a Contractor phone number).

FIBER OPTIC CABLE

Add the following to Articles 871.01, 872.02, 871.04, and 871.05 of the Standard Specifications:

This work shall consist of furnishing and installing Fiber Optical cable in conduit with all accessories and connectors according to Section 871 of the Standard Specifications. The cable shall be of the type, size, and the number of fiber specified.

The control cabinet distribution enclosure shall be CSC FTWO12KST-W/O 12 Port Fiber Wall Enclosure or an approved equivalent. The fiber optic cable shall provide six fibers per tube for the amount of fibers called for in the Fiber Optic Cable pay item in the Contract. A minimum of six multimode fibers from each cable shall be terminated with approved mechanical connectors at the distribution enclosure. Fibers not being used shall be labeled “spare." Fibers not attached to the distribution enclosure shall be capped and sealed. A minimum of 13.0 feet (4m) of extra cable length shall be provided for the controller cabinet. The controller cabinet extra cable length shall be stored as directed by the Engineer.

Fiber Optic cable may be gel filled or have an approved water blocking tape.

Basis of Payment.
The work shall be paid for at the contract unit price for FIBER OPTIC CABLE IN CONDUIT, NO. 62.5/125, MM12F SM12F, per foot (meter) for the cable in place, including distribution enclosure and all connectors.

CONCRETE FOUNDATIONS

Add the following to Article 878.03 of the Standard Specifications:

All anchor bolts shall be according to Article 1006.09, except all anchor bolts shall be hot dipped galvanized the full length of the anchor bolt including the hook.

Concrete Foundations, Type “A” for Traffic Signal Posts shall provide anchor bolts with the bolt pattern specified within the “District One Standard Traffic Signal Design Details.” All Type “A” foundations shall be a minimum depth of 48 inches (1.22 m).

Concrete Foundations, Type "C" for Traffic Signal Cabinets with Uninterruptible Power Supply (UPS) cabinet installations shall be a minimum of 48 inches (1.22 m) long and 31 inches (790 mm) wide. All Type "C" foundations shall be a minimum depth of 48 inches (1.22 m). An integral concrete pad to support the UPS cabinet shall be constructed a minimum of 20 inches (510 mm) long and a minimum depth of 10 inches (250 mm). The concrete apron in front of the Type IV or V cabinet shall be 36 in. x 48 in. x 5 in. (910 mm X 1220 mm X 130 mm). The concrete apron in front of the UPS cabinet shall be 36 in. x 31 in. x 5 in. (910 mm X 790 mm X 130 mm). Anchor bolts shall provide bolt spacing as required by the manufacturer.

Concrete Foundations, Type "D" for Traffic Signal Cabinets shall be a minimum of 48 inches (1.22 m) long and 31 inches (790 mm) wide. All Type "D" foundations shall be a minimum depth of 48 inches (1.22 m). The concrete apron shall be 36 in. x 48 in. x 5 in. (910 mm X 1220 mm X 130 mm). Anchor bolts shall provide bolt spacing as required by the manufacturer.

Concrete Foundations, Type "E" for Mast Arm and Combination Mast Arm Poles shall meet the following requirements:

Table 1
DESIGN TABLE FOR MAST ARM FOUNDATIONS

MAST ARM LENGTH	FOUNDATION DEPTH*	FOUNDATION DIAMETER	SPIRAL DIAMETER	QUANTITY OF NO. 15 (NO. 5) BARS
Less than 9.1m (30')	10'-0" (3.0m)	30" (750mm)	24" (600mm)	8
Greater than or equal to 9.1m (30') and less than 12.2m (40')	13'-6" (4.1m)	30" (750mm)	24" (600mm)	8
	11'-0" (3.4m)	36" (900mm)	30" (750mm)	12
Greater than or equal to 12.2m (40') and less than 15.2m (50')	13'-0" (4.0m)	36" (900mm)	30" (750mm)	12
Greater than or equal to 15.2m (50') and up to 16.8m (55')	15'-0" (4.6m)	36" (900mm)	30" (750mm)	12

Foundation depths specified are for sites which have cohesive soils (clayey, silt, sandy clay, etc.) along the length of the shaft, with an average Unconfined Compressive strength of (Qu)>1.0 tsf (100kPa). This strength shall be verified by boring data prior to construction or with testing by the Engineer during foundation drilling. The Bureau of Bridges & Structures should be contacted for a revised design if other conditions are encountered.

Concrete Foundations, Type "E" for Combination Mast Arm Poles shall be 36 inch (900 mm) diameter, regardless of mast arm length. Foundations used for Combination Mast Arm Poles shall provide an extra 2-1/2 inch (65 mm) raceway.

No foundation is to be poured until the Resident Engineer gives his/her approval as to the depth of the foundation.

DETECTOR LOOP

Revise Section 886 of the Standard Specifications to read:

A minimum of seven (7) working days prior to the Contractor cutting loops, the Contractor shall have the proposed loop locations marked and contact the Area Traffic Signal Maintenance and Operations Engineer (847) 705-4424 to inspect and approve the layout. When preformed detector loops are installed, the Contractor shall have them inspected and approved prior to the pouring of the Portland cement concrete surface, using the same notification process as above.

Loop detectors shall be installed according to the requirements of the "District One Standard Traffic Signal Design Details." Saw-cuts (homeruns on preformed detector loops) from the loop to the edge of pavement shall be made perpendicular to the edge of pavement when possible in order to minimize the length of the saw-cut (homerun on preformed detector loops) unless directed otherwise by the Engineer or as shown on the plan.

The detector loop cable insulation shall be labeled with the cable specifications.

Each loop detector lead-in wire shall be labeled in the handhole using a Panduit 250W175C water proof tag, or an approved equal, secured to each wire with nylon ties.

Resistance to ground shall be a minimum of 100 mega-ohms under any conditions of weather or moisture. Inductance shall be more than 50 and less than 700 microhenries. Quality readings shall be more than 5.

(a) Type I. All loops installed in new asphalt pavement shall be installed in the binder course and not in the surface course. The edge of pavement, curb and handhole shall be cut with a 1/4 inch (6.3 mm) deep x 4 inches (100 mm) saw cut to mark location of each loop lead-in.

Loop sealant shall be a two-component thixotropic chemically cured polyurethane either Chemque Q-Seal 295, Percol Elastic Cement A/C Grade or an approved equal. The sealant shall be installed 1/8 inch (3 mm) below the pavement surface, if installed above the surface the overlap shall be removed immediately.

Detector loop measurements shall include the saw cut and the length of the loop lead-in to the edge of pavement. The lead-in wire, including all necessary connections for proper operations, from the edge of pavement to the handhole, shall be included in the price of the detector loop. Unit duct, trench and backfill, and drilling of pavement or handholes shall be included in detector loop quantities.

(b) Preformed. This work shall consist of furnishing and installing a rubberized heat resistant preformed traffic signal loop in accordance with the Standard Specifications, except for the following:

Preformed detector loops shall be installed in new pavement constructed of Portland cement concrete using mounting chairs or tied to re-bar or the preformed detector loops may be placed in the sub-base. Loop lead-ins shall be extended to a temporary enclosure near the proposed handhole location with ends capped and sealed against moisture and other contaminants.

Handholes shall be placed next to the shoulder or back of curb when preformed detector loops enter the handhole. Non-metallic coilable duct, included in this pay item, shall be used to protect the preformed lead-ins from back of curb to the handhole.

Preformed detector loops shall be factory assembled. Homeruns and interconnects shall be pre-wired and shall be an integral part of the loop assembly. The loop configurations and homerun lengths shall be assembled for the specific application. The loop and homerun shall be constructed using 11/16 inch (17.2 mm) outside diameter (minimum), 3/8 inch (9.5 mm) inside diameter (minimum) Class A oil resistant synthetic cord reinforced hydraulic hose with 250 psi (1,720 kPa) internal pressure rating. Hose for the loop and homerun assembly shall be one continuous piece. No joints or splices shall be allowed in the hose except where necessary to connect homeruns or interconnects to the loops. This will provide maximum wire protection and loop system strength. Hose tee connections shall be heavy duty high temperature synthetic rubber. The tee shall be of proper size to attach directly to the hose, minimizing glue joints. The tee shall have the same flexible properties as the hose to insure that the whole assembly can conform to pavement movement and shifting without cracking or breaking. The wire used shall be #16 THWN stranded copper. The number of turns in the loop shall be application specific. Homerun wire pairs shall be twisted a minimum of four turns per foot. No wire splices will be allowed in the preformed loop assembly. The loop and homeruns shall be filled and sealed with a flexible sealant to insure complete moisture blockage and further protect the wire. The preformed loops shall be constructed to allow a minimum of 6.5 feet of extra cable in the handhole.

Basis of Payment.
This work shall be paid for at the contract unit price per foot (meter) for DETECTOR LOOP, TYPE I or PREFORMED DETECTOR LOOP as specified in the plans, which price shall be payment in full for furnishing and installing the detector loop and all related connections for proper operation.

EMERGENCY VEHICLE PRIORITY SYSTEM

Revise Section 887 of the Standard Specifications to read:

It shall be the Contractor's responsibility to contact the municipality or fire district to verify the brand of emergency vehicle pre-emption equipment to be installed prior to the contract bidding. The equipment must be completely compatible with all components of the equipment currently in use by the Agency.

All new installations shall be equipped with Confirmation Beacons as shown on the "District One Standard Traffic Signal Design Details." The Confirmation Beacon shall consist of a 6 watt Par 38 LED flood lamp with a 30 degree light spread, maximum 6 watt energy consumption at 120V, and a 2,000 hour warranty for each direction of pre-emption. The lamp shall have an adjustable mount with a weatherproof enclosure for cable splicing. All hardware shall be cast aluminum or stainless steel. Holes drilled into signal poles, mast arms, or posts shall require rubber grommets. In order to maintain uniformity between communities, the confirmation beacons shall

indicate when the control equipment receives the pre-emption signal. The pre-emption movement shall be signalized by a flashing indication at the rate specified by Section 4D-11 of the "Manual on Uniform Traffic Control Devices." The stopped pre-empted movements shall be signalized by a continuous indication.

All light operated systems shall include security and transit preemption software and operate at a uniform rate of 14.035 Hz ±0.002, or as otherwise required by the Engineer, and provide compatible operation with other light systems currently being operated in the District.

Basis of Payment.
The work shall be paid for at the contract unit price each for furnishing and installing LIGHT DETECTOR and LIGHT DETECTOR AMPLIFIER. Furnishing and installing the confirmation beacon shall be included in the cost of the Light Detector. The preemption detector amplifier shall be paid for on a basis of (1) one each per intersection controller and shall provide operation for all movements required in the pre-emption phase sequence.

RE-OPTIMIZE TRAFFIC SIGNAL SYSTEM

Description.
This work shall consist of re-optimizing a closed loop traffic signal system according to the following Levels of work.

LEVEL I applies when improvements are made to an existing signalized intersection within an existing closed loop traffic signal system. The purpose of this work is to integrate the improvements to the subject intersection into the signal system while minimizing the impacts to the existing system operation. This type of work would be commonly associated with the addition of signal phases, pedestrian phases, or improvements that do not affect the capacity at an intersection.

LEVEL II applies when improvements are made to an existing signalized intersection within an existing closed loop traffic signal system and detailed analysis of the intersection operation is desired by the engineer, or when a new signalized or existing signalized intersection is being added to an existing system, but optimization of the entire system is not required. The purpose of this work is to optimize the subject intersection, while integrating it into the existing signal system with limited impact to the system operations. This item also includes an evaluation of the overall system operation, including the traffic responsive program.

For the purposes of re-optimization work, an intersection shall include all traffic movements operated by the subject controller and cabinet.

After the signal improvements are completed, the signal shall be re-optimized as specified by an approved Consultant who has previous experience in optimizing Closed Loop Traffic Signal Systems for District One of the Illinois Department of Transportation. The Contractor shall contact the Traffic Signal Engineer at (847) 705-4424 for a listing of approved Consultants. Traffic signal system optimization work, including fine-tuning adjustments of the optimized system, shall follow the requirements stated in the most recent IDOT District 1 SCAT Guidelines, except as note herein.

A listing of existing signal equipment, interconnect information, phasing data, and timing patterns may be obtained from the Department, if available and as appropriate. The existing SCAT Report is available for review at the District One office and if the Consultant provides blank computer disks, copies of computer simulation files for the existing optimized system and a timing database that includes intersection displays will be made for the Consultant. The Consultant shall confer with the Traffic Signal Engineer prior to optimizing the system to determine if any extraordinary conditions exist that would affect traffic flows in the vicinity of the system, in which case, the Consultant may be instructed to wait until the conditions return to normal or to follow specific instructions regarding the optimization.

(a) LEVEL I Re-Optimization

1. The following tasks are associated with LEVEL I Re-Optimization.
   a Appropriate signal timings shall be developed for the subject intersection and existing timings shall be utilized for the rest of the intersections in the system.
   b Proposed signal timing plan for the new or modified intersection(s) shall be forwarded to IDOT for review prior to implementation.
   c Consultant shall conduct on-site implementation of the timings at the turn-on and make fine-tuning adjustments to the timings of the subject intersection in the field to alleviate observed adverse operating conditions and to enhance operations.

2. The following deliverables shall be provided for LEVEL I Re-Optimization.
   a. Consultant shall furnish to IDOT a cover letter describing the extent of the re-optimization work performed.
   b. Consultant shall furnish an updated intersection graphic display for the subject intersection to IDOT and to IDOT's Traffic Signal Maintenance Contractor.

(b) LEVEL II Re-Optimization

1. In addition to the requirements described in the LEVEL I Re-Optimization above, the following tasks are associated with LEVEL II Re-Optimization.
   a. Traffic counts shall be taken at the subject intersection after the traffic signals are approved for operation by the Area Traffic Signal Operations Engineer. Manual turning movement counts shall be conducted from 6:30 a.m. to 9:30 a.m., 11:00 a.m. to 1:00 p.m., and 3:30 p.m. to 6:30 p.m. on a typical weekday from midday Monday to midday Friday. The turning movement counts shall identify cars, and single-unit, multi-unit heavy vehicles, and transit buses.
   b. As necessary, the intersections shall be re-addressed and all system detectors reassigned in the master controller according to the current standard of District One.
   c. Traffic responsive program operation shall be evaluated to verify proper pattern selection and lack of oscillation and a report of the operation shall be provided to IDOT.

2. The following deliverables shall be provided for LEVEL II Re-Optimization.
   a. Consultant shall furnish to IDOT one (1) copy of a technical memorandum for the optimized system. The technical memorandum shall include the following elements:
      (1) Brief description of the project
      (2) Printed copies of the analysis output from Synchro (or other appropriate, approved optimization software file)

(3) Printed copies of the traffic counts conducted at the subject intersection

b. Consultant shall furnish to IDOT two (2) CDs for the optimized system. The CDs shall include the following elements:
   (1) Electronic copy of the technical memorandum in PDF format
   (2) Revised Synchro files (or other appropriate, approved optimization software file) including the new signal and the rest of the signals in the closed loop system
   (3) Traffic counts conducted at the subject intersection
   (4) New or updated intersection graphic display file for the subject intersection
   (5) The CD shall be labeled with the IDOT system number and master location, as well as the submittal date and the consultant logo. The CD case shall include a clearly readable label displaying the same information securely affixed to the side and front.

Basis of Payment.
This work shall be paid for at the contract unit price each for RE-OPTIMIZE TRAFFIC SIGNAL SYSTEM – LEVEL I or RE-OPTIMIZE TRAFFIC SIGNAL SYSTEM – LEVEL II, which price shall be payment in full for performing all work described herein per intersection. Following completion of the timings and submittal of specified deliverables, 100 percent of the bid price will be paid.

OPTIMIZE TRAFFIC SIGNAL SYSTEM

Description.
This work shall consist of optimizing a closed loop traffic signal system.

OPTIMIZE TRAFFIC SIGNAL SYSTEM applies when a new or existing closed loop traffic signal system is to be optimized and a formal Signal Coordination and Timing (SCAT) Report is to be prepared. The purpose of this work is to improve system performance by optimizing traffic signal timings, developing a time of day program and a traffic responsive program.

After the signal improvements are completed, the signal system shall be optimized as specified by an approved Consultant who has previous experience in optimizing Closed Loop Traffic Signal Systems for District One of the Illinois Department of Transportation. The Contractor shall contact the Traffic Signal Engineer at (847) 705-4424 for a listing of approved Consultants. Traffic signal system optimization work, including fine-tuning adjustments of the optimized system, shall follow the requirements stated in the most recent IDOT District 1 SCAT Guidelines, except as note herein.

A listing of existing signal equipment, interconnect information, phasing data, and timing patterns may be obtained from the Department, if available and as appropriate. The existing SCAT Report is available for review at the District One office and if the Consultant provides blank computer disks, copies of computer simulation files for the existing optimized system and a timing database that includes intersection displays will be made for the Consultant. The Consultant shall confer with the Traffic Signal Engineer prior to optimizing the system to determine if any extraordinary conditions exist that would affect traffic flows in the vicinity of the system, in which case, the Consultant may be instructed to wait until the conditions return to normal or to follow specific instructions regarding the optimization.

(a) The following tasks are associated with OPTIMIZE TRAFFIC SIGNAL SYSTEM.

1. Appropriate signal timings and offsets shall be developed for each intersection and appropriate cycle lengths shall be developed for the closed loop signal system.

2. Traffic counts shall be taken at all intersections after the permanent traffic signals are approved for operation by the Area Traffic Signal Operations Engineer. Manual turning movement counts shall be conducted from 6:30 a.m. to 9:30 a.m., 11:00 a.m. to 1:00 p.m., and 3:30 p.m. to 6:30 p.m. on a typical weekday from midday Monday to midday Friday. The turning movement counts shall identify cars, and single-unit and multi-unit heavy vehicles.

3. As necessary, the intersections shall be re-addressed and all system detectors reassigned in the master controller according to the current standard of District One.

4. A traffic responsive program shall be developed, which considers both volume and occupancy. A time-of-day program shall be developed for used as a back-up system.

5. Proposed signal timing plan for the new or modified intersection shall be forwarded to IDOT for review prior to implementation.

6. Consultant shall conduct on-site implementation of the timings and make fine-tuning adjustments to the timings in the field to alleviate observed adverse operating conditions and to enhance operations.

7. Speed and delay studies shall be conducted during each of the count periods along the system corridor in the field before and after implementation of the proposed timing plans for comparative evaluations. These studies should utilize specialized electronic timing and measuring devices.

(b) The following deliverables shall be provided for OPTIMIZE TRAFFIC SIGNAL SYSTEM.
1. Consultant shall furnish to IDOT one (1) copy of a SCAT Report for the optimized system. The SCAT Report shall include the following elements:

Cover Page in color showing a System Map
Figures 1. System overview map – showing system number, system schematic map with numbered system detectors, oversaturated movements, master location, system phone number, cycle lengths, and date of completion. 2. General location map in color – showing signal system location in the metropolitan area. 3. Detail system location map in color – showing cross street names and local controller addresses. 4. Controller sequence – showing controller phase sequence diagrams.
Table of Contents
Tab 1: Final Report 1. Project Overview 2. System and Location Description (Project specific) 3. Methodology 4. Data Collection 5. Data Analysis and Timing Plan Development 6. Implementation a. Traffic Responsive Programming (Table of TRP vs. TOD Operation) 7. Evaluation a. Speed and Delay runs

Tab 2. Turning Movement Counts 1. Turning Movement Counts (Showing turning movement counts in the intersection diagram for each period, including truck percentage)
Tab 3. Synchro Analysis 1. AM: Time-Space diagram in color, followed by intersection Synchro report (Timing report) summarizing the implemented timings. 2. Midday: same as AM 3. PM: same as AM
Tab 4: Speed and Delay Studies 1. Summary of before and after runs results in two (2) tables showing travel time and delay time. 2. Plot of the before and after runs diagram for each direction and time period.
Tab 5: Electronic Files 1. Two (2) CDs for the optimized system. The CDs shall include the following elements: a. Electronic copy of the SCAT Report in PDF format b. Copies of the Synchro files for the optimized system c. Traffic counts for the optimized system d. New or updated intersection graphic display files for each of the system intersections and the system graphic display file including system detector locations and addresses.

Basis of Payment.
The work shall be paid for at the contract unit each for OPTIMIZE TRAFFIC SIGNAL SYSTEM, which price shall be payment in full for performing all work described herein for the entire traffic signal system. Following the completion of traffic counts, 25 percent of the bid price will be paid. Following the completion of the Synchro analysis, 25 percent of the bid price will be paid. Following the setup and fine tuning of the timings, the speed-delay study, and the TRP programming, 25 percent of the bid price will be paid. The remaining 25 percent will be paid when the system is working to the satisfaction of the engineer and the report and CD have been submitted.

TEMPORARY TRAFFIC SIGNAL TIMINGS

Description.
This work shall consist of developing and maintaining appropriate traffic signal timings for the specified intersection for the duration of the temporary signalized condition.

All timings and adjustments necessary for this work shall be performed by an approved Consultant who has previous experience in optimizing Closed Loop Traffic signal Systems for District One of the Illinois Department of Transportation. The Contractor shall contact the Traffic Signal Engineer at (847) 705-4424 for a listing of approved Consultants.

The following tasks are associated with TEMPORARY TRAFFIC SIGNAL TIMINGS.

(a) Consultant shall attend temporary traffic signal inspection (turn-on) and conduct on-site implementation of the traffic signal timings. Make fine-turning adjustments to the timings in the field to alleviate observed adverse operating conditions and to enhance operations.

(b) Consultant shall provide monthly observation of traffic signal operations in the field.

(c) Consultant shall provide on-site consultation and adjust timings as necessary for construction stage changes, temporary traffic signal phase changes, and any other conditions affecting timing and phasing, including lane closures, detours, and other construction activities.

(d) Consultant shall make timing adjustments and prepare comment responses as directed by the Area Traffic Signal Operations Engineer.

Basis of Payment.
The work shall be paid for at the contract unit price each for TEMPORARY TRAFFIC SIGNAL TIMINGS, which price shall be payment in full for performing all work described herein per intersection. When the temporary traffic signal installation is turned on, 50 percent of the bid price will be paid. The remaining 50 percent of the bid price will be paid following the removal of the temporary traffic signal installation.

TEMPORARY TRAFFIC SIGNAL INSTALLATION

Revise Section 890 of the Standard Specifications to read:

General.
Only an approved equipment vendor will be allowed to assemble the temporary traffic signal cabinet. Also, an approved equipment vendor shall assemble and test a temporary railroad traffic signal cabinet. (Refer to the "Inspection of Controller and Cabinet" specification). A representative of the approved control equipment vendor shall be present at the temporary traffic signal turn-on inspection.

Construction Requirements.

(a) Controllers.

1. Only controllers supplied by one of the District approved closed loop equipment manufacturers will be approved for use at temporary signal locations. All controllers used for temporary traffic signals shall be fully actuated NEMA microprocessor based with RS232 data entry ports compatible with existing monitoring software approved by IDOT District 1, installed in NEMA TS1 or TS2 cabinets with 8 phase back panels, capable of supplying 255 seconds of cycle length and individual phase length settings up to 99 seconds. On projects with one lane open and two way traffic flow, such as bridge deck repairs, the temporary signal controller shall be capable of providing an adjustable all red clearance setting of up to 30 seconds in length. All controllers used for temporary traffic signals shall meet or exceed the requirements of Section 857 of the Standard Specifications with regards to internal time base coordination and preemption.

2. All control equipment for the temporary traffic signal(s) shall be furnished by the Contractor unless otherwise stated in the plans. On projects with multiple temporary traffic signal installations, all controllers shall be the same manufacturer brand and model number with current software installed.

(b) Cabinets. All temporary traffic signal cabinets shall have a closed bottom made of aluminum alloy. The bottom shall be sealed along the entire perimeter of the cabinet base to ensure a water, dust and insect-proof seal. The bottom shall provide a

minimum of two (2) 4 inch (100 mm) diameter holes to run the electric cables through. The 4 inch (100 mm) diameter holes shall have a bushing installed to protect the electric cables and shall be sealed after the electric cables are installed.

(c) Grounding. Grounding shall be provided for the temporary traffic signal cabinet meeting or exceeding the applicable portions of the National Electrical Code, Section 807 of the Standard Specifications and shall meet the requirements of the District 1 Traffic Signal Specifications for "Grounding of Traffic Signal Systems".

(d) Traffic Signal Heads. All traffic signal sections and pedestrian signal sections shall be 12 inches (300 mm). Traffic signal sections shall be LED with expandable view, unless otherwise approved by the Engineer. The temporary traffic signal heads shall be placed as indicated on the temporary traffic signal plan or as directed by the Engineer. The Contractor shall furnish enough extra cable length to relocate heads to any position on the span wire or at locations illustrated on the plans for construction staging. The temporary traffic signal shall remain in operation during all signal head relocations. Each temporary traffic signal head shall have its own cable from the controller cabinet to the signal head.

(e) Interconnect.

1. Temporary traffic signal interconnect shall be provided using fiber optic cable or wireless interconnect technology as specified in the plans. The Contractor may request, in writing, to substitute the fiber optic temporary interconnect indicated in the contract documents with a wireless interconnect. The Contractor must provide assurances that the radio device will operate properly at all times and during all construction staging. If approved for use by the Engineer, the Contractor shall submit marked-up traffic signal plans indicating locations of radios and antennas and installation details. If wireless interconnect is used, and in the opinion of the engineer, it is not viable, or if it fails during testing or operations, the Contractor shall be responsible for installing all necessary poles, fiber optic cable, and other infrastructure for providing temporary fiber optic interconnect at no cost to the contract.

2. The existing system interconnect and phone lines are to be maintained as part of the Temporary Traffic Signal Installation specified for on the plan. The interconnect shall be installed into the temporary controller cabinet as per the notes or details on the plans. All labor and equipment required to install and maintain the existing interconnect as part of the Temporary Traffic Signal Installation shall be included in the item Temporary Traffic Signal Installation. When shown in the plans, temporary traffic signal interconnect equipment shall be furnished and installed. The temporary traffic signal interconnect shall maintain interconnect communications throughout the entire signal system for the duration of the project.

3. Temporary wireless interconnect, compete. The radio interconnect system shall be compatible with Eagle or Econolite controller closed loop systems. This item shall include all materials, labor and testing to provide the completely operational closed loop system as shown on the plans. The radio interconnect system shall include the following components:

a. Rack or Shelf Mounted RS-232 Frequency Hopping Spread Spectrum (FHSS) Radio
b. Software for Radio Configuration (Configure Frequency and Hopping Patterns)
c. Antennas (Omni Directional or Yagi Directional)
d. Antenna Cables, LMR400, Low Loss. Max. 100-ft from controller cabinet to antenna
e. Brackets, Mounting Hardware, and Accessories Required for Installation
f. RS232 Data Cable for Connection from the radio to the local or master controller
g. All other components required for a fully functional radio interconnect system

All controller cabinet modifications and other modifications to existing equipment that are required for the installation of the radio interconnect system components shall be included in this item.

The radio interconnect system may operate at 900Mhz (902-928) or 2.4 Ghz depending on the results of a site survey. The telemetry shall have an acceptable rate of transmission errors, time outs, etc. comparable to that of a hardwire system.

The proposed master controller and telemetry module shall be configured for use with the radio interconnect at a minimum rate of 9600 baud.

The radio interconnect system shall include all other components required for a complete and fully functional telemetry system and shall be installed in accordance to the manufacturers recommendations.

The following radio equipment is currently approved for use in Region One/District One: Encon Model 5100 and Intuicom Communicator II.

(f) Emergency Vehicle Pre-Emption. All emergency vehicle preemption equipment (light detectors, light detector amplifiers, confirmation beacons, etc.) as shown on the temporary traffic signal plans shall be provided by the Contractor. It shall be the Contractor's responsibility to contact the municipality or fire district to verify the brand of emergency vehicle preemption equipment to be installed prior to the contract bidding. The equipment must be completely compatible with all components of the equipment currently in use by the Agency. All light operated systems shall operate at a uniform rate of 14.035 hz ±0.002, or as otherwise required by the Engineer, and provide compatible operation with other light systems currently being operated in the District. All labor and material required to install and maintain the Emergency Vehicle Preemption installation shall be included in the item Temporary Traffic Signal Installation.

(g) Vehicle Detection. All temporary traffic signal installations shall have vehicular detection installed as shown on the plans or as directed by the Engineer. Pedestrian push buttons shall be provided for all pedestrian signal heads/phases as shown on the plans or as directed by the Engineer. All approaches shall have vehicular detection provided by Video Vehicle Detection System as shown on the plans or as

directed by the Engineer. The microwave vehicle sensor or video vehicle detection system shall be approved by IDOT before furnishing and installing. The Contractor shall install, wire, and adjust the alignment of the microwave vehicle sensor or video vehicle detection system in accordance to the manufacturer's recommendations and requirements. The Contractor shall be responsible for adjusting the alignment of the microwave vehicle sensor or video vehicle detection system for all construction staging changes and for maintaining proper alignment throughout the project. A representative of the approved control equipment vendor shall be present and assist the contractor in setting up and maintaining the microwave vehicle sensor or video vehicle detection system. An in-cabinet video monitor shall be provided with all video vehicle detection systems and shall be included in the item Temporary Traffic Signal Installation.

(h) Signs. All existing street name and intersection regulatory signs shall be removed from existing poles and relocated to the temporary signal span wire. If new mast arm assembly and pole(s) and posts are specified for the permanent signals, the signs shall be relocated to the new equipment at no extra cost.

(i) Energy Charges. The electrical utility energy charges for the operation of the traffic signal installation shall be paid for by others if the installation replaces an existing signal. Otherwise charges shall be paid for under 109.05 of the Standard Specifications.

(j) Maintenance. Maintenance shall meet the requirements of the Traffic Specifications and District Specifications for "Maintenance of Existing Traffic Signal Installation." Maintenance of temporary signals and of the existing signals shall be included to the cost of this item. When temporary traffic signals are to be installed at locations where existing signals are presently operating, the Contractor shall be fully responsible for the maintenance of the existing signal installation as soon as he begins any physical work on the Contract or any portion thereof. Maintenance responsibility of the existing signals shall be included to the item Temporary Traffic Signal Installation(s). In addition, a minimum of seven (7) days prior to assuming maintenance of the existing traffic signal installation(s) under this Contract, the Contractor shall request that the Resident Engineer contact the Bureau of Traffic (847) 705-4424 for an inspection of the installation(s).

(k) Temporary Traffic Signals for Bridge Projects. Temporary Traffic Signals for bridge projects shall follow the State Standards, Standard Specifications, District 1 Traffic Signal Specifications and any plans for Bridge Temporary Traffic Signals included in the plans. The installation shall meet the above requirements for "Temporary Traffic Signal Installation". In addition all electric cable shall be aerially suspended, at a minimum height of 18 feet (5.5m), on temporary wood poles (Class 5 or better) of 45 feet (13.7 m), minimum height. The signal heads shall be span wire mounted or bracket mounted to the wood pole or as directed by the Engineer. The Controller cabinet shall be mounted to the wood pole or as directed by the Engineer. Microwave vehicle sensors or video vehicle detection may be used in place of the detector loops as approved by the Engineer.

(l) Temporary Portable Traffic Signal for Bridge Projects.

1. Unless otherwise directed by the Engineer, temporary portable traffic signals shall be restricted to use on roadways of less than 8000 ADT that have limited access to electric utility service, shall not be installed on projects where the estimated need exceeds ten (10) weeks, and shall not be in operation during the period of November through March. The Contractor shall replace the temporary portable traffic signals with temporary span wire traffic signals noted herein at no cost to the contract if the bridge project or Engineer requires temporary traffic signals to remain in operation into any part of period of November through March. If, in the opinion of the engineer, the reliability and safety of the temporary portable traffic signal is not similar to that of a temporary span wire traffic signal installation, the Contractor shall replace the temporary portable traffic signals with temporary span wire traffic signals noted herein at no cost to the contract.

2. The controller and LED signal displays shall meet the above requirements for "Temporary Traffic Signal Installation".

3. Work shall be according to Article 701.18(b) of the Standard Specifications except as noted herein.

4. General.

    a. The temporary portable bridge traffic signals shall be trailer-mounted units. The trailer-mounted units shall be set up securely and level. Each unit shall be self-contained and consist of two signal heads. The left signal head shall be mounted on a mast arm capable of extending over the travel lane. Each unit shall contain a solar cell system to facilitate battery charging. There shall be a minimum of 12 days backup reserve battery supply and the units shall be capable of operating with a 120 V power supply from a generator or electrical service.

    b. All signal heads located over the travel lane shall be mounted at a minimum height of 17 feet (5m) from the bottom of the signal back plate to the top of the road surface. All far right signal heads located outside the travel lane shall be mounted at a minimum height of 8 feet (2.5m) from the bottom of the signal back plate to the top of the adjacent travel lane surface.

    c. The long all red intervals for the traffic signal controller shall be adjustable up to 250 seconds in one-second increments.

    d. As an alternative to detector loops, temporary portable bridge traffic signals may be equipped with microwave sensors or other approved methods of vehicle detection and traffic actuation.

    e. All portable traffic signal units shall be interconnected using hardwire communication cable. Radio communication equipment may be used only with the approval of the Engineer. If radio communication is used, a

site analysis shall be completed to ensure that there is no interference present that would affect the traffic signal operation. The radio equipment shall meet all applicable FCC requirements.

f. The temporary portable bridge traffic signal system shall meet the physical display and operational requirements of conventional traffic signals as specified in Part IV of the Manual on Uniform Traffic Control Devices (MUTCD). The signal system shall be designed to continuously operate over an ambient temperature range between -30 ºF (-34 ºC) and 120 ºF (48 ºC). When not being utilized to inform and direct traffic, portable signals shall be treated as nonoperating equipment according to Article 701.11.

g. Basis of Payment. This work will be paid for according to Article 701.20(c).

Basis of Payment.
This work shall be paid for at the contract unit price each for TEMPORARY TRAFFIC SIGNAL INSTALLATION, TEMPORARY BRIDGE TRAFFIC SIGNAL INSTALLATION, or TEMPORARY PORTABLE BRIDGE TRAFFIC SIGNAL INSTALLATION. The price of which shall include all costs for the modifications required for traffic staging, changes in signal phasing as required in the Contract plans, microwave vehicle sensors, video vehicle detection system, any maintenance or adjustment to the microwave vehicle sensors/video vehicle detection system, all material required, the installation and complete removal of the temporary traffic signal.

REMOVE EXISTING TRAFFIC SIGNAL EQUIPMENT

Add the following to Article 895.05 of the Standard Specifications:

The traffic signal equipment which is to be removed and is to become the property of the Contractor shall be disposed of outside the right-of-way at the Contractor's expense.

All equipment to be returned to the State shall be delivered by the Contractor to the State's Traffic Signal Maintenance Contractor's main facility. The Contractor shall contact the State's Electrical Maintenance Contractor to schedule an appointment to deliver the equipment. No equipment will be accepted without a prior appointment. All equipment shall be delivered within 30 days of removing it from the traffic signal installation. The Contractor shall provide 5 copies of a list of equipment that is to remain the property of the State, including model and serial numbers, where applicable. He shall also provide a copy of the Contract plan or special provision showing the quantities and type of equipment. Controllers and peripheral equipment from the same location shall be boxed together (equipment from different locations may not be mixed) and all boxes and controller cabinets shall be clearly marked or labeled with the location from which they were removed. If equipment is not returned with these requirements, it will be rejected by the State's Electrical Maintenance Contractor. The Contractor shall be responsible for the condition of the traffic signal equipment from the time he takes maintenance of the signal installation until the acceptance of a receipt drawn by the State's Electrical Maintenance Contractor indicating the items have been returned in good condition.

The Contractor shall safely store and arrange for pick up of all equipment to be returned to agencies other than the State. The Contractor shall package the equipment and provide all necessary documentation as stated above.

Traffic signal equipment which is lost or not returned to the Department for any reason shall be replaced with new equipment meeting the requirements of these Specifications.

TRAFFIC SIGNAL PAINTING

Description.
This work shall include surface preparation, powder type painted finish application and packaging of new galvanized steel traffic signal mast arm poles and posts assemblies. All work associated with applying the painted finish shall be performed at the manufacturing facility for the pole assembly or post or at a painting facility approved by the Engineer. Traffic signal mast arm shrouds and post bases shall also be painted the same color as the pole assemblies and posts.

Surface Preparation.
All weld flux and other contaminates shall be mechanically removed. The traffic mast arms and post assemblies shall be degreased, cleaned, and air dried to assure all moisture is removed.

Painted Finish.
All galvanized exterior surfaces shall be coated with a urethane or triglycidyl isocyanurate (TGIC) polyester powder to a dry film thickness of 2.0 mils. Prior to application, the surface shall be mechanically etched by brush blasting (Ref. SSPC-SP7) and the zinc coated substrate preheated to 450 degrees F for a minimum one (1) hour. The coating shall be electrostatically applied and cured by elevating the zinc-coated substrate temperature to a minimum of 400 degrees F.

The finish paint color shall be one of the manufacturer's standard colors and shall be as selected by the local agency responsible for paint costs. The Contractor shall confirm, in writing, the color selection with the local responsible agency and provide a copy of the approval to the Engineer and a copy of the approval shall be included in the material catalog submittal.

Traffic signal heads, pedestrian signal heads and controller cabinets are not included in this pay item.

Any damage to the finish after leaving the manufacturer's facility shall be repaired to the satisfaction of the Engineer using a method approvable by the Engineer and manufacturer. If while at the manufacturer's facility the finish is damaged, the finish shall be re-applied.

Warranty.
The Contractor shall furnish in writing to the Engineer, the paint manufacturer's standard warranty and certification that the paint system has been properly applied.

Packaging.
Prior to shipping, the poles and posts shall be wrapped in ultraviolet-inhibiting plastic foam or rubberized foam.

Basis of Payment.
This work shall be paid for at the contract unit price each for PAINT NEW MAST ARM POLE, UNDER 40 FEET (12.19 METER); PAINT NEW MAST ARM POLE, 40 FEET (12.19 METER) AND OVER; PAINT NEW COMBINATION MAST ARM POLE, UNDER 40 FEET (12.19 METER); PAINT NEW COMBINATION MAST ARM POLE, 40 FEET (12.19 METER) AND OVER; or TRAFFIC SIGNAL POST of any height, which shall be payment in full for painting and packaging the traffic signal mast arm poles and posts described above including all shrouds, bases and appurtenances.

DIVISION 1000 MATERIALS

PEDESTRIAN PUSH-BUTTON

Revise Article 1074.02 of the Standard Specifications to read:

(a) General. Push-button assemblies shall be ADA compliant, highly vandal resistant, be pressure activated with minimal movement and cannot be stuck in a closed or constant call position. A red LED and audible tone shall be provided for confirmation of an actuation call.
(b) Housing. The push-button housing shall be solid 6061 aluminum and powder coated yellow, unless otherwise noted on the plans.
(c) Actuator. The actuator shall be stainless steel with a solid state electronic Piezo switch rated for a minimum of 20 million cycles with no moving plunger or moving electrical contacts. The operating voltage shall be 12-24 V AC/DC.
(d) Pedestrian Station. Stations shall be designed to be mounted directly to a post, mast arm pole or wood pole. The station shall be aluminum and accept a 3-inch round push button assembly and 5 X 7 ¾ -inch R10-3b or R10-3d sign. A larger station will be necessary to accommodate the sign, R10-3e, for a count-down pedestrian signal.

CONTROLLER CABINET AND PERIPHERAL EQUIPMENT

Add the following to Article 1074.03 of the Standard Specifications:

(a) Cabinets shall be designed for NEMA TS2 Type 1 operation. All cabinets shall be pre-wired for a minimum of eight (8) phases of vehicular, four (4) phases of pedestrian and four (4) phases of overlap operation.

(b)(5) Cabinets – Provide 1/8" (3.2 mm) thick unpainted aluminum alloy 5052-H32. The surface shall be smooth, free of marks and scratches. All external hardware shall be stainless steel.
(b) (6) Controller Harness – Provide a TS2 Type 2 “A” wired harness in addition to the TS2 Type 1 harness.
(b) (7) Surge Protection – EDCO Model 1210 IRS with failure indicator.
(b) (8) BIU – Containment screw required.
(b) (9) Transfer Relays – Solid state or mechanical flash relays are acceptable.
(b) (10) Switch Guards – All switches shall be guarded.
(b) (11) Heating – Two (2) porcelain light receptacles with cage protection controlled by both a wall switch and a thermostat or a thermostatically controlled 150 watt strip heater.

(b) (12) Plan & Wiring Diagrams – 12" x 16" (3.05mm x 4.06mm) moisture sealed container attached to door.
(b) (13) Detector Racks – Fully wired and labeled for four (4) channels of emergency vehicle pre-emption and sixteen channels (16) of vehicular operation.
(b) (14) Field Wiring Labels – All field wiring shall be labeled.
(b) (15) Field Wiring Termination – Approved channel lugs required.
(b) (16) Power Panel – Provide a nonconductive shield.
(b) (17) Circuit Breaker – The circuit breaker shall be sized for the proposed load but shall not be rated less than 30 amps.
(b) (18) Police Door – Provide wiring and termination for plug in manual phase advance switch.
(b) (19) Railroad Pre-Emption Test Switch – Eaton 8830K13 SHA 1250 or equivalent.

RAILROAD, FULL-ACTUATED CONTROLLER AND CABINET

Add the following to Article 857.02 of the Standard Specifications:

Controller shall comply with Article 1073.01 as amended in these Traffic Signal Special Provisions.

Controller Cabinet and Peripheral Equipment shall comply with Article 1074.03 as amended in these Traffic Signal Special Provisions.

Add the following to Articles 1073.01 (c) (2) and 1074.03 (a) (5) (e) of the Standard Specifications:

Controllers and cabinets shall be new and NEMA TS2 Type 1 design.

A method of monitoring and/or providing redundancy to the railroad preemptor input to the controller shall be included as a component of the Railroad, Full Actuated Controller and Cabinet installation and be verified by the traffic signal equipment supplier prior to installation.

Railroad interconnected controllers and cabinets shall be assembled only by an approved traffic signal equipment supplier. The equipment shall be tested and approved in the equipment supplier's District One facility prior to field installation.

ELECTRIC CABLE

Delete "or stranded, and No. 12 or" from the last sentence of Article 1076.04 (a) of the Standard Specifications.

MAST ARM ASSEMBLY AND POLE

Add the following to Article 1077.03 (a) of the Standard Specifications:

Traffic signal mast arms shall be one piece construction, unless otherwise approved by the Engineer. All poles shall be galvanized. If the Department approves painting, powder coating by the manufacturer will be required over the galvanization.

This work shall consist of furnishing and installing a galvanized steel or extruded aluminum shroud for protection of the mast arm pole base plate similar to the dimensions detailed in the "District One Standard Traffic Signal Design Details." The shroud shall be of sufficient strength to deter pedestrian and vehicular damage. The shroud shall allow air to circulate throughout the mast arm but not allow infestation of insects or other animals. The shroud shall be constructed, installed and designed not to be hazardous to probing fingers and feet. All mounting hardware shall be stainless steel. The shroud shall not be paid for separately but shall be included in the cost of the mast arm assembly and pole.

TRAFFIC SIGNAL POST

Add the following to Article 1077.01 (b) of the Standard Specifications:

All posts and bases shall be steel and hot dipped galvanized. If the Department approves painting, powder coating by the manufacturer will be required over the galvanization.

SIGNAL HEADS

Add the following to Section 1078 of the Standard Specifications to read:

All signal and pedestrian heads shall provide 12” (300 mm) displays with glossy yellow or black polycarbonate housings. All head housings shall be the same color (yellow or black) at the intersection. For new signalized intersections and existing signalized intersections where all signal and/or pedestrian heads are being replaced, the proposed head housings shall be black. Where only selected heads are being replaced, the proposed head housing color (yellow or black) shall match existing head housings. Connecting hardware and mounting brackets shall be polycarbonate (black). A corrosion resistant anti-seize lubricant shall be applied to all metallic mounting bracket joints, and shall be visible to the inspector at the signal turn-on. Post top mounting collars are required on all posts, and shall be constructed of the same material as the brackets.

Pedestrian signal heads shall be furnished with the international symbolic "Walking Person" and "Upraised Palm" lenses. Egg crate sun shields are not permitted.

Signal heads shall be positioned according to the “District One Standard Traffic Signal Design Details."

SIGNAL HEAD, BACKPLATE

Delete 1st sentence of Article 1078.03 of the Standard Specifications and add “All backplates shall be aluminum and louvered”.

INDUCTIVE LOOP DETECTOR

Add the following to Article 1079.01 of the Standard Specifications:

Contracts requiring new cabinets shall provide for card mounted detector amplifiers. Loop amplifiers shall provide LCD displays with loop frequency, inductance, and change of inductance readings.

ILLUMINATED SIGN, LIGHT EMITTING DIODE

Revise Sections 891 of the Standard Specifications to read:

Description.
This work shall consist of furnishing and installing an illuminated sign with light emitting diodes.

General.
The light emitting diode (LED) blank out signs shall be manufactured by National Sign & Signal Company, or an approved equal and consist of a weatherproof housing and door, LEDs and transformers.

(a) Display.
1. The LED blank out sign shall provide the correct symbol and color for “NO LEFT TURN" OR “NO RIGHT TURN" indicated in accordance with the requirements of the "Manual on Uniform Traffic Control Devices". The message shall be formed by rows of LEDs.

2. The message shall be clearly legible. The message shall be highly visible, anywhere and under any lighting conditions, within a 15 degree cone centered about the optic axis.

   The sign face shall be 24 inches (600 mm) by 24 inches (600 mm). The sign face shall be completely illegible when not illuminated. No symbol shall be seen under any ambient light condition when not illuminated.

3. All LEDs shall be T-1 3/4 (5mm) and have an expected lamplife of 100,000 hours. Operating wavelengths will be Red-626nm, Amber-590nm, and Bluish/Green-505nm. Transformers shall be rated for the line voltage with Class A insulation and weatherproofing. The sign shall be designed for operation over a range of temperatures from –35F to +165 F (-37C to +75C).

4. The LED module shall include the message plate, high intensity LEDs and LED drive electronics. Door panels shall be flat black and electrical connections shall be made via barrier-type terminal strip. All fasteners and hardware shall be corrosion resistant stainless steel.

(b) Housing.
1. The housing shall be constructed of extruded aluminum. All corners and seams shall be heli-arc welded to provide a weatherproof seal around the entire case. Hinges shall be continuous full-length stainless steel. Signs shall have stainless steel hardware and provide tool free access to the interior of the sign. Doors shall be 0.125-inch thick extruded aluminum with a 3/16-inch x 1-inch neoprene gasket and sun hood. The sign face shall have a polycarbonate, matte clear, lexan face plate. Drainage shall be provided by four drain holes at the corners of the housing. The finish on the sign housing shall include two coats of exterior enamel applied after the surface is acid-etched and primed with zinc-chromate primer.

2. Mounting hardware shall be black polycarbonate or galvanized steel and similar to mounting Signal Head hardware and brackets specified herein.

Basis of Payment.
This work shall be paid for at the unit price each for ILLUMINATED SIGN, L.E.D.

GROUNDING EXISTING HANDHOLE FRAME AND COVER

Description.
This work shall consist of all materials and labor required to bond the equipment grounding conductor to the existing handhole frame and handhole cover. All installations shall meet the requirements of the details in the "District One Standard Traffic Signal Design Details" and applicable portions of the Specifications.

The equipment grounding conductor shall be bonded to the handhole frame and to the handhole cover. Two (2) ½-inch diameter x 1 ¼-inch long hex-head stainless steel bolts, spaced 1.75-inches apart center-to-center shall be fully welded to the frame and to the cover to accommodate a heavy duty Listed grounding compression terminal (Burndy type YGHA or approved equal). The grounding compression terminal shall be secured to the bolts with stainless steel split-lock washers and nylon-insert locknuts.

Welding preparation for the stainless steel bolt hex-head to the frame and to the cover shall include thoroughly cleaning the contact and weldment area of all rust, dirt and contaminates. The Contractor shall assure a solid strong weld. The welds shall be smooth and thoroughly cleaned of flux and spatter. The grounding installation shall not affect the proper seating of the cover when closed.

The grounding cable shall be paid for separately.

Method of Measurement.
Units measured for payment will be counted on a per handhole basis, regardless of the type of handhole and its location.

Basis of Payment.
This work shall be paid for at the contract unit price each for GROUNDING EXISTING HANDHOLE FRAME AND COVER which shall be payment in full for grounding the handhole complete.

UNIT DUCT

All installations of Unit Duct shall be included in the contract and not paid for separately. Polyethylene unit duct shall be used for detector loop raceways to the handholes. On temporary traffic signal installations with detector loops, polyethylene unit duct shall be used for detector loop raceways from the saw-cut to 10 feet (3m) up the wood pole, unless otherwise shown on the plans. Unit duct shall meet the requirements of NEC Article 343.

UNINTERRUPTIBLE POWER SUPPLY (UPS)

Description.
This work shall consist of furnishing and installing an uninterruptible power supply (UPS).

The UPS shall have the power capacity to provide normal operation of a signalized intersection that utilizes all LED type signal head optics, for a minimum of six hours.

The UPS shall include, but not be limited to the following: inverter/charger, power transfer relay, batteries, battery cabinet, a separate manually operated non-electronic bypass switch, and all necessary hardware and interconnect wiring according to the plans. The UPS shall provide reliable emergency power to the traffic signals in the event of a power failure or interruption. The transfer from utility power to battery power and visa versa shall not interfere with the normal operation of traffic controller, conflict monitor/malfunction management unit, or any other peripheral devices within the traffic controller assembly.

The UPS shall be designed for outdoor applications, and shall meet the environmental requirements of, "NEMA Standards Publication No. TS 2 – Traffic Controller Assemblies", except as modified herein.

Materials.
The UPS shall be line interactive and provide voltage regulation and power conditioning when utilizing utility power. The UPS shall be sized appropriately for the intersection's normal traffic signal operating connected load, plus 20 percent (20%). The total connected traffic signal load shall not exceed the published ratings for the UPS. The UPS shall provide a minimum of six (6) hours of normal operation run-time for signalized intersections with LED type signal head optics at 77 °F (25 °C) (minimum 700 W/VA active output capacity, with 90 percent minimum inverter efficiency).

The maximum transfer time from loss of utility power to switchover to battery backed inverter power shall be 65 milliseconds.

The UPS shall have a minimum of three (3) sets of normally open (NO) and normally closed (NC) single-pole double-throw (SPDT) relay contact closures, available on a panel mounted terminal block or locking circular connectors, rated at a minimum 120 V/1 A, and labeled so as to identify each contact according to the plans. Contact closures shall be energized whenever the unit:

- Switches to battery power. Contact shall be labeled or marked "On Batt".
- Has been connected to battery power for two (2) hours. Contact shall be labeled or marked "Timer".
- Has an inverter/charger failure. Contact shall be labeled or marked "UPS Fail".

Operating temperature for the inverter/charger, power transfer relay, and manual bypass switch shall be -35 to 165 °F (-37 to +74 °C).

Both the power transfer relay and manual bypass switch shall be rated at 240 VAC/30 amps, minimum.

The UPS shall use a temperature-compensated battery charging system. The charging system shall compensate over a range of 1.4 – 2.2 mV/°F (2.5 - 4.0 mV/°C) per cell. The temperature sensor shall be external to the inverter/charger unit. The temperature sensor shall come with 6.5 ft (2 m) of wire.

Batteries shall not be recharged when battery temperature exceeds 122 °F ± 5 °F (50 °C ± 3 °C).

The UPS shall bypass the utility line power whenever the utility line voltage is outside of the following voltage range: 85 VAC to 135 VAC (± 2 VAC).

When utilizing battery power, the UPS output voltage shall be between 110 and 125 VAC, pure sine wave output, ≤ 3 percent THD, 60 Hz ± 3 Hz.
The UPS shall be compatible with the District's approved traffic controller assemblies utilizing NEMA TS 1 or NEMA TS 2 controllers and cabinet components for full time operation.

When the utility line power has been restored at above 90 VAC ± 2 VAC for more than 30 seconds, the UPS shall dropout of battery backup mode and return to utility line mode.

When the utility line power has been restored at below 130 VAC ± 2 VAC for more than 30 seconds, the UPS shall dropout of battery backup mode and return to utility line mode.

The UPS shall be equipped to prevent a malfunction feedback to the cabinet or from feeding back to the utility service.

In the event of inverter/charger failure, the power transfer relay shall revert to the NC state, where utility line power is reconnected to the cabinet. In the event of an UPS fault condition, the UPS shall always revert back to utility line power.

Recharge time for the battery, from "protective low-cutoff" to 80 percent or more of full battery charge capacity, shall not exceed twenty hours.

The manual bypass switch shall be wired to provide power to the UPS when the switch is set to manual bypass.

When the intersection is in battery backup mode, the UPS shall bypass all internal cabinet lights, ventilation fans, service receptacles, any lighted street name signs, any automated enforcement equipment and any other devices directed by the Engineer.

As the battery reserve capacity reaches 50 percent, the intersection shall automatically be placed in all-red flash. The UPS shall allow the controller to automatically resume normal operation after the power has been restored. The UPS shall log an alarm in the controller for each time it is activated.

A blue LED indicator light shall be mounted on the front of the traffic signal cabinet or on the side of the UPS cabinet facing traffic and shall turn on to indicate when the cabinet power has been disrupted and the UPS is in operation. The light shall be a minimum 1 in. (25 mm) diameter, be viewable from the driving lanes, and able to be seen from 200 ft (60 m) away.

All 24 volt and 48 volt systems shall include an external or internal component that monitors battery charging to ensure that every battery in the string is fully charged. The device shall compensate for the effects of adding a new battery to an existing battery system by ensuring that the charge voltage is spread equally across all batteries.

Mounting/Configuration.
The inverter/charger unit shall be rack or shelf-mounted.

All interconnect wiring provided between the power transfer relay, manual bypass switch, and cabinet terminal service block shall be at least 6.5 ft (2 m) of #10 AWG wire.

Relay contact wiring provided for each set of NO/NC relay contact closure terminals shall be 6.5 ft (2 m) of #18 AWG wire.

Battery Cabinet.

Batteries, inverter/charger and power transfer relay shall be housed in a separate NEMA Type 3R cabinet. The cabinet shall be Aluminum alloy, 5052-H32, 0.125-inch thick and have a natural mill finish.

The door shall open to the entire cabinet, have a neoprene gasket, an Aluminum continuous piano hinge with stainless steel pin, and a three point locking system. The cabinet shall be provided with a main door lock which shall operate with a traffic industry conventional No. 2 key. Provisions for padlocking the door shall be provided.

The manually bypass switch shall be installed inside the traffic signal cabinet.

No more than three batteries shall be mounted on individual shelves for a cabinet housing six batteries and no more than four batteries per shelf for a cabinet housing eight batteries.

A minimum of three shelves shall be provided. Each shelf shall support a load of 132 lb (60 kg) minimum.

The battery cabinet housing shall have the following nominal outside dimensions: a width of 25 in. (785 mm), a depth of 16 in. (440 mm), and a height of 41 to 48 in. (1.1 to 1.3 m). Clearance between shelves shall be a minimum of 10 in. (250 mm).

The battery cabinet shall be ventilated through the use of louvered vents, filters, and one thermostatically controlled fan. The cabinet fan shall not be energized when the traffic signals are on UPS power.

The battery cabinet shall have provisions for an external generator connection.

The UPS with battery cabinet shall come with all bolts, conduits and bushings,
gaskets, shelves, and hardware needed for mounting. A warning sticker shall be placed on the outside of the cabinet indicating that there is an uninterruptible power supply inside the cabinet.

Maintenance, Displays, Controls, and Diagnostics.
The UPS shall include a display and/or meter to indicate current battery charge status and conditions.

The UPS shall have lightning surge protection compliant with IEEE/ANSI C.62.41.

The UPS shall be equipped with an integral system to prevent battery from destructive discharge and overcharge.

The UPS hardware and batteries shall be easily replaced without requiring any special tools or devices.

The UPS shall include a resettable front-panel event counter display to indicate the number of times the UPS was activated. The total number of hours the unit has operated on battery power shall be available from the controller unit or UPS unit.

The UPS shall be equipped with an RS-232 port.

The UPS shall include tip or kill switch installed in the battery cabinet, which shall completely disconnect power from the UPS when the switch is manually activated.

The UPS shall incorporate a flanged electric generator inlet for charging the batteries and operating the UPS. The generator connector shall be male type, twist-lock, rated as 15A, 125VAC with a NEMA L5-15P configuration and weatherproof lift cover plate (Hubbell model HBL4716C or approved equal). Access to the generator inlet shall be from a secured weatherproof lift cover plate or behind a locked battery cabinet police panel.

The manufacturer shall include two sets of equipment lists, operation and maintenance manuals, board-level schematic and wiring diagrams of the UPS, and battery data sheets. The manufacturer shall include any software needed to monitor, diagnose, and operate the UPS. The manufacturer shall include any required cables to connect the UPS to a laptop computer.

Battery System.
Individual batteries shall be 12 V type, 65 amp-hour minimum capacity at 20 hours, and shall be easily replaced and commercially available off the shelf.

The UPS shall consist of an even number of batteries that are capable of maintaining normal operation of the signalized intersection for a minimum of six hours. Calculations shall be provided showing the number of batteries of the type supplied that are needed to satisfy this requirement. A minimum of four batteries shall be provided.

All batteries supplied in the UPS shall be either gel cell or AGM type, deep cycle, completely sealed, prismatic leadcalcium based, silver alloy, valve regulated lead acid (VRLA) requiring no maintenance. All batteries in a UPS installation shall be the same type; mixing of gel cell and AGM types within a UPS installation is not permitted.

Batteries shall be certified by the manufacturer to operate over a temperature range of -13 to 160 °F (-25 to + 71 °C) for gel cell batteries and -40 to 140 °F (-40 to + 60 °C) for AGM type batteries.

The batteries shall be provided with appropriate interconnect wiring and corrosion resistant mounting trays and/or brackets appropriate for the cabinet into which they will be installed.

Batteries shall indicate maximum recharge data and recharging cycles.

Battery interconnect wiring shall be via a modular harness. Batteries shall be shipped with positive and negative terminals pre-wired with red and black cabling that terminates into a typical power-pole style connector. The harness shall be equipped with mating power-pole style connectors for the batteries and a single, insulated plug-in style connection to the inverter/charger unit. The harness shall allow batteries to be quickly and easily connected in any order and shall be keyed and wired to ensure proper polarity and circuit configuration.

Battery terminals shall be covered and insulated so as to prevent accidental shorting.

Warranty.
The warranty for an uninterruptible power supply (UPS) shall cover a minimum of two years from date the equipment is placed in operation; however, the batteries of the UPS shall be warranted for full replacement for a minimum of five years from the date the traffic signal and UPS are placed into service.

Installation.
When a UPS is installed at an existing traffic signal cabinet, the UPS cabinet shall partially rest on the lip of the existing controller cabinet foundation and be secured to the existing controller cabinet by means of at least four (4) stainless steel bolts. The UPS cabinet shall be completely enclosed with the bottom and back constructed of the same material as the cabinet.

When a UPS is installed at a new signal cabinet and foundation, it shall be mounted as shown on the plans.

Basis of Payment.
This work will be paid for at the contract unit price per each for UNINTERRUPTABLE POWER SUPPLY.

SIGNAL HEAD, LIGHT EMITTING DIODE

Description.
This work shall consist of furnishing and installing a traffic signal head or pedestrian signal head with light emitting diodes (LED) of the type specified in the plan or retrofitting an existing traffic signal head with a traffic signal module or pedestrian signal module with LEDs as specified in the plans.

General.
LED signal heads (All Face and Section Quantities), (All Mounting Types) shall conform fully to the requirements of Sections 880 and 881 and Articles 1078.01 and 1078.02 of the "Standard Specifications for Road and Bridge Construction," adopted January 1, 2007, and amended herein:

1. The LED signal modules shall be replaced or repaired if an LED signal module fails to function as intended due to workmanship or material defects within the first 60 months from the date of delivery. LED signal modules which exhibit luminous intensities less than the minimum values specified in Table 1 of the ITE Vehicle Traffic Control Signal Heads: Light Emitting Diode (LED) Circular Signal Supplement (June 27, 2005) [VTSCH]

or show signs of entrance of moisture or contaminants within the first 60 months of the date of delivery shall be replaced or repaired. The manufacturer's written warranty for the LED signal modules shall be dated, signed by an Officer of the company and included in the product submittal to the State.

2. Each module shall consist of an assembly that utilizes LEDs as the light source in lieu of an incandescent lamp for use in traffic signal sections.

(a) Physical and Mechanical Requirements

1. Modules can be manufactured under this specification for the following faces:

   a. 12 inch (300 mm) circular, multi-section
   b. 12 inch (300 mm) arrow, multi-section
   c. 12 inch (300 mm) pedestrian, 2 sections

2. The maximum weight of a module shall be 4 lbs. (1.8 kg).

3. Each module shall be a sealed unit to include all parts necessary for operation (a printed circuit board, power supply, a lens and gasket, etc.), and shall be weather proof after installation and connection.

4. Material used for the lens and signal module construction shall conform to ASTM specifications for the materials.

5. The lens of the module shall be tinted with a wavelength-matched color to reduce sun phantom effect and enhance on/off contrast. The tinting shall be uniform across the lens face. Polymeric lens shall provide a surface coating or chemical surface treatment applied to provide abrasion resistance. The lens of the module shall be integral to the unit, convex with a smooth outer surface and made of plastic. The lens shall have a textured surface to reduce glare.

6. The use of tinting or other materials to enhance ON/OFF contrasts shall not affect chromaticity and shall be uniform across the face of the lens.

7. Each module shall have a symbol of the type of module (i.e. circle, arrow, etc.) in the color of the module. The symbol shall be 1 inch (25.4 mm) in diameter. Additionally, the color shall be written out in 1/2 inch (12.7mm) letters next to the symbol.

(b) Photometric Requirements

1. The minimum initial luminous intensity values for the modules shall conform to the values in Table 1 of the VTCSH (2005) for circular signal indications, and as stated in Table 3 of these specifications for arrow and pedestrian indications at 25°C.

2. The modules shall meet or exceed the illumination values stated in Article 1078.01(3)c of the “Standard Specifications for Road and Bridge Construction,” Adopted January 1, 2007 for circular signal indications, and Table 3 of these specifications for arrow and pedestrian indications, throughout the useful life based on normal use in a traffic signal operation over the operating temperature range.

3. The measured chromaticity coordinates of the modules shall conform to the chromaticity requirements of Section 4.2 of the VTCSH (2005).

4. The LEDs utilized in the modules shall be AlInGaP technology for red, yellow, Portland orange (pedestrian) and white (pedestrian) indications, and GaN for green indications, and shall be the ultra bright type rated for 100,000 hours of continuous operation from -40°C to +74°C.

(c) Electrical

1. Maximum power consumption for LED modules is per Table 2.

2. LED modules will have EPA Energy Star compliance ratings, if applicable to that shape, size and color.

3. Operating voltage of the modules shall be 120 VAC. All parameters shall be measured at this voltage.

4. The modules shall be operationally compatible with currently used controller assemblies (solid state load switches, flashers, and conflict monitors).

5. When a current of 20 mA AC (or less) is applied to the unit, the voltage read across the two leads shall be 15 VAC or less.

6. The LED modules shall provide constant light output under power. Modules with dimming capabilities shall have the option disabled or set on a non-dimming operation.

7. The individual LEDs shall be wired such that a catastrophic loss or the failure of one or more LED will not result in the loss of the entire module.

(d) Retrofit Traffic Signal Module

1. The following specification requirements apply to the Retrofit module only. All general specifications apply unless specifically superseded in this section.

2. Retrofit modules can be manufactured under this specification for the following faces:

   a. 12 inch (300 mm) circular, multi-section
   b. 12 inch (300 mm) arrow, multi-section
   c. 12 inch (300 mm) pedestrian, 2 sections

3. Each Retrofit module shall be designed to be installed in the doorframe of a standard traffic signal housing. The Retrofit module shall be sealed in the doorframe with a one-piece EPDM (ethylene propylene rubber) gasket.

4. The maximum weight of a Retrofit module shall be 4 lbs. (1.8 kg).

5. Each Retrofit module shall be a sealed unit to include all parts necessary for operation (a printed circuit board, power supply, a lens and gasket, etc.), and shall be weather proof after installation and connection.

6. Electrical conductors for modules, including Retrofit modules, shall be 39.4 inches (1m) in length, with quick disconnect terminals attached.

7. The lens of the Retrofit module shall be integral to the unit, shall be convex with a smooth outer surface and made of plastic or of glass.

(e) The following specification requirements apply to the 12 inch (300 mm) arrow module only. All general specifications apply unless specifically superseded in this section.

1. The arrow module shall meet specifications stated in Section 9.01 of the Equipment and Material Standards of the Institute of Transportation Engineers (November 1998) [ITE Standards], Chapter 2 (Vehicle Traffic Control Signal Heads) for arrow indications.

2. The LEDs arrow indication shall be a solid display with a minimum of three (3) outlining rows of LEDs and at least one (1) fill row of LEDs.

(f) The following specification requirement applies to the 12 inch (300 mm) programmed visibility (PV) module only. All general specifications apply unless specifically superseded in this section.

1. The LED module shall be a module designed and constructed to be installed in a programmed visibility (PV) signal housing without modification to the housing.

(g) The following specification requirements apply to the 12 inch (300 mm) Pedestrian module only. All general specifications apply unless specifically superseded in this section.

1. Each pedestrian signal LED module shall provide the ability to actuate the solid upraised hand and the solid walking person on one 12 inch (300mm) section.

2. Two (2) pedestrian sections shall be installed. The top section shall be wired to illuminate only the upraised hand and the bottom section shall be the walking man.

3. “Egg Crate” type sun shields are not permitted. All figures must be a minimum of 9 inches (225mm) in height and easily identified from a distance of 120-feet (36.6m).

Basis of Payment.

This item shall be paid for at the contract unit price each for SIGNAL HEAD, LED, of the type specified, which price shall be payment in full for furnishing the equipment described above including signal head, LED(s) modules, all mounting hardware, and installing them in satisfactory operating condition.

The type specified will indicate the number of signal faces, the number of signal sections, and the method of mounting.

Pedestrian head(s) shall be paid for at the contract unit price each for PEDESTRIAN SIGNAL HEAD, LED, of the type specified and of the particular kind of material when specified.

The type specified will indicate the number of faces and the method of mounting.

When installed in an existing signal head, this item shall be paid for at the contract unit price each for SIGNAL HEAD, LED of the type specified, RETROFIT, which price shall be payment in full for furnishing the equipment described above including LED(s) modules, all mounting hardware, and installing them in satisfactory operating condition.

The type specified will indicate the number of signal faces, the number of signal sections, and the method of mounting.

When installed in an existing signal head, this item shall be paid for at the contract unit price each for PEDESTRIAN SIGNAL HEAD, LED, of the type specified, RETROFIT, which price shall be payment in full for furnishing the equipment described above including LED(s) modules, all mounting hardware, and installing them in satisfactory operating condition.

The type specified will indicate the number of faces and the method of mounting.

TABLES

Table 2 Maximum Power Consumption (in Watts)

	Red		Yellow		Green	
Temperature	25°C	74°C	25°C	74°C	25°C	74°C
12 inch (300 mm) circular	11	17	22	25	15	15
12 inch (300 mm) arrow	9	12	10	12	11	11
	Hand–Portland Orange		Person-White			
Pedestrian Indication	6.2		6.3			

Table 3 Minimum Initial & Maintained Intensities for Arrow and Pedestrian Indications (in cd/m^2)

	Red	Yellow	Green
Arrow Indication	5,500	11,000	11,000

PEDESTRIAN COUNTDOWN SIGNAL HEAD, LIGHT EMITTING DIODE

Description.
This work shall consist of furnishing and installing a pedestrian countdown signal head, with light emitting diodes (LED) of the type specified in the plan.

Pedestrian Countdown Signal Head, Light Emitting Diode, shall conform fully to the SIGNAL HEAD, LIGHT EMITTING DIODE specification, with the following modifications:

(a) Application.

1. Pedestrian Countdown Signal Heads, shall not be used at signalized intersections where traffic signals and railroad warning devices are interconnected.

2. All pedestrian signals at an intersection shall be the same type and have the same display. No mixing of countdown and other types of pedestrian traffic signals will be permitted.

(b) General.

1. The module shall operate in one mode: Clearance Cycle Countdown Mode Only. The countdown module shall display actual controller programmed clearance cycle and shall start counting when the flashing clearance signal turns on and shall countdown to “0” and turn off when the steady Upraised Hand (symbolizing Don’t Walk) signal turns on. Module shall not have user accessible switches or controls for modification of cycle.

2. At power on, the module shall enter a single automatic learning cycle. During the automatic learning cycle, the countdown display shall remain dark.

3. The module shall re-program itself if it detects any increase or decrease of Pedestrian Timing. The counting unit will go blank once a change is detected and then take one complete pedestrian cycle (with no counter during this cycle) to adjust its buffer timer.

4. The module shall allow for consecutive cycles without displaying the steady Upraised Hand.

5. The module shall recognize preemption events and temporarily modify the crossing cycle accordingly.

6. If the controller preempts during the Walking Person (symbolizing Walk), the countdown will follow the controller's directions and will adjust from Walking Person to flashing Upraised Hand. It will start to count down during the flashing Upraised Hand.

7. If the controller preempts during the flashing Upraised Hand, the countdown will continue to count down without interruption.

8. The next cycle, following the preemption event, shall use the correct, initially programmed values.

9. If the controller output displays Upraised Hand steady condition and the unit has not arrived to zero or if both the Upraised Hand and Walking Person are dark for some reason, the unit suspends any timing and the digits will go dark.

10. The digits will go dark for one pedestrian cycle after loss of power of more than 1.5 seconds.

11. The countdown numerals shall be two (2) “7 segment” digits forming the time display utilizing two rows of LEDs.

12. The LED module shall meet the requirements of the Institute of Transportation Engineers (ITE) LED purchase specification, “Pedestrian Traffic Control Signal Indications - Part 2: LED Pedestrian Traffic Signal Modules,” or applicable successor ITE specifications, except as modified herein.

13. The LED modules shall provide constant light output under power. Modules with dimming capabilities shall have the option disabled or set on a non-dimming operation.

14. In the event of a power outage, light output from the LED modules shall cease instantaneously.

15. The LEDs utilized in the modules shall be AlInGaP technology for Portland Orange (Countdown Numerals and Upraised Hand) and GaN technology for Lunar White (Walking Person) indications.

16. The individual LEDs shall be wired such that a catastrophic loss or the failure of one or more LED will not result in the loss of the entire module.

(c) Pedestrian Countdown Signal Heads.

1. Pedestrian Countdown Signal Heads shall be 16 inch (406mm) x 18 inch (457mm), for single units with the housings glossy black polycarbonate. Connecting hardware and mounting brackets shall be polycarbonate (black). A corrosion resistant anti-seize lubricant shall be applied to all metallic mounting bracket joints, and shall be visible to the inspector at the signal turn-on.

2. Each pedestrian signal LED module shall be fully MUTCD compliant and shall consist of double overlay message combining full LED symbols of an Upraised Hand and a Walking Person. "Egg Crate" type sun shields are not permitted. Numerals shall measure 9 inches (229mm) in height and easily identified from a distance of 120 feet (36.6m).

(d) Electrical.

1. Maximum power consumption for LED modules is 29 watts.

2. The measured chromaticity shall remain unchanged over the input line voltage range listed of 80 VAC to 135 VAC.

Basis of Payment.
This item shall be paid for at the contract unit price each for PEDESTRIAN COUNTDOWN SIGNAL HEAD, LED, of the type specified, which shall be payment in full for furnishing the equipment described above including LED(s) modules, all mounting hardware, and installing them in satisfactory operating condition. The type specified will indicate the number of faces and the method of mounting.

FULL-ACTUATED CONTROLLER AND CABINET (SPECIAL)
Effective: January 1, 2002 Revised: January 1, 2007

This work shall consist of furnishing and installing a(n) "Eagle" brand at US RT 6 (159th) & Dixie Highway and "Econolite" brand at US RT 6 (159th) & Halsted St., traffic actuated solid state digital controller in the controller cabinet of the type specified, meeting the requirements of the current District One Traffic Signal Special Provisions including conflict monitor, load switches and flasher relays, with all necessary connections for proper operation.

This controller shall operate as Local, Master and Sub-Master multi-phase microprocessor based controller(s) at the location(s) indicated on the plans, or as directed by the Engineer. The controllers shall comply with the requirements of sections 857, 1073.01 and 1073.04 of the Standard specifications for Road and Bridge Construction, adopted January 1, 2007.

The Local controller shall exceed NEMA TS2 Type 2 Standard and NTCIP requirements. The controller shall also provide downward compatibility.

The Master & Sub-Master controller shall be stand alone master or zone master operation. The controller must be based on coordination of Traffic Responsive Plan selection (TRP), TOD schedule, manual input or external command. The controller shall have a Dual-coordination mode for crossing arterial control. The controller shall communicate with controllers via four-wire telemetry, fiber-optic or radio inter-connect. The master controller shall serve as stand-alone system master for up to 24 controllers in its zone and shall be capable of connecting to sub-master and or slave, and also for synchronization of crossing or adjacent parallel arteries. The controller shall have 6 cycle lengths, 5 offsets per cycle and 4 splits per cycle.

Basis of Payment. This work will be paid for at the contract unit price each for FULL-ACTUATED CONTROLLER AND TYPE IV CABINET (SPECIAL) or FULL-ACTUATED CONTROLLER AND TYPE V CABINET (SPECIAL).

CONFIRMATION BEACON
Effective: January 1, 2002 Revised: January 1, 2007

This item shall consist of furnishing and installing a Traffic Signal Emergency Confirmation Beacon (single channel or dual channel) at the locations specified on the plans and as described as follows for intersections which have existing emergency preemption systems previously installed.

Confirmation Beacon, Single Channel - Where the light detector is used to detect a single direction of traffic, one LED lamp for only that direction shall be provided. If the detector covers opposing directions of traffic and has a single output, a separate lamp for each direction shall be provided but they shall have identical indications.

Confirmation Beacon, Dual Channel - A separate LED lamp with appropriate separate indications for each direction shall be provided.

It shall be the Contractor's responsibility to verify the existing brand of emergency vehicle equipment at the intersection and the confirmation beacons must be completely compatible with all existing components. The Confirmation Beacon shall consist of a 6 watt Par 38 LED flood lamp with a 30 degree light spread, 120V, and a 2000 hour warranty for each direction of pre-emption. The lamp shall have an adjustable mount with a weatherproof enclosure for cable splicing. All hardware shall be cast aluminum or stainless steel. No new holes may be drilled into signal poles, mast arms, or posts. The Confirmation Beacon shall be mounted to the existing light detector hardware as shown on the mounting detail in the plans. In order to maintain uniformity between communities, the Confirmation Beacons shall indicate when the control equipment receives the pre-emption signal. The pre-emption movement shall be signalized by a flashing indication at the rate specified the current District One Traffic Signal Special Provisions. The stopped pre-empted movements shall be signalized by a continuous indication.

Any modification required to the existing optical detector installation to meet the requirements of the mounting detail shown in the plans shall be included in this item.

Basis of Payment. This work will be paid for at the contract unit price each for CONFIRMATION BEACON.

POROUS GRANULAR EMBANKMENT, SUBGRADE

Effective: September 30, 1985 Revised: January 1, 2007

This work consists of furnishing, placing, and compacting porous granular material to the lines and grades shown on the plans or as directed by the Engineer in accordance with applicable portions of Section 207. The material shall be used as a bridging layer over soft, pumpy, loose soil and for placing under water and shall conform to Article 1004.04 except the gradation shall be as follows:

1. Crushed Stone, Crushed Blast Furnace Slag, and Crushed Concrete

Sieve Size	Percent Passing
*6 in. (150 mm)	97 ± 3
*4 in. (100 mm)	90 ± 10
2 in. (50 mm)	45 ± 25
No. 200 (75 μm)	5 ± 5

2. Gravel, Crushed Gravel and Pit Run Gravel

Sieve Size	Percent Passing
*6 in. (150 mm)	97 ± 3
*4 in. (100 mm)	90 ± 10
2 in. (50 mm)	55 ± 25
No. 4 (4.75 mm)	30 ± 20
No. 200 (75 μm)	5 ± 5

*For undercut greater than18 inches (450 mm) the percent passing the 6 inch (150 mm) sieve may be 90 ± 10 and the 4 inch (100 mm) sieve requirements eliminated.

The porous granular material shall be placed in one lift when the total thickness to be placed is 2 feet (600 mm) or less or as directed by the Engineer. Each lift of the porous granular material shall be rolled with a vibratory roller meeting the requirements of Article 1101.01(g) to obtain the desired keying or interlock and compaction. The Engineer shall verify that adequate keying has been obtained.

A 3 inch (75 mm) nominal thickness top lift of capping aggregate having a gradation of CA 6 will be required when Aggregate Subgrade is not specified in the contract and Porous Granular Embankment, Subgrade will be used under the pavement and shoulders. Capping aggregate will not be required when embankment meeting the requirements of Section 207 or granular subbase is placed on top of the porous granular material.

Construction equipment not necessary for the completion of the replacement material will not be allowed on the undercut areas until completion of the recommended thickness of the porous granular embankment subgrade.

Full depth subgrade undercut should occur at limits determined by the Engineer. A transition slope to the full depth of undercut shall be made outside of the undercut limits at a taper of 1 foot (300 mm) longitudinal per 1 inch (25 mm) depth below the proposed subgrade or bottom of the proposed aggregate subgrade when included in the contract.

Method of Measurement. This work will be measured for payment in accordance with Article 207.04. When specified on the contract, the theoretical elevation of the bottom of the aggregate subgrade shall be used to determine the upper limit of Porous Granular Embankment, Subgrade. The volume will be computed by the method of average end areas.

Basis of Payment. This work shall be paid for at the contract unit price per cubic yard (cubic meter) for POROUS GRANULAR EMBANKMENT, SUBGRADE which price shall include the capping aggregate, when required.

The Porous Granular Embankment, Subgrade shall be used as field conditions warrant at the time of construction. No adjustment in unit price will be allowed for an increase or decrease in quantities from the estimated quantities shown on the plans.

AGGREGATE SUBGRADE, 12" (300 MM)
Effective: May 1, 1990 Revised: January 1, 2007

This work shall be performed in accordance with the applicable portions of Section 207. The material shall conform to Article 1004.04 except as follows:

1. Crushed Stone, Crushed Blast Furnace Slag, and Crushed Concrete will be permitted. Steel slag and other expansive materials as determined through testing by the Department will not be permitted.

Sieve Size	Percent Passing
6 in. (150 mm)	97 ± 3
4 in. (100 mm)	90 ± 10
2 in. (50 mm)	45 ± 25
No. 200 (75 μm)	5 ± 5

2. Gravel, Crushed Gravel, and Pit Run Gravel

Sieve Size	Percent Passing
6 in. (150 mm)	97 ± 3
4 in. (100 mm)	90 ± 10
2 in. (50 mm)	55 ± 25
No. 4 (4.75 mm)	30 ± 20
No. 200 (75 μm)	5 ± 5

3. Crushed Concrete with Bituminous Materials**

Sieve Size	Percent Passing
6 in. (150 mm)	97 ± 3
4 in. (100 mm)	90 ± 10
2 in. (50 mm)	45 ± 25
No. 4 (4.75 mm)	20 ± 20
No. 200 (75 μm)	5 ± 5

**The Bituminous material shall be separated and mechanically blended with the crushed concrete so that the bituminous material does not exceed 40% of the final products. The top size of the bituminous material in the final product shall be less than 4 inches (100 mm) and shall not contain more than 10.0% steel slag RAP or any material that is considered expansive by the Department.

The Aggregate subgrade shall be placed in two lifts consisting of a 9 inch (225 mm) and variable nominal thickness lower lift and a 3 inch (75 mm) nominal thickness top lift of capping aggregate having a gradation of CA 6. The CA 6 may be blended as follows. The bituminous materials shall be separated and mechanically blended with interlocking feeders with crushed concrete or natural aggregate, in a manner that the bituminous material does not exceed 40% of the final product. This process shall be approved by the engineer prior to start of production. The top side of the bituminous material in the final products shall be less than 1 ½ inches (37.5 mm) and shall not contain any material considered expansive by the department. Reclaimed Asphalt Pavement (RAP) (having a maximum of 10% steel slag RAP) meeting the requirements of Article 1004.07 and having 100% passing the 3 inch (75 mm) sieve and well graded down through fines may also be used as capping aggregate. IDOT testing of the RAP material will be used in determining the percent of steel slag or Expansive Material. When the contract specifies that an aggregate subbase is to be placed on the Aggregate Subgrade, the 3 inches (75 mm) of capping aggregate will be eliminated. A vibratory roller meeting the requirements of Article 1101.01(g) shall be used to roll each lift of material to obtain the desired keying or interlock and necessary compaction. The Engineer will verify that adequate keying has been obtained.

When a recommended remedial treatment for unstable subgrades is included in the contract, the lower lift of Aggregate Subgrade may be placed simultaneously with the material for Porous Granular Embankment, Subgrade when the total thickness to be placed is 2 feet (600 mm) or less.

Method of Measurement.

Contract Quantities. Contract quantities shall be in accordance with Article 202.07.

Measured Quantities. Aggregate subgrade will be measured in place and the area computed in square yards (square meters).

Basis of Payment. This work will be paid for at the contract unit price per square yard (square meter) for AGGREGATE SUBGRADE, 12" (AGGREGATE SUBGRADE, 300 mm).

TEMPERATURE CONTROL FOR CONCRETE PLACEMENT (DISTRICT ONE)
Effective: May 1, 2007

Delete the second and third sentences of the second paragraph of Article 1020.14(a) of the Standard Specifications.

BITUMINOUS PRIME COAT FOR HOT-MIX ASPHALT PAVEMENT (FULL DEPTH) (D-1)
Effective: May 1, 2007

Revise Article 407.06(b) of the Standard Specifications to read:

"A bituminous prime coat shall be applied between each lift of HMA according to Article 406.05(b) at a rate of 0.02 to 0.05 gal/sq yd (0.1 to 0.2 L/sq m), the exact rate to be determined by the Engineer."

Revise the second paragraph of Article 407.12 of the Standard Specifications to read:

"Prime Coat will be paid for at the contract unit price per gallon (liter) or per ton (metric ton) for BITUMINOUS MATERIALS (PRIME COAT)."

FINE AGGREGATE FOR HOT-MIX ASPHALT (HMA) (DISTRICT ONE)
Effective: May 1, 2007

Revise Article 1003.03 (c) to read:

"Gradation. The fine aggregate gradation for all HMA shall be FA1, FA 2, FA 20, or FA 21. When Reclaimed Asphalt Pavement (RAP) is incorporated in the HMA design, the use of FA 21 Gradation will not be permitted.

ANTI-STRIP ADDITIVE FOR HMA (DISTRICT ONE)
Effective: May 1, 2007 Revised: January 24, 2008

Revise the first paragraph of Article 1030.04(c) of the Standard Specifications to read:

"(c) Determination of Need for Anti-Stripping Additive. The Engineer will determine if an additive is needed in the mix to prevent stripping. The determination will be made on the basis of tests performed according to Illinois Modified AASHTO T 283. To be considered acceptable by the Department as a mixture not susceptible to stripping, the conditioned to unconditioned tensile strength ratio (TSR) shall be equal to or greater than 0.85 for 6 in. (150 mm) specimens. Mixtures, either with or without an additive, with TSRs less than 0.85 for 6 in. (150 mm) specimens will be considered unacceptable."

Revise the sixth paragraph of Article 406.14 of the Standard Specifications to read:

"If an anti-stripping additive is required for any HMA, the cost of the additive and the cost incurred in introducing the additive into the HMA will not be paid for separately, but shall be considered as included in the contract unit price for the HMA item involved.

RECLAIMED ASPHALT PAVEMENT (RAP) (DISTRICT ONE)
Effective: January 1, 2007 Revised: January 24, 2008

In Article 1030.02(g), delete the last sentence of the first paragraph in (Note 2).

Revise Section 1031 of the Standard Specifications to read:

"**SECTION 1031. RECLAIMED ASPHALT PAVEMENT**

1031.01 Description. Reclaimed asphalt pavement (RAP) is reclaimed asphalt pavement resulting from cold milling or crushing of an existing dense graded hot-mix asphalt (HMA) pavement. The Contractor shall supply written documentation that the RAP originated from routes or airfields under federal, state, or local agency jurisdiction.

1031.02 Stockpiles. The Contractor shall construct individual, sealed RAP stockpiles meeting one of the following definitions. No additional RAP shall be added to the pile after the pile has been sealed. Stockpiles shall be sufficiently separated to prevent intermingling at the base. Stockpiles shall be identified by signs indicating the type as listed below (i.e. "Homogeneous Surface").

Prior to milling, the Contractor shall request the District to provide verification of the quality of the RAP to clarify appropriate stockpile.

(a) Homogeneous. Homogeneous RAP stockpiles shall consist of RAP from Class I, Superpave (High ESAL), HMA (High ESAL), or equivalent mixtures and represent: 1) the same aggregate quality, but shall be at least C quality; 2) the same type of crushed aggregate (either crushed natural aggregate, ACBF slag, or steel slag); 3) similar gradation; and 4) similar asphalt binder content. If approved by the Engineer, combined single pass surface/binder millings may be considered "homogenous" with a quality rating dictated by the lowest coarse aggregate quality present in the mixture.

(b) Conglomerate 5/8. Conglomerate 5/8 RAP stockpiles shall consist of RAP from Class I, Superpave (High ESAL), HMA (High ESAL), or equivalent mixtures. The coarse aggregate in this RAP shall be crushed aggregate and may represent more than one aggregate type and/or quality but shall be at least C quality. This RAP may have an inconsistent gradation and/or asphalt binder content prior to processing. All conglomerate 5/8 RAP shall be processed prior to testing by crushing to where all RAP shall pass the 5/8 in. (16 mm) or smaller screen. Conglomerate 5/8 RAP stockpiles shall not contain steel slag or other expansive material as determined by the Department.

(c) Conglomerate 3/8. Conglomerate 3/8 RAP stockpiles shall consist of RAP from Class I, Superpave (High ESAL), HMA (High ESAL), or equivalent mixtures. The coarse aggregate in this RAP shall be crushed aggregate and may represent more than one aggregate type and/or quality but shall be at least B quality. This RAP may have an inconsistent gradation and/or asphalt binder content prior to processing. All conglomerate 3/8 RAP shall be processed prior to testing by crushing to where all RAP shall pass the 3/8 in. (9.5 mm) or smaller screen. Conglomerate 3/8 RAP stockpiles shall not contain steel slag or other expansive material as determined by the Department.

(d) Conglomerate "D" Quality (DQ). Conglomerate DQ RAP stockpiles shall consist of RAP from Class I, Superpave (High or Low ESAL), HMA (High or Low ESAL), or equivalent mixtures. The coarse aggregate in this RAP may be crushed or round but shall be at least D quality. This RAP may have an inconsistent gradation and/or asphalt binder content. Conglomerate DQ RAP stockpiles shall not contain steel slag or other expansive material as determined by the Department.

(e) Non-Quality. RAP stockpiles that do not meet the requirements of the stockpile categories listed above shall be classified as "Non-Quality".

RAP containing contaminants, such as earth, brick, sand, concrete, sheet asphalt, bituminous surface treatment (i.e. chip seal), pavement fabric, joint sealants, etc., will be unacceptable unless the contaminants are removed to the satisfaction of the Engineer. Sheet asphalt shall be stockpiled separately.

1031.03 Testing. When used in HMA, the RAP shall be sampled and tested either during or after stockpiling.

For testing during stockpiling, washed extraction samples shall be run at the minimum frequency of one sample per 500 tons (450 metric tons) for the first 2000 tons (1800 metric tons) and one sample per 2000 tons (1800 metric tons) thereafter. A minimum of five tests shall be required for stockpiles less than 4000 tons (3600 metric tons).

For testing after stockpiling, the Contractor shall submit a plan for approval to the District proposing a satisfactory method of sampling and testing the RAP pile either in-situ or by restockpiling. The sampling plan shall meet the minimum frequency required above and detail the procedure used to obtain representative samples throughout the pile for testing.

Before extraction, each field sample shall be split to obtain two samples of test sample size. One of the two test samples from the final split shall be labeled and stored for Department use. The Contractor shall extract the other test sample according to Department procedure. The Engineer reserves the right to test any sample (split or Department-taken) to verify Contractor test results.

(a) Testing Conglomerate 3/8. In addition to the requirements above, conglomerate 3/8 RAP shall be tested for maximum theoretical specific gravity (G_{mm}) at a frequency of one sample per 500 tons (450 metric tons) for the first 2000 tons (1800 metric tons) and one sample per 2000 tons (1800 metric tons) thereafter. A minimum of five tests shall be required for stockpiles less than 4000 tons (3600 metric tons).

(b) Evaluation of Test Results. All of the extraction results shall be compiled and averaged for asphalt binder content and gradation and, when applicable G_{mm}. Individual extraction test results, when compared to the averages, will be accepted if within the tolerances listed below.

Parameter	Homogeneous / Conglomerate	Conglomerate "D" Quality
1 in. (25 mm)		± 5 %
1/2 in. (12.5 mm)	± 8 %	± 15 %
No. 4 (4.75 mm)	± 6 %	± 13 %
No. 8 (2.36 mm)	± 5 %	
No. 16 (1.18 mm)		± 15 %
No. 30 (600 μm)	± 5 %	
No. 200 (75 μm)	± 2.0 %	± 4.0 %
Asphalt Binder	± 0.4 % 1/	± 0.5 %
G_{mm}	± 0.02 2/	

1/ The tolerance for conglomerate 3/8 shall be ± 0.3 %.

2/ Applies only to conglomerate 3/8. When variation of the G_{mm} exceeds the ± 0.02 tolerance, a new conglomerate 3/8 stockpile shall be created which will also require an additional mix design.

If more than 20 percent of the individual sieves are out of the gradation tolerances, or if more than 20 percent of the asphalt binder content test results fall outside the appropriate tolerances, the RAP shall not be used in HMA unless the RAP representing the failing tests is removed from the stockpile. All test data and acceptance ranges shall be sent to the District for evaluation.

With the approval of the Engineer, the ignition oven may be substituted for extractions according to the Illinois Test Procedure, "Calibration of the Ignition Oven for the Purpose of Characterizing Reclaimed Asphalt Pavement (RAP)".

1031.04 Quality Designation of Aggregate in RAP. The quality of the RAP shall be set by the lowest quality of coarse aggregate in the RAP stockpile and are designated as follows.

(a) RAP from Class I, Superpave (High ESAL), or HMA (High ESAL) surface mixtures are designated as containing Class B quality coarse aggregate.

(b) RAP from Superpave (Low ESAL)/HMA (Low ESAL) IL-19.0L binder and IL-9.5L surface mixtures are designated as Class D quality coarse aggregate.

(c) RAP from Class I, Superpave (High ESAL), or HMA (High ESAL) binder mixtures, bituminous base course mixtures, and bituminous base course widening mixtures are designated as containing Class C quality coarse aggregate.

(d) RAP from bituminous stabilized subbase and BAM shoulders are designated as containing Class D quality coarse aggregate.

1031.05 Use of RAP in HMA. The use of RAP in HMA shall be as follows.

(a) Coarse Aggregate Size. The coarse aggregate in all RAP shall be equal to or less than the nominal maximum size requirement for the HMA mixture to be produced.

(b) Steel Slag Stockpiles. RAP stockpiles containing steel slag or other expansive material, as determined by the Department, shall be homogeneous and will be approved for use in HMA (High ESAL and Low ESAL) surface mixtures only.

(c) Use in HMA Surface Mixtures (High and Low ESAL). RAP stockpiles for use in HMA surface mixtures (High and Low ESAL) shall be either homogeneous or conglomerate 3/8, in which the coarse aggregate is Class B quality or better.

(d) Use in HMA Binder Mixtures (High and Low ESAL), HMA Base Course, and HMA Base Course Widening. RAP stockpiles for use in HMA binder mixtures (High and Low ESAL), HMA base course, and HMA base course widening shall be homogeneous, conglomerate 5/8, or conglomerate 3/8, in which the coarse aggregate is Class C quality or better.

(e) Use in Shoulders and Subbase. RAP stockpiles for use in HMA shoulders and stabilized subbase (HMA) shall be homogeneous, conglomerate 5/8, conglomerate 3/8, or conglomerate DQ.

(f) The use of RAP shall be a contractor's option when constructing HMA in all contracts. When the contractor chooses the RAP option, the percentage of RAP shall not exceed the amounts indicated in the table for a given N Design.

Max RAP Percentage

HMA MIXTURES [1/, 3/]	MAXIMUM % RAP		
Ndesign	Binder/Leveling Binder	Surface	Polymer Modified
30	30	30	10
50	25	15	10
70	15 / 25 [2/]	10 / 15 [2/]	10
90	10	10	10
105	10	10	10

1/ For HMA Shoulder and Stabilized Sub-Base (HMA) N-30, the amount of RAP shall not exceed 50% of the mixture.

2/ Value of Max % RAP if 3/8 RAP is utilized.

3/ When RAP exceeds 20%, the high & low virgin asphalt binder grades shall each be reduced by one grade (i.e. 25% RAP would require a virgin asphalt binder grade of PG64-22 to be reduced to a PG58-22).

1031.06 HMA Mix Designs. At the Contractor's option, HMA mixtures may be constructed utilizing RAP material meeting the above detailed requirements.

RAP designs shall be submitted for volumetric verification. If additional RAP stockpiles are tested and found that no more than 20 percent of the results, as defined under "Testing" herein, are outside of the control tolerances set for the original RAP stockpile and HMA mix design, and meets all of the requirements herein, the additional RAP stockpiles may be used in the original mix design at the percent previously verified.

1031.07 HMA Production. The coarse aggregate in all RAP used shall be equal to or less than the nominal maximum size requirement for the HMA mixture being produced.

To remove or reduce agglomerated material, a scalping screen, crushing unit, or comparable sizing device approved by the Engineer shall be used in the RAP feed system to remove or reduce oversized material. If material passing the sizing device adversely affects the mix production or quality of the mix, the sizing device shall be set at a size specified by the Engineer.

If the RAP control tolerances or QC/QA test results require corrective action, the Contractor shall cease production of the mixture containing RAP and either switch to the virgin aggregate design or submit a new RAP design. When producing mixtures containing conglomerate 3/8 RAP, a positive dust control system shall be utilized.

HMA plants utilizing RAP shall be capable of automatically recording and printing the following information.

(a) Dryer Drum Plants.

(1) Date, month, year, and time to the nearest minute for each print.

(2) HMA mix number assigned by the Department.

(3) Accumulated weight of dry aggregate (combined or individual) in tons (metric tons) to the nearest 0.1 ton (0.1 metric ton).

(4) Accumulated dry weight of RAP in tons (metric tons) to the nearest 0.1 ton (0.1 metric ton).

(5) Accumualted mineral filler in revolutions, tons (metric tons), etc. to the nearest 0.1 unit.

(6) Accumulated asphalt binder in gallons (liters), tons (metric tons), etc. to the nearest 0.1 unit.

(7) Residual asphalt binder in the RAP material as a percent of the total mix to the nearest 0.1 percent.

(8) Aggregate and RAP moisture compensators in percent as set on the control panel. (Requied when accumulated or individual aggregate and RAP are printed in wet condition.)

(b) Batch Plants.

(1) Date, month, year, and time to the nearest minute for each print.

(2) HMA mix number assigned by the Department.

(3) Individual virgin aggregate hot bin batch weights to the nearest pound (kilogram).

(4) Mineral filler weight to the nearest pound (kilogram).

(5) RAP weight to the nearest pound (kilogram).

(6) Virgin asphalt binder weight to the nearest pound (kilogram).

(7) Residual asphalt binder in the RAP material as a percent of the total mix to the nearest 0.1 percent.

The printouts shall be maintained in a file at the plant for a minimum of one year or as directed by the Engineer and shall be made available upon request. The printing system will be inspected by the Engineer prior to production and verified at the beginning of each construction season thereafter.

1031.08 RAP in Aggregate Surface Course and Aggregate Shoulders. The use of RAP in aggregate surface course and aggregate shoulders shall be as follows.

(a) Stockpiles and Testing. RAP stockpiles may be any of those listed in Article 1031.02, except "Other". The testing requirements of Article 1031.03 shall not apply.

(b) Gradation. One hundred percent of the RAP material shall pass the 1 1/2 in. (37.5 mm) sieve. The RAP material shall be reasonably well graded from coarse to fine. RAP material that is gap-graded or single sized will not be accepted."

STORM SEWER ADJACENT TO OR CROSSING WATER MAIN
Effective: February 1, 1996 Revised: January 1, 2007

This work consists of constructing storm sewer adjacent to or crossing a water main, at the locations shown on the plans. The material and installation requirements shall be according to the latest edition of the "Standard Specifications for Water and Sewer Main Construction in Illinois", and the applicable portions of Section 550 of the Standard Specifications; which may include concrete collars and encasing pipe with seals if required.

Pipe materials shall meet the requirements of Sections 40 and 41-2.01 of the "Standard Specifications for Water and Sewer Main Construction in Illinois", except PVC pipe will not be allowed. Ductile-Iron pipe shall meet the minimum requirements for Thickness Class 50.

Encasing of standard type storm sewer, according to the details for "Water and Sewer Separation Requirements (Vertical Separation)" in the "STANDARD DRAWINGS" Division of the "Standard Specifications for Water and Sewer Main Construction in Illinois", may be used for storm sewers crossing water mains.

Basis of Payment: This work will be paid according to Article 550.10 of the Standard Specifications, except the pay item shall be STORM SEWER (WATER MAIN REQUIREMENTS), of the diameter specified.

BACKFILLING STORM SEWER UNDER ROADWAY
Effective: September 30, 1985 Revised: July 2, 1994

For storm sewer constructed under the roadway, backfilling methods two and three authorized under the provisions of Article 550.07 will not be allowed.

CLEANING EXISTING DRAINAGE STRUCTURES
Effective: September 30, 1985 Revised: January 1, 2007

All existing storm sewers, pipe culverts, manholes, catch basins and inlets shall be considered as drainage structures insofar as the interpretation of this Special Provision is concerned. When specified for payment, the location of drainage structures to be cleaned will be shown on the plans.

All existing drainage structures which are to be adjusted or reconstructed shall be cleaned in accordance with Article 602.15. This work will be paid for in accordance with Article 602.16.

All other existing drainage structures which are specified to be cleaned on the plans will be cleaned according to Article 602.15.

Basis of Payment. This work will be paid for at the contract unit price each for DRAINAGE STRUCTURES TO BE CLEANED, and at the contract unit price per foot (meter) for STORM SEWERS TO BE CLEANED.

AGGREGATE FOR CONCRETE BARRIER (DISTRICT ONE)
Effective: February 11, 2004 Revised: January 1, 2007

Add the following paragraph to Article 637.02 of the Standard Specifications:

"The coarse aggregate to be used in the concrete barrier walls shall conform to the requirement for coarse aggregate used in Class BS concrete according to Article 1004.01(b), paragraph 2."

ENGINEER'S FIELD OFFICE, TYPE A (SPECIAL)

Revise the first paragraph of Article 670.02 to read:

> Engineer's Field Office, Type A (Special). Type A (Special) field office shall have a ceiling height of not less than 2m (7 ft.) and a floor space of not less than 235 sq. m. (2500 sq. ft.) with a minimum of three separate offices. The office shall also have a separate storage room capable of being locked for the storage of the nuclear measuring devices. The office shall be equipped with sufficient heat, natural and artificial light, and air conditioning. Doors and windows shall be equipped with locks approved by the Engineer.

Revise the second sentence of the fourth paragraph of Article 670.02 to read:

The facilities shall also include solid waste disposal consisting of seven (7) waste baskets and an outside trash container of sufficient size to accommodate a weekly provided pick-up service.

Revise the fifth paragraph of Article 670.02 to read:

An electronic security system that will respond to any breach of exterior doors and windows with an on-site alarm shall be provided.

Add the following to Article 670.02:

A weekly cleaning service for the office shall be provided.

Revise subparagraph (a) of Article 670.02 to read:

(a) six (6) desks with minimum working surface 42 x 30 in. (1.1 m x 750mm) each and six non-folding chairs with upholstered seats and backs.

Revise subparagraph (c) of Article 670.02 to read:

(c) Two (2) four-post drafting table with minimum top size of 37 1/2 x 48” (950 mm x 1.2 m). The top shall be basswood or equivalent and capable being tilted through an angle of 50 degrees. An adjustable height drafting stool with upholstered seat and back shall also be provided.

Revise subparagraph (d) of Article 670.02 to read:

(d) two (2) free standing four drawer legal size file cabinet with lock and underwriters' laboratories insulated file device 350 degrees one hour rating.

Revise subparagraph (e) of Article 670.02 to read:

(e) Eight (8) folding chairs.

Revise subparagraph (h) of Article 670.02 to read:

(h) Two (2) electric desk type tape printing calculator and two (2) pocket scientific notation calculator with a 1000 hour battery life or with a portable recharger.

Revise subparagraph (i) of Article 670.02 to read:

(i) Six (6) telephones, with touch tone, where available, and two (2) digital telephone answering machines, for exclusive use by the Engineer. Two (2) additional separate telephone lines, without telephone, shall be provided for the exclusive use of the Engineer.

Revise subparagraph (j) of Article 670.02 to read:

(j) One (1) dry process copy machine capable of reproducing prints up to tabloid size [11in. x 17 in. (280 x 432 mm)] from nontransparent master sheets, as black or blue lines on white paper, including maintenance, reproduction paper, activating agent, and power source.

Revise subparagraph (k) of Article 670.02 to read:

(k) One plain paper fax machine including maintenance and supplies.

Revise subparagraph (l) of Article 670.02 to read:

(l) One electric water cooler dispenser including water service.

Add the following subparagraph to Article 670.02:

(n) Two (2) 1.2m x 1.8m (4ft.x6ft.) dry erase boards or chalk boards.

Basis of Payment. The building or buildings fully equipped as specified, once accepted by the Engineer, will be paid for on a monthly basis until the building or buildings are released by the Engineer. The Contractor will be paid the contract bid price each month provided the building or buildings are maintained, equipped, and utilities furnished. Payment will not be made when the contract is suspended according to Article 108.07 for failure of the Contractor to comply with the provisions of the contract. The building or buildings fully equipped, will be paid for at the contract unit price per calendar month or fraction thereof for ENGINEER'S FIELD OFFICE TYPE A (SPECIAL).

PROTECTION OF RAILWAY INTEREST

1. AUTHORITY OF RAILROAD ENGINEER AND STATE ENGINEER:

The Contractor shall perform all work in accordance with Section 107.12 of the Standard Specifications and as specified herein. Wherever the word Railroad is used throughout these Special Provisions, or the Illinois Department of Transportation Standard Specifications for Road and Bridge Construction adopted January 1, 2007, and Supplemental Specifications and Recurring Special Provisions, dated January 1, 2007 or January 1, 2008, it shall refer to the CN and/or Metra.

The authorized representative of the Railroad, hereinafter referred to as Railroad Engineer, shall have final authority in all matters affecting the safe maintenance of railroad traffic of his company including the adequacy of the foundations and structures supporting the railroad tracks.

The authorized representative of the State, hereinafter referred to as the Engineer, shall have authority over all other matters as prescribed herein and in the Project Specifications.

2. NOTICE OF STARTING WORK:

A. The Contractor shall not commence any work on Railroad right of way until he has complied with the following conditions:

1. Provide the Railroads written notice, with copy to the Engineer who has been designated to be in charge of the work, at least fourteen days in advance of the date he proposes to begin work on Railroad rights of way. The notice shall include written procedures detailing the proposed work methods. The notice shall be sent to:

CN
Mr. John M. Henriksen, Manager Public Works
17641 Ashland Avenue
Homewood, IL 60430
(708) 332-3557
Fax (708) 332-3514

Metra
Mr. James T. Peffer,
Office of Real Estate and Contract Management
547 West Jackson Blvd.
Chicago, IL 60661
(312) 322-8010
Fax (312) 322-7098

2. Obtain written authorization from the Railroad to begin work on railroad rights of way; such authorization may include an outline of specific conditions with which he must comply.

3. Obtain written approval from the Railroads of Railroad Protective Insurance coverage as required by Section 11 herein.

B. The Railroads' written authorization to proceed with the work shall include the name(s), addresses, and telephone numbers of the Railroads' representatives who are to be notified as hereinafter required. Where more than one representative is designated, the area of responsibility of each representative shall be specified.

3. INTERFERENCE WITH RAILROAD OPERATIONS:

All reasonable care and diligence shall be used in the work in order to avoid accidents, damage to, unnecessary delay to, or interference with the trains and other property of the Railroads. Work shall be conducted in a manner satisfactory to the Railroad Engineer. It shall be performed in such a manner and at such time as not to interfere with the movements of trains or railroad traffic. Work shall be held open to inspection by the Railroads' inspectors at all times. All public utilities, railroad, and other companies having occasion to do work on and in connection with the project shall be cooperated with. Unnecessary use of railroad property within the limits of the construction shall be avoided. Use of railroad property beyond the limits of construction for the project shall not be made without written permission of the Railroad.

Any work to be performed by the Contractor, which requires flagging service or inspection service (watchman), shall be deferred by the Contractor until the flagging protection required by the Railroad is available at the job site. Anytime that the contractor is working within 25-feet of the centerline of any active track or using any equipment, such as a crane, that has the potential to foul any active track, a Railroad flagman will be required to protect the movement of trains through the work limits. In this Special Provision, fouling of the track shall be defined as any interference with the movement of trains.

The Contractor shall be knowledgeable about and adhere to all applicable regulations and requirements of the Federal Railway Administration pertaining to working near active railroad tracks.

4. CROSSING OF IN-SERVICE TRACKS

Numerous temporary railroad grade crossings will likely be required to enable construction of the project. The Contractor shall not cross any in-service tracks on the project without prior written authorization by the applicable Railroad (the CN or Metra). When authorized by the Railroad, the Contractor shall only cross in-service tracks for the specific time period provided for in the authorization and only then when flagging protection is provided. The use of any temporary grade crossing will only be allowed when a railroad flagman is on site.

The Contractor shall make arrangements with the CN and Metra for the construction, protection, maintenance and later removal of all temporary railroad grade crossings needed for the construction of this project in accordance with Section 107.10 of the Standard Specifications.

The Contractor shall contact Metra and the CN concerning pricing and other related requirements and restrictions for these crossings that will not be measured or paid for

separately but will be the Contractor's responsibility. Following are CN and Metra contacts for obtaining further information regarding the Railroad's providing of temporary railroad grade crossings for the Contractor's use in construction of this project:

Mr. John M. Henriksen, Manager Public Works
17641 Ashland Avenue
Homewood, IL 60430
(708) 332-3557
Fax (708) 332-3514

Mr. William T. Archer, Director
Engineering Department
Metra Electric District
12301 South Indiana Avenue
Chicago, IL 60628
(312) 322-2745

An estimated cost to the Contractor for the CN to install a temporary railroad at-grade crossing at each location for each of its tracks is $12,000. The actual cost may vary and be higher or lower that this based on such factors as / but not limited to: whether the track being crossed is old or new and the type of track (mainline, siding, lead track, etc.). In addition and associated with the providing of temporary railroad grade crossings, the CN will require the Contractor to furnish Contractual Liability Insurance. Such insurance shall have a minimum combined single limit of $5,000,000 per occurrence with an aggregate limit of $10,000,000 per annual policy period and said insurance shall be deemed primarily as it relates to the Agreement.

An estimated cost to the Contractor for Metra to install a 24-foot long temporary railroad at-grade crossing at each location for each of its tracks is $5,600.

In addition to the above costs to the Contractor for the Railroads to furnish materials for and to install the temporary railroad grade crossings, the Railroads may require the Contractor at his own additional cost to furnish and install security gates or cables with railroad locks to prevent the unauthorized use of any temporary grade crossing. The Contractor at his own additional cost may also be required to furnish or place stone, fabric and other related materials for the approaches to these temporary crossings as directed by the Railroad Engineer. The Contractor at his own additional cost shall furnish to Metra 7"x16" timbers in 8-foot lengths for use by that Railroad in constructing the temporary railroad grade crossings of Metra tracks requested by the Contractor. Timbers shall conform to *Illinois Central Gulf Railroad Standard Solid Timber Road Crossing (Using 7" x 16" Timbers) Drawing 5.17* for 11228-11525 Section of Rail as included in the Plans. Metra will drill the required holes, and furnish and drive spikes. The Contractor shall deliver the timbers for each crossing to the location specified by Metra.

Prior to start of work on the project, the Contractor shall determine the locations of temporary grade crossings he will need to access work areas. The Contractor shall apply to the CN and Metra for such grade crossings in the format required by each Railroad. The Railroad will determine if the location is satisfactory, issue a permit to the Contractor and install all temporary grade crossings.

Work time and access to many of the areas of construction for this project will be very much dependent on and limited by operations of both Railroads. The Contractor shall plan and schedule all associated operations for work requiring access by crossing of in-service railroad tracks accordingly. No additional compensation will be considered for delays and/or work congestion resulting from railroad traffic operating on and/or stopped and staged on tracks during the project. The actual total number of trains that will operate on, pass through, and /or stage on the tracks within the work limits of the project will vary on a day-to-day basis and their number cannot be forecasted in advance.

During the first stage of construction for SN 016-2755 for the Metra two-track portion of that railroad structure, all work access shall be from 159th Street below and from the west side of the Metra tracks along Park Avenue. Crossing of the CN tracks will not be permitted during that construction stage. Crossing of the active diversion of Metra Tracks 1 and 2 will also not be permitted.

During the second stage of construction for SN 016-2755 for the CN two-track portion of that railroad structure, the primary means of access, whenever possible, shall be from 159th Street below. Additional access during this construction stage for the structure shall be from the east across CN tracks 1, 2, 3, 4, and the Gateway Lead Track - and then only as necessary, after advance authorization in writing by the CN, and in full compliance with that Railroad's flagging requirements. Based on his construction methods and equipment, the Contractor may need to cross these tracks from either on the south side of the bridge only (requiring five temporary crossings – for CN tracks 1, 2, 3, 4, and the Gateway Lead Track) or on both the north and south sides (requiring up to ten temporary crossings – for CN tracks 1, 2, 3, 4, and the Gateway Lead Track). Crossing of Metra tracks will not be permitted during this construction stage.

Additional work requiring crossing of CN and/or Metra tracks will include but may not be limited to the following:

- Construction of catenary support structures
- Construction of the catenary bridge structure
- Construction of the catenary dead end structure
- Removal of the existing signal bridge
- Removal of catenary structures
- Installation of conduit Metra electrical systems

Work time and access to the work area for the second stage of construction for SN 016-2755 will be very much dependent on and limited by operations of both Railroads. The available work space from above 159th Street adjacent to railroad tracks will be very limited due to CN and Metra tracks that must remain in uninterrupted service immediately adjacent to the work area on both its east and west sides. The Contractor shall plan and schedule all related operations for this portion of construction accordingly. No additional compensation will be considered for delays and/or work congestion resulting from railroad traffic operating on and/or stopped and staged on the immediately adjacent tracks. The actual total number of trains that will operate on, pass through, and /or stage on these tracks within the work area of the project will vary on a day-to-day basis and their number cannot be forecasted in advance. Additional information regarding this work constraint is shown in the structure plans for SN 016-2755 and includes the configuration with approximate locations of the immediately adjacent in-service railroad tracks that will exist during the Stage II construction of that SN 016-2755 and the associated portion of removal of existing structure SN 016-0384 required for that construction.

5 TRACK CLEARANCES:

A. Minimum track clearance requirements of the CN and Metra shall be maintained by the Contractor during construction. Before undertaking any work within the Railroad rights of way, before placing any material or equipment adjacent to a track, and/or before placing any obstruction over any track, the Contractor shall:

1. Notify the Railroad's representative at least 72 hours in advance of the work.

2. Receive assurance from the Railroad's representative that arrangements have been made for flagging service as may be necessary.

3. Receive permission from the Railroad's representative to proceed with the work.

4. Confirm that the Engineer has received copies of the notice to the Railroad and of the Railroad's response thereto.

6. CONSTRUCTION PROCEDURES:

A. General:

Construction work on Railroad property shall be:

1. Subject to the inspection and approval of the Railroads.

2. In accordance with any specific conditions which may be provided in writing by the Railroads.

3. In accordance with these Special Provisions and the Standard Specifications.

B. Excavation:

The subgrade of an operated track shall be maintained with edge of berm at least 10 feet from centerline of track and not more than 24 inches below top of rail. The contractor will not be required to make an existing section meet this specification if substandard, in which case the existing section will be maintained.

C. Excavation for Structures:

The Contractor shall comply with the Special Provision for Braced Excavation noted elsewhere in the Special Provisions.

D. Removal of Existing Structures:

Removal of existing structures shall be performed in a manner that will not jeopardize the integrity of the superstructures or substructures of adjacent old or newly-constructed bridges carrying rail traffic. Methods for removal shall be submitted for review and approval by the Railroads.

E. Maintenance of Railroad Facilities:

1. The Contractor will be required to maintain all ditches and drainage structures free of silt or other obstructions which may result from his operations; to promptly repair eroded areas within Railroad rights of way and to repair any other damage to the property of the Railroad or its tenants. For further requirements for erosion and sediment control for this project, refer to specification "Temporary Erosion Control".

2. The Contractor shall protect all rail, vehicular and pedestrian traffic of the Railroads from his operations. The Contractor shall protect all Railroad structures and utility lines. The contractor shall assure that movements of intermodal trucks and service vehicles for the CN Gateway Intermodal Facility are not obstructed. The Contractor shall coordinate with the CN to request temporary outages of traffic lanes for any work that involves the possibility of obstruction to intermodal traffic movements. Such outages will only be permitted during work hours.

3. All such maintenance and repair of damages due to the Contractor's operations shall be performed at the Contractor's expense.

F. Storage of Materials and Equipment:

Materials and equipment shall not be stored where they will interfere with the Railroad operations, nor on the right of way of the Railroad without first having obtained written permission from the Railroad engineer, and such permission will be with the understanding that the Railroad will not be liable for damage to such material and equipment from any cause and that the Railroad Engineer may move, or require the Contractor to move, at the Contractor's expense, such material and equipment.

The contractor shall not store any equipment or material within the limits of the Gateway Intermodal Yard without specific permission from the Railroad Engineer.

All grading and construction machinery that is left parked near the track and unattended by a watchman shall be effectively immobilized so that unauthorized persons cannot move it. The Contractor shall protect, defend, indemnify and save the Railroad and an associated, controlled, or affiliated corporation, harmless from and against all loss, costs, expenses, claim or liability for loss of or damage to property or the loss of life or personal injury, arising out of or incident to the Contractor's failure to immobilize grading or construction machinery.

G. Cleanup:

Upon completion of the work, the Contractor shall remove from within the limits of the Railroad rights of way, all machinery, equipment, surplus materials, falsework, rubbish or temporary buildings of the Contractor, and leave said rights of way in a neat condition satisfactory to the Railroad Engineer or his authorized representative. Building of fires on property of the Railroads shall never be performed.

H. Snow Removal:

The Railroad will only remove snow from areas required for Railroad or intermodal operations. The Contractor is responsible for snow removal from the work area. Removed snow shall not be deposited in any location that interferes with Railroad operations. If removed snow is to be deposited on Railroad property, the Contractor shall obtain specific permission from the Railroad to do so, and the Railroad will determine an acceptable location to deposit such snow.

7. FLAGGING SERVICES:

A. When Required:

CN and Metra will provide flagging. Under the terms of the agreement between the Department and the Railroads, the Railroads have sole authority to determine the need for flagging required to protect its operations. In general, the requirements of such services will be whenever the Contractor's personnel or equipment are, or are likely to be, working on Railroad rights of way, or across, over and adjacent to or under a track, or when such work has disturbed or is likely to disturb a railroad

structure or the railroad roadbed or surface and alignment of any track to such extent that the movement of trains must be controlled by flagging. In addition, should any equipment located in the vicinity of an active track have the potential to foul the track, a flagman will be required.

Normally the Railroads will assign one flagman to a project, but in some cases, more that one may be necessary, such as yard limits where additional flagman may be needed to protect the movement of trains in the area. Because of the number of trains and the proximity of the yard to the work site, it is likely that a flagman will be required full time during construction on this project. The CN will provide flagmen to protect its tracks and Metra will provide separate flagmen to protect its tracks. In addition, Metra may require a separate flagman when work is to occur adjacent to its overhead AC power and/or DC catenary system wires.

B. Scheduling and Notification:

1. Not later than the time that approval is initially requested to begin work on Railroad right of way, Contractor shall furnish to the Railroad and the Department a schedule for all work required to complete the work within the Railroad's right of way and arrange for a job site meeting between the Contractor, the Department and the Railroad's authorized representative. Detail the schedule to show the sequence of work for which tracks must, if required, be temporarily taken out of service. Include a detailed listing of materials and their source, equipment to be used; emergency equipment available and emergency plans of action. Show which track(s) will remain in operation for various stages of the work, and the timing of construction operations. Work shall not to commence without formal approval by the CN and/or Metra. Flagman or Flagmen may not be provided until the job site meeting has been conducted and the Contractor's work schedule has been approved by the Railroads.

2. The Contractor will be required to provide the Railroad representative at least 10 working days of advance written notice of intent to begin work within the Railroad right of way in accordance with this special provision. Once begun, when such work is then suspended at any time, or for any reason, the Contractor will be required to provide the Railroad representative at least 3 working days of advance notice before resuming work on Railroad right of way. Such notices shall include sufficient details of the proposed work to enable the Railroad representative to determine if flagging will be required. If such notice is in writing, the Contractor shall furnish the Engineer a copy; if the notice if provided verbally it shall be confirmed in writing to the Engineer. If flagging is required, no work shall be undertaken until the flagman, or flagmen are present at the job site. It may take up to 30 days to obtain flagging initially from the Railroad. If flagging becomes unnecessary and is suspended, it may take up to 30 days to again obtain flagging from the Railroad. Due to Railroad labor agreements, it is necessary for the contractor to provide a minimum of 5 working days notice before flagging service may be discontinued and responsibility for payment stopped.

3. If, after the flagman is assigned to the project site, emergencies arise which require the flagman's presence elsewhere on the Railroad, then the Contractor shall delay work on the Railroad rights of way until such time as the flagman is again available. Any additional costs resulting from such delay shall be borne by the Contractor and not the Department or the Railroads.

C. Payment:

1. The Department will reimburse the Railroads directly for all costs of flagging which is required on account of construction of the grade separation project, within the Railroads' right of ways, which is shown in the project plans, or which is covered by an approved plan revision, supplemental agreement or change order. Any cost deemed to be caused by acts of omission, carelessness, or negligence or unnecessary delays on the part of the Contractor will also be borne by the Engineer but will be deducted from progress or final payment made to the Contractor. However, this deduction will be made only after the Department has provided the contractor written notification that these flagging costs have been determined to be the Contractor's responsibility. The Contractor will be required to reimburse the Railroads for any flagging on the account of WORK FOR THE BENEFIT OF THE CONTRACTOR (See Section 8 of this special provision). This includes the flagging required solely for protection of temporary crossings constructed for the benefit of the Contractor.

2. The cost of flagging service is approximately:

   For flagging on the CN cost for flagging will be approximately $725 per day based on an 8-hour workday and a 40-hour workweek. For flagging on the Metra cost for flagging will be approximately $ 350 per day based on an 8-hour workday and a 40-hour workweek. Time for travel to and from headquarters and time to install and remove warning boards each day is included in addition to the 8-hour Contractor working day. This cost includes base pay for the flagman, composite overhead and per diem costs.

   The charge to the Department by CN and Metra will be the actual cost based on the rate of pay for the Railroad's employees who are available for flagging service at the time the service is required. Work by a flagmen in excess of 8 hours per day or 40 hours per week but not more than 12 hours a day will result in overtime pay at approximately $120 per hour. Work by a flagman in excess of 12 hours per day will result in overtime pay at 2 times the appropriate rate. If work is performed on a holiday, the flagging rate is 2 ½ times the normal rate. Railroad work involved in preparing and handling invoices will also be charged to the Department. Charges to the Department by the Railroads shall conform to applicable provisions of 23 CFR Part 140, Subpart I, Subchapter B and 23 CFR, Part 646, Subpart B, of the Federal Aid Policy Guide issued by the Federal Highway Administration on December 9, 1991, including all current amendments. Flagging costs are subject to change. The above estimates are provided for information only and are not binding in any way.

D. Verification:

1. The Contractor and Engineer will review and sign the flagman's time sheet, attesting that the flagman was present during the time recorded. A flagman may be removed by the Railroad if the form is not signed. If a flagman is removed, the Contractor will not be allowed to re-enter the Railroad right of way until the issue is resolved. Any complaints concerning the flagman, or flagmen, must be resolved in a timely manner. If need for flagman, or flagmen, is questioned, please contact the below named person. The Contractor within 5 working days must confirm all verbal complaints in writing with a copy to the Department's Engineer. All written correspondence should be addressed to:

CN	Metra
Mr. Thomas Tucker, Officer Auditing	Mr. Jim Carpenter
2800 Livermois Road	Power Supervisor
Troy, MI 48083	312-322-2472 or
248-740-6227	Peter Swolfer, Supt. of Train Operations
Fax: 248-740-6031	312-322-7800

2. The Railroad flagman assigned to the project will be responsible for notifying the Engineer upon arrival at the job site on the first day (or as soon thereafter as possible) that flagging services begin and on the last day that he performs such services for each separate period that services arise provided. The Engineer will document such notification in the project records. When requested, the Project Engineer will also sign the flagman's diary showing daily time spent and the activity at the project site.

8. WORK FOR THE BENEFIT OF THE CONTRACTOR:

A. Anticipated temporary and permanent changes in wire lines, signal locations, railroad utilities or other facilities which are considered necessary to the project are shown on the plans. They are included in the force account agreement between the Department and the Railroad or will be covered by the appropriate revisions to same which will be initiated and approved by the State and/or Railroad.

B. Should the Contractor desire any changes in addition to the above, he shall make separate arrangements with the Railroad for it to be accomplished at the Contractor's expense.

9. COOPERATION AND DELAYS:

A. It shall be the Contractor's responsibility to arrange a schedule with the Railroads for accomplishing stage construction involving work by the Railroads or tenants of the Railroad. In arranging his schedule he shall ascertain, from the Railroad(s), the lead time required for assembling crews and materials and shall make due allowance therefore.

B. No charge or claims of the contractor against either the Department or the Railroads will be allowed for hindrance or delay on account of railroad traffic; any work performed by the Railroads or other delay incident to or necessary for safe maintenance of railway traffic or for any delays due to compliance with these special provisions.

10. TRAINMAN'S WALKWAYS AND FALL PROTECTION:

Any work at any location on CN or Metra property creating the potential for a fall hazard to railroad personnel shall be provided with fall protection. Appropriate fall protection systems shall be furnished and installed by the Contractor, shall be a minimum of 3'-6" high, and be subject to approval of the CN and/or Metra.

Along the outer side of each exterior track of multiple operated track, and on each side of single operated track, an unobstructed continuous trainman's walkway space suitable for trainman's use in walking along trains, extending to a line not less than 10-feet from centerline of track over the entire length of the project shall be maintained. Any temporary impediments to walkways and track drainage encroachments or obstructions allowed and approved in advance by the Railroad during work hours while the Railroad's protective service is provided shall be removed before the close of each work day. For any excavation or structure removal performed in the vicinity of the continuous 10-foot space for trainman's walkways over the construction limits of the project, a handrail having a minimum height of 3'-6" and a minimum clearance from centerline of track of 10'-0" shall be furnished and installed.

For track on existing or newly constructed structure during the staged removal of the existing bridges over 159th Street and/or the staged excavation, construction and erection for the replacement structures - temporary walkways shall be provided along the outboard side of each track adjacent to any work that may create a fall hazard. Such walkways shall provide an unobstructed continuous space without fall hazards suitable for trainman's use in walking along trains. Handrail a minimum of 3'-6" high shall be provided along of the outside edge of all such walkways with the inside face of the handrail not infringing on the clearance requirements of AREMA Figure 15-1-1 "Minimum Railway Bridge Clearances".

Maintaining of walkways for trainmen and providing of fall protection surrounding all construction, structure removal, and structure construction that creates the potential for all hazards will not be measured separately for payment except as specified in the following special provisions and shown in the plans for:

- "Temporary Removable Walkway System for SN 016-2755 Construction"
- "Temporary Removable Walkway System for SN 016-2819 Construction"
- "Temporary Removable Walkway System for SN 016-2822 Construction"
- "Temporary Ballast Retainer System"

11. INSURANCE:

See RAILROAD PROTECTIVE LIABILITY INSURANCE (5 and 10) (BDE). Separate policies will be required for both the CN and Metra.

12. RAILROAD WORKER SAFETY TRAINING AND SECURITY:

All staff of the Contractor and of all staff of all Subcontractors having to enter on Railroad property shall complete and maintain current on an annual basis the Railroad Worker Safety Training Contractor Orientation Courses for both the CN and Metra. Information regarding this training can be found at http://www.contractororientation.com/.

All staff of the Contractor and of all staff of all Subcontractors having to enter on Railroad property shall also have on them an E-Railsafe System Badge. This railroad security requirement requires completing of web-based training and having a background check successfully performed. The fee for the background check and web-based training is estimated at $50 per person. After completion of the web-based training and submittal of information required for the security check, it is estimated to take three days to receive the E-Railsafe System Badge. This requirement is part of the Homeland Security requirements for America's railroads.

13. WORKING NEAR ACTIVE METRA TRACKS:

No work shall be performed within 25 feet of active Metra Tracks on weekdays between the hours of 6:00 am and 9:00 am and between the hours of 3:00 pm and 6:30 pm.

The Contractor shall coordinate and make arrangements with Metra for limited work windows that may be needed with one or both tracks out-of-service. Opportunities for such track-outage work windows for either or both Metra Tracks will be very limited in time-of-day, day-of-week and duration. Metra will only consider requests by the Contractor when it will not create any disruptions in its service. Requests for review and approval of track outages must be made in writing to Metra a minimum of seven days in advance of the day they are needed.

Track outage work windows will be dependent on the timetable that is current for the Metra Electric District during construction of the project. A table of tentative windows of opportunity for track closures that may be able to be provided by Metra is included in the plans. That information shall be treated as for-reference-only when bidding the project. Shorter track outage work windows may result due to train delays, faults or failures in systems of the Metra Electric District and/or unavailability of Metra staff required to facilitate the outage. Such reductions in available work windows cannot be predicted or projected and will not be considered cause for additional compensation or extension of time to the Contractor.

Longer outages of one track may be possible by single-tracking rail traffic through the project site. However such outages will be very limited in time-of-day and day-of-week and will be solely based on Metra's decision to allow and/or approve them. Metra will also only consider requests by the Contractor to operate with a single track through the project site when it will not create any potential for disruptions in its service and the Railroad has available staff to set up, maintain and remove the single-tracking rail operation.

Track outage work windows will not be available for all or part (as indicated) of the following special event blackout dates for 2008 and for the corresponding dates for the same special event blackout days in subsequent years:

Good Friday: 3/21 work until noon

Friday prior to Memorial Day: 5/23 work until noon

Taste of Chicago Festival: no work
Saturday 6/28, Sunday 6/29, Thursday 7/3, Saturday 7/5 and Sunday 7/6

Air and Water Show: no work
Saturday 8/16 and Sunday 8/17

Friday prior to Labor Day: 8/29 work until noon

Wednesday prior to Thanksgiving: 11/26 work until noon

Early business quits for the holidays: work until noon
12/19, 12/23, 12/24 and 12/30 and 12/31

14. WORKING NEAR ENERGIZED METRA CATENARY SYSTEM:

Any work performed by the Contractor between or immediately adjacent to and outboard of Metra's two active tracks shall be planned, arranged and scheduled in such a manner as to assure that no construction equipment or materials will come in contact with any components of the DC catenary system. Construction equipment having the capability in any manner to reach to and contact any elements of the catenary system shall not operate any closer than ten feet from the nearest element of the catenary system when it is energized. No part of any construction equipment shall at any time during the project be extended over energized catenary systems, regardless of the height of the equipment above the wires.

The Contractor shall coordinate and make arrangements with Metra for limited work windows with the DC system for a track to be de-energized if he elects to work closer than 10 feet to normally energized elements of the DC catenary system with equipment having the ability to reach the system. Opportunities for work windows with the catenary system for either or both Metra Tracks de-energized will be very limited in time-of-day, day-of-week and duration. Metra will only consider requests by the Contractor to de-energize its catenary system when it will not create any potential for disruptions in its service. Requests for review and approval of track outages with DC catenary system de-energization must be made in writing to Metra a minimum of seven days in advance of the day they are needed.

Work windows with the catenary system for either track de-energized will be based on the timetable that is current for the Metra Electric District during construction of the project. Refer to the previous section regarding a table of tentative windows of opportunity for track closures that may be able to be provided by Metra that is included in the plans. Track outage information contained in that table do not account for the time required by Metra to de-energize the DC catenary system before work can begin and the time to re-energize the system after work is completed. Beginning times for work windows with de-energized track will have to account for that time required for Metra forces to remove power from the system after the last train of the day requiring it leaves the electrified section of the catenary system servicing the section of track of the project site. Ending times for work windows with de-energized track will have to account for the time required for Metra forces to apply power from the system before the first train of the day requiring it arrives at the electrified section of the catenary system servicing the section of track of the project site. Each of these times are is estimated to take up to one hour away from the potential track outage windows shown in the tentative windows of opportunity for track closures in the plans.

Due to the potential for stray electrical current to create safety hazards, the Contractor shall avoid all contact by personnel, equipment, and/or materials with steel structures supporting the DC catenary system.

15. LOCATION AND MARKING OF RAILROAD UTILITIES:

The Contractor shall comply with Section 107.31 of the Standard Specifications and the following:

The Contractor shall contact the Railroad a minimum of 72 hours in advance of performing any work in areas that may impact Railroad utilities. The Railroad will attempt to locate and mark all utilities within 72 hours, but does not guarantee such a timeframe. The Contractor shall not proceed with work until the Railroad has confirmed that all utilities in the work area are marked. In the event that markings are disturbed due to construction

activities or weather, the Contractor shall stop all work in these areas, notify the Railroad of areas to be re-marked, and allow 72 hours for re-marking of the utilities. The Contractor shall copy the Engineer on all correspondence with the Railroad regarding location and marking of railroad utilities.

15. FAILURE TO COMPLY:

In the event the Contractor violates or fails to comply with any of the requirements of these Special Provisions:

A. The Railroad Engineer may require that the Contractor vacate Railroad property.

B. The Engineer may withhold all monies due the Contractor on monthly statements.

Any such orders shall remain in effect until the Contractor has remedied the situation to the satisfaction of the Railroad Engineer and the Engineer.

16. PAYMENT FOR COST OF COMPLIANCE:

No separate payment will be made for any extra cost incurred on account of compliance with these special provisions. All such cost shall be included in prices bid for other items of the work as specified in the payment items.

17. DELAYS DUE TO RAIL TRAFFIC:

The contractor, in pursuit of his work on this project, may be delayed due to the inability of the flagmen to arrange track time for him to complete his task on account of rail traffic that the railroad operates on the various tracks on a daily basis. The contractor shall prepare his schedule accordingly and take into consideration possible delays in pursuit of the work. The Department will provide no additional compensation for delays associated with the movement, stopping, and/or staging of trains on any track of either the CN or Metra property. Should the Contractor in his opinion consider the delays to be causing him to not meet his working schedule, he shall forward such concern to the Department in writing at the time of occurrence. The Department and the Railroads will work as diligently as possible to minimize the delays due to rail traffic.

CONTRACTOR SUBMITTALS TO RAILROADS

The Contractor shall schedule all work based on the review and approval of all required submittals to the Railroads taking a minimum of 30 calendar days of time. The Contractor shall furnish submittals to the Engineer for review by the Railroad, for items of work including, but not limited to, the following:

A. Procedure for Removal of Existing Structures
B. Temporary Bridge Rail Systems
C. Bridge Deck Tie Support System
D. Temporary Ballast Retainer System
E. Temporary Removable Walkway Systems
F. Temporary Jump Span
G. Braced Excavation Systems
H. Temporary Ballast Retainer System

I. Temporary Stairway Access to Metra Tracks
J. Temporary Ramp Access to Metra Tracks
K. Structural Steel
L. Bridge Bearings
M. Temporary Soil Retention System
N. Catenary Bridge Structure
O. Catenary Support Structures
P. Catenary Dead-End Structure
Q. Catenary Hardware
R. Metra Signal Materials
S. All Electrical Items

The Contractor shall furnish work-related submittals to the categories, as follows:

A. Shop Drawings - Eight prints.
B. Product data - Eight sets.
C. Samples - Eight sets.
D. The Contractor shall provide two 4-mil Mylar sets of final “as-built” drawings.
E. Miscellaneous submittals - as directed by the Engineer

The Contractor shall furnish a complete schedule of work-related submittals to be made to the Engineer. The Contractor shall submit his schedule for submittals to the Engineer at the preconstruction meeting for his approval. The schedule for submittals shall be coordinated with the construction schedule. The Contractor shall revise his schedule as directed by the Engineer and resubmit same for final approval, prior to first payment request. The Contractor shall revise the schedule as directed by the Engineer.

All submittals shall be reviewed and approved by the General Contractor and, if applicable, by the subcontractor(s) involved before transmittal. The submittals shall be reviewed for compliance with the Contract Documents. Submittals not in compliance with the Contract Documents will be returned for re-submittal.

Every sheet, page, drawing or sample of all submittals shall be marked with a permanent, tamper-proof identification that includes the following:

A. Specification Number
B. Contract Number
C. General Contractor - date approved
D. Subcontractor - date approved
E. Sub-Subcontractor - date approved
F. Supplier/Manufacturer - prepared (mailed)
G. State Specification Division, Section, Subsection and Paragraph(s) involved –
H. Specify Related Drawings and Details

All submittals shall be accompanied by a transmittal letter plus two copies of the letter. A draft of the transmittal letter form for use on the project shall be submitted at the preconstruction meeting to the Engineer for review.

A. The transmittal letter shall include all identification information marked on the submittal and the General Contractor's certification that all information is in compliance with the Contract Documents.
B. Minor variations from the Contract Documents shall also be indicated and each submittal made to highlight such deviations.

All submittals shall have a minimum of 2" x 3" clear space for approval stamps and signatures.

Submittals shall be packaged appropriately and sent by U.S. registered mail, or delivered to the Engineer. The Railroads will not be responsible for time losses and extra costs due to lost submittals or transmittal delays.

Any submittals not in compliance with the requirements herein will be returned to the Contractor without review.

Review time shall be thirty (30) calendar days from the date of receipt. The Contractor will be advised when it is determined that a submittal being reviewed must be delayed for coordination.

Review Procedure: All submittals in compliance with these requirements will be reviewed by the Engineer for compliance with the Contract Documents, stamped, signed and distributed. Submittals stamped REJECTED shall be corrected by the Contractor, as requested, and resubmitted to the Engineer. No work related to the submittal shall begin until approval is given. Submittals marked NO EXCEPTIONS TAKEN constitute an acceptable submittal and acceptance is final.

The Engineer's and/or Railroads' review shall not be considered a complete check of the method of assembly, erection or construction. Review shall in no way be construed as:

A. Permitting any departure whatsoever from the Contract Documents.
B. Relieving the Contractor of his responsibility for any error in quality of materials, details, omissions or otherwise that may exist.
C. Relieving the Contractor of his responsibility for adequate field connections, erection techniques, and measurements and quantities required.
D. Relieving the Contractor of his responsibility for satisfactory performance of all work and coordination with the work of all subcontractors and other contractors.
E. Permitting departure from additional details or instructions furnished by the Railroad.

Distribution of reviewed and stamped submittals will be made as follows:

A. Two to the Railroads.
B. Two retained for the Engineer's file.
C. Two to the Contractor.
D. One for the State.
E. One for the field office.

The railroads will permit two reviews of each submittal by the Engineer, consisting of a review of the original submittal, and if necessary, review of the re-submittal at no expense to the Contractor. The Railroad will charge the Contractor 1.5 times the cost of review for each subsequent review of each submittal after review of the original submittal and one re-submittal.

SPECIAL REQUIREMENTS FOR SUBMITTALS:

A. A separate submittal shall be prepared for each material type and/or system.
B. Prepare and transmit submittals sufficiently in advance of performing related work to allow time for review and possible re-submittal. No extension of time will be authorized due to the Contractor's failure to prepare or transmit submittals sufficiently in advance of the work.
C. A submittal shall be made for all required work, whether or not a submittal is specifically indicated.
D. Do not proceed with work in a manner that will necessitate late revision of a submittal that has been transmitted.
E. Shop Drawings: Prepare Shop Drawings that establish the actual detail of the work: indicate proper relation to adjoining work: amplify design details of all general, civil and structural items in proper relation to verified physical items: and incorporate minor changes of design or construction to suit actual conditions. Fully describe all material and equipment to be incorporated into the project. Include manufacturer's specifications and special detailed information.
    1. Drawings shall be made under the direction and supervision of the Contractor and shall show all work dimensioned exactly as installed. Major equipment and apparatus shall be shown to scale and properly located.
    2. The drawing shall include plan layouts drawn at a scale (or scales) as required; minimum scale shall be l/8" equal to 1' - 0". It is intended that construction drawings of each trade be the same scale(s) in order to permit respective plans to be superimposed upon all others of each trade.
    3. The Engineer may request additional drawings if, in his opinion, they are required to properly coordinate the project.
    4. The Contractor shall be responsible for the coordination of all work with the work of all trades and shall, in preparing the drawings, continually check the work of all other trades (inclusive of that indicated by Shop Drawings) in order to avoid possible installation conflicts arising there from. It shall be understood that the work shown on the Drawings has been so coordinated. In the event of conflicts or interferences that cannot be resolved in the field, the Contractor shall request a written clarification from the Engineer.
F. Brochures and Prospectus: In the case of materials for which no Shop Drawings are required, the Contractor shall submit one original and five photocopied prospectus, giving descriptive data so that a proper evaluation may be made.
G. Samples: Samples shall be sufficient size to show general visual effect. When samples must show range of color, texture, finish graining or other properties, submit in sets of three showing the full scope of this range. Each sample shall bear identifying labels stating project name, material, manufacturer and location of project.
H. Workmanship Bonds: Where specific units of work require insurance of a bond, or similar provision, as a means of assuring the Railroad that certain possible failures of the work, to be performed as represented, are to be rectified at someone else's expense, submit fully executed bond backed by a surety company acceptable to the Railroad and in the principal amount indicated. Include information sheet for the Railroad maintenance/operating personnel outlining proper procedures in case of failure or other instances which might affect validity of bond; list names, addresses and telephone numbers for the Railroad's emergency action and follow-up in connection with utilization of each bond.

I. The Contractor shall submit a list of all materials and equipment/systems to the Engineer, giving names of the manufacturers of the products/materials he intends to furnish under this Contract.
J. The Contractor shall make any corrections required by the Engineer and shall resubmit as often as necessary. The Contractor shall direct specific attention in writing, or on the resubmitted Shop Drawings, to revisions other than the corrections requested by the Engineer on previous submissions.
K. Only such shop and working drawings, catalog cuts, pamphlets, manufacturer's specifications and data, etc., as signed and stamped with approval of the Engineer shall be allowed on the site.

NON-SPECIAL WASTE WORKING CONDITIONS

This work shall be according to Article 669 of the Standard Specifications and the following:

Qualifications. The term environmental firm shall mean an environmental firm with at least five (5) documented leaking underground storage tank (LUST) cleanups or that is pre-qualified in hazardous waste by the Department. Documentation includes but not limited to verifying remediation and special waste operations for sites contaminated with gasoline, diesel, or waste oil in accordance with all Federal, State, or local regulatory requirements and shall be provided to the Engineer for approval. The environmental firm selected shall not be a former or current consultant or have any ties with any of the properties contained within and/or adjacent to this construction project.

General. Implementation of this Special Provision will likely require the Contractor to subcontract for the execution of certain activities. It will be the Contractor's responsibility to assess the working conditions and adjust anticipated production rates accordingly.

All contaminated materials shall be managed as non-special waste. This work shall include monitoring and potential sampling, analytical testing, and management of a material contaminated by regulated substances.

Any soil classified as a non-special waste shall be excavated and disposed of as directed by this project or the Engineer. Any excavation or disposal beyond what is required by this project or the Engineer will be at no additional cost to the Department. The preliminary site investigation (PSI) report, available through the District's Environmental Studies Unit, estimated the excavation quantity of non-special waste at the following location. The information available at the time of plan preparation determined the limits of the contamination and the quantities estimated were based on soil excavation for construction purposes only. The lateral distance is measured from centerline and the farthest distance is the offset distance or construction limit which ever is less. Any soil samples or analysis without the approval of the Engineer will be at no additional cost to the Department.

A) The Environmental Firm shall continuously monitor for worker protection and the Contractor shall manage and dispose of all soils excavated within the following areas as classified below.

1. Station 90+50 to Station 91+00 0 to 140 feet RT (Illinois Central Railroad Yard, Site 814-23) – non-special waste. Contaminants of concern sampling parameters: PNAs and Metals.
2. Station 91+00 to Station 92+50 0 to 160 feet LT (Illinois Central Railroad Yard, Site 814-23) – non-special waste. Contaminants of concern sampling parameters: PNAs and Metals.
3. Station 91+00 to Station 92+50 300 to 480 feet RT (Illinois Central Railroad Yard, Site 814-23) – non-special waste. Contaminants of concern sampling parameters: PNAs and Metals.
4. Station 93+00 to Station 94+25 0 to 360 feet LT (Illinois Central Railroad Yard, Site 814-23) – non-special waste. Contaminants of concern sampling parameters: PNAs and Metals.
5. Station 93+00 to Station 94+75 160 to 440 feet RT (Illinois Central Railroad Yard, Site 814-23) – non-special waste. Contaminants of concern sampling parameters: PNAs and Metals.
6. Station 94+75 to Station 96+00 0 to 170 feet LT (Illinois Central Railroad Yard, Site 814-23) – non-special waste. Contaminants of concern sampling parameters: PNAs and Metals.
7. Station 94+75 to Station 95+00 0 to 160 feet RT (Illinois Central Railroad Yard, Site 814-23) – non-special waste. Contaminants of concern sampling parameters: PNAs and Metals.
8. Station 96+00 to Station 96+30 180 to 300 feet LT (Illinois Central Railroad Yard, Site 814-23) – non-special waste. Contaminants of concern sampling parameters: PNAs and Metals.
9. Station 96+30 to Station 97+40 0 to 120 feet RT (Illinois Central Railroad Yard, Site 814-23) – non-special waste. Contaminants of concern sampling parameters: PNAs and Metals.
10. Station 50+870 to Station 50+961 0 to 15 meters (0 to 49 feet) LT (Vacant City of Harvey Parcel, Site 814-25, Southeast quadrant of Center Avenue and 159th Street) – non-special waste. Contaminants of concern sampling parameters: Arsenic and TCLP Lead.
11. Station 50+950 to Station 51+000 0 to 15 meters (0 to 49 feet) RT (Vacant City of Harvey Parcel, Site 814-25, Southeast quadrant of Center Avenue and 159th Street) – non-special waste. Contaminants of concern sampling parameters: Arsenic and TCLP Lead.
12. Station 2+825 (92+68) to Station 2+835 (93+00) 0 to 20 meters (0 to 66 feet) LT (Canadian National Gateway/IC Railroad, Site 814-23/814A-2/814B-1, 15840 South West Avenue) – non-special waste. Contaminants of concern sampling parameters: PNAs.
13. Station 2+926 (96+00) to Station 2+950 (96+78) 0 to 20 meters (0 to 66 feet) LT (Canadian National Gateway/IC Railroad, Site 814-23/814A-2/814B-1, 15840 South West Avenue) – non-special waste. Contaminants of concern sampling parameters: PNAs.
14. Station 51+365 to Station 51+408 0 to 15 meters (0 to 49 feet) LT (Canadian National Gateway/IC Railroad, Site 814-23/814A-2/814B-1, 15840 South West Avenue) – non-special waste. Contaminants of concern sampling parameters: PNAs, Arsenic, and TCLP Lead.

B) The Environmental Firm shall continuously monitor for worker protection and the Contractor shall manage any excavated soils **within the construction limits of this project as fill.**

Although the soil concentrations exceed a residential property's Tier 1 soil remediation objective for the ingestion exposure pathway, they can be utilized within the construction limits as fill because the roadway is not considered a residential property. All storm sewer excavated soils can be placed back into the excavated trench as backfill unless trench backfill is specified. If the soils cannot be utilized within the construction limits as fill then they must be managed off-site as a non-special waste. The following areas can be managed within the construction limits as fill.

1. Station 90+50 to Station 91+00 0 to 120 feet LT (Illinois Central Railroad Yard, Site 814-23) – non-special waste. Contaminants of concern sampling parameters: PNAs and Metals.
2. Station 92+50 to Station 93+00 0 to 100 feet LT (Illinois Central Railroad Yard, Site 814-23) – non-special waste. Contaminants of concern sampling parameters: PNAs and Metals.
3. Station 92+50 to Station 93+00 0 to 100 feet RT (Illinois Central Railroad Yard, Site 814-23) – non-special waste. Contaminants of concern sampling parameters: PNAs and Metals.
4. Station 93+00 to Station 94+75 0 to 160 feet RT (Illinois Central Railroad Yard, Site 814-23) – non-special waste. Contaminants of concern sampling parameters: PNAs and Metals.
5. Station 95+00 to Station 96+00 0 to 160 feet RT (Illinois Central Railroad Yard, Site 814-23) – non-special waste. Contaminants of concern sampling parameters: PNAs and Metals.
6. Station 96+00 to Station 96+30 0 to 180 feet LT (Illinois Central Railroad Yard, Site 814-23) – non-special waste. Contaminants of concern sampling parameters: PNAs and Metals.
7. Station 96+00 to Station 96+30 0 to 180 feet RT (Illinois Central Railroad Yard, Site 814-23) – non-special waste. Contaminants of concern sampling parameters: PNAs and Metals.
8. Station 96+30 to Station 97+40 0 to 120 feet LT (Illinois Central Railroad Yard, Site 814-23) – non-special waste. Contaminants of concern sampling parameters: PNAs and Metals.

DUCTILE IRON WATER MAIN WITH POLYETHYLENE ENCASEMENT

This work shall consist of the construction of various sized ductile iron water main at locations indicated on the plans or as directed by the Engineer. The water main shall be "Ductile Iron," ANSI thickness Class 52, Clow "Super Bell-Tite", "Push-On" Joint, or approved equal, and must meet all applicable requirements of ANSI A21.51 (AWWA C151)[pipe]; ANSI A21.10 (AWWA C110) or AWWA C153, [fittings]; ANSI A21.11 (AWWA C111) [joints]; and ANSI A21.4 (AWWA C104) [pipe lining] specifications. Alloyed steel bolts shall be used to prevent corrosion. All water mains shall be wrapped in 8-mil thick polyethylene encasement (ANSI/AWWA C105/A21.5) Method B, with pipe and joints wrapped separately.

Measurement shall be made along the centerline of water main installed. The cost for furnishing all labor, materials and equipment necessary for excavation, construction of the new water main, backfilling, all materials and labor required for wrapping the water main will be paid for at the contract unit price per METER as DUCTILE IRON WATER CLASS 52 WITH POLYETHYLENE ENCASEMENT of the size specified.

MECHANICAL JOINT RESTRAINTS

All mechanical joint restraints shall be incorporated in the design of a follower gland. The gland shall be manufactured of ductile iron conforming to ASTM A 536. Dimensions of the gland shall be such that it can be used with the standardized mechanical joint bell and tee-head bolts conforming to AWWA C111 and C153.

The restraint mechanism shall consist of numerous individually activated gripping surfaces to maximize restraint capability. The gripping surfaces shall be sedges designed to spread the bearing surfaces on the pipe. Twist-off nuts, sized same as tee-head bolts, shall be used to insure proper actuating of restraining devices. When the nut is sheared off, a standard hex nut shall remain. The mechanical joint restraint device for ductile iron pipe shall have a working pressure of at least 1.72 N/mm2 (250 psi) with a minimum safety factor of 2. Gasket material identical to water main gaskets shall be utilized at all joints and fittings.

The mechanical joint restraint devices shall be EBAA Iron, Inc. MegaLug 1100 series, Uni-Flange Series 1400, or engineer-approved equal.

Joint restraint for ductile iron pipe within the steel sleeve shall be Field Lok 350, for Tyton Joint pipe and fittings, TR Flex pipe and fittings, or other engineer-approved equal. Restrained ductile iron pipe shall be rated for 2.41 N/mm2 (350 psi) in accordance with ANSI/AWWA C111/A21.11 Rubber-Gasket Joints for Ductile Iron Pipe and Fittings. The difference in price for the restrained joint pipe versus the push on joint pipe shall not be paid for separately but shall be included in the unit price for the steel sleeve.

All design associated with mechanical joint restraints shall be completed by the contractor and his supplier. Design calculations shall be submitted to the City Engineer for review and approval prior to the ordering of materials. The cost for designing, materials, and labor for furnishing, installing, adjusting, and testing of mechanical joint restraints will not be compensated for separately but shall be included in the price of ductile iron water main.

FITTINGS

All fittings shall be made from gray-iron or ductile iron and furnished with mechanical joint ends. All fittings shall have a pressure rating of 1.72 N/mm2 (250 psi) and shall be wrapped with an 8-mil thick polyethylene material per AWWA Standard C105. At locations indicated on the plans or as directed by the Engineer, the water main shall be constructed around existing utility structures or other obstacles by use of tees, bends or other appropriate fittings. Gasket material identical to water main gaskets shall be utilized at all joints and fittings.

Fittings will not be measured and paid separately, but shall be considered included in the price of ductile iron water main.

STEEL SLEEVE- OPEN CUT

This work shall consist of furnishing spiral welded, steel casing of the thickness listed in the table below and of the outer diameter specified on the plans or as directed by the Engineer.

The sleeve shall meet ASTM A139 and ANSI/AWWA C200, Grade B, minimum yield strength of 241 N/mm2 (35,000 psi). Sleeves shall extend at least three meters (ten feet (10')) beyond the outer edge of the existing pavement or sewer pipe, as indicated in the detail drawings, unless otherwise approved by the Engineer. All work shall be done in accordance with Section 552 of the Standard Specifications.

After installation of the steel sleeve is completed, the proposed water main shall be constructed in place within the sleeve. The water main shall be inserted and centered by use of model CCS stainless steel casing spacers as manufactured by Cascade Waterworks Mfg. Co. of Yorkville, IL or approved equal at a maximum spacing of 3 meters (10 feet). Casing spacers shall be bolt on style with a two-piece shell made from T-304 stainless steel of a minimum 14-gauge thickness. Each shell section shall have bolt flanges formed with ribs for added strength. Each connecting flange shall have a minimum of three 7 mm (5/16") T-304 bolts. The shell shall be lined with a ribbed PVC extrusion with a retaining section that overlaps the edge of the shell and prevents slippage. Bearing surfaces (runners) made from UHMW polymer with a static coefficient of friction of 0.11-0.13 shall be attached to support structures (risers) at appropriate positions to properly support the carrier within the casing and to ease installation. The runners shall be attached mechanically by T-304 threaded fasteners inserted through the punched riser section and TIG welded for strength. Risers shall be made of T-304 14 gauge stainless steel. All risers over 50 mm (2-inches) in height shall be reinforced. Risers shall be MIG welded to the shell. All metal surfaces shall be fully passivated. The ends of the sleeve shall be sealed using a method approved by the Engineer.

The cost for casing spacers, filling of the annular space (if required), and furnishing and installing the steel sleeve shall be included in the contract unit price for the steel sleeve. Unless otherwise shown on the plans, steel sleeves [casings] shall be of the size and thickness shown in the table below:

Standard Sizes of Steel Sleeves Used As Casings*

Carrier Pipe ID in mm (Inches)	Casing Wall Thickness in mm (Inches)	Casing Outside Diameter in mm (Inches)
150 (6)	9 (0.344)	500 (20)
200 (8)	9 (0.344)	500 (20)
250 (10)	9 (0.344)	500 (20)
300 (12)	10 (0.375)	600 (24)

*Adapted from City of Chicago, IL Water Department Standard Specifications

The cost of furnishing and installation of the steel sleeve, and all incidental work necessary for its installation, including casing spacers, will be paid for at the contract unit price per METER as STEEL SLEEVE of the specified diameter and wall thickness, OPEN CUT. The cost for water main constructed within the sleeves will be measured and paid for separately as specified.

WATER VALVES

All 250 mm (10 inches) and smaller valves shall be East Jordan, Mueller, or approved equal resilient wedge type abiding to AWWA C509 and AWWA C550.

All proposed valves larger than 250 mm (10 inches) shall be Pratt butterfly or approved equal type with extension stem and ground level position indicator, or approved equal iron body, rubber seat butterfly valve, Class 150B, counter clockwise to open, conforming to AWWA C504 and approved by the City of Harvey Water Superintendent. The cost for each valve shall be included in the appropriate valve vault or valve box unit price.

VALVE VAULTS

Valve vaults shall be installed at the locations indicated in the plans or as directed by the Engineer. Valves shall be centered directly under the vault lid opening unless otherwise approved by the Engineer. Valve vaults shall conform to ASTM C478.

No more than two (2) adjusting rings with 150 mm (6-inch) maximum height adjustment shall be allowed. Rubber adjusting rings instead of concrete adjusting rings are required for all valve vaults and precast rings are not allowed. All joints between vaults sections shall be sealed with mastic and McWrap or equal shall be used around the outside wall of the vault at the joints.

All vaults shall be provided with a heavy duty Type 1 frame and closed lid. The manhole frame and cover shall be an East Jordan 1022Z3 embossed “CITY OF HARVEY WATER”.

Valve vault construction shall be as specified in detail drawings shown in the plans. Measurement for payment shall be per EACH for valve vaults installed, and shall include the appropriate VALVE or TAPPING SLEEVE AND VALVE as called out in the plans and proposal sheet.

WATER SERVICE CONNECTION

This item shall include the installation of new water services, open cut short water service connection and bored under the roadway long water service connection, and all necessary appurtenances from the new water main to the property line or at a location as directed by the Engineer. The water service installation shall start from the property line with a corporation stop. The contractor shall install new connection fittings, k-copper pipe, roundway, curb box (Minneapolis Pattern screw on), connection fittings, excavation, bedding, and trench backfill with CA-10 as required within the installation limits.

Corporation stops will be a Mueller H-15000, McDonald 4701 or approved equal. Curb stops shall be the screw on Minneapolis Pattern type. They shall be installed in the parkway and in no case shall be positioned in a sidewalk or driveway or buried underground. A cement or brick block shall be placed under each curb stop to ensure stability. All material shall be as approved by the City of Harvey Water Department prior to installation. This work will be paid for at the contract price per EACH of WATER SERVICE CONNECTION of the specified diameter. Trench backfill for these services shall be included in the cost of this item.

FIRE HYDRANT WITH AUXILIARY VALVE AND VALVE BOX

This work shall consist of the installation of new hydrants, auxiliary valves, valve boxes, tees and associated pipe and fittings at the locations indicated in the plans or as directed by the Engineer. Hydrants shall be as manufactured by East Jordan Iron Works, or equal as approved by the Harvey Public Works Director and Harvey Fire Chief. The cost for pipe, if any, needed for offsetting the hydrant from the water main shall be included in the cost of the hydrant construction. The cost for 130 mm (5") Harrington Storz hydrant connection shall be also included in the cost of the hydrant construction

All hydrants shall be painted as directed by the City of Harvey Water Department. All work shall be in accordance with the Standard Specifications of this contract. The cost for this work will be paid for at the contract unit price per EACH for FIRE HYDRANT WITH AUXILIARY VALVE AND VALVE BOX.

WATER MAIN REMOVAL

This work shall consist of the removal of all existing water main pipe as indicated on the plans.

After all water services have been reinstated, the contractor shall remove the existing water main by cutting water main and installing caps at the locations indicated on the plans to water main that is to remain in service, or as directed by the Engineer. The work on the water main to remain in service shall be done in accordance with the Standard Specifications for Water and Sewer Main Construction in Illinois. All operations of water valves shall be assisted by the public works department, performing appropriate valve closings as necessary. Cutting and capping for water main shall be considered included in the item of water main removal.

Excavation shall be done in accordance with the applicable portions of Article 550.04 of the Standard Specifications. Backfilling shall be according to Article 550.07 of the Standard Specifications.

This work will be measured for payment in meters along the existing centerline of the pipe being removed.

This work will be paid for at the contract unit price per meter for WATER MAIN REMOVAL of the diameter specified.

Trench Backfill will be paid according to Article 208.04 of the Standard Specifications.

TEMPORARY SIDEWALK

Description. This work shall consist of the construction and subsequent removal of a temporary sidewalk.

Materials. It shall be the Contractor's option to use either asphaltic or PCC materials. If asphaltic materials are chosen, materials shall meet the requirements of Article 406.02. If PCC materials are chosen, they shall meet the requirements of Article 424.02.

Equipment. The equipment used to perform this work shall meet the requirements of Articles 406.03, or 424.03 depending on the chosen material.

Placing and Finishing. The thickness of the sidewalk shall be 100mm (4”), and construction shall conform to Articles 406.06 or 424.06, depending on the chosen material.

Sidewalk Ramps. Sidewalk accessibility ramps to the disabled shall conform to Article 424.08.

Method of Measurement. Temporary sidewalk shall be measured for payment in place and the surface area computed in square meters.

Basis of Payment. This work will be paid for at the contract unit price per square meter for TEMPORARY SIDEWALK, which price shall include all required labor and materials to install and remove the sidewalk.

CONCRETE MEDIAN REMOVAL

Description. This work shall consist of the complete removal of existing concrete median pavement in accordance with Section 440 of the Standard Specifications and as herein specified.

General. All existing pavement, including surface courses, base courses, and stabilized subbases, and other appurtenances as listed above, which interfere with construction work shall be completely removed as shown on the plans or as directed by the Engineer.

Disposal of Material. Materials resulting from the removal of existing pavement and appurtenances as herein specified shall be disposed of according to Article 202.03.

Method of Measurement. This work will be measured for payment in place and the area computed in square meters.

Basis of Payment. This work will be paid for at the contract unit price per square meter for CONCRETE MEDIAN REMOVAL.

CATCH BASIN, MANHOLE, INLET, DRAINAGE STRUCTURE, AND VALVE VAULT CONSTRUCTION, ADJUSTMENT, AND RECONSTRUCTION

Catch Basins, Manholes, Inlets, and Drainage Structures shall be constructed of either Cast-In-Place Portland Cement Concrete in accordance with Article 602.04 of the Standard Specifications or of Precast Reinforced Concrete in accordance with Article 602.07 of the Standard Specifications and in accordance with the construction details. Brick Masonry and Concrete Masonry units will not be allowed.

All structures that will be tributary to a combined storm sewer system shall be constructed with a watertight boot, in conforming to ASTM C-923, between each pipe and the structure walls. This

shall include all drainage structures, existing and proposed, at locations as shown on the plans and as herein indicated: Structures 139 through 221; Structure 275; and Structures CW4 through CW14 as shown on plan drawings DU-1 through DU-44.

All costs of work and materials required to comply with the above requirements shall be included in the pay item bid prices, under which Catch Basins, Manholes, Inlets, and Drainage Structures are paid, and no additional compensation will be allowed.

DOMESTIC WATER SERVICE BOXES TO BE ADJUSTED

This work shall meet the requirements of Section 565 of the Standard Specifications. The Contractor shall coordinate this work with the appropriate municipality prior to construction. The following municipality owns and operates water mains within the project limits:

City of Harvey
15320 Broadway
Harvey, IL 60426
Attn: Mr. Richard Gini

TEMPORARY PAVEMENT

This item shall include all materials, labor, and equipment necessary to construct, maintain, remove, and dispose of temporary pavement necessary to safely maintain traffic lanes as shown in the plan or as approved by the Engineer.

The temporary pavement shall be constructed at a minimum of 200mm of Hot-Mix Asphalt Base Course meeting the requirements of Section 406, or 200mm of PCC Pavement meeting the requirements of Section 420 of the Standard Specifications and the details in the plans.

This work will be paid for at the contract unit price per square meter for TEMPORARY PAVEMENT which price shall be full payment for all materials, labor, and equipment necessary to construct, maintain, and remove the temporary pavement.

TEMPORARY STORM SEWER

This work shall consist of installing temporary storm sewer at locations shown on the plans or as directed by the Engineer and their removal after completion of the staging phase. This work shall be as specified in Section 542 and 550 of the Standard Specifications and as shown on the plans and shall include all incidental materials and labor necessary to construct this item as shown on the plans.

The Contractor shall have the option of utilizing new material or previously used material if acceptable to the Engineer.

This item will be paid for at the contract unit price per meter for TEMPORARY STORM SEWER of the size as specified on the plans which payment shall be full compensation for furnishing and installing the sewer, excavation, trench backfill, removal of the temporary sewer and all other appurtenances and collateral work necessary to complete this work as specified.

TEMPORARY DRAINAGE STRUCTURES

This work shall consist of installing temporary inlets at locations shown on the plans or as directed by the Engineer and their removal after completion of the staging phase. This work shall be as specified in Section 602 of the Standard Specifications and as shown on the plans and details and shall include the drainage structure, cast iron frame and lid, and all incidental materials and labor necessary to construct this item as shown on the plans.

The frames and lids shall be as designated on the plan. The Contractor shall have the option of utilizing new material or previously used material if acceptable to the Engineer.

This item will be paid for at the contract unit price each for TEMPORARY INLETS of the type and size as specified on the plans which payment shall be full compensation for furnishing and installing the inlet, frame and lid or grate, excavation, trench backfill, removal of the inlet and all other appurtenances and collateral work necessary to complete this work as specified.

DRILL AND GROUT #25 TIE BARS

This work shall consist of furnishing and installing epoxy coated deformed tie bars as detailed in the plans and specified herein at the locations shown on the plans.

Material. Tie bars shall be epoxy coated No. 25 deformed reinforcement in accordance with section 1006.10 of the Standard Specifications, and shall be 600mm in length. Grout shall be non-shrink grout in accordance with section 1024.01 or a chemical adhesive resin system in accordance with section 1027.01of the Standard Specifications.

Construction Procedures. This work shall be performed in accordance with Article 420.05(b) of the Standard Specifications and as herein specified. Tie bar holes shall be drilled perpendicular to the face of the pavement. The drilling operation shall not crack or spall the pavement. Tie bars shall be embedded into the existing pavement surface a minimum of 250mm. Immediately prior to grouting the tie bars, the holes shall be thoroughly cleaned of drilling debris. Dust and debris shall be blown from the joint with a power brush/blower or with compressed air. If compressed air is used, the pneumatic tool lubricator must be bypassed and a filter installed on the discharge valve to keep water and oil out of the lines.

Measurement and Payment. This work will not be measured or paid for separately but shall be included in the cost of the pavement items being constructed.

FENCE REMOVAL

This work shall consist of the removal and disposal of existing fence, gates, hardware, posts and foundations.

FENCE REMOVAL will be measured for payment in meters, measured from center to center of end fence posts. This work will be paid for at the contract unit price per meter for FENCE REMOVAL, which price shall include removing end posts, line posts, foundations, hardware, and gates, and for disposing of all material off site in accordance with the standard specifications.

REMOVAL OF EXISTING STRUCTURES NO. 1

Description. This work shall consist of the removal in three stages and disposal of the existing six track Metra and CN railroad structure SN 016-0384. This work will require working immediately adjacent to and in-between tracks carrying large numbers of freight and passenger rail traffic. It will also require having to cross active railroad tracks.

Construction Requirements. This work shall be performed in accordance with the requirements of Section 501 of the Standard Specifications. Removal work shall be performed in stages as shown on the plans to provide for maintenance of railroad traffic during the staged construction of replacement structure SN 016-2755.

All elements of the existing superstructure and substructures shall be completely removed except for portions of the existing south abutment shown in the plans that are to remain and be incorporated into the new construction. This work shall include removal and disposal of all existing materials on the deck except for ties, rails and other track material (OTM) above the ballast.

The Contractor shall prepare a detailed removal plan and submit it to the Engineer for review and approval before beginning any removal work. The plan shall include specific details pertaining to how the work will be performed adjacent to active rail tracks of the CN and Metra and how the integrity of adjacent portions of existing and/or newly construction structures over 159th Street carrying CN and Metra rail traffic will be assured. They shall be prepared and sealed by an Illinois Licensed Structural Engineer and their submittal shall be accompanied by complete design computations.

Method of Measurement. Removal and disposal of the existing six track Metra and CN railroad structure SN 016-0384 will be measured for payment as each

Basis of Payment. The removal of the existing structure will be paid for at the contract unit price per each for REMOVAL OF EXISTING STRUCTURES NO. 1 which price shall include the cost for all labor, materials, and equipment required to remove and dispose of the structure. The price bid for this pay item will be considered to include all costs associated with disruptions associated with having to work immediately adjacent to and having to cross active railroad tracks.

Removal and disposal of ties, rails and other track material (OTM) above the ballast on the structure will be paid for separately as RAILROAD TRACK, REMOVE.

REMOVAL OF EXISTING STRUCTURES NO. 2

Description. This work shall consist of the removal and disposal of the existing railroad and intermodal yard structure SN 016-0385 of the CN. This work will require working immediately adjacent to and in-between tracks carrying large numbers of freight and passenger rail traffic. It will also require having to cross active railroad tracks.

Construction Requirements. This work shall be performed in accordance with the requirements of Section 501 of the Standard Specifications. Removal work shall be performed in stages as shown on the plans to provide for maintenance of railroad and vehicle traffic of the CN during the staged construction of replacement structures SN 016-2819, SN 016-2820, SN 016-2821 and SN 016-2822.

All elements of the existing superstructure and substructures shall be completely removed except for portions of the existing south abutment as shown in the plans that are to remain and be incorporated into the new construction. This work shall include removal and disposal of all existing materials on the deck except for ties, rails and other track material (OTM) above the ballast.

This work also includes removal of low-level retaining walls situated immediately outboard of the existing north and south sidewalks located between existing structure SN 016-0385 and SN 016-2754.

The Contractor shall prepare a detailed removal plan and submit it to the Engineer for review and approval before beginning any removal work. The plan shall include specific details pertaining to how the work will be performed adjacent to active rail tracks and intermodal vehicle traffic lanes of the CN and how the integrity of adjacent portions of existing and/or newly construction structures over 159th Street carrying CN rail and vehicle traffic will be assured. They shall be prepared and sealed by an Illinois Licensed Structural Engineer and their submittal shall be accompanied by complete design computations.

Method of Measurement. Removal and disposal of the existing railroad and intermodal yard structure SN 016-0385 of the CN will be measured for payment as each.

Basis of Payment. The removal of the existing structure will be paid for at the contract unit price per each for REMOVAL OF EXISTING STRUCTURES NO. 2 which price shall include the cost for all labor, materials, and equipment required to remove and dispose of the structure. The price bid for this pay item will be considered to include all costs associated with disruptions associated with having to work immediately adjacent to and having to cross active railroad tracks.

Removal and disposal of ties, rails and other track material (OTM) above the ballast on the structure will be paid for separately as RAILROAD TRACK, REMOVE.

PIPE HANDRAIL, SPECIAL

Description. This work shall consist of furnishing and installing pipe handrail on the concrete curb, ballast retainers and walkways along the edge of the bridge decks and on the wingwalls as shown on the plans and as directed by the Engineer. This work applies to railroad structures SN 016-2755, SN 016-2819 and SN 016-2822, and to the retaining walls along Park Avenue.

General. This work shall conform to the requirements of Subsections 509.02, 509.03, 509.04 and 509.05 of the Standard Specifications except as modified herein.

The railings and posts shall be 2 inch-diameter "Extra Strong" pipe. The pipe shall be ASTM A53, Type S or E, Grade A or B, minimum yield point = 30ksi.

Railings and posts shall be galvanized. At all points except expansion joints, connections of railings to posts shall be by continuous welding without fittings. Post anchorage shall be fabricated and constructed as shown in the Plans.

Method of Measurement. This work will be measured for payment in place in feet. The length measured will be the overall length along the centerline of the top longitudinal railing member thru all posts and gaps.

Basis of Payment. This work will be paid for at the contract unit price per foot for PIPE HANDRAIL, SPECIAL which price shall include the cost for all materials, fabrication, transportation, labor, and equipment required to furnish and install the complete handrail system.

TEMPORARY BRIDGE RAIL

Description. This work shall consist of furnishing, installing and removing a temporary steel bridge rail system as shown in the Plans attached to existing Structure SN 016-0385 immediately adjacent to and along the west side of the Stage I construction of Structure SN 016-2820. This work shall include furnishing and installing ballast-retaining timber lagging between the metal posts of the temporary railing. Also included is removal and replacement of any bituminous surface and underlying ballast needed to install the rail posts and the associated timber lagging between them.

Materials. The steel post, steel tubing, bolts, rail splices and accessories for fastening rail to the post and fabric pad shall conform to the applicable requirements of Article 509 of the Standard Specifications. The anchor bolts for fastening the post to the bridge deck shall be ASTM A-108, 120 ksi high strength steel concrete epoxy anchors.

The timber lagging between the rail post shall be rough cut treated structural timber conforming to Section 1007.03 of the Standard Specifications.

Method of Measurement. This work will be measured by the foot of completed railing system.

Basis of Payment. This work will be paid for at the contract unit price per foot for TEMPORARY BRIDGE RAIL, which price shall include the costs of all materials, fabrication, transportation, erection, construction and later removal and disposal of the rail system.

TEMPORARY REMOVABLE WALKWAY SYSTEM FOR SN 016-2755 CONSTRUCTION

Description. This work shall consist of designing, furnishing, constructing and installing sections of single-span or multiple-span temporary removable walkway system immediately adjacent to and along active railroad tracks during the Stage I and Stage II construction of Structure SN 016-2755 and during the associated removal of portions of existing Structure SN 016-0384. The system shall provide personnel of Metra and the CN a safe walkway with fall protection immediately adjacent to and along the side of their in-service railroad tracks during the construction of the substructures and/or superstructure for SN 016-2755 and the removal of the substructures and/or superstructure for existing SN 016-0384. The approximate locations and footprints for the system are shown on the plans and include the following:

- During Stage I Construction along the west side of Temporary Metra Track #1 at the north abutment.
- During Stage II Construction along the west side of Temporary CN Track #1 at the north abutment.
- During Stage II Construction along the east side of Permanent Metra Track #2 from and including the north abutment to and including the south abutment.

The temporary walkway system shall extend for the full length of any fall hazard that may be created immediately adjacent to and along the railroad track through removal of the adjacent portion of existing Structure SN 016-0384 and/or the excavation, construction, and/or erection of the substructures and superstructure of Structure SN 016-2755 during Stage I and Stage II construction.

The walkway surface shall not be higher than the top of track ties. The walkway shall provide a minimum usable clear width of 2'-0". The walkway shall extend to the edge of the portion of existing structure SN 016-0384 supporting the in-service track and/or the edge of temporary sheeting for braced excavation beyond the existing structure's abutment such that no opening greater than 6 inches exists.

Refer to section 10 "Trainman's Walkways and Fall Protection" of the special provision "Protection of the Railway Interest" for requirements to provide additional fall protection outboard of the limits of the temporary removable walkway system where needed to protect all areas of open excavation and construction that may create a fall hazard. Furnishing of that additional fall protection is not part of the work under the pay item covered by this special provision.

Materials and Construction. The system shall conform to the requirements of AREMA Section 8.5 "Walkways and Handrails on Bridges". The work shall include furnishing and constructing all elements necessary to securely support the temporary walkway system.

This work shall include providing a handrail system along the outboard side of each section of the walkway (along the west side of the walkway section along Temporary Metra Track #1 during Stage I Construction, along the west side of Temporary CN Track #1 during Stage II Construction, and along the east side of Permanent Metra Track #2 during Stage II Construction). The top handrail shall not be less than 3'-6" above the surface of the walkway. An intermediate rail shall be provided having clear spaces of not more than 1'-9" between it and the top rail and between it and the top of the walkway surface. The inside face of the handrail

shall not infringe on the clearance requirements of AREMA Figure 15-1-1 "Minimum Railway Bridge Clearances" with respect to Temporary Metra Track 1, Permanent Metra Track 2, and Temporary CN Track 1. The walkway shall have a toe board.

The walkway system including the extent, arrangement and type of support system shall be subject to approval of Metra and the CN. The Contractor shall submit detailed plans sealed by an Illinois Licensed Structural Engineer of the proposed walkway system including the details for its support system for review and approval of Metra and the CN.

Usage. The walkway system shall be constructed so that it can be removed for short durations of up to a single work-day and then re-installed. The walkway system shall only be removed each time when coordinated with and approved in advance each time by Metra and the Engineer. The walkway system shall only be removed when necessary to enable construction of elements of Structure SN 016-2755 immediately adjacent to or beneath the system and/or removal of portions of SN 16-0384 required to construct the new structure. The walkway shall be kept in place when the Contractor is not actively performing structure construction or removal work for which its temporary removal is necessary. The sections of the walkway shall be immediately placed back into position and re-secured to its support system when elements of structure construction or removal work requiring its temporary removal have been completed. In no case shall sections of the walkway system be left removed overnight or at any other time when the Contractor is not actively on-site performing work requiring the platform's temporary removal. The walkway system shall be kept in place until there are no remaining open spaces through which a railroad worker of Metra could fall.

Method of Measurement. This work will be measured as a lump sum unit for providing and maintaining the sections of complete walkway system.

Basis of Payment. This work will be paid for at the contract lump sum price for TEMPORARY REMOVABLE WALKWAY SYSTEM FOR SN 016-2755 CONSTRUCTION, which price shall include all costs for designing the system, furnishing all required materials, fabrication, transportation, construction and erection, maintenance, final removal and disposal after its use is no longer required, and all associated incidentals for a fully functional walkway. This price shall also include the cost for making temporary removals and reinstallations as necessary during the Stage I and Stage II construction of Structure SN 016-2755 and associated removal of portions of existing structure SN -16-0384. This price shall also include all costs for preparing and submitting for approval by Metra and the CN detailed plans and other information that may be required by the Railroads to review and approve its use.

TEMPORARY REMOVABLE WALKWAY SYSTEM FOR SN 016-2819 CONSTRUCTION

Description. This work shall consist of designing, furnishing, constructing and installing a single-span or multiple-span temporary removable walkway system immediately adjacent to and along the west side of the temporary diversion of the CN Gateway Lead Track. The system shall provide personnel of the CN a safe walkway with fall protection immediately adjacent to and along the west side of the in-service railroad track during the construction of Structure SN 016-2819. The approximate location and extent for the system is shown on the plans.

The temporary walkway system shall extend for the full length of any fall hazard that may be created immediately adjacent to and along the railroad track through removal of the adjacent portion of existing Structure SN 016-0385 and/or the excavation, construction, and/or erection of the substructures and superstructure of Structure SN 016-2819. The walkway surface shall not be higher than the top of track ties. The walkway shall provide a minimum usable clear width of 2'-0". The walkway shall extend to the edge of the portion of existing structure SN 016-0385 supporting the in-service track and/or the edge of temporary sheeting for braced excavation beyond the existing structure's abutment such that no opening greater than 6 inches exists.

Refer to section 10 "Trainman's Walkways and Fall Protection" of the special provision "Protection of the Railway Interest" for requirements to provide additional fall protection outboard of the limits of the temporary removable walkway system where needed to protect all areas of open excavation and construction that may create a fall hazard. Furnishing of that additional fall protection is not part of the work under the pay item covered by this special provision.

Materials and Construction. The system shall conform to the requirements of AREMA Section 8.5 "Walkways and Handrails on Bridges". The work shall include furnishing and constructing all elements necessary to securely support the temporary walkway system.

This work shall include providing a handrail system along the outboard (west) side of the walkway. The top handrail shall not be less than 3'-6" above the surface of the walkway. An intermediate rail shall be provided having clear spaces of not more than 1'-9" between it and the top rail and between it and the top of the walkway surface. The inside face of the handrail shall not infringe on the clearance requirements of AREMA Figure 15-1-1 "Minimum Railway Bridge Clearances" with respect to the of the temporary diversion of the CN Gateway Lead Track. The walkway shall have a toe board.

The walkway system including the extent, arrangement and type of support system shall be subject to approval of the CN. The Contractor shall submit detailed plans sealed by an Illinois Licensed Structural Engineer of the proposed walkway system including the details for its support system for review and approval of the CN.

Usage. The walkway system shall be constructed so that it can be removed for short durations of up to a single work-day and then re-installed. The walkway system shall only be removed each time when coordinated with and approved in advance each time by the CN and the Engineer. The walkway system shall only be removed when necessary to enable construction of elements of Structure SN 016-2819 immediately adjacent to or beneath the system and/or removal of portions of SN 16-0385 required to construct the new structure. The walkway shall be kept in place when the Contractor is not actively performing structure construction or removal work for which its temporary removal is necessary. The walkway shall be immediately placed back into position and re-secured to its support system when elements of structure construction or removal work requiring its temporary removal have been completed. In no case shall the walkway be left removed overnight or at any other time when the Contractor is not actively on-site performing work requiring the platform's temporary removal. The walkway system shall be kept in place until there are no remaining open spaces through which a railroad worker of the CN could fall.

Method of Measurement. This work will be measured as a lump sum unit for providing and maintaining the complete walkway system.

Basis of Payment. This work will be paid for at the contract lump sum price for TEMPORARY REMOVABLE WALKWAY SYSTEM FOR SN 016-2819 CONSTRUCTION, which price shall include all costs for designing the system, furnishing all required materials, fabrication, transportation, construction and erection, maintenance, final removal and disposal after its use is no longer required, and all associated incidentals for a fully functional walkway. This price shall also include the cost for making temporary removals and reinstallations as necessary during construction of Structure SN 016-2819 and removal of existing structure SN -16-0385. This price shall also include all costs for preparing and submitting for approval by the CN detailed plans and other information that may be required by the Railroad to review and approve its use.

TEMPORARY REMOVABLE WALKWAY SYSTEM FOR SN 016-2822 CONSTRUCTION

Description. This work shall consist of designing, furnishing, constructing and installing a single-span or multiple-span temporary removable walkway system immediately adjacent to immediately adjacent to and along the east side of the temporary diversion of the CN Thoroughfare Main Track. The system shall provide personnel of the CN a safe walkway with fall protection along the east side of the in-service railroad track during the construction of Structure SN 016-2822. The approximate location and extent for the system are shown on the plans.

The temporary walkway system shall extend for the full length of any fall hazard that may be created immediately adjacent to and along the railroad track through removal of the adjacent portion of existing Structure SN 016-0385 and/or the excavation, construction, and/or erection of the substructures and superstructure of Structure SN 016-2822. The walkway surface shall not be higher than the top of track ties. The walkway shall provide a minimum usable clear width of 2'-0". The walkway shall extend to the edge of the portion of existing structure SN 016-0385 supporting the in-service track, the edge of the ties on the temporary jump span, and/or the edge of temporary sheeting for braced excavation beyond the existing structure's abutments such that no opening greater than 6 inches exists.

Refer to section 10 "Trainman's Walkways and Fall Protection" of the special provision "Protection of the Railway Interest" for requirements to provide additional fall protection outboard of the limits of the temporary removable walkway system where needed to protect all areas of open excavation and construction that may create a fall hazard. Furnishing of that additional fall protection is not part of the work under the pay item covered by this special provision.

Materials and Construction. The system shall conform to the requirements of AREMA Section 8.5 "Walkways and Handrails on Bridges". The work shall include furnishing and constructing all elements necessary to securely support the temporary walkway system.

This work shall include providing a handrail system along the outboard (east) side of the walkway. The top handrail shall not be less than 3'-6" above the surface of the walkway. An intermediate rail shall be provided having clear spaces of not more than 1'-9" between it and the top rail and between it and the top of the walkway surface. The inside face of the handrail shall not infringe on the clearance requirements of AREMA Figure 15-1-1 "Minimum Railway Bridge Clearances" with respect to the of the temporary diversion of the CN Thoroughfare Track. The walkway shall have a toe board.

The walkway system including the extent, arrangement and type of support system shall be subject to approval of the CN. The Contractor shall submit detailed plans sealed by an Illinois Licensed Structural Engineer of the proposed walkway system including the details for its support system for review and approval of the CN.

Usage. The walkway system shall be constructed so that it can be removed for short durations of up to a single work-day and then re-installed. The walkway system shall only be removed each time when coordinated with and approved in advance each time by the CN and the Engineer. The walkway system shall only be removed when necessary to enable construction of elements of Structure SN 016-2822 immediately adjacent to or beneath the system and/or removal of portions of SN 16-0385 required to construct the new structure. The walkway shall be kept in place when the Contractor is not actively performing structure construction or removal work for which its temporary removal is necessary. The walkway shall be immediately placed back into position and re-secured to its support system when elements of structure construction or removal work requiring its temporary removal have been completed. In no case shall the walkway be left removed overnight or at any other time when the Contractor is not actively on-site performing work requiring the platform's temporary removal. The walkway system shall be kept in place until there are no remaining open spaces through which a railroad worker of the CN could fall.

Method of Measurement. This work will be measured as a lump sum unit for providing and maintaining the complete walkway systems.

Basis of Payment. This work will be paid for at the contract lump sum price for TEMPORARY REMOVABLE WALKWAY SYSTEM FOR SN 016-2822 CONSTRUCTION, which price shall include all costs for designing the system, furnishing all required materials, fabrication, transportation, construction and erection, maintenance, final removal and disposal after its use is no longer required, and all associated incidentals for a fully functional walkway. This price shall also include the cost for making temporary removals and reinstallations as necessary during construction of Structure SN 016-2822 and removal of existing structure SN -16-0385. This price shall also include all costs for preparing and submitting for approval by the CN detailed plans and other information that may be required by the Railroad to review and approve its use.

MEMBRANE WATERPROOFING (SPECIAL)

Description. This work shall consist of furnishing and installing a butyl rubber waterproofing membrane system with protective asphalt planks as shown on the plans and as directed by the Engineer. This work applies to railroad Structures SN 016-2755, SN 016-2819 and SN 016-2822.

This work also includes placement of the first four inches of Metra-furnished ballast for the Metra two-track portion of Structure SN 016-2755.

Materials. The membrane waterproofing requirements shall conform to Article 580 of the Standard Specifications, using asphalt planks as membrane protection.

Asphalt plank shall meet the requirements of ASTM designation D517. Asphalt plank used for protection of waterproofing membranes shall be plain and consist of 1" thicknesses. Edges of asphalt planks to be applied in a single layer shall be supplied with shiplapped joints.

Galvanized steel waterproofing retainer plates 1/4–inch thick by 6-inch wide shall be furnished and installed as shown in the plans along concrete ballast retaining curbs at the termination of the vertical portion of the membrane waterproofing. The retainer plates shall overlap the end of the waterproofing system by two inches. Stainless steel anchor bolts 3/8–inch in diameter and 3-inches long shall be furnished and installed as shown in the plans for attaching the retainer plates to the ballast retaining curbs.

Construction. Backfilling behind the abutments shall be coordinated with placement of the membrane waterproofing system to the required depth of two feet below beam seat elevation.

Method of Measurement. Method of measurement shall conform to Article 580 of the Standard Specifications. The galvanized steel waterproofing retainer plates will not be measured separately for payment but will be considered included in the square foot price for the overall waterproofing system.

Placement by the Contractor of the first four inches of Metra-furnished ballast on the membrane waterproofing system on the Metra two-track portion of Structure SN 016-2755 will not be measured separately for payment but will be considered included in the square foot price for the overall waterproofing system. Furnishing and placing of all ballast on the membrane waterproofing system for CN Structures SN 016-2819, SN 016-2822, and the CN two-track portion of SN 016-2755 will be measured separately by the ton and paid for separately by the ton as BALLAST.

Basis of Payment. This work will be paid for at the contract unit price per square foot for MEMBRANE WATERPROOFING (SPECIAL).

TEMPORARY JUMP SPAN

Description. This work shall consist of furnishing, constructing, and removing a temporary jump span for maintaining rail traffic on the CN Thoroughfare Main Track during the removal of Structure SN 016-0385 and construction of replacement Structure SN 016-2822 as shown on the plans and specified herein. This work includes all work required to be performed on portions of existing Structure SN 016-0385 to enable any portion of it to be used as part of the support for the jump span system.

Materials. Steel for beams, diaphragms, lateral bracing, cap beams, grillage beam, plates, piles, and all associated connection hardware shall conform to Sections 505 and 512 of the Standard Specifications and shall be AASHTO M270, Grade 50.

Timber for lagging and posts shall conform to the requirements of Section 1007 of the Standard Specifications.

Construction Requirements. The temporary jump span shall be constructed in accordance with the requirements of AREMA Section 8-28-1. All elements of the structural system for the temporary jump span shall be designed to carry E-80 rail loading with impact for steam locomotives with hammer blow plus rocking effect. All construction details for the temporary jump span system shall conform to applicable requirements of the CN. The CN will serve as the final authority concerning what is acceptable for materials use in and construction of the temporary jump span.

Timber construction shall comply with the applicable requirements of Section 507 of the Standard Specifications.

The Contractor shall maintain the temporary jump span in sound condition until rail traffic on the CN Thoroughfare Main Track is shifted to permanent Structure SN 016-2822. All labor and materials required for such maintenance, including the repair of any wear or damage caused by rail traffic, shall be furnished by the Contractor without additional compensation.

After rail traffic on the Thoroughfare Main Track is shifted to newly constructed Structure SN 016-2822 and the need for the temporary jump span structure no longer exists, it shall be removed by the Contractor. Upon removal, it shall become the property of the Contractor and shall be disposed of in accordance with Article 501.02 of the Standard Specifications.

The Contractor shall prepare and submit shop drawings for the jump span structure for review and approval by the CN. Design capacities of all piles for the jump span shall be shown on the shop drawings.

Basis of Payment. This work will be paid for at the contract lump sum price for TEMPORARY JUMP SPAN which price shall include preparing all shop drawings; furnishing all materials, labor, and equipment, and incidentals to construct it; maintaining it during use by the Railroad; and later removing the structure.

PARAPET RAILING

Description. This work shall consist of furnishing and installing an 8-inch tall single rail steel railing system as shown on the plans on the parapet along the east edge of Structure SN 016-2820, on the parapet along the west edge of Structure SN 016-2821, and on the retaining walls between the abutments of Structures SN 016-2820 and SN-2821.

Materials. The steel railing shall conform to the applicable portions of Article 509.03 of the Standard Specifications. The railing system shall be painted as provided on the plans.

Method of Measurement. This work will be measured in accordance with Article 509.09 of the Standard Specifications.

Basis of Payment. This work will be paid for at the contract unit price per foot for PARAPET RAILING, which price shall include all materials, fabrication, transportation, erection, cleaning, and painting.

BRACED EXCAVATION

Description. This work shall consist of designing, furnishing, installing and removing steel sheeting, bracing members, and related components to support the excavation for construction of abutments, wingwalls, retaining walls and catenary structures adjacent to active railroad tracks. The bracing systems shall be designed to prevent vertical and horizontal movement of the adjacent embankment supporting active rail tracks. Steel sheet piling for braced excavation shall be furnished and installed in accordance with the applicable requirements of Section 512 of the Standard Specifications, AREMA, and requirement of the Railroad.

This work shall include the designing, furnishing, and installation of all closure systems necessary to assure stability and retention of embankment material between the steel sheeting of the braced excavation system and adjacent existing or new substructures. Closure systems shall be positively secured with anchorage systems to existing concrete in a manner that is acceptable to the railroads.

Where braced excavation is shown on the plans, cantilevered sheet piling will not be permitted.

Construction:

All braced excavation systems shall be designed by the Contractor in accordance with the requirements of the Railroads and shall be subject to their approval. The Contractor shall coordinate with the Railroads to obtain all specific requirements by each of them for all necessary details and detailing of the proposed bracing systems and shall coordinate with the Railroads to obtain approval by them of the design.

The work shall be performed in accordance with the applicable requirements of Section 502 of the Standard Specifications. This work shall include all excavation necessary at locations designated on the plans as braced excavation to enable construction of foundation systems to the elevations and limits shown on the plans.

Interlocking steel sheet piling, driven prior to excavation, shall be provided to maintain track stability. The use of trench boxes or similar devices will not be considered an acceptable support system for braced excavation. The method of earth-anchored tieback sheeting will not be allowed. Bracing members shall be installed as soon as an excavation depth is reached to permit their installation.

The sheeting shall be designed to support all lateral forces caused by the earth, railroad and other surcharge loads. The railroad surcharge pressure shall be based on E-80 loading. The lateral forces acting on the sheeting shall be computed as follows:

a. The active earth pressure due to the weight of the soil shall be computed by the Rankine theory.

b. The Boussinesq analysis shall be used to determine the lateral pressure caused by railroad loading. The load on the track shall be taken as a strip load with a width equal to the length of the ties (8'-6"). The vertical surcharge, q (psf), caused by each axle, shall be uniform and equal to the axle weight divided by the tie length and the axle spacing (5'-0"). For an E-80 loading, this results in:

q = 80,000 / (8.5 X 5) = 1882 psf.,

The horizontal pressure due to the live load surcharge at any point on the sheet-piling wall, Ph, can be calculated by the following formula in accordance with AREMA Chapter 8, Part 20: $Ph = (2q/\pi)(\beta+\sin\beta \sin^2\alpha-\sin\beta \cos^2\alpha)$ (β in radians)

The allowable stresses for sheet piling and other associated members (wales, struts, etc.) shall conform to AREMA Chapter 15, Part 1, and Chapter 8, Parts 20 and 28. These allowable stresses may be increased ten percent (10%) due to the temporary nature of the installation.

Exclusive track occupancy will be required while installing sheeting braced excavation systems within 25 feet of the centerline of a live track or when there is a potential to obstruct an active track by a crane or other piece of construction equipment. Exclusive track occupancy is a method of establishing working limits on a controlled track in which movement authority of trains and other equipment is withheld by the train dispatcher. The likelihood of work disruptions during installation of the braced excavation systems due to rail traffic will be high.

Cavities in existing railroad-supporting embankments created by the driving of sheet piling, shall be immediately filled with porous granular embankment.

The Railroad shall be immediately informed of any ballast disturbed by installation of braced excavation systems. No additional work shall be performed until the Railroad has restored and tamped the disturbed ballast.

Sheet piling installed within ten feet of the centerline of in-service tracks shall be immediately cut off after installation at an elevation no higher than top of tie elevation. After construction and backfilling has been completed, all elements of braced excavation systems shall be removed unless otherwise directed or approved by the Railroad.

All braced excavation systems shall be constructed in conformance with Section 10 – “Trainman's Walkways and Fall Protection” of the special provision “Protection of the Railway Interest.

The Contractor shall advise the Railroad of the schedule of each operation and obtain approval of the Railroad for all work to be performed adjacent to railroad tracks so that railroad personnel may properly supervise it.

The Contractor shall design the proposed braced excavation systems and prepare and submit detailed plans of them for review and approval by the Railroad and the Engineer. They shall be prepared and sealed by an Illinois Licensed Structural Engineer and their submittal shall be accompanied by complete design computations. The Contractor shall not proceed with construction of the braced excavation systems until receiving approval of the Engineer and Railroad. However, such approvals will not relieve the Contractor of being fully responsible for the safety, stability and adequacy of the bracing system. The Contractor shall be solely responsible and liable for all damages resulting from construction of the braced excavation systems and for any failure or inadequacy of them during construction of other components of the project requiring it.

In the event the bracing system protecting the existing embankment fails or is otherwise inadequate, in the judgment of the Railroad or the Engineer, the Contractor shall, at his own expense immediately take all necessary steps to restore the embankments to a safe operating condition to the satisfaction of the Railroad and Engineer.

A minimum of five sets of copies of braced excavation plans and design computations shall be submitted for review and approval. The Contractor shall base his schedule on a minimum of a thirty-day review period by the Railroad from the day it is received.

A field representative of the Railroad must be present at the site during the entire installation period for brace excavation systems. The Contractor shall provide the railroad representative and the Engineer a minimum of seventy-two hours advance notice for installation of braced excavation systems.

Method of Measurement This work will be measured by the cubic yard of material excavated in accordance with the applicable requirements of Section 502.12 of the Standard Specifications. The lateral limits for measurement shall be based on the dimensions shown on the plans. The limits for measurement shall not extend more than two feet beyond the edge of footings.

Basis of Payment This work will be paid for at the contract unit price per cubic yard for BRACED EXCAVATION. Payment shall be according to the applicable requirements of Section 502.13 of the Standard Specifications. Payment for this excavation will be limited to those locations shown on the plans and additional or separate payment will not be made for structure excavation in those areas. This work will include the cost of designing, furnishing and installing all elements of the system for the excavation support system including all closures between it and existing or new substructures and sheeting systems. All costs related to work disruptions during installation of the braced excavation systems due to rail traffic will be considered to be included in the unit price bid for this work.

TEMPORARY BALLAST RETAINER SYSTEM

Description: This work shall consist of furnishing and installing temporary ballast retainer systems to prevent loss of ballast from existing Structures SN 016-0384 and SN 016-0385 during the adjacent construction of new structures SN 016-2755, SN 016-2819, SN 016-2820 and SN 016-2821. This work shall also include furnishing and installing temporary ballast retainer systems on newly stage-constructed portions of Structure SN 016-2755. This work shall also include furnishing, installing, and attaching safety railing systems to the timber ballast retainers where shown on the plans and as directed by the Engineer. The temporary ballast retainer systems shall be provided at the locations and extent shown on the plans and as directed by the Engineer.

This work shall also include furnishing and installing temporary timber deck planking adjacent to portions of the temporary ballast retainer systems as shown on the plans for the staged construction of SN 016-2755 and the associated staged removal of SN 016-0384 where shown on the plans.

Not included with this work item is the furnishing and installation of temporary removable walkway systems where shown in the plans.

This work shall include removal of the temporary ballast retainer systems after they are no longer required.

Multiple uses of the components of a temporary ballast retainer system will be permitted, subject to approval of the Engineer.

Timber Components: Timber components shall include ballast retainers, deck planking, platform support beams and timber curbs. Timber components shall be treated and shall be rough cut or surfaced timber. Timber components shall conform to Section 1007.03 of the Standard Specifications. The Contractor shall furnish and install timber deck planking at the locations shown in the plans for SN 016-2755.

Ballast Retainer Anchor Bolts: Anchor bolts and nuts shall conform to ASTM A307 Grade C. The 3/4" diameter anchors shall have a minimum epoxy grouted embedment depth as shown in the Plans. The Contractor shall be responsible for removing the anchors from the new deck without damaging the deck and grouting the holes to match the top surface of the deck. The Contractor shall use extreme precautions while installing and removing anchors from the new concrete deck. Any part of the damaged deck shall be repaired by the Contractor at his own cost, and no additional compensation will be made for this work.

Safety Railing: The safety railing system shall conform to the details shown in the plans. Structural shapes shall conform to the requirements of AASHTO M 270, Grade 36. The galvanized messenger cable shall conform to the requirements of ASTM A 785 for Aluminum-Zinc Alloy-Coated Wire Strand, Common Grade. Bolts, nuts and washers shall conform to ASTM A307. Wire rope clips shall be heavy duty.

Timber Planking: The timber planking shall be constructed of 2x8 timber supported on ballast retaining timbers and timber beams spanning across open areas of removed existing bridge deck as shown in the plans for SN 016-2755. The timber planking shall be securely attached to supporting timber beams and timber ballast retainers and shall be subject to approval of the Engineer, Metra, and the CN.

Construction Requirements: The timber ballast retainers shall be continuous along the existing or proposed concrete deck or abutment elements for the extent shown on the plans. They shall be securely attached as indicated on the plans to prevent any ballast from rolling or falling off of the deck or from behind the abutments. The safety rail posts shall be attached to the timber ballast retainers and the galvanized messenger cables attached to each post, all as indicated on the plans.

The work shall include grading and reshaping the ballast to allow installation of the ballast retainers and to prevent ballast from falling over the top of the ballast retainers after installation. The installation of the timber ballast retainers shall be coordinated with the partial demolition of the existing concrete deck and with the construction of the new deck as shown on the plans.

For temporary ballast retainers that are two or more tiers in height, joints between adjacent lengths of individual timbers shall not occur (within one foot) above a joint between adjacent lengths of individual timbers in the lower level.

Shop and Working Drawings: For each location shown on the plans, the Contractor shall submit working drawings for approval of the specific designs for the timber ballast retainer systems and associated timber planking and safety railings including connections. The Contractor shall submit shop drawings for approval of the epoxy grouted anchor bolts.

Method of Measurement: The temporary ballast retainer system will be measured in feet along the centerline of the ballast retainer systems as shown on the plans. Separate measurement will not be made for the safety railing or timber planking components that are to be provided with the ballast retainer systems as shown in the plans.

Basis of Payment: This work will be paid for at the contract unit price per foot for TEMPORARY BALLAST RETAINER SYSTEM. The cost of the safety railing systems and timber planking systems will be considered to be included in the contract unit price per foot of this work.

Payment will be made for each of the different locations shown on the plans regardless of whether the system is constructed of all-new components for each location or of reused components from previous installations. The furnishing and installation of temporary removable walkway systems where shown in the plans will be paid separately from this item of work.

BRIDGE DECK TIE SUPPORT SYSTEM

Description. This work shall consist of furnishing, construction and removal of bridge deck tie support system as shown on the plans for structure SN 016-2822.

Materials. Timber: Timber for the tie support system shall conform to the requirements of Section 507 of the Standard Specifications. Connection hardware shall conform to Sections 505 and 512 of the Standard Specifications and shall be AASHTO M270, Grade 36.

Construction Requirements. The construction of the bridge deck tie support system shall conform to the requirements of AREMA Section 30.

Timber construction shall comply with the applicable requirements of Section 507 of the Standard Specifications.

The Contractor shall maintain the bridge deck tie support system in good condition during its period of service or until the completion of the work covered by the contract. All labor and material required for such maintenance, including the repair of any damage caused by the traffic, shall be furnished by the Contractor without additional compensation.

After the new construction has been opened for traffic and the need for the bridge deck tie support system no longer exists, it shall be removed by the Contractor. Upon removal, it shall become the property of the Contractor and shall be disposed of by the Contractor as provided in Article 501.02 of the Standard Specifications.

Detailed shop drawings and assembly drawings shall be furnished for review by the Engineer and the CN prior to fabrication.

Basis of Payment. This work will be paid for at the contract lump sum price for BRIDGE DECK TIE SUPPORT SYSTEM upon completion of construction, which price shall include removal, placement, materials, hardware, and all labor and incidentals necessary to complete the work.

CHAIN LINK FENCE, 8' (SPECIAL)

This work shall consist of constructing chain link fence with top and bottom rails and barbed wire at the locations shown on the plans in the vicinity of the CN Gateway Intermodal facility along 159th Street. This work shall be performed in accordance with Section 664 of the Standard Provisions and as herein specified.

Materials. POST TOPS shall consist of combination tops with barbed wire supporting arms. The top shall be provided with a hole suitable for the through passage of the top rail. The post tops shall fit over the outside of posts and shall exclude moisture from posts.

TOP AND BOTTOM RAILS shall be in lengths not less than 5.5-m (18 feet), and shall be fitted with couplings or swedged for connecting the lengths into a continuous run. The couplings shall be not less than 150-mm (6 inches) long, with 1.75-mm (0.070 inches) minimum wall thickness, and shall allow for expansion and contraction of the rails. Open seam outside sleeves shall be permitted only with a minimum wall thickness of 2.50-mm (0.100 inches). Suitable ties or clips shall be provided in sufficient number for attaching the fabric securely to the both rails at intervals not exceeding 600-mm (24 inches). Means shall be provided for attaching both rails to each gate, corner, pull and end post.

BARBED WIRE SUPPORTING ARMS shall be at an angle of approximately 45°, and shall be fitted with clips or other means for attaching three strands of barbed wire. The top wire shall be approximately twelve inches horizontally from the fence line and the other wires spaced uniformly between the top of the fence fabric and the outside strand. Barbed wire arm shall be of sufficient strength to withstand a weight of 113.3 kg (250 pounds) applied at the outer strand of barbed wire.

Construction. Barbed wire and chain link fabric shall be stretched and fastened to each metal post and rail by means of suitable fasteners. The barbed wire and mesh fabric shall be attached to the roadway side of the posts and rails and the spacing of posts shall not exceed 3-meters (10–feet).

Corner posts of the chain link fence at the bridge rail shall be spaced allowing a gap no greater than 100-mm (4-inches) between the bridge hand rail and the fence corner post.

Method of Measurement. This work will be measured in accordance with Section 664 of the Standard Specifications.

Basis of Payment. This work will be paid for at the contract unit price per foot for CHAIN LINK FENCE, 8' (SPECIAL), which price shall include payment for all excavation and backfilling, all materials and installation of the complete fence including all fabric, posts, rails, barbed wire, fittings and accessories as necessary to complete the fence.

CHAIN LINK FENCE REMOVAL

This item of work shall consist of the removal and disposal of existing fence, barbed wire, razor wire, gates, hardware, posts and foundations.

This work will be measured for payment in feet, measured from center to center of end fence posts. This work will be paid for at the contract unit price per foot for CHAIN LINK FENCE REMOVAL, which price shall include removing end posts, line posts, fence fabric, barbed wire, razor wire, foundations, hardware, and gates, and for disposing of all material off site in accordance with the standard specifications.

GRADING AND SHAPING SPECIAL

Description. This work shall consist of excavating and filling of material in the intermodal yard adjacent to the areas of structure removal and construction as required to maintain temporary and permanent continuous CN railroad, intermodal truck, and other railroad vehicle traffic during the project. Lane configurations for CN intermodal truck and other vehicle traffic shall be maintained as shown on the plans. This work includes preparation of the subgrade of areas to be re-paved with HMA, and for final grading of the non-paved ground surfaces of the intermodal yard. This work also includes all excavation, fill, and preparation of the subgrade for the temporary aggregate access road.

This work shall include all earthwork, including excavation and embankment for areas of the intermodal facility required to facilitate the staged removal of the existing structure SN 016-0385 and construction of replacement structures SN 016-2819, SN 016-2820, SN 016-2821, and SN 016-2822, and all earthwork required to meet existing grades and provide for surface drainage surrounding these structures during and after their construction. This work includes all earthwork to grade the areas behind and between the wingwalls of SN 016-2754 and SN 016-2819 as shown on the plans.

Construction Requirements: All excavation associated with this work shall be performed in accordance with applicable portions of Section 202. All embankment associated with this work shall be performed in accordance with applicable portions of Section 205. Where grading and shaping is required for preparation of the subgrade for new HMA pavement or bridge approach pavements, this work shall be performed in accordance with applicable portions of Section 301. Final shaping, trimming, and finishing associated with this work shall be performed in accordance with applicable portions of Section 212.

The Contractor shall coordinate closely with the CN concerning the acceptability and schedule for any proposed short duration interruptions that may be necessary to complete all grading and shaping work.

Method of Measurement This work will be measured in square yards of work performed.

Basis of Payment This work will be paid for at the contract unit price per square yard for GRADING AND SHAPING SPECIAL. Payment for this work will be limited to those locations shown on the plans.

INTERMODAL YARD UTILITY RELOCATION

Description: This work shall consist of furnishing and placing temporary and permanent 2" and 4" diameter galvanized steel conduit as shown in the plans for use by the CN in temporarily and permanently relocating the following intermodal yard utilities and maintaining them in service during construction:

1. Guard House Utilities - Temporary and permanent 110V electric, communication and CCTV lines from the electrical manhole near the terminal building to the relocated guard house south of the bridges, and from the guard house to the electrical manhole adjacent to the relocated guard house.
2. 4160V Electric - Temporary and permanent 4160V electric from the east side of the terminal building to the electric switchgear south of the bridges.

Materials. All conduit shall conform to Section 810 of the Standard Specifications.

Construction Requirements:

General. All utility relocation work shall be coordinated with the CN. The Contractor shall furnish and install all conduit. The CN will furnish and install all cable and hardware required for installation of the utilities into the conduit. The contractor shall be responsible for all coring into existing manholes or junction boxes required for placement of new conduit in these structures and to provide staff of the Railroad uninhibited and clear access to the ends of the conduit for installation of its signal cable into it. This work includes any pavement removal or replacement, trenching, and any other work necessary to install the conduit required for these utility relocation.

The Contractor shall coordinate and cooperate with the CN concerning any work associated with the electrical and communication systems for which its labor agreements mandate be performed by Railroad forces. No extra payment will be made for this coordinating, scheduling and cooperation of work.

All conduit to be placed under tracks that will operate over them shall be galvanized steel and be placed to a depth to provide a minimum of 5 feet of clearance between the top of the conduit and the base of the rail.

Placement of Temporary Guard House Utilities: These conduits shall be routed across the existing bridge to the east of Stage 1 removal for construction of SN 016-2820. Remove ballast as required and lay conduit on top of deck. The Contractor shall not attach or affix conduit directly to the bridge deck. The Contractor shall exercise caution when placing ballast over the conduit to assure it is not damaged.

Placement of Permanent Guard House Utilities: These conduits shall be routed and attached to the east parapet of SN 016-2820. All hardware required to provide continuous conduit up to and attached to the bridge, including attachment hardware on the bridge and expansion fittings at both ends of the bridge, is included in this pay item.

Placement of Temporary 4160V Electric: These lines conduits shall be routed across the existing bridge to the west of the temporary run-around CN Thoroughfare Track. Conduit passing under railroad tracks shall be galvanized steel and shall be located a minimum of five

feet below the bottom of tie elevation. The Contractor shall remove ballast as required and lay conduit on top of deck. The Contractor shall not attach or affix conduit directly to the bridge deck. The Contractor shall exercise caution when placing ballast over the conduit to assure it is not damaged.

Placement of Permanent 4160V Electric: These conduits shall be routed to the west edge of SN 016-2822 and buried in the ballast. Permanent conduit shall be placed on the deck of SN 016-2822 after installation of the deck waterproofing membrane system and before placement of ballast for construction of the adjacent railroad track. The Contractor shall not attach or affix conduit directly to the bridge deck. The Contractor shall exercise caution when placing ballast over the conduit to assure it is not damaged.

Basis of Payment: This work shall be paid for at the contract unit price per foot for the following:

1. CONDUIT IN TRENCH, 2" DIA., GALVANIZED STEEL
2. CONDUIT IN TRENCH, 4" DIA., GALVANIZED STEEL
3. CONDUIT ATTACHED TO STRUCTURE, 2" DIA., GALVANIZED STEEL

GUARD HOUSE REMOVAL AND REPLACEMENT

Description. This work consists of removing and disposing of the existing CN guard house from its current location near the mid-span of the existing Structure SN 016-0385, and replacing it with a new fully-functional guard house including concrete foundation pad south of the new highway bridge SN 016-2820 as shown on the plans. Disconnecting of utilities from the guard house prior to removing it and connecting of utilities to the new guard house will be performed by the CN.

Materials. The replacement guard house shall be equivalent in size, dimension, construction, and function as the existing guard house. It shall have minimum dimensions of 5 feet in width by 12 feet in length. The building shall be constructed using 2"x2"x0.083" minimum-size structural steel tube framing. It shall have 16 gauge galvanized steel walls. It shall be provided with R-10 wall insulation and R-19 roof insulation. The unit shall be designed for exterior use with a 12" fascia and 18" overhang on all sides. The roof shall be designed to support its own dead weight, air conditioner unit, live load, snow load and wind load in accordance with all applicable design codes. The roof shall have a heat protective membrane coating. Floor underside shall be coated. All seams and joints shall pressure bonderized. All openings shall be fully weather stripped and sealed.

The floor shall be 11 gauge steel plate covered with 19" square by 1/8" thick black industrial rubber tiles and 4" base cove, set on a 3" stainless steel tube frame and joists. The guard house shall have two commercial steel framed swing-out doors with commercial locks, stainless steel hinges and hydraulic closers. The guard house shall have four commercial steel-framed horizontal slide windows with stainless steel sills and locks. Additional fixed windows shall be provided as shown on the plans. All glazing shall be 3/4" tinted tempered dual pane insulated glass. Two heavy-duty steel shelves and drawers with factory finish shall be integral with the guard house and rated for a 250 pound load. The guard house shall have interior florescent lights recessed in a 16 gauge galvanized steel ceiling with wall switch. The guard house shall

also have two duplex outlets and an RJ-45 J-Box mounted under a 24" deep steel shelf at each 5' end. The guard house shall also have a 120/240 volt three wire, 12 pole, 125 amp single phase breaker panel. Guard house shall include an 11,600 BTU roof-mounted air conditioner. Guard house shall also include two 11,600 BTU heating units, one mounted under each shelf.

The guard house shall have a one-color polyurethane paint finish. The paint system shall include a rust inhibitive high build epoxy primer and two part polyurethane finish coat. Paint shall be impact and fade resistant and be graffiti and chemical resistant. The contractor shall coordinate with the CN on the color of the paint system.

The guard house shall be mounted directly to its concrete foundation pad using stainless steel expansion-type anchor bolts. The new foundation for the relocated guard house shall be constructed having a size and thickness as shown in the plans. Verify the required size of concrete pad with the manufacturer of the guard house prior to furnishing the foundation. Excavation shall conform to Section 502 of the Standard Specification. Concrete shall conform to Section 503 of the Standard Specifications. Welded wire reinforcement fabric shall conform to Section 508 of the Standard Specifications. Granular Subbase, Type B shall conform to Section 311 of the Standard.

The Contractor shall provide and incorporate conduit stubs into the foundation for conduit to be placed through the foundation and into the guard house through its floor. Coordinate the exact locations for conduit stubs with the manufacturer of the guard house unit. Furnish and install one 2" rigid galvanized steel conduit stub for service power and one 2" rigid galvanized steel conduit stub for communication. Extend the conduit a minimum of two feet out from the edge of the concrete foundation pad and cap for installation of service conduit and conductors to and from the guard house as specified in the section titled "Intermodal Yard Utility Relocation". Install a ¾" diameter by 10-foot long ground rod and bond to service panel and building per NEC 250.

Construction Requirements: The existing guard house shall be removed and disposed of after construction of the new guard house is complete, made fully functional, and has been inspected and accepted by the CN. This work shall be coordinated with the relocation of existing utilities on Structure SN 16-0385. This work shall be performed prior to the removal of the portion of existing Structure SN 016-0385 where the guard house is currently situated.

Method of Measurement. This work will be measured as a lump sum unit.

Basis of Payment. This work will be paid for at the contract lump sum price for GUARD HOUSE REMOVAL AND REPLACEMENT, which price shall include all materials, equipment and labor required to remove and dispose of the existing guard house, and to furnish and install the new guard house complete including concrete pad foundation, reinforcement, excavation, subbase, and all accessories.

TEMPORARY STAIRWAY ACCESS TO METRA TRACKS

Description. This work shall consist of the furnishing, installation, maintenance, and removal of temporary stairways to enable personnel of Metra and the Contractor to access areas of construction on Metra property at track level. The Contractor shall furnish and install the

number of stairway specified by Metra and in-turn directed by the Engineer. It is anticipated that Metra may require up to two stairways. The construction of the stairways shall confirm with the requirements of this special provision and with the details shown in the plans.

Construction Requirements. The Contractor shall coordinate with Metra and the Engineer to determine and confirm the number and precise location of each of the stairway from Park Avenue. The stairways shall be maintained for safe use during all times that Metra may need to access the construction area at track level, including during winter. The Contractor will be permitted to jointly use the stairways with Metra. The stairways shall be completed before any work on site for the project by Metra is needed and removed after Metra tracks have been placed back to their permanent alignment and all associated work by and for Metra is complete. When not in use for construction, such as at night and weekends, each stairway shall have fencing with a lockable gate and a single lock. Metra will hold the only key for the lock to prevent unauthorized access to Metra property. The Contractor shall not use the stairways to access Metra property without Metra first unlocking the gate and remaining on site. The Contractor shall submit plans including materials, design, and exact locations for review and approval by the Engineer and Metra before construction. The construction, presence, and/or removal of the stairways shall not cause destabilization of the Metra embankment.

The Contractor shall prepare and submit details for review and approval by the Engineer and Metra of any changes he proposed to make to the Metra embankment to accommodate construction of the stairs. If any changes are made to the Metra embankment, the embankment must be restored to its original and stable condition after removal of the stairways. Stairways shall be heavy duty, sturdy, safe, rigid, and shall conform to all OSHA requirements for stairways. Stairways shall be a minimum of 3'-0" wide. Stairways shall have handrails between 36" and 37" high, with no more than 19" of space between handrails. Handrails shall be designed to withstand 200 pounds of force in any downward or lateral direction at any point along the top edge of the handrail. Stairways shall be securely anchored to prevent any sliding movement down the embankment.

A durable slip resistant surface having a minimum width of two inches shall be placed on the surface of each tread along its nose. The slip resistant surface shall be replaced as necessary over the course of the project while they are required by Metra. Stairways shall have landings at least 30 inches deep at every 12 feet or less of vertical rise. Variations in riser height or stair tread depth shall not exceed ¼ inch.

Stairways shall be maintained by the Contractor. The Contractor shall periodically check the stairways for defects and make necessary repairs. Stairway parts must be free of dangerous projections such as protruding nails. Slippery conditions on stairways shall be corrected. The Contractor shall remove snow from the stairway surfaces whenever the stairways may be needed by Metra during times of cold weather.

Basis of Payment. Providing of stairways to Metra track level from Park Avenue will be paid for at the contract unit price each for TEMPORARY STAIRWAY ACCESS TO METRA TRACKS and will be considered full payment for furnishing all materials, equipment and labor to construct, maintain, and remove each one.

Any traffic control required for the construction of the temporary stairway access shall be included in the contract lump sum price for TRAFFIC CONTROL AND PROTECTION (SPECIAL).

TEMPORARY RAMP ACCESS TO METRA TRACKS

Description. This work shall consist of the furnishing, installation, maintenance, and removal of temporary ramps to enable personnel, equipment and vehicles of Metra and the Contractor to access areas of construction on Metra property at track level. The Contractor shall furnish and install the number of ramps specified by Metra and in-turn directed by the Engineer. It is anticipated that Metra may require up to four ramps.

Construction Requirements. The Contractor shall coordinate with Metra and the Engineer to determine and confirm the number and precise location of each of the ramps. The Contractor shall construct temporary ramps along Park Avenue for vehicular access to Metra's tracks during construction. The ramps shall provide a minimum usable width for construction equipment and vehicles of 11'-0" and shall be designed to provide Metra access for its construction trucks and other equipment up to track level. The Contractor will be permitted to jointly use the ramps with Metra. The ramp shall be sloped no greater than 10 horizontal to 1 vertical and shall extend to the top of track tie elevation. A horizontal landing a minimum of 11'-0" wide by 25'-0" long shall be provided at the top of tie elevation. The inboard side of the usable 11'-0" of ramp width landing adjacent to Metra Track No. 1 shall be a minimum distance of 10 feet from the centerline of that track. The Contractor may for his specific needs and at his additional expense construct the ramps with usable widths greater than 11'-0".

The ramps shall be maintained for safe use by Metra during all times of construction, including the winter. The ramp shall be completed before any work by Metra on site for the project is needed and removed after Metra tracks have been placed back to their permanent alignment and all associated work by and for Metra is complete. When not in use for construction, such as at night and weekends, each ramp shall have fencing with a lockable gate and a single lock. Metra will hold the only key for the lock to prevent unauthorized access to Metra property. The Contractor shall not use the ramps to access Metra property without Metra first unlocking the gate and remaining on site. The Contractor shall submit plans including materials, design, and exact locations for review and approval by the Engineer and Metra before construction. The construction, presence, and/or removal of the ramp shall not cause destabilization of the Metra embankment. If any changes are required to the Metra embankment, the embankment must be restored to its original stable condition after removal of the ramp. The Contractor shall coordinate with Metra and the Engineer to determine the location of the ramps. The ramps shall be constructed so that they will not interfere with the normal flow of two lanes of traffic in each direction on Park Avenue.

The ramps shall be constructed by providing additional material to build outward from the existing railroad embankment. No excavation into the existing embankment will be permitted. This work shall include the furnishing, installation, maintenance, and removal of temporary sheeting and/or other temporary soil retention systems to retain the additional temporary embankment fill as approved by the Engineer and Metra.

The ramp shall be maintained by the Contractor. The ramp shall be constructed with guard rail and fall protection as required conforming to applicable sections of AASHTO and AREMA and conforming to requirements of Metra. The design of the ramp shall be prepared by an Illinois Licensed Professional Engineer. The Contractor shall prepare design calculations and detailed plans sealed by an Illinois Licensed Structural Engineer for all proposed temporary sheeting and/or other temporary soil retentions systems for constructing the temporary ramp for submission to the Engineer and Metra for their review and approval.

Additional ramps not required by Metra for the Contractor's his own use may be provided by the Contractor. Such additional ramps will not be paid for separately, but will be provided, constructed, and removed at the Contractor's own expense. Additional access ramps for the Contractor's own use will only be permitted if approved by Metra. Detailed plans for the construction of additional access ramps shall be prepared by the Contractor and provided for review approval by the Engineering and Metra.

An aerial cable supported by wood poles is situated along the east side of Park Avenue at and parallel to the toe of the railroad embankment. This Metra-owned utility is abandoned. The Contractor may remove portions of this facility to improve access to construction at Metra track level from Park Avenue and ease of construction of associated access ramps. Any portions of the cable and/or poles removed shall be disposed of off-site. If a portion of the overhead cable is removed, the Contractor shall assure the first wood pole supporting the remaining portion of the cable is made stable by guy-wire or other means to offset the unbalanced force of the remaining cable. The removal of any portion of this abandoned utility will be at the Contractor's own cost and no separate additional payment will be made for it. The first wood pole for this facility north of 159th Street also supports a cable that provides electrical service for the existing bridge underlighting system. That pole must be maintained until 159th Street is closed to traffic between Park Avenue and West Street and the bridge underlighting system is replaced as part of bridge reconstruction.

Basis of Payment. Providing of ramps to Metra track level from Park Avenue will be paid for at the contract unit price each for TEMPORARY RAMP ACCESS TO METRA TRACKS and will be considered full payment for furnishing all materials, equipment and labor to construct, maintain, and remove each one and return the existing embankment to its original condition.

Any traffic control required for the construction of the temporary ramp access to Metra tracks shall be included in the contract lump sum price for TRAFFIC CONTROL AND PROTECTION (SPECIAL).

COLLECT AND RE-USE GRANULAR SURFACE MATERIAL

Description. This work shall consist of collecting and storing granular surface material of the railroad embankment along the east side of Park Avenue and placing it back after completion of the construction affecting it.

Construction Requirements. The existing surface condition of the embankment along the east side of Park Avenue is primarily granular in nature and is the result of cinders and other similar open-graded granular materials that have spilled down from above from Metra's tracks surfacing and related maintenance activities. Only a limited amount of vegetative cover exists. There does not appear to be any problems with erosion. The granular material likely simply allows rainfall to pass through it to the underlying embankment. This condition shall be maintained along Park Avenue. Prior to construction activities affecting the surface of the embankment sideslope including but not limited to embankment widening for raising of rail profiles and construction of retaining walls, access ramps and stairs and catenary bridge and catenary dead end structures, the Contractor shall collect and store the surface material so it can be re-used and be placed back after completion of the associated construction. Seeding of this surface will not be provided as it is intended to continue to function in the manner that it currently does with surface water freely draining through it.

Method of Measurement. This work will not be measured for payment.

Basis of Payment. No additional compensation will be made for this work. The cost of this work will be considered to be included in the price bid for the various bid items for work being performed including, but not limited to, construction of track, retaining walls, bridge abutments, temporary access ramps and stairs, permanent access stairs, and catenary bridge structure construction.

GRANULAR SURFACE MATERIAL

Description. This work shall consist of furnishing and placing granular surface material on the railroad embankment along the east side of Park Avenue after completion of construction along it.

Materials. Granular surface material shall be open graded CA-7 conforming to Section 1004 of the Standard Specifications.

Construction Requirements. Place granular material in the locations and to the depth as directed by the Engineer. This material will be used to supplement the material placed as specified in the above section "Collect and Re-Use Granular Material".

Method of Measurement. This work will be measured for payment by cubic yards furnished and installed, to the depth and locations as determined by the Engineer.

Basis of Payment. This work will be paid for at the contract unit price per cubic yard for GRANULAR SURFACE MATERIAL, which price shall include all materials, equipment, and labor required to furnish and place the additional granular surface material.

CATENARY STRUCTURE FOUNDATIONS

Description. This work shall consist of constructing foundation systems for catenary-related structures including catenary support structures, the catenary bridge structure, and catenary dead end structure.

Construction Requirements. All foundation construction for the catenary-related structures shall conform to the Special Provision "Protection of Railway Interest". The contractor shall coordinate with Metra concerning the timing and sequencing of construction for all foundation construction. The contractor shall assure that the construction of the foundations does not interfere with or damage existing or proposed construction for railroad tracks, DC catenary lines; railroad signal, AC power, fiber optic, and SCADA/communication lines above or below ground. No materials for construction of the foundations shall be lifted over aerial DC catenary lines, AC power lines, or fiber optic SCADA/communication lines.

The soil at the proposed location of the foundations for each catenary-related structure generally consists of granular type fill materials. However, no soil borings have been taken to confirm specific actual conditions at each proposed foundation location. Encountering of

obstructions during foundation system construction will be considered as included in the unit cost of braced excavation for this work and no additional separate payment will be made for the encountering and removal of such items.

During construction, if soils are found to be unsuitable to provide adequate support of the catenary support structure foundations, the Contractor shall notify the Engineer before making of any modifications to the foundations.

All excavation adjacent to active railroad tracks shall be braced. Cantilevered sheeting will not be permitted. Braced excavation shall be required wherever the distance from the centerline of any railroad track to the closest edge of excavation is less than 10 feet plus 1.0 times the vertical distance from top-of-rail to bottom of excavation. This braced excavation shall conform to the Special Provision "Braced Excavation". The Contractor shall prepare plans of the details for the proposed braced excavation system for constructing each foundation. The plans shall be sealed by an Illinois licensed structural engineer and submitted to the Engineer for review and approval by Metra and the CN.

The contractor shall assure that spoil material from the excavation for the foundations does not contaminate the existing ballast of Metra or CN tracks. Contaminated ballast will be replaced by the Railroads at the Contractor's expense.

Drilled concrete foundations shall be constructed using the temporary casing method described in the Standard Specifications. Temporary casings shall extend the full depth of drilled shaft. Temporary casings shall be provided and used in such a manner so as to assure no loss of surrounding material that may cause destabilization or settlement of subgrade for adjacent existing in-service or future railroad tracks.

The construction of the foundations for the catenary bridge structure shall include installation of galvanized steel conduit to allow railroad signal cables to be routed through them and in-turn into the masts of the structure erected on them.

Method of Measurement. Construction of catenary structure foundations will be measured for payment by cubic yards of braced excavation made within limits shown on the plans, pounds of reinforcement bars and epoxy coated reinforcement bars furnished and installed, cubic yards of concrete furnished and placed, and cubic feet of drilled shafts installed in soil and rock.

Basis of Payment. This work will be paid for as BRACED EXCAVATION, DRILLED SHAFT IN SOIL, DRILLED SHAFT IN ROCK, CONCRETE STRUCTURES, REINFORCEMENT BARS, and REINFORCEMENT BARS EPOXY COATED as applicable for the work described in each of the listed pay items and shall be considered full payment for all work including miscellaneous ancillary items to construct complete foundation systems.

The costs for all work inefficiencies and delays associated with working near the active railroad tracks of Metra and CN to perform the work will be considered to be included in the price bid for this work and no additional compensation will be made. No additional compensation will be allowed for any delays that result from the Contractor's lack of adequate coordination with either Metra and/or the CN. No additional compensation will be allowed for any delays that result

from the Railroads not being able to provide promised windows of track outage work time due to but not limited to changes in their operational needs or staffing availability. No additional compensation will be allowed for any weekend or nighttime hours that may be required to perform this work.

CATENARY SUPPORT STRUCTURE

Description. This work shall consist of furnishing and installing temporary and permanent catenary support structures for Metra Tracks 1 and 2. This work shall include furnishing and fabricating the steel structures and erecting of each structure adjacent to and over active railroad tracks. This work includes all structure construction above foundations and includes furnishing and installing anchor rods into the supporting foundation systems. This work also includes removing the temporary catenary support structures and portions of supporting foundations after they are no longer needed for the operation of Metra on the temporary diversion of its Tracks 1 and 2. The installation and cutover of all catenary, power, and communication lines and associated hardware on these structures will be performed by Metra.

Materials. Steel for the catenary support structures and all associated connection hardware shall conform to Sections 505 and 512 of the Standard Specifications. Rectangular HSS structural sections shall be ASTM A500, Grade B; associated connection steel shall be ASTM A36.

Anchor rods for all permanent structures shall be zinc-coated ASTM F-1554 Grade 55. Anchor rods for all temporary structures shall be ASTM F-1554 Grade 55.

Fabreeka or Metra approved equivalent washers, bushings, and pads shall be provided at the base of all permanent catenary support structures for electrical isolation as shown in the plans. There shall be no direct contact between any portion of the permanent steel structures and the attaching anchor bolts or supporting concrete foundations.

Painting of the permanent catenary support structures shall confirm with the Special Provision for “Cleaning and Painting New Metal Structures” using the full shop application system. All permanent steel shall be painted with the organic zinc rich primer/epoxy/urethane paint system; the color of the final finish coat for all steel surfaces shall be flat black.

Steel for the temporary catenary support structures need not be painted.

Construction Requirements. The contractor shall coordinate with Metra and the CN concerning the timing and sequencing of erection for the catenary structures. The Contractor shall prepare and submit a staging plan for the erection of the catenary structures to the Engineer for review by the Engineer and the Railroads. The Contractor shall be responsible for assuring that the erection of the catenary support structures does not interfere with rail traffic on existing and proposed railroad tracks, DC catenary lines; and all railroad signal, AC power, and fiber optic SCADA/communication lines.

Detailed shop drawings and assembly drawings shall be furnished for review by the Engineer and Metra prior to fabrication.

The contractor shall provide a minimum of 14 calendar days written notice to Metra and the CN for all catenary support structure work to be performed within 25 feet of the centerline of the live tracks of either railroad. Work shall not disrupt the schedule of Metra's commuter trains, and shall be performed with railroad flagging during periods between off-peak hours of train traffic. Metra will be the final authority concerning what days and times of day catenary support structure construction can be performed within 25 feet of its tracks and the CN for when construction can be performed within 25 feet of its tracks. The Contractor shall be responsible for assessing though coordination with the CN and Metra what work windows will be available to construct catenary support structures without interfering with railroad traffic.

The Contractor shall adhere to the applicable provisions of the Sections "Working Near Active Metra Tracks" and "Working Near Energized Metra Catenary System" of the Special Provision "Protection of Railway Interest" during construction and erection of catenary support structures.

After Metra's temporary diversion tracks 1 & 2 are no longer needed, all temporary catenary support structures shall be removed. The foundations for all temporary catenary support structures shall be removed to a depth of at least two feet below the bottom of tie elevation of any permanent Metra or CN track located within 20 feet of the nearest edge of the foundation.

All catenary support structures shall conform to the applicable provisions of AREMA.

Method of Measurement. Constructing, furnishing, fabricating, erecting of temporary and permanent catenary support structures, including the later removal of temporary catenary support structures, will be measured for payment per each structure required.

Basis of Payment. This work will be paid for at the contract unit price each for CATENARY SUPPORT STRUCTURE PERMANENT and CATENARY SUPPORT STRUCTURE TEMPORARY, which price shall include all materials, equipment, and labor required to provide both permanent and temporary catenary support structures, and for the removal of temporary catenary support structures and foundation portions. The cost of furnishing and installing anchor bolts and Fabreeka electrical isolation washers, bushings and pads will be considered to be included in the price for this work.

Costs associated with obtaining work space from the Railroads to stage material and equipment to facilitate the work shall be considered as included in the contract unit prices bid for the various items of work involved, and no additional compensation will be allowed.

The costs for all work inefficiencies and delays associated with working near the active railroad tracks of Metra and CN to perform the work will be considered to be included in the price bid for these two pay items of this special provision and no additional compensation will be made. No additional compensation will be allowed for any delays that result from the Contractor's lack of adequate coordination with either Metra and/or the CN. No additional compensation will be allowed for any delays that result from the Railroads not being able to provide promised windows of track outage work time due to but not limited to changes in their operational needs or staffing availability. No additional compensation will be allowed for any weekend or nighttime hours that may be required to be worked for catenary support structure related work.

CATENARY BRIDGE STRUCTURE

Description. This work shall consist of furnishing and installing a structure over Metra Tracks #1 and #2 and CN tracks #1, #2, #3, and #4 to initially serve as a temporary catenary dead-end support and then serve as a permanent catenary support for Metra and a permanent signal support structure for both Metra and CN tracks. This work shall include furnishing and fabricating the structure, and erecting structure on site adjacent to and over active railroad tracks. This work includes all structure work above the foundations and includes furnishing and installing of anchor rods. The installation and transfer of all catenary, power, and communication lines; signals; and all associated hardware will be performed by Metra and the CN railroads. The contractor shall make bridge components available on site and provide advance notice to allow railroad forces the opportunity to install hardware and equipment prior to erection.

Materials. All materials for the catenary bridge structure shall conform to the requirements set forth in the special provision Catenary Support Structure. Steel for the catenary bridge structure shall be painted with the same system used for the permanent catenary support structures as set forth in the special provision Catenary Support Structure.

The catenary bridge structure described herein shall conform to the applicable portions of the American Railway Engineering and Maintenance-of-Way Association (AREMA) Communications & Signals Manual of Recommended Practice including, but not limited to, parts14.4.1A, 14.4.7A,14.47B, 14.4.7C, 14.4.9A, 14.4.9B, 14.4.9C, 14.4.9D, 14.4.9E, 15.1.4, 15.1.5, and 15.3.1; and AASHTO Specifications for a railroad signal bridge with walkway.

Where brand, manufacturer or product names are indicated in this special provision, they are included only for the purpose of establishing identification and general descriptions of the item. Wherever such names appear, the term “or Metra approved equivalent” is considered to follow.

The catenary bridge structure shall be provided complete with all structural members, foundations, ladders, walkways, handrails, junction cases, pull boxes, conduit, masts, junction boxes, connectors and all necessary assembly and mounting hardware. Metra signal heads are to be provided as described in Signals Metra – Color Light Signal Units. CN signal heads will be provided by CN.

Bolts, nuts and washers, and all retaining fasteners shall be hot-dipped galvanized.

Anchor rods for the permanent columns shall be ASTM F-1554 Grade 55, hot dipped galvanized and be two inches in diameter. Anchor rods for the temporary guy anchors shall be ASTM F-1554 Grade 55.

Fabreeka or Metra approved equivalent washers, bushings, and pads shall be provided at the base of the permanent columns for electrical isolation. There shall be no direct contact between the permanent steel structures and the attaching anchor bolts or concrete foundations.

American Mechanical Engineering standards shall apply to threaded parts. No cable troughs or raceways will be permitted.

Construction Requirements. Construction requirements for the catenary bridge structure shall conform to those set forth for permanent catenary support structures in the special provision Catenary Support Structure.

The Contractor shall make the pre-assembled Metra portion of the overhead truss available to Metra forces for attachment of its signal heads prior to final erection over the tracks. The Contractor shall make the pre-assembled CN portion of the overhead truss available to CN forces for attachment of its signal heads prior to final erection over the tracks.

The fabricator of the catenary bridge structure shall have a minimum of five years experience manufacturing similar units for Class I railroads. The fabricator shall have previously manufactured at least three similar units with those units having had a previous, satisfactory in-service performance record of at least two years. Proof of performance statements shall be provided, upon request, with confirming statements from previous purchasers. Failure to provide proof if requested will be cause for rejection.

The catenary bridge structure shall be sized to conform to minimum railroad clearance requirements from the track centerlines and a minimum vertical clearance as shown in the plans from the top of rail to the lowest point on the bridge assembly.

The catenary bridge structure shall be of tubular steel construction and shall be sectionalized such that on-site assembly is possible without modification.

Walkways shall be constructed of galvanized steel grating to provide safe footing, minimize wind load and prevent ice/snow building-up. Walkways grating shall be fully banded with no jagged edges and shall be securely fastened to the structure and cover the length and width shown in the plans. Openings in the walkway shall be provided to allow signal masts to pass through. Two horizontal handrails shall be provided on all sides, approximately 18 and 36 inches above the walkway, and shall not interfere with viewing of the signals.

All threaded openings in tubular members shall have removable plugs and be protected from damage. All tubing and pipe ends shall be sealed with caps. Open ends of signal masts shall be covered with temporary caps until signals are mounted.

The catenary bridge structure shall be equipped with two steel ladders securely and permanently fastened with the rungs parallel to the tracks, outside the main structure. The ladder shall have non-slip, 16-inch (minimum) rungs and be capable of supporting the weight of two people and shall be spaced seven inches off the structure for ease of climbing. The catenary bridge structure shall be equipped for easy access without hindrance and may include handholds or other aids as necessary. The ladder shall extend from the base of the structure (top of foundation) to a minimum of six feet above the lower platform.

A ladder guard shall be fitted to the lower portion of the ladder. The ladder guard shall be fabricated from flat aluminum plate, of sufficient height to inhibit unauthorized access to the signal bridge. A hasp arrangement having a minimum 1/2-inch diameter opening shall be provided to secure the ladder guard with railroad-provided padlocks. The Contractor shall assure that the hasp arrangement is suitable to accommodate both Metra and CN locks provided.

Each ladder shall be supplied with an appropriate safety cage extending from the top of the ladder to eight feet from the top of the foundation. The lower platform walkway shall extend beyond the plane of the ladder approximately two feet. Suitable handholds shall be located within 30 inches of the top of the ladder to provide a firm grip when transferring from the ladder to the walkway.

The catenary bridge structure shall be equipped with a steel ladder between the lower and upper levels. This ladder shall extend from the surface of the lower platform to a minimum point five feet above the upper platform.

Junction cases suitable for terminating wires and underground cables shall be provided as a part of this work. The junction cases shall be weather-tight and fitted with a double-hinged door with provisions having a minimum 1/2-inch diameter opening for a Metra padlock and grease fittings in the hinges.

The junction cases shall be constructed of cast aluminum or sheet aluminum, at least 0.100 inches thick, with all structural joints welded and sealed. The maximum outside width of junction cases shall be 24 inches.

The junction cases shall be located at the base of the structure with the bottom of the case approximately three feet above the top of the foundation concrete. The cases shall be mounted to the mast leg on the same side that the signal masts are mounted in order to provide the most direct wire routing to the signals.

One 6 x 2 post terminal block complete with washers and nuts shall be provided for each signal head, plus 20 percent spare terminals. Insulated test links (Safetran No. 024620-1X or Metra approved equivalent) and appropriate hardware shall be provided for each pair of junction box terminals.

The junction cases shall be provided with a minimum of 21 square inches of 3/4-inch plywood backboard for each 6 x 2 post terminal block or part of a block. The backboard shall be mounted to fill the case height and width excluding the mast entrance opening. No overcrowding of terminals shall be permitted. An alternate method of mounting the terminal block may be submitted as an equivalent.

Cable and wire entry to the junction cases shall be via a main mast of the structure. External cable entrance conduits will not be permitted.

The method of routing wires from junction cases to each signal head shall be to route the wires within the tubular members of the structure. Wires shall be pulled through the tubular members and attached flexible conduit. Appropriate pull box and hand hole locations shall be provided as necessary. All edges and cut-outs shall be smooth and rounded to accommodate wire installation. Wire will not be furnished as part of this work. Pull cords shall be furnished and installed for each of the wire runs as part of this work. All inside edges of steel members at corners shall be de-burred to prevent damage to the wires which are pulled around these corners.

An opening approximately four inches by six inches shall be provided in mast legs under each junction case, to allow access for cable sealing at the foundation. The opening shall be fitted with a bolt-on metal cover plate and neoprene gasket.

Signal masts shall be shop welded to the horizontal supporting structural members of the truss assembly. Signal masts shall be five-inch diameter steel tubes. Appropriate openings shall be provided for wire entrance from the structural members. Furnish all conduits, fittings and necessary mounting hardware that are required. One signal mast shall be provided for each signal head and future signal head. All signal heads shall be top-of-mast mount. Removable caps shall be mounted on the tops of the two signal masts for Track #1. Caps shall be typical signal-type caps that secure to the masts with set screws.

An appropriate platform, handrails, ladder and mast brackets shall also be provided for the upper level.

The catenary bridge structure shall be mounted on anchor rods that project through the top of the foundations. Rod spacing and arrangement shall not weaken the foundation.

One 2-inch diameter anchor rod, four nuts, one washer, one anchor plate, one isolation bushing, and one isolation washer shall be furnished and installed for each mounting hole at the base of the catenary bridge structure columns. One isolation pad shall be furnished and installed for each column of the catenary bridge structure columns. One steel anchor rod, four nuts, one anchor plate, and one washer shall be provided for each mounting hole at the base of the catenary bridge structure guy anchors.

Detailed shop drawings and assembly drawings shall be furnished for review by the Engineer and Metra prior to fabrication.

The catenary bridge structure shall be shipped complete with all associated hardware. Loose mounting hardware shall be individually tagged and identified and shall be plainly marked with manufacturer's references including serial and model numbers.

The product shall be assembled or packed as to permit convenient handling and to protect against loss or damage during shipment. Loose pieces shall be tightly taped or wired to the catenary bridge structure or shipping pallet, or packed separately but firmly attached to the product.

A detailed list of packages and their contents shall be provided for all shipments. One copy shall be included with shipment and one copy shall be sent directly to the Engineer. The Engineer's copy shall be mailed not later than the shipping date of the equipment.

The Contractor shall notify the Engineer and Metra of shipping date 48 hours prior to shipment.

Metra and the Engineer will inspect the unit upon delivery to the site for any items not conforming to this Special Provision. The Contractor shall provide a timely schedule to furnish, deliver to destination and install or correct such items without charge. Failure to respond appropriately shall be cause for rejection with return of rejected units at the Contractor's total expense.

The Contractor shall replace (furnish, deliver to destination and install or correct) without charge, any part of material, which fails within a period of one year of date of installation from defects of material, design, manufacture and/or workmanship.

Metra and the Engineer reserve the right to inspect all equipment at Manufacturer's plant prior to shipment.

Fill material shall be placed at base of ladders for leveling and access purposes. This material shall be placed as shown in the Plans, and is included in the cost of Catenary Bridge Structure.

Method of Measurement. The catenary bridge structure will be measured for payment per each structure provided.

Basis of Payment. This work will be paid for at the contract unit price each for CATENARY BRIDGE STRUCTURE, which price shall include all materials, equipment, and labor required to provide a permanent catenary and signal support structure. The cost of furnishing and installing anchor bolts and Fabreeka electrical isolation washers, bushings and pads will be considered to be included in the price for this work.

The costs for all work inefficiencies and delays associated with working near the active railroad tracks of Metra and CN to perform the work will be considered to be included in the price bid for this work and no additional compensation will be made. No additional compensation will be allowed for any delays that result from the Contractor's lack of adequate coordination with either Metra and/or the CN. No additional compensation will be allowed for any delays that result from the Railroads not being able to provide promised windows of track outage work time due to but not limited to changes in their operational needs or staffing availability. No additional compensation will be allowed for any weekend or nighttime hours that may be required to perform this work.

CATENARY DEAD END STRUCTURE

Description. This work shall consist of furnishing and installing a temporary catenary dead end structure for Metra Tracks 1 and 2 at the south end of the temporary diversion of the tracks. This work shall include erecting the structure adjacent to and over active Metra Tracks 1 & 2 and CN Tracks 1, 2, 3, & 4. This work includes all structure construction above foundations and including anchor rods. This work also includes removing the structure and portions of its foundation after it is no longer needed for the operation of Metra on the temporary diversion of its Tracks 1 and 2. The installation and transfer of all catenary lines and associated hardware will be performed by Metra.

Materials. All materials for the catenary dead end structure shall conform to the requirements of the special provision for Catenary Support Structures. Steel for the temporary catenary dead end structure need not be painted. No base isolation is required for this temporary structure.

Anchor rods shall be ASTM F-1554 Grade 55.

Construction Requirements. Construction of the catenary dead end structure shall confirm to relevant requirements of the Special Provision "Catenary Support Structures".

Detailed shop drawings and assembly drawings shall be furnished for review by the Engineer and Metra prior to fabrication.

One steel anchor rod, four nuts, one anchor plate, and one washer shall be provided for each mounting hole at the base of the catenary dead end structure.

The foundation system, including drilled shafts, shall be removed to 2 feet below bottom of tie elevation, as described in the Special Provision for Catenary Support Structures.

Method of Measurement. Construction, furnishing, fabricating, erecting, and removal of the catenary dead end structure will be measured for payment per each structure required.

Basis of Payment. This work will be paid for at the contract unit price each for CATENARY DEAD END STRUCTURE, which price shall include all materials, equipment, and labor required to provide the temporary catenary dead end structure and the removal of the temporary catenary dead end structure and foundation portions. The cost of furnishing and installing anchor bolts will be considered to be included in the price for this work.

The costs for all work inefficiencies and delays associated with working near the active railroad tracks of Metra and CN to perform the work will be considered to be included in the price bid for this work and no additional compensation will be made. No additional compensation will be allowed for any delays that result from the Contractor's lack of adequate coordination with either Metra and/or the CN. No additional compensation will be allowed for any delays that result from the Railroads not being able to provide promised windows of track outage work time due to but not limited to changes in their operational needs or staffing availability. No additional compensation will be allowed for any weekend or nighttime hours that may be required to perform this work.

REMOVE EXISTING SIGNAL BRIDGE

Description. This work shall consist of the removal of an existing railroad signal bridge over active Metra Tracks 1 & 2 and CN Tracks 1, 2, 3, & 4 at the location shown on the plans.

Construction Requirements. Metra will be responsible for transfer of the existing overhead power lines, communication lines and catenary lines from the existing signal bridge. Metra will also remove the existing signals from the structure. In addition, any signals or lines that may belong to the CN will also be removed by that railroad prior to removal of the structure.

The foundations for the structure shall be removed to an elevation two feet below the bottom of tie elevation for any permanent tracks to be located within twenty feet of the foundation.

The Contractor shall be prepared to remove the existing overhead structure during the track outage time window that will be concurrently allowed by Metra and the CN, regardless of the time of day or day of week. The contractor shall provide all materials, equipment, and labor needed to protect all railroad underground and overhead utilities during the work. Such utilities may include but are not limited to ones for AC distribution power, DC catenary, railroad signal and fiber optic SCADA/communication systems. The Contractor shall make arrangements ahead of time to have all materials and equipment on site when needed. The Contractor shall make arrangements in advance to obtain from Metra and the CN access to the needed work

areas to perform the work. The Contractor shall coordinate with both railroads for access to the site to remove the structure. Flagging for both railroads will be required for access onto and/or over the tracks to remove the bridge. This work shall be scheduled at least 14 working days in advance so the track time required for the process can be setup on both railroads.

Reference should also be made to the provisions of "Working Near Active Metra Tracks" and "Working Near Energized Metra Catenary System" listed in the Special Provision PROTECTION OF RAILWAY INTEREST for additional removal of existing signal bridge requirements not listed in this special provision.

Method of Measurement. REMOVE EXISTING SIGNAL BRIDGE will be measured for payment per EACH item.

Basis of Payment. This work will be paid for at the contract price per each for REMOVE EXISTING SIGNAL BRIDGE, which price shall include shall include all, labor, equipment and material required to remove the structure in accordance with the plans and as directed by the Engineer.

The costs for all work inefficiencies and delays associated with working near the active railroad tracks of Metra and CN to perform the work will be considered to be included in the price bid for this work and no additional compensation will be made. No additional compensation will be allowed for any delays that result from the Contractor's lack of adequate coordination with either Metra and/or the CN. No additional compensation will be allowed for any delays that result from the Railroads not being able to provide promised windows of track outage work time due to but not limited to changes in their operational needs or staffing availability. No additional compensation will be allowed for any weekend or nighttime hours that may be required to perform this work.

REMOVE EXISTING CATENARY POLE

Description. This item shall consist of the removal of the existing catenary poles shown at the locations noted on the plan.

Construction Requirements. Metra will be responsible for transfer of the existing overhead power lines, communication lines and catenary lines from the existing catenary poles.

The foundations for the poles shall be removed to an elevation two feet below the bottom of tie elevation for any permanent tracks to be located within twenty feet of the foundation.

The Contractor shall make arrangements ahead of time to have all materials and equipment on site when needed. The Contractor shall coordinate with both railroads for obtaining equipment access to the site to perform the removal work.

The Contractor shall be prepared to remove the catenary poles during the track outage times allowed by Metra and the CN. Railroad flagging will be required for any access onto, over or immediately adjacent to active tracks that is required to perform the work. This work shall be coordinated and scheduled with the Railroads at least 14 working days in advance so the track outage time required for the process can be arranged and planned for by either or both Railroad as applicable.

This work shall only be performed with adjacent wires of the catenary DC power system de-energized on days and time of day allowed by Metra. Metra will be the final authority in determining the days and time of day a track and its DC catenary power system may be taken out of service. The contractor will protect all overhead catenary wires and the SCADA/communication cable when removing the poles.

Reference should also be made to the provisions of "Working Near Active Metra Tracks" and "Working Near Energized Metra Catenary System" listed in the Special Provision PROTECTION OF RAILWAY INTEREST for additional removal of existing catenary pole requirements not noted in this special provision.

Method of Measurement. This work shall be measured at the contract unit price each for REMOVE EXISTING CATENARY POLE.

Basis of Payment. This work will be paid for at the contract price each for REMOVE EXISTING CATENARY POLE, which price shall include shall include all, labor, equipment and material required to remove the poles in accordance with the plans and as directed by the Engineer.

The costs for all work inefficiencies and delays associated with working near the active railroad tracks of Metra and CN to perform the work will be considered to be included in the price bid for this work. No additional compensation will be allowed for any delays that result from the Contractor's lack of adequate coordination with either Metra and/or the CN. No additional compensation will be allowed for any delays that result from the Railroads not being able to provide promised windows of track outage work time due to but not limited to changes in their operational needs or staffing availability. No additional compensation will be allowed for any weekend or nighttime hours that may be required to perform this work.

PERMANENT ACCESS STAIRWAY

Description. This work shall consist of the furnishing and installation of a permanent stairway to enable Metra personnel to access the catenary bridge structure on Metra property at track level from Park Avenue. The construction of the stairway shall conform to the requirements of this special provision and with the details shown in the plans.

Materials. Steel Structures: Steel for the stairway, railings, and all associated connection hardware shall conform to Sections 505 and 512 of the Standard Specifications. Steel shall be ASTM A36. Anchor rods shall be ASTM F-1554 Grade 55.

Construction Requirements. The stairway shall be heavy duty, sturdy, safe, rigid, and conform to all OSHA requirements for stairways. The stairway shall be a minimum of 3'-0" wide. The stairway shall have handrails between 36" and 37" high, with no more than 19" of space between handrails. Handrails shall be designed to withstand 200 pounds of force in any downward or lateral direction at any point along the top edge of the handrail. The stairway shall be securely anchored to prevent any sliding movement down the embankment. The stairway shall have landings at least 30 inches deep at every 12 feet or less of vertical rise. Variations in riser height or stair tread depth shall not exceed ¼ inch.

Railing for the stairway shall also be placed on the permanent sheet piling adjacent to the foundation for the catenary bridge structure at the top of the stairway. This railing shall meet the same requirements as the railing on the stairway.

Flat landings shall be formed at the top and bottom of the stairway by grading and gradually sloping the earth away from the landings.

Detailed shop drawings and assembly drawings shall be furnished for review by the Engineer and Metra prior to fabrication.

Basis of Payment. Providing a stairway to Metra track level from Park Avenue will be paid for at the contract lump sum price for PERMANENT ACCESS STAIRWAY and will be considered full payment for furnishing all materials, equipment and labor to construct the stairway system. This price shall include furnishing and installing steel stair stringers, treads, hand railing, anchor bolts, railing on sheet piling, all bolts and welds for required connections, and all grading required to provide flat landings at the top and bottom of the stairway.

Any traffic control required for the construction of the permanent access stairway shall be included in the contract lump sum price for TRAFFIC CONTROL AND PROTECTION (SPECIAL).

CONSTRUCTION OF TRACK

Description - This work shall consist of furnishing, constructing, maintaining and removing of railroad track. This work includes those portions of temporary diversion tracks and permanent tracks of the CN for which track work can be performed at a distance greater than 10 feet from the centerline of that Railroad's in-service tracks. This work also includes construction of those portions of temporary diversion tracks for Metra situated beyond that Railroad's property line (located approximately midway between existing Metra Track 2 and existing CN Track 1). This work also includes providing assistance to the CN in making of track shifts. Construction of track shall include supplying all materials required for the track system - including sub-ballast, ballast, crossties, rail, tie plates, connectors and all other track materials required for the construction of the complete track system. This work does not include performing construction of railroad signal systems.

General Requirements - No roadbed or track work shall be performed on frozen ground or when ballast is frozen. The CN and Metra shall serve as the final authority in approving temperature and forecasted temperature conditions that are suitable for construction of their respective tracks.

A suggested sequence for roadbed and track construction is shown in the plans. The Contractor shall submit his proposed construction sequence plan for this work to the CN and Metra for review and approval by these Railroads.

Track Materials - Materials used in the construction of the track shall conform to the following specifications:

Rail: New 136 RE CWR for temporary and permanent CN Thoroughfare track, and new 115 RE CWR for all other CN track, per CN Specifications; and new 115 RE CWR per Metra Specifications (CWR: continuous welded rail, not jointed)

Crossties: Mainline, 7" X 9"x8'-6", New, AREMA grade in accordance with CN Specification 12-30A, current revisions, subject to approval by CN and Metra.

Ballast: Mainline, Granite, per CN and Metra specifications (limestone, dolomite or slag will not be allowed), subject to approval by CN and Metra. Mainline ballast gradation shall conform to AREMA section 2.10.4. Ballast for the CN Thoroughfare Main and Gateway Lead tracks shall be Arema Size No. 5.

Tie Plates: New, AREMA 14" plan 8 for 6-inch rail base, subject to approval by CN and Metra.

Anchors: New, Unit 5 drive on or equivalent, subject to approval by CN and Metra.

Welded Rail - Orgo-Thermit Field Welds or Flash Butt Welds. Welds shall be installed and tested as per CN and Metra specifications included within these specifications. Only welders qualified by CN and Metra will be allowed to perform any of the field welding that will be required. CN-qualified welders include the following:

Bankhead Railway Services, Inc.
1080 Donald L. Hollowell Pkwy.
Atlanta, GA 30318
Phone: 404-894-7924
Fax: 404-894-7937

Orgo-Thermit, Inc.
3500 Colonial Drive North
Manchester, NJ 08759
Phone: (732)657-5781, Ext. 26
Fax: (732)657-1047

Railtech Boutet, Inc.
25 Interstate Dr., P.O. Box 69
Napoleon, OH 43545
Phone: (419)592-5050
Fax: (419)599-3630

Sub-ballast – Sub-ballast shall be placed on the completed roadbed as shown in the typical sections. Aggregate Size No. CA 6 (IDOT) may be used as sub-ballast. The use of slag as sub-ballast will not be allowed. Sub-ballast shall be placed in accordance with Section 311 of the Standard Specifications and applicable CN and Metra specifications. Where different, requirements of Railroads' specifications for furnishing, placement, and compaction of sub-ballast will govern.

Ballast – Furnishing and placement of ballast shall include all labor, material, equipment and transportation to furnish and install this material. The hauling, stockpiling and placement of

ballast shall be performed to minimize the segregation of the ballast. The CN and Metra reserve the right to reject any ballast placement if in their opinion the material has segregated beyond acceptable limits.

Dolomite limestone and slag ballast shall not be used for track construction.

Ballasting of track shall be accomplished in not less than two lifts. Each lift shall not exceed four inches in height, except the final lift shall be approximately two inches in height to allow the track to be surfaced to final line and grade.

Construction of Railroad Track - The furnishing and construction of railroad track will include all labor, equipment, joint welding, drilling and bolting of connections, temperature adjustment of rail, lining, surfacing and material (not including ballast which shall be paid by the ton), required to install temporary and permanent CN Track 1, Track 2, Gateway Lead and the Thoroughfare Main along with temporary and permanent Metra Track 1 and Track 2 to the line and grade shown on the plans. This pay item shall include all materials including rail, ties, weld kits, OTM (tie plates, spikes, anchors, joint bars and bolts with washers, etc.), equipment and labor, except for materials that may provided by CN and/or Metra, required to install the new track.

All continuous welded rail shall be installed, anchored and adjusted in accordance with CN and Metra requirements as per FRA 49 CFR 213.119 shown in the procedures attached to these specifications. The Contractor will install all weld joints in track constructed by the Contractor and said welds will be inspected by CN or Metra prior to placing the track in service. Should any weld fail inspection the Contractor must cut out the weld per CN or Metra specifications and re-weld the joints at no additional cost. CN or Metra will connect rail ends of track constructed by the Contractor to that constructed or shifted by the Railroad by the use of joint bars. The Contractor will furnish the joint bars for all track shift connections. Any field welds on active track will be performed by CN or Metra.

Surfacing of the track shall be performed by methods, which will prevent undue bending of the rail or straining of the joints. The amount of track lift shall not endanger the horizontal or vertical stability of the track. The track shall be initially raised so that the final raise of not less than one inch nor more than three inches will be required to bring the track to finished grade. All ties that have pulled loose shall be replaced to proper position and shall have full bearing against the rail and be properly secured to the rail.

Tamping of ballast shall be performed with power tamping equipment. Control or cycling of the power tamper shall provide the maximum proper compaction of the ballast uniformly along the track. The ballast shall be thoroughly tamped on both sides of the tie from a point 15 inches inside to the rails to the ends of the ties. The track shall be placed in proper alignment when initially raised and tamped. The final alignment of the track shall be performed on track power operated lining equipment capable of meeting the specified track tolerances. When the track has been raised to within two inches of the final grade and properly compacted, a finishing lift shall be made by jacking the track to the finished top-of-rail elevations. The ballast shall then be applied under the ties for their entire length and thoroughly driven in place for a space extending from 15 inches inside either rail to the end of the ties, by tamping machines, tamping picks or tamping bars. The ballast under the remainder of the tie bearing shall not be tamped. In making

the finishing lift, the spot board and track level board shall be sued with care and the track brought to a true surface whit the required super elevation of the outer rail on spirals and curves. The Railroad Engineer may require that the Contractor string line the track under their supervision prior to final acceptance of the work.

After the track has been brought to the established track center every effort shall be made to maintain appropriate line during primary ballast applications. Final dressing of the ballast shall conform to the typical cross sections or as directed by CN or Metra.

Relocate Temporary CN Track No. 1 – This work will include all labor, equipment and material, including ballast, required to shift existing temporary CN Track No. 1 to the position of final CN Track No. 2. Care will be taken in moving the track section to the final location of Track No. 2 and any ties, rail or OTM damaged by the Contractor will be replaced. Moving the long track section may require cutting the track into sections and this will only be performed if allowed by CN. Ballast that was placed on Temporary Track No. 1 will not be reused unless allowed by CN. Once the track is placed in the location of No. 2 main track the section will be lined and surfaced to the line and grade shown on the plans. The Contractor shall move the track with enough equipment to prevent bending or twisting of any part of the track section. Should any section be deemed unfit by CN the Contractor will remove and replace that section at no additional cost. The track will be moved and lined to the stations noted on the plans and any excess will be saw cut and removed and become the property of the Contractor and removed from the project. Final dressing of the track will conform to the typical sections or as directed by CN.

Prior to placing ballast the contractor will realign all ties square with the rail and at the required spacing. All loose spikes will be pulled, the spike holes plugged and the spikes reset. All anchors will be reset as may be required and the track temperature adjusted once the track segment is completed and ready for connection to the existing CN No. 2 track.

Removal of Railroad Track - The removal of railroad track will include all labor, equipment and material required to remove portions of track from existing CN Track 1, Track 2, Gateway Lead and Thoroughfare Lead as shown on the plans; the temporary diversion tracks of CN Track 1, Gateway Lead and Thoroughfare Lead, and portions of existing CN Track 4. It will also include removal of those potions of the temporary diversion tracks for Metra Tracks 1 and 2 outside of Metra property.

As required for replacement of the CN railroad structures over 159th Street and unless otherwise directed, the Contractor shall remove portions of the existing CN mainline Tracks 1 and 2, Gateway Lead Track and Thoroughfare Main Track after the Railroad has made the cut and throws to the temporary diversions of these tracks and released the existing ones for removal. The Contractor shall dismantle all removed CN track at the direction of the Railroad. There shall be no cutting of continuous welded rail into pieces without approval of the CN. The CN will mark any salvage rail where it is to be cut and the Contractor shall haul and stockpile at the location designated by the Railroad.

After completion of construction of the CN structures over 159th Street and placing of CN railroad traffic back on permanent CN mainline Track 1, the Gateway Lead Track and Thoroughfare Main Track across them, the Contractor shall remove the temporary diversions of these tracks. After placing of CN railroad traffic back on permanent CN mainline Track 2, existing CN Tracks 3 and 4 shall be shifted from their original location to the west side of Structure SN 016-2754 and the Contractor shall remove the temporary diversion of Track 4.

After completion of reconstruction of the Metra two-track portion of railroad structure SN 016-2755 over 159th Street and Metra's placing of railroad traffic back on permanent Tracks 1 and 2, the Contractor shall remove the portion of the temporary diversions of these tracks that it furnished and constructed outside of Metra property.

All new track-related materials for Meta or CN tracks furnished by the Contractor for use during the project but removed and not incorporated into the final construction, including but not limited to rail, wood ties, ballast, and other track materials (OTM) shall become the property of the Contractor. The Contractor shall remove and dispose of all such materials in a suitable manner off-site and in accordance with the Standard Specifications. The Contractor's bid prices for related track work shall reflect his receiving the salvage value of these materials.

All existing CN track-related materials and components removed by the Contractor and not incorporated into the final construction of this project, including but not limited to rail, wood ties, ballast, and OTM shall become the property of and be disposed by the CN. The Contractor shall dismantle existing track-related materials and components to the degree specified by the CN and transport those removed materials to a location designated by the CN, near the job site, no further than five miles from the intersection of US Route 6 and Center Street.

Remove No. 10 Turnout - This work will include all labor, equipment and material required to remove the No. 10 Turnout as shown in the plans.

Assisting with CN Track Shifts - the Contractor, if required, shall assist the CN with the cut and throw of Track 1, Track 2, Gateway Lead and the Thoroughfare Main to the temporary alignments and back to the permanent alignments. The Contractor, if required, shall assist the CN with the cut and throw of existing Tracks 3 and 4 to new alignments on the west side of existing Structure SN 016-2754. The assistance shall include providing one bulldozer, one crawler tractor, and one backhoe. Each piece of equipment shall have an operator provided for it. The use of this equipment shall be coordinated with CN personnel who will be performing the actual track swing. The Contractor will not be required to assist Metra in the cut and throw of Metra Track 1 and 2.

A full swing of the CN tracks is planned for one day, more than likely in a 4-6 hour window, including the cut and throw of both ends of the track. No track is to be out-of-service over night.

The Contractor shall provide written notification to CN and Metra at least 30 days in advance of when track work will be completed to enable the anticipated track shift to the new alignments. The Contractor shall provide written confirmation at least 10 days prior to the actual date the new alignments will be ready for the track shift. All work on the new alignment track must be completed and inspected by CN and/or Metra, including tamping and regulating, prior to initiating the shift of each track onto the new alignment track. The specific day of the track shift shall be established by the CN.

Applicable Project and Railroad Specifications and Requirements - The Contractor shall furnish all materials and perform all track construction and removal work described herein in accordance with the requirements of this project special provision and in accordance with the relevant portions of all applicable CN and Metra and specifications, standards and details. Those standards and details of the two Railroads are made a part of the special provisions for this project.

Listed below are CN and Metra Specifications that are included and follow this special provision for reference and may contain relevant requirements for the work to be performed on this project:

- CN Standard For Rail, General
- CN Standard For Laying Rail, General
- CN Standard For Continuous Welded Rail (Cwr)
- CN Standard For Field Welding
- CN Standard For Joints
- CN Standard For Timber Tie Installation And Maintenance
- CN Standard For Tie Plates
- CN Standard For Rail Anchors
- CN Standard For Rail Fastening
- CN Standard For Ballasting, Surfacing, And Lining
- CN Standard For Turnouts
- CN Standard For Track Inspection Guidelines
- CN Standard For Track Geometry
- CN Standard For Minimum Track Construction Standards
- CN Standard For Track Clearances
- CN Standard For Signal & Communications Systems
- Metra Specification for High-Carbon Steel Track Spikes
- Metra Specification for Prepared Limestone Ballast
- Metra Specification for Steel Rails
- Metra Specification for Timber Cross Ties
- Metra Specification for Prefabricated Insulated Joints
- Metra Specification for Filter Fabric
- Metra Specification for Low-Carbon Steel Tie Plates
- Metra Specification for Aluminothermic Rail Joint Field Weld Kits
- Metra - AREMA Specification for Electric-Flash Butt Welding of Rail
- Metra Specification for High-Carbon Steel Joint Bars

Construction of CN track shall also conform to the CN Engineering Maintenance of Way Standard Practice Circulars dated April 2005 and subsequent revisions to same.

In the case of conflict between this special provision and the CN and/or Metra specifications, the decision by the Railroad Engineer of the applicable railroad will govern.

Method of Measurement. – Furnishing and construction of railroad track will be measured for payment per foot of railroad track installed as noted above. Track directly involved in the track shifts by the Railroad from the mainline to the new alignments will not be measured for payment.

Removal of the existing track will be measured for payment per foot of track removed. Track directly involved in the track shifts by the Railroad from the mainline to the new alignments will not be measured for payment.

Furnishing and placement of ballast will be measured for payment per ton in place as either pre-ballast, if so required by CN or Metra, or dumped on constructed track, and subsequent placements of ballast to bring track to the final alignment and profile as shown on the plans or as directed by the Railroad.

Sub-ballast will be measured for payment per ton, in place, compacted to the line and grade per the plans and shall include all labor, material and transportation to install this material.

Assisting with railroad track shifts will be measured for payment per each track shift for which assistance is requested by the CN and provided by the Contractor.

Basis of Payment. – RAILROAD TRACK will be paid for at the contract unit price per track foot.

RAILROAD TRACK, REMOVE will be paid for at the contract unit price per track foot. This payment will be considered to include all costs for removal and disposal of wood ties, rail, ballast, and all other track material (OTM) for all new track construction furnished as part of the project and requiring removal before its completion. This payment will also be considered to include all costs for removal, disassembly, and delivery to locations specified by the CN of all existing wood ties, rail, ballast, and all other track material (OTM) for existing track requiring removal as part of the project.

REMOVE NO. 10 TURNOUT will be paid for at the contract unit price per each.

RELOCATE TEMPORARY CN TRACK NO. 1 will be paid for at the contract unit price per track foot.

BALLAST will be paid for at the contract unit price per ton.

SUB-BALLAST will be paid for at the contract unit price per ton.

RAILROAD TRACK SHIFT ASSIST will be paid for at the contract unit price each, which will be considered full compensation for providing all equipment and labor required to complete the work as directed by the CN.

CN STANDARD FOR RAIL, GENERAL

RAIL

TS 1.0 - General

1. Where unloaded rail presents a walking hazard it shall be covered by a General Bulletin Order (GBO).
2. Rails kept for spot renewals should have the wear measurements, length and UTT (where applicable) clearly marked.
3. Rails used for spot renewals should be selected to have the same average wear, and metallurgy as the rail in track.
4. Scrap rails must be clearly marked with an X or red paint at regular intervals to differentiate them from reusable rails.
5. Rails used in main track tangents must not be less than 12' long. For welding in curves, rails in main tracks should not be less than 19' 6".
6. When cutting rail the saw cut must be made at least 4 inches from any torch mark or bond/bolt hole in the rail.
7. Rail having cuts or holes made with an oxy acetylene torch or an electric arc must not be used in track unless being cropped for use per item 6.
8. Rail should be unloaded by use of a crane with magnets, rail tongs, skids or threader and must not be dropped.
9. Rail must not be struck with a spike mauls, steel hammer or similar tool.
10. Rail on curves that are approaching their rail wear limits shall be monitored frequently.

11. Rail should not be transposed in main track with annual tonnage greater than 10 MGT. In locations where it has been deemed acceptable, the high rail may be transposed to the low side. In no case will the low rail be transposed to the high side.
12. If rail is continued in service beyond the following vertical wear limits, high clearance joint bars must be used on the gauge side of rail for new construction, repairs and spot replacements.

141 lb. 140 lb.	136 lb. 155 lb. 124 lb.	119 lb. 132 lb. 152 lb.	115 lb. 110 lb. 130 HF	112 lb. 113 lb.	100 lb. 105 lb.	90 lb. 100 HF	85 lb. (or less)
26 mm	23 mm	19 mm	16 mm	13 mm	10 mm	6 mm	5mm
1"	7/8"	3/4"	5/8"	1/2"	3/8"	1/4"	3/16"

a) Appendix A indicates the wear limits at which rail should be removed from track. If rail worn beyond the limits in this table is to be left in track, the Assistant Regional Chief Engineer must be notified. A speed restriction may be placed and additional inspection frequency specified at the discretion of the Regional Chief Engineer.

b) Maximum allowable gauge face wear is 1/2 inch (13 mm).

APPENDIX A - TABLE 1: RAIL WEAR LIMITS

(i) For rail having vertical wear only (no flange wear):

141 lb. 140 lb.	136 lb. 155 lb. 124 lb.	119 lb. 132 lb. 152 lb.	115 lb. 110 lb. 130 HF	112 lb. 113 lb.	100 lb. 105 lb.	90 lb. 100 HF	85lb. (or less)
26 mm 1"	23 mm 7/8"	19 mm 3/4"	16 mm 5/8"	13 mm 1/2"	10 mm 3/8"	6 mm 1/4"	5 mm 3/16"

(ii) For rail having both vertical and flange wear, vertical wear shall not exceed the limits tabulated in (i), but the sum of the vertical and flange wear (gauge and field side) permitted shall not exceed:

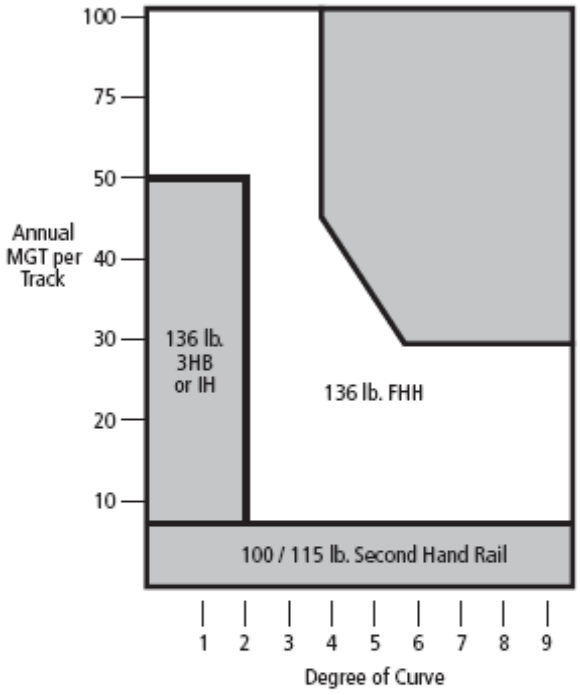
141 lb. 140 lb.	136 lb. 155 lb. 124 lb.	132 lb. 152 lb.	115 lb. 119 lb. 110 lb. 130 HF	112 lb. 113 lb.	100 lb. 105 lb.	90 lb. 100 HF	85 lb. (or less)
32 mm 1-1/4"	29 mm 1-1/8"	24 mm 15/16"	21 mm13/16"	17 mm 11/16"	14 mm 9/16"	11 mm 7/16"	8 mm 5/16"

* For gauge face wear see section 12 b)

13. Rail for relay programs will be in accordance with Appendix B

APPENDIX B

RAIL USAGE GUIDELINES



CN STANDARD FOR LAYING RAIL, GENERAL

TS 1.2 - Laying Rail - General

1. Rail of different metallurgies shall not be mixed in any given stretch of track
2. The gauge of track after laying must be uniform. Rail must be laid to the gauge shown in Table 1.

TABLE 1: GAUGE FOR HIGH DEGREE CURVES

Degree of Curve	Gauge in inches
Up to 14°00′	56-1/2
14°01′ to 16°00′	56-5/8
16°01′ to 18°00″	56-3/4
18°01′ to 20°00′	56-7/8

3. On completion of the rail laying, cribs must be filled and the track must be surfaced and lined, if necessary, as soon as possible.
4. Jointed rail shall be laid with staggered joints. The stagger between joints of opposite rails should not be less than 12ft.
5. The rail temperature shall be measured periodically throughout the day with at least two accurate thermometers placed on the base of the rail near the web, away from wind and out of the direct rays of the sun and away from all sources of artificial heat or cold. The thermometer shall be left in place for at least 10 minutes prior to taking a reading. A pyrometer may also be used to measure rail temperature.

6. Expansion space between rail ends, when laying bolted rail or track panels, must be provided. Expansion space of the proper dimension between rail ends can be obtained through the use of shims of the correct thickness as per Tables 2A below. Expansion shims must not be removed until the rail is properly spiked, the bolts tightened and rail anchors applied.

TABLE 2A. EXPANSION GAP IN INCHES REQUIRED FOR RAIL TEMPERATURE

Expansion Gap Inches	33 ft. Rail Rail Temp. Degree F.	39 ft. Rail Rail Temp. Degree F.
5/16	Below 10	Below 6
1/4	10 to 14	6 to 25
3/16	15 to 34	26 to 45
1/8	35 to 59	46 to 65
1/16	60 to 85	65 to 85
0	Above 85	Above 85

7. Rail joints should not be installed closer than
   - 20 ft. from the edge of road crossings. Short welded rails (SWR) should be used wherever possible;
   - 20 ft. to the face of the backwall of an open deck bridge on the approach side, nor less than 4 ft. from the face of the backwall on the bridge side.

8. Joint bars must be applied and the bolts tightened before the rail is spiked. Bolts in rail joints shall be tightened in the following sequence:
   - the two bolts in the center of the bar
   - the second bolt from the center
   - the third bolt from the center, if applicable.
9. Tighten track bolts with track wrenches or power wrenches set to the proper torque settings. Care must be exercised when tightening bolts to avoid stripping threads.

TORQUE TO BE APPLIED TO TRACK BOLTS

Size of Bolt	7/8	1	1 1/8
Torque – ft.-lb	375	490	705

10. When the day's work is completed, all the rail laid must be bolted and anchored per standard and each plate must have a minimum of two spikes.
11. Rail joints should be slotted to prevent flowed rail and chipped joints.

    Where different sections of rail are being joined, one of the following methods shall be used:
    - compromise rails of the correct sections
    - compromise welds
    - compromise joints of the correct design

12. When newly laid rail joins rail previously in track, the old rail should be built up by welding at the joint, if necessary, to protect the end of the newly laid rail.
13. Where rail end mismatch exceeds 1/8" (3 mm) on the top or the gauge side of a rail joint, it shall be repaired promptly by grinding, welding or replacement of the rail. Until such time as these repairs are made, movements over the mismatch shall not exceed the speed for the appropriate class of track, as prescribed by the following table:

Class of Track	Maximum Mismatch On top of Rail	Maximum Mismatch on Gauge Side of Rail
1	1/4"	1/4"
2	1/4"	3/16"
3	3/16"	3/16"
4 and 5	1/8"	1/8"

14. Rail ends with excessive flow will be repaired by slotting. Crushed or battered rail ends will be repaired by welding.

CN STANDARD FOR CONTINUOUS WELDED RAIL (CWR)

TS 1.3 - Continuous Welded Rail (CWR)

DEFINITIONS

1. "Continuous Welded Rail" (CWR) is rail welded into lengths of 400 feet or more.
2. "Rail Laying Temperature" (RLT) is the actual temperature at which the CWR is laid.
3. The "Preferred Rail Laying Temperature" (PRLT) is the target installation temperature of welded rail in a particular area.
4. The "Preferred Rail Laying Temperature Range" (PRLT) is between the PRLT and the PRLT plus 25 degrees F.
5. CWR may be installed on open deck bridges with curves provided that the anchoring requirements adhere to Track Standard 3.2.
6. Current PRLTs are shown in the following Table:

TABLE 1: PREFERRED RAIL LAYING TEMPERATURE

Eastern/Western Regions	Southern Region
90° F	105° F Former DWP/DMIR: 100° F

7. CWR will be installed and anchored within the PRLTR without further adjustment. CWR installed outside the PRLTR must be de-stressed as soon as possible after laying. Destressing must be completed before the rail temperature increase is greater than 40 degrees F above the RLT.
8. CWR must be destressed using proper procedures. Heaters or expanders must be used to bring the rail to the correct length. The CWR Thermal Expansion Chart is contained in Appendix A.

UNLOADING

9. When unloading CWR the following procedures should be followed:
   a. A qualified employee will be present to direct the operation and use of equipment.
   b. The qualified person will be in complete charge of the unloading or loading of CWR and
   c. No other person will supersede his authority
   d. Do not loosen any of the rail tie downs on the CWR train until the train is at the unloading site and unloading operation is ready to begin
   e. Maximum unloading speed for CWR trains is 5 M.P.H
   f. Unload CWR to the outside of the track unless otherwise instructed
   g. CWR may be cut with acetylene torch when being unloaded to meet physical conditions, such as turnouts, paved highway crossings, railroad crossings, etc.
   h. When unloading CWR, chain clevises will be removed and rail ends bypassed to provide for rail expansion.
   i. When a CWR train is partially unloaded, all remaining CWR on the train must be secured before the train is moved.
10. After a CWR train is unloaded, secure all tie down fastenings, tools, clevises, and other equipment in their proper boxes.
11. If strings of CWR are left on the train for shipment to other locations, tie-down clamps must be checked and re-secured if necessary. Tie-down bolt locks must be in place prior to movement of the train.

INSTALLATION

12. CWR will not end on open deck bridges or closer than 200 feet from the backwall of the bridge.
13. A list of the rail temperatures marked on each string, the string numbers, alloy (if any) mileage and date of laying or adjusting shall be compiled and kept up to date by the Track Supervisor with copies to the Engineering Superintendent. The actual rail laying temperature will be marked at the end of each string of CWR installed.
14. Field welds (thermite or flash butt) should be made at the time of rail laying, regardless of temperature.
15. Trains may operate over unanchored track at a speed not exceeding 10 mph under authorization from the Foreman. Such authorization should include instructions to avoid unnecessary brake applications through or near the work area.
16. On completion of the days work, all rail laid, or ties inserted, must be spiked with a minimum of two rail loading spikes per plate, bolted and anchored per standard. The gang must then return to spike the ties to the applicable spiking pattern in TS 3.4.
17. CWR strings may be left between the rails until the next shift (overnight) provided that:
    a. the CWR string height does not exceed 1" above the top of the running rail
    b. deflectors are placed at each end of rail
    c. the CWR rail ends are bypassed and secured at the ends with spikes.
18. When destressing, the adjusting temperature is to be marked on the rail and all previous temperature markings shall be obliterated.

MAINTENANCE OF RAIL NEUTRAL TEMPERATURE

19. Detailed guidelines on destressing CWR are contained in RM 3205-0 and RM3205-2. Guidelines on handling rail failures in CWR are contained in RM 3205-1.
20. Precautions must be taken to monitor the length of rail installed during rail changes and repairs. Whenever practicable, rail will not be added to CWR track.
21. When a rail is to be changed, reference marks will be made on the web of the rail extending on to the rail base prior to cutting the CWR. They will be on each side of the location where the cut is to be made and where the mark will not be covered by joint bars or removed by changing the rail.
22. The reference marks and the measured distance between them will be written with paint stick or other permanent marker.
23. When addressing a failure in CWR,
    a. if the rail ends have pulled apart, the distance of separation of the two rail ends will be noted. The distance recorded on the rail shall then be the measured distance between the reference marks minus the separation of the rail ends.
    b. If the rail ends bypass each other, the distance recorded on the rail shall be the measured distance between the reference marks plus the amount the rail ends bypass.
    c. After the rail has been changed, measure the distance between the reference marks. If the distance changes over the original measured distance, the amount of rail added or removed will be marked on the rail and forwarded to the Track Supervisor.

24. The Track Supervisor will be responsible for the locations and amounts of rail added or removed.

25. The Superintendent of Engineering will ensure that any locations with rail added during cooler weather will have the correct length plug installed prior to the ambient temperature reaching 85°F in the US and 70°F in Canada. When ambient temperatures exceed these, and adjustments have not been made, a speed restriction will be placed.

26. Except in the case of emergencies, no surfacing and lining, rail replacement or tie renewal will be performed if the rail temperature is above the PRLTR unless approved by the Assistant Regional Chief Engineer. As a guideline, rail temperature will be 25 to 30°F above the ambient temperature.

27. Track maintenance activities that disturbs track and could potentially cause a track buckle must be protected by the appropriate speed restriction. Table 2 contains the speed restrictions and the timeframe for removing them on CWR track.

TABLE 2: MINIMUM REQUIRED SPEED RESTRICTIONS IN CWR TERRITORY

Type of Work	Maximum Expected Rail Temperature within next 24 hours	Required TSO	
		Without Dynamic Stabilizer	With Dynamic Stabilizer
Mechanized tie renewal Panelized turnout Replacement Out-of-face surfacing Ballast cleaning Undercutting Shoulder cleaning Lining	At or above the PRLT	1 freight train at 10 mph then inspect, if OK then 25 mph for 100,000 tons then inspect, if OK then return to track speed	2 freight trains at 25 mph then inspect, if OK then return to track speed
	Between the PRLT and 40° below the PRLT	1 freight train at 10 mph then inspect, if Ok then 25 mph for 50,000 tons then inspect, if OK the return to track speed	1 freight train at 25 mph then inspect, if OK then return to track speed
	40° or more below the PRLT	2 freight trains at 25 mph then inspect, if OK then return to track speed	Inspect, if OK then allow track speed
Spot tie renewal Spot surfacing	At or above the PRLT	1 freight train at 25 mph then inspect, if OK then return to track speed	n/a
	Below the PRLT	Inspect, if OK then allow track speed	n/a

a. Where traffic is predominately passenger service and the above speed restrictions are applied, 6 passenger trains may be treated as equivalent to 1 freight train.

b. If the neutral temperature of the rail is known or suspected to be below the PRLT, the suspected neutral temperature will be used in place of the PRLT for determining speed restrictions in the above table.

c. The limits of the speed restriction should be 500 feet on either side of the work area.

d. More restrictive speed restrictions may be required depending on local conditions such as subgrade condition, weak ballast, insufficient anchors, poor ties etc.

e. Prior to increasing or removing a speed restriction, the track must be inspected to ensure appropriate anchorage exists and that there are no signs of tight rail per clause 29. Verification must also be made that the required tonnage actually passed over the track being restricted. Speed restrictions should not be removed in the heat of the day.

f. The following equivalency table can be used as a guideline for determining train tonnages:

Table 3: Equivalency Tonnage Table

Number of Trains		Equivalent Tonnage		Total Tonnage
_____ loaded trains	x	8,000 tons	=	_____ tons
_____ empty trains	x	3,500 tons	=	_____ tons
_____ passenger trains	x	1,333 tons	=	_____ tons
		Total =		_____ tons

TRACK BUCKLE PREVENTION

28. During periods of potential track buckles, CWR track in track buckle prone areas should be inspected during the hours of maximum rail temperature, generally between the hours of 12:00 (noon) and 20:00. Sufficient patrols will be arranged in order to cover the track.

29. When any of the following are apparent: bunched or pushing ties which are plowing ballast, rail running either through rail anchors or with the anchors, rail lifting up under the spike heads, rail pushing against both shoulders of the tie plates, canting rail on curves, gaps at the ends of the ties indicating lateral movement of the track or track having a kinky alignment immediate remedial action will be taken by either placing a speed restriction or adjusting the rail.

30. When surfacing near high risk locations Track Standard 4.0 item 11 must be followed.

31. Before surfacing and lining a curve on main tracks class 2 and above, the curve must be staked if it is more than 3° and the rail temperature is more than 50°F below the preferred rail laying temperature, or is expected to be in the next 24 hours.

32. To stake a curve prior to surfacing and lining, place at least 3 reference stakes uniformly spaced around the curve with the middle stake located near the middle of the curve. Additional stakes may be used due to the overall length of the curve.

33. Inspect for curve movement periodically after the work, especially during periods of large temperature changes. If the curve is found to have shifted inward more than 1", it must be lined out or destressed prior to ambient temperature reaching 85°F in the US and 70°F in Canada. If the curve is not lined out or destressed, then a speed restriction must be placed. The effective rail length added to a curve as a result of chording inwards is calculated as per Appendix B.

DESTRESSING RAIL

34. When it is evident that the stress free temperature of a section of rail has decreased to a level that a track buckle may occur, the stress-free temperature should be adjusted back to the Preferred Rail Laying Temperature. The method of destressing involves removing rail anchors, cutting the rail and removing rail to achieve the correct rail laying temperature.

35. Prior to cutting the rail, make reference marks on the web of the rail extending on to the rail base on either side of where the cut is to be made. The distance between the marks will be measured and written on the rail. The rail will be cut and ends either trimmed or offset, anchors will be removed for a sufficient length each side of the cut and the rail allowed to grow. The current rail temperature is now the Stress Free Temperature and Rail Laying Temperature at this location and it must be clearly marked on the web of the rail along with the date and gang ID.

FAILURES IN CWR

36. Service failures of CWR include broken rails, pull-aparts, buckles or other rail damage. Any service failure and the associated remedial action must be reported promptly in RDTS.

37. When a track buckle occurs one of the following corrective actions must be taken:

    a. Make cuts in the CWR near the buckle, remove rail anchors a sufficient distance either side of the buckle allowing rail to run, line the track and make a closure.

    b. Place the track in the best possible alignment where it will remain without further movement and where it will provide proper clearance.

    c. While under temporary repair, trains are to be operated at a speed specified by the foreman in charge but not more than 10 m.p.h.

    d. After the track is full repaired, it will be treated as disturbed track and protected by speed restrictions as shown in Table 2.

38. When a pull-apart occurs corrective action must be taken by either applying heat or expanders to bring the rail ends together or by installing a temporary closure.

39. Joints in CWR will be treated in the following manner:

    a. Temporary joints in CWR that cannot be immediately welded will be drilled and splice bars applied to allow for future thermite welding, leaving a joint gap not exceeding 3/8". All temporary joints should be welded prior to the onset of winter. Any temporary joints that are unable to be welded prior to winter should be fully drilled, bolted and box anchored.

    b. Permanent joints in CWR which are not intended to be welded will be fully drilled and bolted, splice bars applied, and the rail fully box anchored 200 feet each side of the joint in accordance with the applicable Track Standards.

APPENDIX A - CONTINUOUS WELDED RAIL THERMAL EXPANSION CHART

Determination of rail expansion for lengths between those shown in the table can be done through averaging rail lengths that bound the intermediate length and rounding to the nearest 1/8th inch.

TEMP. Difference From PRLT °F	LENGTH OF CWR (ft.) CWR MOVEMENT (in.)							
	200	400	600	800	1000	1200	1400	1482
5	1/8	1/8	1/4	3/8	3/8	1/2	1/2	5/8
10	1/8	3/8	1/2	5/8	3/4	1	1 1/8	1 1/8
15	1/4	1/2	3/4	1	1 1/4	1 1/2	1 5/8	1 3/4
20	3/8	5/8	1	1 1/4	1 5/8	1 7/8	2 1/4	2 3/8
25	3/8	3/4	1 1/4	1 5/8	2	2 3/8	2 3/4	3
30	1/2	1	1 1/2	1 7/8	2 3/8	2 7/8	3 3/8	3 1/2
35	1/2	1 1/8	1 5/8	2 1/4	2 3/4	3 3/8	3 7/8	4 1/8
40	5/8	1 1/4	1 7/8	2 1/2	3 1/4	3 7/8	4 1/2	4 3/4
45	3/4	1 1/2	2 1/8	2 7/8	3 5/8	4 3/8	5	5 3/8
50	3/4	1 5/8	2 3/8	3 1/4	4	4 3/4	5 5/8	5 7/8
55	7/8	1 3/4	2 5/8	3 1/2	4 3/8	5 1/4	6 1/8	6 1/2
60	1	1 7/8	2 7/8	3 7/8	4 3/4	5 3/4	6 3/4	7 1/8

TEMP. Difference From PRLT °F	LENGTH OF CWR (ft.) CWR MOVEMENT (in.)							
	200	400	600	800	1000	1200	1400	1482
5	1/8	1/8	1/4	3/8	3/8	1/2	1/2	5/8
10	1/8	3/8	1/2	5/8	3/4	1	1 1/8	1 1/8
15	1/4	1/2	3/4	1	1 1/4	1 1/2	1 5/8	1 3/4
20	3/8	5/8	1	1 1/4	1 5/8	1 7/8	2 1/4	2 3/8
25	3/8	3/4	1 1/4	1 5/8	2	2 3/8	2 3/4	3
30	1/2	1	1 1/2	1 7/8	2 3/8	2 7/8	3 3/8	3 1/2
35	1/2	1 1/8	1 5/8	2 1/4	2 3/4	3 3/8	3 7/8	4 1/8
40	5/8	1 1/4	1 7/8	2 1/2	3 1/4	3 7/8	4 1/2	4 3/4
45	3/4	1 1/2	2 1/8	2 7/8	3 5/8	4 3/8	5	5 3/8

APPENDIX B - EFFECTIVE RAIL LENGTH ADDED FOR CURVES CHORDING INWARD

When a curve chords inward, it is equivalent to adding rail into the track. The effective amount of rail added into a curve based on the amount the curve has shifted, or chorded inward can be calculated by the table below.

DEGREE OF CURVE	EFFECTIVE RAIL LENGTH ADDED TO CURVE PER 1000 FT. OF CURVE (INCHES)												
	DISTANCE CURVE HAS CORED INWARD (INCHES)												
	1/2	1	1-1/2	2	2-1/2	3	3-1/2	4	4-1/2	5	5-1/2	6
0-30	0	1/8	1/8	1/8	1/4	1/4	1/4	3/8	3/8	3/8	1/2	1/2
1-00	1/8	1/8	1/4	3/8	1/2	1/2	5/8	3/4	3/4	7/8	1	1
1-30	1/8	1/4	3/8	1/2	5/8	3/4	7/8	1	1-1/8	1-1/4	1-1/2	1-5/8
2-00	1/8	3/8	1/2	3/4	7/8	1	1-1/4	1-3/8	1-1/2	1-3/4	1-7/8	2-1/8
2-30	1/4	3/8	5/8	7/8	1-1/8	1-1/4	1-1/2	1-3/4	1-7/8	2-1/8	2-3/8	2-5/8
3-00	1/4	1/2	3/4	1	1-1/4	1-5/8	1-7/8	2-1/8	2-3/8	2-5/8	2-7/8	3-1/8
3-30	1/4	5/8	7/8	1-1/4	1-1/2	1-7/8	2-1/8	2-1/2	2-3/4	3-1/8	3-3/8	3-5/8
4-00	3/8	3/4	1	1-3/8	1-3/4	2-1/8	2-1/2	2-3/4	3-1/8	3-1/2	3-7/8	4-1/4
4-30	3/8	3/4	1-1/8	1-5/8	2	2-3/8	2-3/4	3-1/8	3-1/2	3-7/8	4-3/8	4-3/4
5-00	1/2	7/8	1-1/4	1-3/4	2-1/8	2-5/8	3	3-1/2	3-7/8	4-3/8	4-3/4	5-1/4

DEGREE OF CURVE	EFFECTIVE RAIL LENGTH ADDED TO CURVE PER 1000 FT. OF CURVE (INCHES)												
	DISTANCE CURVE HAS CORED INWARD (INCHES)												
	1/2	1	1-1/2	2	2-1/2	3	3-1/2	4	4-1/2	5	5-1/2	6
5-30	1/2	1	1-1/2	1-7/8	2-3/8	2-7/8	3-3/8	3-7/8	4-1/4	4-3/4	5-1/4	5-3/4
6-00	1/2	1	1-5/8	2-1/8	3-5/8	3-1/8	3-5/8	4-1/8	4-5/8	5-1/4	5-3/4	6-1/4
6-30	5/8	1-1/8	1-3/4	2-1/4	2-7/8	3-3/8	4	4-1/2	5	5-5/8	6-1/4	6-3/4
7-00	5/8	1-1/4	1-7/8	2-1/2	3	3-5/8	4-1/4	4-7/8	5-1/2	6-1/8	6-3/4	7-3/8
7-30	5/8	1-1/4	2	2-5/8	3-1/4	3-7/8	4-5/8	5-1/4	5-7/8	6-1/2	7-1/4	7-7/8
8-00	3/4	1-3/8	2-1/8	2-3/4	3-1/2	4-1/4	4-7/8	5-5/8	6-1/4	7	7-5/8	8-3/8
8-30	3/4	1-1/2	2-1/4	3	3-3/4	4-1/2	5-1/4	5-7/8	6-5/8	7-3/8	8-1/8	8-7/8
9-00	3/4	1-1/2	2-3/8	3-1/8	3-7/8	4-3/4	5-1/2	6-1/4	7	7-7/8	8-5/8	9-3/8
9-30	7/8	1-5/8	2-1/2	3-3/8	4-1/8	5	5-3/4	6-5/8	7-3/8	8-1/4	9-1/8	10
10-00	7/8	1-3/4	2-5/8	3-1/2	4-3/8	5-1/4	6-1/8	7	7-3/4	8-3/4	9-5/8	10-1/2

Example:

A 2000' 4 degree curve is found to have shifted inwards an average of 3 inches. What is the effective amount of rail added to the curve? Per the table, for a 4-degree curve and 3 inches of movement, it is equivalent to adding 2-1/8" of rail per 1000'. For a 2000' curve the effective rail length added would therefore be 4-1/4.

CN STANDARD FOR FIELD WELDING

TS 1.6 - Field Welding

1. Prior to welding, rail must be visually examined for physical defects and must meet the criteria herein for alignment and wear.
2. Welding kits must be compatible with the type of rail being welded. For any weld involving a chrome alloy rail, only a chrome welding procedure shall be used.
3. Thermite or field flash butt welds shall be located as close as possible to the center of tie cribs. The weld should not be closer than 4" to the edge of the tie and in no case may a field weld be situated over a tie plate.
4. Thermite Welds will not be made:
   a. Within 6 feet of another thermite weld
   b. Within 3 feet of a plant weld
5. Welding gaps for thermite welds shall be minumum1", maximum 1 1/8" inches except where approved wide gap welds are used.
6. All rail ends must be saw cut. The cut must be square and perpendicular to the rail axis, with a variation not exceeding 1/8" and all burrs must be removed.
7. In case of emergency, torch cutting of the rail is allowable provided:
   a. the rail is preheated prior to cutting;
   b. the torch cut is relatively smooth; and
   c. within 30 minutes of torch cutting, the rail is trimmed with a rail saw at least 1/4".
8. If a train has been allowed to pass over the torch cut rail prior to cooling to 100°F, a minimum of 4" of rail must be removed.

9. The distance from the end of rail to the nearest edge of any hole drilled in the rail shall not be less than 4", except in class 1 tracks.
10. The Month, Year, Welder ID, and weld number if applicable of each weld shall be identified with a tag or written with marker on the gauge side of the web, 6" away from the weld.
11. Rails which require thermite welding on bridges shall be welded off the bridge wherever possible, and then laid in place on the bridge after all work on the weld is finished. However, when there is no alternative to doing thermite welding on a bridge, the following precautions must be taken.
    a. Before any welding is undertaken, a site inspection must be made to identify any hazards, and in particular, anything that may take fire. Any loose combustible material, dry vegetation, etc., must be removed. The entire structure must be examined. Do not assume that if no combustible is visible from above, the bridge is fire safe. A ballast deck timber trestle is as combustible as an open deck timber trestle and must be treated as such.
    b. When thermite welding must be performed on open deck bridges, a 1/4" thick steel sandbox partially filled with sand and placed between the ties is required in case of a run through. Bridge timbers will be spread by the B&S forces so that the box may be installed. Welding shall not be undertaken without the use of the box.

c. A thorough job briefing must be conducted with all personnel involved, to determine what will be done in case of accident or fire. Where sufficient personnel and equipment are not available to take care of any accident or fire that may occur, welding shall not be undertaken.

d. Designated fire watch person(s) must be assigned. Such person(s) must understand their duties and ensure that suitable fire fighting equipment is in position before the work commences. Where the fire watch person(s) are positioned under the bridge, fire-fighting equipment must also be available on the bridge deck.

e. The area around the weld must be wetted down to lessen the chance of fire.

f. When welding is complete, a fire watch person(s) shall remain at the site until the weld has cooled to ambient temperature.

12. During the arc welding process stray electrical current can damage sensitive signal equipment. The following is applicable:

a. Avoid accidentally striking an arc while ground clamp is attached to the opposite rail.

b. In locations of potential damage notify the S & C employee well in advance in order that circuit fuses can be installed to protect the equipment.

c. All electrical equipment must be grounded at the source.

d. No more than two single arc welding machines may be operated within the limits of any track circuit. This applies to territory having one or more tracks.

13. For the welding of insulated joints, standard splice bars shall be applied on only one joint at a time. (Note that when the insulated joint is on the closure rail the installation of standard splice bars may short the track circuit.

MAXIMUM ALLOWABLE RAIL HEIGHT DIFFERENCE

		WEIGHT OF RAIL		
		100 lb. and smaller	112 / 115 lb.	132 / 136 / 141 lb.
TYPE OF WELD	Standard Thermite Kit	0.125" (3 mm)	0.30" (8 mm)*	0.30" (8 mm)*
	Step Down Thermite Kit 136NEW to 13610	----------		0.375" (10 mm)
	Flash Butt Welder	0.20" (5 mm)		

* If Vertical Rail Base Offset exceeds 1/8" (3 mm) a sloped base plate must be used

CN STANDARD FOR JOINTS

TS 1.8 – Joints

1. In conventional jointed track, each rail shall be bolted with at least two bolts at each joint in Classes 2 through 5 track and with at least one bolt in Class 1 track.
2. In the case of CWR track, each rail shall be bolted with at least two bolts at each joint.

CONVENTIONAL RAIL JOINTS

3. Rail bolt holes will be located using the correct indexing bar. The indexing bar will be placed so that the edge of the indexing bar matches the end of the rail.
4. Only joint bars of the correct design for the rail section, drilling pattern and bolt type will be used.
5. All joints in CWR territory must be inspected at a minimum frequency of that shown in TS, section 7.
6. In Class 3 and above track, broken or cracked joint bars on that allow vertical movement of either rail when all bolts are tight should be replaced as soon as possible.
7. Track joint bars that are cracked or broken between the middle two bolt holes regardless of the class of track must be replaced immediately.
8. Rail joints should be slotted to prevent flowed rail and chipped joints.
9. Where 33 to 39 foot panels are installed and three or more consecutive square joints exist, speed will be limited to that of class 3 track.

INSULATED JOINTS

10. Defective insulated joints must be repaired or replaced promptly.

11. Signal forces must report defective insulated joints to track forces promptly.
12. Signal forces must advise the track forces of the location of insulated joints for proper signal operation. The location must not be changed without the approval of the Signal Supervisor.
13. Bonded insulated joints are to be used in Continuous Welded Rail.
14. Encapsulated (coated) insulated joints are to be used in jointed rail sections.
15. Fibre bars may be used in light rail sections.
16. Plates must be used with all insulated joints on wood track ties. As shown on TS-1206, insulated tie plates will be used on ties within 2" of the end post of an insulated joint.
17. Proper insulated joint clip fully driven in place must be used when Pandrol tie plates or concrete ties are used.
18. Insulated joints should be suspended, that is, the end post should not be over a tie.
19. Rail ends where insulated joints are to be installed must conform to the following:
    a. The end face shall be saw cut and bolt holes drilled to the proper size and location for the rail section.
    b. All rough edges and burrs shall be removed from the end face and the bolt holes.
    c. Batter shall not exceed 1/32 inch.
    d. The heights of the adjacent rails shall not differ by more than 1/16 inch.
20. All rust, scale, dirt or other foreign matter must be removed from the rail joint area and from the joint bars before the joint is installed.

21. If the end post projects above the top of rail, it must be trimmed so that the top is below the top of rail, but not exceeding 1/8 inch below.
22. Track near insulated joints shall be adequately anchored. Non-glued insulated joints will be considered as joints and will be anchored to the correct standard.
23. Rail anchors must not be applied on the sides of ties adjacent to bootlegs.
24. Rail end overflow must be removed at insulated joints by slotting in accordance with Standard Plan TS 1113. The gap should be filled with silicone sealer to prevent the influx of dirt and grinding material.
25. After welding insulation must not be replaced until the rails have cooled.
26. Insulated joints, no longer required must be removed from track as soon as possible.

COMPROMISE JOINTS AND RAILS

27. To determine the hand of the joint, face the joint from the center of the track. When the larger rail section is on the left side of the joint, it is a left hand joint. When the rail of larger section is on the right, it is a right hand joint.
28. A compromise joint consists of one gauge side and one field side bar. The rail sections that the compromise bar will fit are indicated at each end of the bar.
29. Compromise joint bars must not be modified from its initial design to fit a different rail section.
30. Compromise joints (except 132/136 lb.) must not be installed in turnouts, or within 20 ft. of an open deck bridge, turnout, highway crossing or railroad crossing.

31. Compromise joint should be painted a colour designated by the Regional Chief Engineer.
32. Compromise rails consist of a single piece of rail, with a forged transition from one rail section to another. Compromise rails may be universal or "handed", depending on the rail sections, and are identified just as a joint would be.
33. Compromise rails will be fully supported and tamped with the correct size tie plates under the corresponding rail section.
34. The use of 100/115 lb. and 115/136 lb. compromise bars is not be permitted on main tracks where:
    a. Operating speed is greater than Class 2, or;
    b. Where annual tonnage is greater than 10 mgt.
35. Compromise bars are permitted in non-main tracks, main tracks in Class 1 and 2, and main tracks less than and equal to 10 mgt annually.

CN STANDARD FOR TIMBER TIE INSTALLATION AND MAINTENANCE

TIES

TS 2.1 - Timber Tie Installation and Maintenance

1. Bridge approach ties as per plan TS-1108 must be used on the approaches to open deck bridges and trestles.
2. Treated ties must not be handled with any tool having sharp points that will penetrate beyond the depth of the treatment, or cause damage to the ties.
3. When ties are re-spiked, the spike holes must be plugged.
4. Ties must not be allowed to become center-bound.
5. In preparation for a tie renewal program:
   a) The Track Supervisor, or a person designated by the Regional Chief Engineer, shall be responsible for inspecting, marking and recording ties for renewal and preparing a list showing the actual number of ties per mile that are to be replaced the following year; and
   b) The following definitions of defective ties will be used:
      i. Broken Tie - Tie that is broken through the entire depth of the tie
      ii. Split Tie - Tie split end to end for the entire depth of the tie
      iii. Split Tie End - Tie end split into the spike holes, or split full depth and wide enough to permit ballast to come through, resulting in poor surface and gauge.
      iv. Cut Tie - Tie that is rail or plate cut or adzed to a depth of 2" or more on No. 1 ties, or 1" or more on No. 2 ties.
      v. Crushed Tie - Tie that has the bearing surface under the rail crushed or splintered, 1" or more, to the extent that it cannot hold surface, line or gauge.
      vi. Spike Killed Tie - Condition may be indicated by numerous splits at the tie end, loose or high spikes, rail or plate movement of more than 1/2" or wide gauge (including dynamic wide gauge).
      vii. Decayed Tie - Tie that is decayed and cannot hold spikes, gauge or surface.
      viii. Damaged Tie - Tie that has been damaged by derailment, dragging equipment, or fire to the extent that it cannot hold surface, line or gauge.
      ix. Worn Tie - A tie worn or rounded on the bottom from movement of the tie in the ballast, resulting in poor surface and line and an inability to hold spikes.
6. At least one tie at each rail joint must be sound and In any case the number of non-defective ties in any 39 foot length of track shall never be less than that indicated in the table below and shall be so distributed as to effectively support the entire 39' length.

Track Class	Train Speed, Max.		Minimum No. of Non-Defective Ties	
	Passenger (mph)	Freight (mph)	Tangent up to 2 Deg.	Turnouts and curves More than 2 Deg.
5	90*	80	12	14
4	80	60	12	14
3	60	40	10	10
2	30	25	8	9
1	15	10	5	6

*For Can. Lines 95 mph, for LRC Trains, 100 mph

ENGINEERING TRACK STANDARDS

7. A cluster (or spot renewal) program should be undertaken when there is a high frequency of:
   a. four or more consecutive defective ties;
   b. three or more consecutive defective ties in a curve greater than 2°; or
   c. defective ties in the joint area.
8. When renewing ties, regardless of method of installation:
   a. Correct gauge where required;
   b. Where required, no more ballast than is absolutely necessary should be removed from the crib or shoulder;
   c. All ties installed must be spiked and anchored, the ballast shoulders restored, and the ties properly tamped before the close of each day. Any adjacent ties that may be left hanging should also be tamped; and
   d. When necessary to allow trains to operate through tie gang renewal areas during working hours, not more than three consecutive ties on tangent track or two consecutive ties on curved track can be left unspiked, ties on either side of all joints must be spiked, and the speed must be limited to a maximum of 10 mph.
   e. In preparation for the following day tie installation the spiking pattern may be reduced to a minmum of 2 rail holding spikes per plate on each tie to be removed.

9. No ties will be installed when the temperature is above the PRLTR unless directed by the Regional Chief Engineer. The Regional Chief Engineer must specify all necessary precautions to be taken such as mandating the use of a stabilizer, a production tamper, increased inspections, more restrictive speed restrictions, or limiting work to emergency applications.
10. The track will be protected by the appropriate speed restriction as per TS 1.3 until track has been surfaced, backfilled and consolidation has occurred.
11. In CWR territory the maximum number of consecutive track ties that can be renewed in a single pass shall be:

	Number of Consecutive Ties	
	Tangent track to 2° curves	Greater than 2°
With a Junior or Production Tamper	5	4
With Hand Tamping or Hydraulic Tools	3	2

12. Switch ties in CWR territory may be replaced in a single pass provided the appropriate speed restriction is applied for spot surfacing.
13. Crossing Ties in CWR territory replaced as part of crossing rehabilitation may all be changed in a single pass provided;
   a. Crossing surface is replaced immediately following tie renewal;
   b. Crossing approaches are restored and are of sound condition; and
   c. The appropriate speed restriction is applied for spot surfacing.

14. Transition tie sets in CWR territory may be changed out in a singlepass provided:
    a. The ties are being replaced in conjunction with ballast rehabilitation work.
    b. Upon completion of work, the ballast section is fully restored with a minimum 12" shoulder; and
    c. The appropriate speed restriction is applied for spot surfacing.
15. Gauge rods installed in winter must be removed in the next work season and a sufficient number of ties installed. Under no circumstances are gauge rods that have been installed in one winter to be left in track through the following winter

CN STANDARD FOR TIE PLATES

O.T.M.

TS 3.1 - Tie Plates

1. The use of new or second hand tie plates shall be as directed by the Regional Chief Engineer, however:
   a) Broken or damaged tie plates must not be reused.
   b) Tie plates with excessively worn spike holes or shoulders greter than the limits shown below should not be reused:
      i) spike holes worn more than 1/4 inch
      ii) timber screws holes worn more than 1/4 inch
      iii) Tie plate shoulders worn more than 1/4 inch
2. Tie plates must be installed so that:
   a) The plates have full, even bearing on the ties.
   b) The field side plate shoulder is square against the field side base edge of the rail
   c) The plate is centered on the tie.
   d) The rail is canted toward the center of the track.
   e) Each plate has the same cant. (1:40)
3. In Classes 3 through 5 track where timber crossties are used there shall be tie plates under the running rails on at least eight of any 10 consecutive ties.
4. Ensure that there are no metal objects that cause concentrated loading solely supporting the rail between the rail and the tie plate. This includes the tie plate shoulders and spike heads.
5. Torch cutting of tie plates is not permitted.
6. Tie plates shall be used in accordance with the following table:

Recommended Tie Plate Usage – Lines Carrying Heavy Axle Loads

Add Annual Tonnage (MGT)	Class of Track	5 1/2 " rail base			6" rail base		
		11" or 12" plate		13" or 14" plate, MSR 16" and 18" Plates			
		Degree of Curve			Degree of Curve		
		0° to 2°	More than 2° to 6°	All	12" plate	14" plate	16" plate	MSR 16" plate (Pandrol Clips)
<5	1 – 5				0° to 2°	More than 2° to 6°	More than 6°	
More than5	1 – 5					0° to 4°	More than 4° to 6°	More than 6°
Annual Tonnage (MGT)	Class of Track					0° to 4°	More than 4° to 6°	More than 6°
<5	1 – 5					0° to 2°	More than 2° to 4°	More than 4°
5 to 20	1 – 5						0° to 2°	>2°
20 to 40	1 – 2							
	3 – 6							
>40	3 – 6							

CN STANDARD FOR RAIL ANCHORS

TS 3.2 - Rail Anchors

1. Anchors should be applied uniformly along the rail against ties.
2. To avoid tie skewing, anchors must be installed in the same direction against the same tie on the opposite rail. Ties should be at right angles to rail before applying anchors
3. Anchors will be applied to the gauge side of the rail when practicable.
4. When changing rail or renewing ties, all anchors removed must be reapplied.
5. Sprung or damaged rail anchors will not be installed.
6. Use only the proper tools or machines when applying or removing anchors in order to avoid damaging the anchor or risk injury. The use of spike mauls is prohibited. Anchors should be removed from the rail while the rail is still in track.
7. When installing anchors, ensure the anchor is fully engaged on the rail base with the rail base inside the lip of the anchor. Drive on rail anchors must not be overdriven.
8. Do not install anchors within one inch of a plant or field weld.
9. Do not install anchors on the rail opposite joints.
10. Do not install rail anchors where they will contact and damage signal connection wires.
11. Rail anchors are not to be used on shimmed track. Anchors removed during shimming shall be replaced promptly when shims are removed.

12. In jointed rail, the minimum number of evenly spaced anchors per 39' of track are:

TC / FRA Class of Track	No of Ties to Box Anchor
1	6
2 & 3	8
4 & 5	10

13. Turnouts should be fully anchored to the extent possible in both jointed and CWR track.
14. In CWR track, rail anchors will be installed in a box pattern on every other tie except:
    a. At permanent joints within CWR (joints that will not be welded), then every tie will be box anchored for a minimum distance of 200' each direction from the joint.
    b. When jointed rail abuts CWR, a minimum of 200' of rail on either side immediately adjacent to the joint will have every tie boxed anchored.
    c. At turnouts, non-glued insulated joints and crossing frogs, every tie will be box anchored for a minimum distance of 200' each way from the turnout or joint.

15. When CWR is installed on a bridge with an open deck span, the following, when practicable, will be used:

LENGTH OF CONTINOUS OPEN DECK PORTION (ft.)	INDIVIDUAL SPAN LENGTH (ft)	RAIL ANCHOR REQUIREMENTS	SLIDING JOINT REQUIREMENTS
100 ft. or Less	All Spans	No anchors	Not required
		—OR—	
100 ft. or Less (if anchors are required)	100 ft or Less	Box Anchor every second tie*	Not required
Greater than 100 ft	100 ft or Less	Box Anchor every second tie*	None Required
		—OR—	
		No Anchors	Sliding Joint(s) Required
	Greater than 100 ft.	Box anchor every second tie for 100' from fixed end of span*	None Required
		—OR—	
		No Anchors	Sliding Joint(s) Required
	Greater than 300 ft	Box anchor every second tie for 100' from fixed end of span*	As directed by the Assistant Chief Engineer - Bridges

* Box anchors are to be applied only to ties that are hook bolted to the span. Box anchor spacing may be extended to every 3rd tie if required to match the hook bolt spacing.

a. Manager B & S to identify fixed ends of spans prior to installing CWR.

b. Prior to anchoring CWR on open deck steel TPG, TT, and DT spans, the Manager B & S will confirm the requirements for bridge traction bracing.

c. Anchor requirements and pattern should be confirmed with the Manager B & S.

d. Box anchor every tie for a minimum of 200' off each end of open deck portion.

e. On timber span bridges, only box anchor the ties that are attached to the span with boat spikes, usually every other tie or as directed by the Regional Chief Engineer.

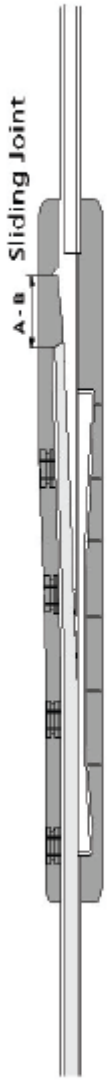
f. Movable spans will be anchored as directed by the Chief Engineer.

g. Where elastic fasteners provide longitudinal restraint they will considered equivalent to anchoring.

16. CWR installed on a ballast deck bridge or span will be box anchored a minimum of every second tie.

FIGURE 1

EXPANSION LENGTH OF SLIDING JOINTS IN CWR



Rail Temp °F	Distance from A to B in inches													
	Length of unanchored CWR in feet													
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1482		
0	16 1/2	16 3/4	17 1/8	17 1/2	17 7/8	18 1/4	18 5/8	19	19 3/8	19 3/4	20 1/8	20 3/8		
10	16 1/8	16 3/8	16 3/4	17	17 1/4	17 1/2	17 7/8	18 1/8	18 3/8	18 5/8	19	19 1/8		
20	15 3/4	16	16 1/4	16 3/8	16 5/8	16 3/4	17	17 1/4	17 3/8	17 5/8	17 7/8	18		
30	15 1/2	15 5/8	15 3/4	15 7/8	16	16	16 1/4	16 3/8	16 1/2	16 5/8	16 3/4	16 3/4		
40	15 1/8	15 1/4	15 1/4	15 1/4	15 3/8	15 3/8	15 3/8	15 1/2	15 1/2	15 1/2	15 5/8	15 5/8		
50	14 7/8	14 3/4	14 3/4	14 3/4	14 5/8	14 5/8	14 1/2	14 1/2	14 1/2	14 1/2	14 1/2	14 3/8		
60	14 1/2	14 3/8	14 1/4	14 1/8	14	13 7/8	13 3/4	13 5/8	13 1/2	13 3/8	13 3/8	13 1/4		
70	14 1/4	14	13 3/4	13 5/8	13 3/8	13 1/4	13	12 3/4	12 5/8	12 3/8	12 1/8	12		
80	13 7/8	13 5/8	13 3/8	13	12 3/4	12 1/2	12 1/8	11 7/8	11 5/8	11 3/8	11	10 7/8		
90	13 1/2	13 1/4	12 7/8	12 1/2	12 1/8	11 3/4	11 3/8	11	10 5/8	10 1/4	9 7/8	9 5/8		
100	13 1/4	12 3/4	12 3/8	11 7/8	11 1/2	11	10 5/8	10 1/8	9 3/4	9 1/4	8 3/4	8 1/2		

17. Sliding Joints that are installed shall be:

    a. of a design approved by the Chief Engineer;

    b. installed in pairs, and opposite each other or properly guarded if staggered;

    c. installed and maintained with sufficient expansion length as per Figure 1;

    d. normally located behind the abutment and on the downgrade approach or expansion end of end spans to the bridge, and;

    e. spaced no more than 1500' apart, which may result in sliding joints being installed on the deck of longer structures.

CN STANDARD FOR RAIL FASTENING

TS 3.4 - Rail Fastening

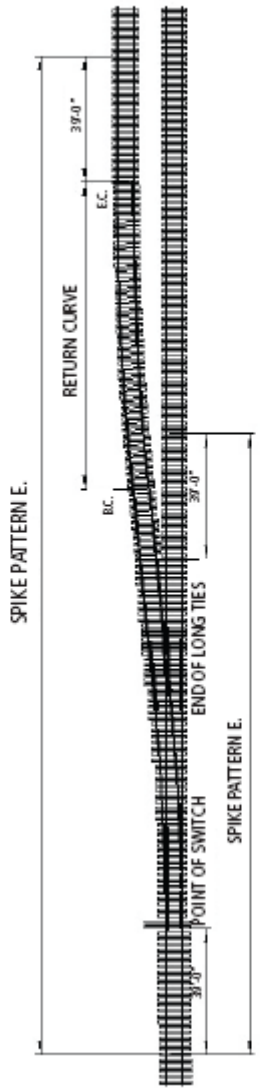
1. Each rail shall be spiked as per the appropriate attached spiking pattern.
2. Drive spikes vertically with the face of the spike in contact with the base edge of the rail, except spikes against insulated joints, which will be installed with heads turned away from the joint bar and not in solid contact with the joint bar. No fastenings may be installed at insulated joints in a manner that may short circuit the track circuit.
3. Spikes will be driven to a depth such that the spike head is within 3/16" of top of the rail base. Every effort should be made not to overdrive spikes.
4. Spikes should not be driven at the ends of insulated joint bars in any manner that would cause the insulated joint bar to become electrically connected to the rail.
5. Spikes will be driven only with a standard spike maul, pneumatic or hydraulic spiking hammer or spiking machine.
6. Spikes will not be driven within 2 inches of the end of, or in the slots of, skirted (slotted) joint bars.

FIGURE 1: Spiking Patterns

No.	SPIKING PATTERN Field	Gauge	MGTs PER YEAR	DEGREE OF CURVE Tangent up to 3°	3° to 4°	4° to 6°	>6°
A			Other than Main Track	X			
B			Other than Main Track		X	X	X
			0-20	X			
C		OR	0-20		X	X	
			>20	X			
D			0-20				X
			>20		X	X	
E			>20				X

Turnouts Spiking pattern E will be applied to turnouts as per Figure 1 below 90

FIGURE 2: Spiking Through Turnouts



7. When pulling spikes, a spike lifter will be used when spikes cannot be loosened with a claw bar.
8. Spikes between the running rail and guard rails, as well as spikes in tight areas around heel blocks and frogs will be removed using a four-ball spike puller and claw-bar.
9. Claw bars will not be struck with mauls or other tools.
10. Timber screw installation will require a 5/8" pilot hole, drilled a minimum 5 inches into the tie.
11. Timber screws will be run (turned) into tie and not driven.
12. Timber screws will be used without washers.
13. Pandrol e 2055 clips are used on wood tie turnouts and wooden track ties with elastic fastener plates.
14. Care must be taken to drive the clips correctly
    a) On concrete ties the "e" clips should be driven so that the leg is flush with the shoulder
    b) On turnout plates on timber ties clips must be driven flush with the shoulder
    c) On pandrol plates clips will be driven so that the radius in the clips does not contact the plate
15. Where clips are installed by hand, care must be taken not to strike the shoulder or tie with the striking tool.
16. Where clips are installed by machine, the operator must ensure that the machine is adjusted to insert the clip horizontally into the hole without binding.

CN STANDARD FOR BALLASTING, SURFACING, AND LINING

TS 4.0 - Ballasting, Surfacing, and Lining

DEFINITIONS:

1. "Spot Surfacing" Restoring track surface, cross-level and alignment through short stretches, not more than 19'6" in length, when a continuous raise is not necessary.
2. "Out-of-face Surfacing" - The continuous raising of track to restore track surface, cross-level and alignment.

SURFACING

3. When surfacing operations effect signal related track components, the Signal Department must be notified in order to perform needed adjustments, repairs or inspections.
4. During surfacing work, employees must check the surface using a track level.
5. Any anchors removed must be replaced, anchors adjusted, missing elastic fasteners replaced, high spikes plugged and re-driven, and hanging ties brought up tight to the rail base. After all work is completed employees should check for missing clips.
6. On completion of surfacing, the surface must be in compliance with Track Standard 7.1.
7. When tamping, only 16" on either side of the rail is to be tamped. The center of the tie must not be tamped. When tamping transition ties, the entire length of the tie outside the rail must be tamped.
8. Track raises in excess of 6" should be avoided, however, if it is necessary, such lifts should be carried out successively so that individual lifts do not exceed 3 inches. Dynamic stabilizers should be used between lifts.

9. Track surfacing and lining which eliminates long line swings or lines curves to the inside may generate additional rail and should when practicable be monitored to determine if adjustment is needed.
10. When surfacing CWR track, monitor the rail temperature.
11. When rail has been added or the track lined inwards within 300 feet of a high risk location listed below AND the rail temperature is above the PRLT, the following precautions must be taken:

High risk locations:

a. Bottom of a grade near a fixed track location such as a bridge, turnout, road crossing or diamond
b. Known areas of heavy train breaking at or near fixed track locations
c. areas of no insufficient anchors (not per Track Standard)
d. fixed track locations within a directional running zone
e. any areas showing signs of high rail compression

Precautions to be taken:

a. If possible surface away from the fixed location and not towards it.
b. If not possible, cut the rail and ensure a desirable rail neutral temperature.

12. Before surfacing and lining a curve on main tracks class 2 and above, the curve must be staked if it is more than 3° and the rail temperature is more than 50° F below the preferred rail laying temperature, or is expected to be in the next 24 hours.

13. To stake a curve prior to surfacing and lining, place at least 3 reference stakes uniformly spaced around the curve with the middle stake located near the middle of the curve. Additional stakes may be used due to the overall length of the curve.

14. Inspect for curve movement periodically after the work, especially during periods of large temperature changes. If the curve is found to have shifted inward more than 1', it must be lined out or destressed prior to ambient temperature reaching 85° F in the US and 70° F in Canada. If the curve is not lined out or destressed than a speed restriction must be placed. The effective rail length added to a curve as a result of chording inwards is calculated in Appendix B of Track Standard 1.3.

15. After surfacing, track seen to exhibit signs that CWR is out of adjustment shall be reported to the appropriate authority and the track protected until remedial action is taken.

BALLASTING

16. Ballast cross sections for new construction shall conform to TS plan 2205.

17. Usage of ballast shall be in accordance with Track Standard 8.0.

18. Ballast cross section shall have:

a. cribs filled to a minimum of 1" below the top of tie (except concrete ties).

b. No ballast left on top of ties, spikes and tie plates.

c. Shoulder ballast for jointed rail to be maintained to a minimum of 6" out from the end of the tie before sloping.

d. Shoulder ballast for CWR track should be maintained to a minimum of 12 "out from the end of the tie before sloping.

e. On double main track and between main and siding tracks, a ballast trough between tracks should be maintained.

19. Ample clearance for rolling stock shall be provided when distributing and dressing ballast. Remove ballast from switches or flangeways through frogs, guardrails and crossings, which will impede proper operation or passage of wheel flanges.

20. When unloading ballast, only the amount of ballast required should be unloaded and in the correct location in order to reduce wasting ballast. Extra care should be taken when unloading near open deck bridges or road crossings. Car doors should be closed prior to any movement across open deck bridges. Ballast shall not be allowed to accumulate on road crossings.

21. When unloading ballast in the center of the track, a plow tie may be used in order to evenly spread ballast and prevent excessive rock from accumulating on the rail and possibly derailing cars.

22. When unloading ballast, all cars must be completely empty and doors closed and locked prior to releasing.

23. Care must be exercised when unloading ballast from cars on one side or on curves with superelevation. Prior to movement, the load should be levelled.

CN STANDARD FOR TURNOUTS

TS 5.1 - Turnouts

1. Care will be taken when working around turnouts to avoid interfering with Signals Systems:
   a. Use extreme care not to short across an insulated gauge rod, insulated gauge plate or insulated joints, when using any tool that conducts electricity such as track wrench, shovel, ballast fork, tie tongs or metal broom.
   b. At locations where snow-clearing devices are installed, use extra precautions because of the possibility of creating a short circuit through the metal ductwork.
2. Responsibility for lubrication of switch point plates at any particular location will be assigned by the Regional Chief Engineer.

INSTALLATION

3. Turnouts must not be installed or renewed on main track curves, except in special cases as authorized by the Regional Chief Engineer.
4. Power, Dual Control, Spring and Electrically Locked switches shall be installed only at locations approved by the Regional Chief Engineer.
5. When turnouts are delivered pre-fabricated and in panel cars, the following precautions will be taken when unloading and transporting:
   a. Panel turnouts must be completely secured to the racks of the cars whenever the car is moved.
   b. The weight of each panel must be known and compared to the load chart of the crane prior to attempting a lift.

   c. Each panel in the car will be fully secured until it is ready to be lifted from the car. The panel will only be released once the crane lift lines are secured to the panel.
   d. Removal of panel tie-down chains will be done from behind the turnout panel.
   e. No one is allowed in a panel turnout car when the panel is being lifted.
   f. Panels will be placed where they will not affect the safety of railroad operations or the public.
   g. All tie-down chains must be placed in the car when the car is empty.
6. When turnouts are being constructed, trains should not be permitted to move in either direction until:
   a. The frog is properly protected by a guard rail.
   b. The main track switch point is clamped or lined and locked against the stock rail.
7. Switch stands should be plumb and be securely spiked, bolted or lagged to the head block ties. Stands on spring switches shall be securely bolted to the head block ties.
8. Main track switch stands shall be of an approved rigid type
9. On other than main track, approved rigid, or safety stands (17D) may be used.
10. Semi-automatic stands of an approved type may be used on yard tracks only.
11. Approved rigid stands must be used with spring switches, or where operating stands are used with derails.

12. New and rebuilt switch stands may be supplied with ergonomic switch handles.
    a. In Canada, where ergonomic switch handles are used they will be painted silver in colour to ensure they are visible at night.
    b. In the U.S., where ergonomic switch handles are used they will be painted yellow.
13. All main track stands must be equipped with an approved switch lock in good working order and properly chained to the stand on high mast switch stand or to the ties on low mast switch stands. Switch stands on other than main tracks are to be equipped with a hook type keeper unless otherwise directed.
14. On all main track hand operated switches, regardless of the method used to control train operation, as well as Yard limits high security switch locks must be installed
    a Dual control and power switches need not be so equipped, except self -restoring, locally controlled switches (LCS).
    b At locations where vandalism is a concern, high security switch locks may also be installed as directed by the Regional Chief Engineer on the following.
    - Hand operated switches on other than main tracks
    - Other devices such as derails, electric switch locks, foot pedals, push button operation panels, etc.
15. Switch stands must be located so as to conform to TS plan .
16. Low stands must be used where stands are to be located between tracks having track centres 18'-0" or less.

17. Switch stands and switch machines must be placed, wherever possible, on the closed point side of the track, so the connecting rod is in tension, when the switch is set for the normal position.
    a. The handle on all high switch stands (RACOR 17D, 31B or Hi-Star) should be positioned so that when the switch is in the normal position the handle faces away from the frog and away from the track. When the switch is lined over for the diverging route the handle should move in the same direction as the points. (Exception 112E stands)
    b. When installing parallel or ground throw switch stands, the operating lever must point toward the frog for normal position.
18. Switch stands must be equipped with the proper reflectorized target according to TS.
19. Approved switch point locks, must be installed on all manually operated main track switches (except spring switches) seen as facing points from a highway crossing at grade where all the following conditions exist:
    a. the crossing is not protected by gates or half gates, and;
    b. the train speed is 50 mph or faster (30 mph where sight lines are poor), and;
    c. the switch is within 200 ft of the crossing.
20. Switch rods and connecting rod bolts must be inserted with the nuts on the top side and secured with cotter pins. Ensure the connecting rod jaw openings, bolt holes and bolts correctly match the switch rods. The connecting rod bolt under the switch stand must be installed with the head of the bolt on the upper side.

21. Where switch point locks are installed, the switch will be identified by painting the top of the switch stand castings white.
22. Switch points shall fit snugly against the stock rails for the entire length of the planed portion.
23. Turnout stock rails shall be horizontally bent as shown on the Standard Plan. The CB-60-141 is the only rail bender permitted to field bend stock rails of all metallurgy, for rail weights up to and including the 141 RE section. All other benders, without exception, are limited to bending 115 lb. or lighter rail in standard carbon and 3HB metallurgy only.
24. It is important that stock rails are properly seated in the switch plate, have no lateral movement in the plates and that switch plates have no movement on the ties. Care must be taken in adjusting braces to avoid over-driving and rotating the stock rails out of the rail seat of the plate.
25. When surfacing through a turnout with boltless adjustable rail braces, switch points and stock rails will be blocked to prevent displacement of the stock rail from the switch plate.
26. Switch point protectors or switch point guards of an approved type may be installed, to protect the switch point where the speed on any route through the turnout does not exceed 15 mph. Care must be taken when installing to ensure that the protector fits properly against the rail and that any flowed metal on the gauge side of the straight stock rail is ground off.
27. Ballast will be cleaned from cribs to a depth adequate to prevent contact with rods and to facilitate winter switch maintenance and drainage.

MAINTENANCE

28. The Signal Maintainer shall be present when any planned work, which may interfere with the functioning of the signal apparatus, is being performed.
29. Switch stands, switch plates, connecting rod bolts, and spring frogs shall be kept properly lubricated to provide easy movement and to protect against excessive wear.
30. Switch stands, targets, masts, connecting rods and all other component parts must be kept in good operating condition and must have defective parts repaired or replaced immediately.
31. The application of heat or mechanical methods to repair bent or twisted switch stand masts is not permitted.
32. Adjustment of semi-automatic switch stands shall be performed in accordance with Recommended Method 3500-6. Where inspection/adjustment reveal excessive wear or other internal problems with the stand, it must be removed from track.
33. Insulation in switch rods, pipe connected derails and gauge plates shall be maintained in good condition at all times.
34. Metal flow on switch points and stock rails shall be kept ground off to maintain proper gauge and to prevent chipping of these parts. Flow should not exceed 1/8" on switch point or gauge side of stock rail.
35. Switch rods and transit clips should have sufficient clearance so as not to contact the side of the tie or the slide plate.
36. Maintain good tie condition under the heel assembly.

37. Self-guarded manganese frogs must not be used in track where speeds exceed 15 mph.

38. Once a frog has been installed, the manganese inserts should be ground at the following suggested minimum intervals to remove flow and lip:

    a. after the passage of approximately 0.5 MGT of traffic (about 3 days at 50 Million Gross Tons (MGT)/year);

    b. after the passage of approximately 1.5 MGT of traffic (about 10 days at 50 MGT/year);

    c. after the passage of approximately 4 MGT of traffic; and

    d. after every subsequent 12 MGT or as required to remove flow and lip.

39. All new special trackwork 100 lb. or less will be assembled using Grade 5 bolts. All new special trackwork 115 lb. or greater will be assembled using Grade 8 bolts.

40. Grade 5 bolts can be identified by three (3) radial lines on the head of the bolt. Grade 8 bolts have six (6) radial lines.

41. On trackwork Grade 8 bolts shall be used, and each bolt must be equipped with a hardened steel washer Grade 8 bolts must be tightened to the torque shown in Table 3.

TABLE 1: TORQUE TO BE APPLIED TO GRADE 5 BOLTS FOR SPECIAL TRACKWORK

Size of Bolt - inches	1"	1 1/16"	1 1/8"	1 1/4"
Torque- ft-lbs	670	850	1200	1600

TABLE 2: TORQUE TO BE APPLIED TO GRADE 8 BOLTS FOR SPECIAL TRACKWORK

Size of Bolt - inches	1	1 1/4	1 3/8
Torque ft.- lb.	840	1675	2500

Note: All torques listed are for lubricated bolts using a graphite based lubricant.

CN STANDARD FOR TRACK INSPECTION GUIDELINES

TS 7.0 - Track Inspection Guidelines

1. The allowable train speed on a subdivision, or portion thereof, shall be used to determine the class of track as follows:

Track Class	Maximum Allowable Speed, mph			
	Canadian Lines		US Lines	
	Passenger	Freight	Passenger	Freight
1	15	10	15	10
2	30	25	30	25
3	60	40	60	40
4	80	60	80	60
5	95*	80	90	80

*For LRC Trains, 100 mph

   a. Minimum track inspection frequencies in Canada shall be as outlined in the Transport Canada Track Safety Rules. Minimum track inspection frequencies in the US shall be as outlined in the FRA Track Safety Standards.

   b. The Track Supervisor must know that any person designated to do track inspections is qualified and must ensure the quality of inspection.

2. Walking inspections on class 3, 4, and 5 main track and sidings, and on class 1 and 2 main tracks that carry more than 25 million gross tons of traffic per year should be carried out in such a manner that priority locations and areas of known problems, such as those outlined in Table 1, are monitored.

3. Walking inspections on class 1 and 2 main track and sidings that carry less than 25 million gross tons of traffic will be performed as directed by the Regional Chief Engineer.

4. Each turnout, railway crossing at grade, moveable bridge lift rail, derail, sliding joint, or other transition device must be inspected on foot at least monthly.

   b. In the case of track that is used less than monthly, each turnout, railway crossing at grade, moveable bridge lift rail, derail, sliding joint, or other transition device must be inspected on foot before it is used.

5. Walking inspections of public crossings shall be undertaken at least annually, with no more than 12 calendar months between inspections.

Periodic and Follow-up Inspection of Joint Bars

6. The following classes of track require on foot inspection of joints in CWR:

   • Class 2 – only if passenger trains operate

   • Class 3 and above – required

7. joints requiring on foot inspection are any joints located in a CWR string, or any joint in a segment of rail between CWR strings that is less than 200 ft apart.

   a. Each joint in CWR track shall be inspected on foot each calendar year at the frequency indicated by class of track and annual tonnage in the following table:

Table 1 Periodic on Foot Joint Bar Inspection Frequencies

Class of Track	Freight			Passenger	
	<40 MGT	> 40 to 60 MGT	> 60 MGT	<20 MGT	> 20 MGT
5	2x	3x[1]	4x[1]	3x[1]	3x[1]
4	2x	3x[1]	4x[1]	2x	2x
3	1x	2x	2x	2x	2x
2	0	0	0	1x	1x

4x = Four times per year, with one inspection in each of the following periods:

January to March; April to June; July to September; and October to December; with consecutive inspections separated by at least 60 calendar days.

3x = three times per calendar year, with one inspection in each of the following periods:

January to April; May to August; September to December; with consecutive inspections separated by at least 90 calendar days.

2x = Twice per calendar year, with one inspection in each of the following periods:

January to June and July to December, with consecutive inspections separated by at least 120 calendar days.

1x = Once per calendar year, with consecutive inspections separated by at least 180 calendar days.

[1]Where extreme weather conditions prevent the periodic inspection of a particular territory within the required interval, the interval may be extended by up to 30 calendar days from the last day that the extreme weather condition prevented the required inspection.

b. Where both passenger and freight trains operate over a portion of CWR track, the greater frequency in the table must be used.

8. If any of the following conditions contained in Table 2 are found at a joint in CWR and are not a regulatory defect and cannot be corrected immediately, on foot follow up inspections will be required until such time as the condition is corrected.

Table 2 Rail Joint Conditions and Remedial or Corrective Actions

Rail Joint Condition	*Remedial Action**
Broken Bar	Replace Immediately and Complete Fracture Report
Visible cracks in joint bar	Replace Immediately and Complete Fracture Report
Loose bolt(s)	Tighten bolt(s)
Bent bolt(s)	Replace bolt(s) or re-inspect as per Table 1 above
Missing bolt(s) **	Replace bolt(s)
Rail end batter (More than 3/8" in depth and more than 6" in length measured with a 24" straight-edge)	Repair by welding joint or removing rail or Inspect weekly until corrective action taken
Rail end mismatch exceeding limits specified by FRA 213.115 or TC Track Safety Rules, Part II, Subpart D, IV.	Weld or grind
Longitudinal rail movement greater than 2.5"	Add or adjust rail anchors, tighten bolts, add or remove rail at appropriate time or Inspect weekly until corrective action taken
Wide rail gap greater than 1.5"	Adjust rail gap and secure joint or Inspect weekly until corrective action taken
Surface deviations exceeding limits specified by FRA 213.63 or TC Track Safety Rules, Part II, Subpart C, VI.	Surface joint immediate

* Remedial action may also consist of placing a speed restriction or removing the track from service.

** Minimum of 2 bolts per rail must be in place.

9. In the US, if a cracked or broken joint bar is found by an inspector during a regular track inspection, monthly turnout and track railway crossing at grade, lift rail assembly or transition device inspection, or periodic, follow up, or special inspection, a fracture Report must be completed and sent to the FRA.

   a. The Fracture Report must be completed at the time the cracked or broken bar is found. The Fracture Report must contain the following required information:

- Railroad name
- Date of inspection
- Milepost
- Subdivision
- Class of track
- Annual MGT for the previous year
- Rail section
- Type of bar (standard, insulated or compromise)
- Number of holes in the bar (4 hole or 6 hole bar etc.)
- Location of crack or break
- Length of crack (in inches)
- Gap between rail ends
- Amount and length of rail batter
- Tread and gauge mismatch
- Estimated vertical and lateral movement of the joint

b. In the US, Fracture Reports must be sent to the FRA by July 31 for the preceding six-month period (January 1 to June 30) and by January 31 for the preceding six-month period (July 1 to December 31).

10. A record must be kept of each periodic and follow-up inspection. The record shall contain at a minimum, the date of inspection, the name of the inspector, the boundaries of the territory inspected, the fact that all CWR joints in the specified territory were inspected, the nature and location of any joints with defects or joints of concern, any remedial action or corrective action that has been or is to be taken.

11. On foot inspection of all joints in bridges must be undertaken at the following frequencies:

- track with less than 10 MGT annually - once per year.
- track with 10 MGT or great annually - twice per year.

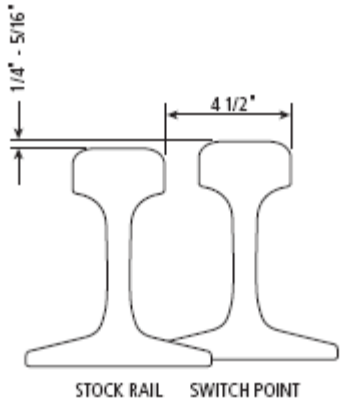
12. Turnouts must be inspected by a qualified track inspector at the following minimum frequencies:

Type of Inspection	Description
Routine Inspection	Each time the turnout is crossed it shall be visually inspected for defects and noted on the track inspection report.
Walking Inspection	Each turnout shall be inspected on foot at least monthly and observing overall condition, except that in the case that track is used less than monthly each turnout will be inspected on foot before the track is used. Inspections will be noted on the switch inspection report.
Detailed Inspection	A thorough detailed observation of the condition of all components in each turnout shall be performed annually. Inspections will be noted on the switch inspection report.

13. In addition, all main track switches in class 3 through 6 track shall be operated in all its positions during one inspection in every 3 month period.

14. A report of each Walking Inspection and Detailed Inspection must be prepared on a prescribed turnout inspection form on the same day that the inspection is performed. The inspection report must be signed by the person making the inspection, and retained at the designated location for at least one year.

15. Description of items to check and acceptable conditions are listed in RM 3500.
16. There must be no broken or bent clips or stop blocks. Switch rods or connecting rods must not be excessively bent, broken or corroded to a depth exceeding 1/8 inch (3 mm).
17. Welding on connecting rods is not allowed.
18. The top surface of switch points shall be inspected to ensure that the outer edge of the wheel tread cannot contact the gauge side of the stock rail.
19. Switch points are manufactured such that the running surface is 1/4" to 5/16" (6 to 8 mm) higher than the stock rail, as measured at the location where the distance between gauge face of stock rail and gauge face of switch point when tight against the stock rail is 4-1/2" (115 mm). When this vertical dimension is reduced by wear to 3/16" (5 mm), the location must be monitored for signs of wheel contact on the stock rail. Where contact is evident, the switch point must be renewed or the stock rail ground to restore the 1/4" to 5/16" (6 to 8 mm) dimension.



20. On point ends which are chipped or broken the thickness must not exceed 3/16" (5 mm).
21. Guard rail bolts and fasteners must be intact and tight. Guard rail wear surfaces must not be worn more than 5/8".
22. Guard Check Gauge and the Guard Face Gauge shall be within the limits shown in Table 1:

TABLE 1. Guard Check Gauge and Guard Face Gauge

Class of Track	MINIMUM Guard Check Gauge [a]	MAXIMUM Guard Face Gauge [b]
1	54 1/8"	53 1/4"
2	54 1/4"	53 1/8"
3,4	54 3/8"	53 1/8"
5,6	54 1/2"[c]	53"

[a] the distance from the gauge line of a frog to the guard line of its guard rail or guarding face, as measured across the track at right angles to the gauge line. See Figure 2.

[b] the distance between guard lines as measured across the track at right angles to the gauge line. See Figure 2.

[c] at points of heavy point frogs equipped with through gauge plates, 54 3/8" (1381 mm)

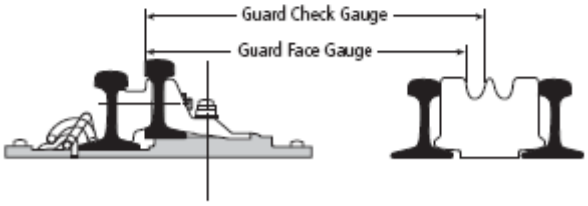


Figure 2. Guard Check Gauge and Guard Face Gauge Measurement Locations.

23. Frogs will be inspected to determine bolts are of the correct size, length and grade. Loose, missing or broken bolts must be replaced.
24. Inspect frog plates for fit and firm attachment to ties or gauge plates. Lateral wear should not exceed 1/8".
25. The flangeway depth measured from a plane across the wheel bearing area of a frog on Class 1 track may not be less than 1 3/8" or less than 1 1/2" on class two through 6 track.
26. If a frog point is chipped, broken or worn more than 5/8" down and 6" back, operating speed over that frog may not be more than 10 m.p.h.
27. If the tread portion of a frog casting is worn down more than 3/8" (10 mm) below the original contour, operating speed over that frog may not be more than 10 m.p.h.
28. Clearance between the horn and hold-down housing on spring frogs must not exceed 1/4" (6 mm), and the horn must not bind on the hold down housing.
29. Each spring must have a compressive force sufficient to hold the wing rail against the point rail. Note, the wing on 100 lb., 115 lb., 132 lb., and 136 lb. spring frogs is designed to be open 3/8" (10 mm) at the half inch point.
30. The retarder, on frogs so equipped, must close completely with a cycle time from 1 minute to 3 minutes after opening.

31. Inspections of all railway crossings at grade shall be conducted as follows:
    a. Every time the crossing is traveled over by hi-rail it shall be visually inspected for defects.
    b. Crossings shall be inspected at least monthly on foot measuring gauge and looking closely at the condition of all components.
32. Unsafe conditions on either railway which cannot be corrected immediately will be reported to the Rail Traffic Controller or Train Dispatcher and proper action taken to protect traffic on all routes.

CULVERT INSPECTION

33. General inspections of all culverts and surface drainage conditions will be conducted by track Inspectors in conjunction with track inspections.

Note: All persons engaged in making inspections will prepare and sign a record of each inspection on the day the inspection is made in accordance with applicable Transport Canada or Federal Railroad Administration Rules. The report shall be retained for at least one year after the date of the inspection.

TABLE 1 - PRIORITY LOCATIONS FOR WALKING INSPECTIONS

Rail

a. areas with high numbers of fatigue related rail defects (based on rail flaw detection reports and CWR Failure Reports) and in service rail failures
b. rail defects protected by joint bars
c. rail damage which has been alleviated by grinding
d. areas approaching condemning limits for wear (based on wear limits in Track Standards SPC 3200)

e. locations prone to overstressed rail, such as;
   i. areas where rail repairs have been made (too little or too much rail installed)
   ii. curves
   iii. areas of severe rail corrugation
   iv. areas of heavy brake application
   v. areas of buffer rails or any joints adjoining CWR
   vi. areas of steep grades
   vii. areas of insufficient or damaged rail anchors, or significant rail movement.
   viii. derailment sites or derailment damaged rail

Joints
- a. Cracked
- b. Broken
- c. pumping

Wood Ties
- a. clusters of defective ties
- b. gauge problem areas (13mm (1/2") or greater dynamic wide gauge using data from T.E.ST. Car)
- c. excessive loss of cant as detected by T.E.ST.. Car
- d. areas prone to hanging ties, such as insulated joints, road crossings and bridge approaches
- e. areas of high or broken spikes or timber tie screws
- f. areas with high dynamic braking such as home signals, PSOs

Concrete Ties
- a. loose or missing clips or insulators
- b. signs of rail movement
- c. loose or damaged shoulder castings
- d. signs of rail seat abrasion
- e. areas repaired by the use of Laird Clips
- f. areas with historical clip failure.

Ballast
- a. sink holes
- b. mud pumping locations
- c. frost heave locations
- d. areas of weak ballast shoulders
- e. areas where recent program work has left ballast disturbed

Roadbed / Slope Stability
- a. areas historically prone to track geometry problems (surface, line, cross level)
- b. slope stability problems (slip, rock falls or mud slides)

Drainage
- a. areas prone to ponding water (beaver dams, drainage ditches, blocked culverts, etc.)
- b. areas of high or increased surface run-off (near forestry operations, industrial development, high water tables, etc.)
- c. areas prone to ice build-up under the plate
- d. culverts

Transition Areas
- a. bridge approaches
- b. concrete tie to wood tie transition areas

Derailment Areas
- a. substandard conditions or temporary repairs
- b. monitor until permanent repairs have been completed

GAS WELDED RAIL INSPECTION POLICY

34. Main track on the core route that contains gas welded continuous welded rail, the minimum inspection frequency is amended as follows:

    a. Three times weekly with at least 1 calendar day between inspections.

    b. The Track Supervisor must make every effort to personally perform at least one inspection per week.

    c. Additional inspections on secondary main tracks and other tracks shall be as directed by the Regional Chief Engineer.

This policy shall be in effect from October 1 to March 1 and other times when the ambient temperature is expected to fall below +25° Fahrenheit.

EXTREME COLD WEATHER INSPECTION POLICY

35. Daily cold weather track inspections will be under taken on core lines under the following conditions:

Territory	Track Conditions	Either Condition Met	
		Extreme Low Temperature	Rapid Drop in Temperature
Canadian Lines	* Susceptible to Cold	less than -25°C	Greater than 25° Celsius within a 24-hour period.
	All Track	less than -35°C	
U.S. Lines North of Chicago	* Susceptible to Cold	less than -25°F	Greater than 40° Fahrenheit within a 24-hour period.
	All Track	less than -30°F	
Between Chicago and Centralia	All Track	less than -10°F	
South of Centralia	All Track	less than -5°F	

36. Lines shall be considered susceptible to cold weather related rail failure if any one of the following conditions applies:
    a. Non-signalled territory.
    b. Jointed and/or gas welded rail.
    c. Rail of 115 lb. weight or lighter subject to 286K lb. loading.
    d. Rail with a history of frequent defects.

37. Additional track inspections should also be considered during the first "cold snap" of the season.

COLD WEATHER TEMPORARY SPEED RESTRICTIONS

38. In areas identified as having rail with a history of frequent defects (a list of such areas will be generated by headquarters engineering each year) the following cold weather temporary speed restrictions will be put in place:

39. When temperature is below -25°C in Canada or -10°F in the U.S. all freight trains shall be restricted to a speed of 35 mph or track speed whichever is more restrictive and all passenger trains shall be restricted to a speed of 60 mph or track speed, whichever is more restrictive.

EXTREME HOT WEATHER POLICY FOR CWR TERRITORY

40. Whenever ambient (air) temperature exceeds those shown in the table below or during periods of significant seasonal increase in temperature (i.e. Spring), hot weather track patrols must be undertaken between the hours of 11:00 and 20:00.

Territory	Ambient Temperature
Canadian Lines	More than 30°C
U.S. Lines North of Centralia	More than 95°F
Lines South of Centralia	More than 100°F

41. Hot weather patrols may be suspended if temperatures have stabilized and previous inspections have shown that the track structure is stable and complies with standards.

HOT WEATHER TEMPORARY SPEED RESTRICTIONS

42. Hot weather TSOs must be applied on portions of Subdivisions where the above temperature thresholds are met and any one of the following track conditions are known to exist:

a. lateral or vertical movement of rail (i.e. "wavy" or improperly seated rail);

b. deviations in alignment;

c. movement of ties (i.e. gaps or voids in ballast at tie ends or in cribs);

d. insufficient ballast section (i.e. weak shoulders, empty cribs);

e. rail running through anchors;

f. "tight steel" (i.e. areas of frequent dynamic brake application, approaches to PSO's, bottoms of grades, etc.);

g. recently completed track work;

h. grade instability; or

i. any other areas having a history of lateral instability or where Track Supervisors have a concern.

43. The magnitude and duration of speed restrictions applied during hot weather under this policy must be commensurate with track and weather conditions. As a guide, speeds ordered for freight trains will be 10 mph less than that normally authorized or 30 mph whichever is greater. Unless otherwise restricted, passenger trains will be limited to 65 mph. Except in extraordinary circumstances, hot weather TSO's are to be in effect between the hours of 1200 noon and 20:00.

NOTE: This policy does not supersede timetable instructions governing either the operation of unit trains over specified branch lines or the movement of trains on subdivisions equipped with HBD talkers broadcasting ambient temperature.

CN STANDARD FOR TRACK GEOMETRY

TS 7.1 - Track Geometry

TRACK GEOMETRY MAINTENANCE STANDARDS

1. Deviations exceeding Transport Canada Track Safety Rules or F.R.A. Track Safety Standards minimum safety requirements for track geometry are defined as "URGENT" defects.
2. Where a portion of track exceeds the limits defined as "URGENT", one of the following actions must be immediately taken before the operation of the next train over the defect(s):
    i. the defect(s) must be repaired to within the allowable tolerance;
    ii. except as prescribed in section 4, if the defect is a speed-related type, a temporary slow order (TSO) must be placed restricting trains to a maximum speed which is within the track class allowed for the severity of the defect(s), (refer to Table 3 and Appendix A); or
    iii. operation over the track must be halted
3. Deviations approaching Transport Canada Track Safety Rules or F.R.A. Track safety Standards minimum safety requirements for track geometry are defined as "NEAR URGENT" defects.
    i. "NEAR URGENT" defects will be identified by the Geometry Car and must be inspected within 72 hours and remedial action must be taken within 30 days.
4. Deviations exceeding CN recommended maintenance tolerances are defined as "PRIORITY" defects.
    a. Where a portion of track exceeds the limits defined as "PRIORITY", the defect must be monitored until it is repaired to ensure it does not escalate to an "URGENT" condition

    i. The following approach is to be used in responding to PRIORITY defects and combinations of PRIORITY defects:
        a. address combination defects (i.e. defects within 100' of each other) in the following order;
        b. combination defects on curve spirals
        c. combination defects on curve body
        d. combination defects near changes in track modulus (i.e. near bridges, crossings, turnouts, etc.)
        e. address all other PRIORITY defects
5. When unloaded track is measured to determine compliance with this TS the amount of rail movement, if any, which occurs when the track is loaded must be added to the measurement of the unloaded track.
6. On Canadian Lines:
    a. Where speed related track geometry defects are detected during track geometry (T.E.ST.) car inspections, the Tables 3 and 4 may be used to determine the maximum Temporary Slow Order speed to be applied for the seventy-two (72) hour period immediately following the inspection.
    b. If the track defect has not been repaired upon the expiration of the seventy-two (72) hour period, the temporary slow order speed must be revised, restricting trains to a maximum speed that is within the track class allowed by the severity of the defect(s). (See Table 2 - Urgents)
7. Details of remedial action or temporary slow orders applied must be recorded on the exception reports initialled and dated.

TRACK GEOMETRY DEFINITIONS

8. Gauge

a. Standard gauge is 56-1/2″ on tangents and curves up to 14°. Refer to TS 1.2 for standard gauge of curves over 14°.

b. The gauge at hotbox detectors and for a minimum of 50 ft. in either direction must be maintained between 56-1/2″ and 56-3/4″.

c. Gauge should not be allowed to become less than 56″.

On U.S. Lines, where gauge is found to be less than 56″ track shall be considered impassable;

On Can. Lines, where gauge is found to be less than 56″ must be reduced to the lesser of;

i. the maximum permissible speed for the next lower class of track, or
ii. the maximum permissible speed for the class of track as determined from the following table:

If change in gauge over 20′ (6 m) either side of the point of narrow gauge is...	Then limit speed to maximum permissible in Class...
More than 7/8″ less than or equal 1 1/8″	3
More than 1 1/8″ less than or equal 1 1/2″	2
More than 1 1/2″	1

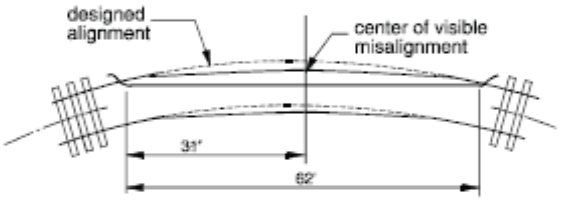
9. ALIGNMENT

a. The measurement for alignment shall be the maximum mid ordinate, (positive or negative), in inches, of a 62′ or 31′ chord measured at the gauge point.

b. On curved track the high (outside) rail shall be used as the line rail. On tangent track, either rail may be used as the line rail but the same rail must be used throughout the tangent.

c. The maximum mid-ordinate shall be established by centering visible misalignments on the chord.

d. If 62-foot chords are used, the mid-ordinate (in inches) is a 1 to 1 relation with the degree of curve. If 31-foot chords are used, the mid-ordinate (in inches) must be multiplied by 4 to obtain the degree of curve.



10. SUPERELEVATION

a. Except as provided in Section 12 for limits of Cross level from Design, the outside rail of a curve shall not be lower than the inside rail nor have more than 6″ of superelevation. Design superelevation should not exceed 5″

b. When superelevation on a curve is less than the amount required, the curve must be checked for V-max.

11. SURFACE

a. The maximum allowable deviations for surface related defects are listed in Table 2.

b. The measurement for SURFACE shall be the maximum positive or negative mid-ordinate, in mm or inches, of a 62′ chord measured along the top surface of the rail.

The maximum mid-ordinate shall be established by centering visible peaks or sags on the chord.

(drawings to be reformatted , metric measurements to be removed throughout the drawing below)

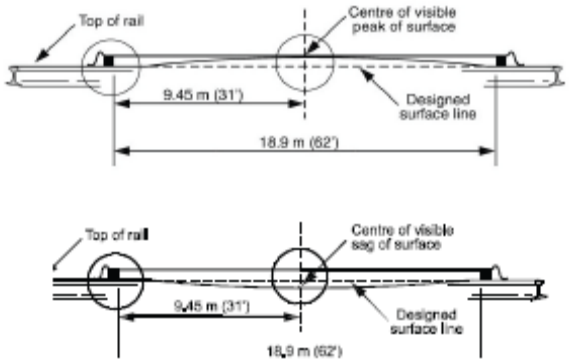


Illustration of Surface measurement

12 CROSS LEVEL

a. The measurement for cross-level shall be the difference in elevation, in mm or inches, between the grade rail and the other rail, measured with a level board.

b. On curved track the grade rail is the low (inside) rail. On tangent track either rail may be used as the grade rail, but the same rail must be used throughout the tangent.

c. The difference in cross level readings shall be used to calculate WARP 31and WARP 62. Measurement for cross level shall be taken so as to ensure that the maximum deviations are recorded. Both of these terms describe variations in cross level which contribute to the wheel lift and harmonic rocking action of rolling stock that can result in a derailment.

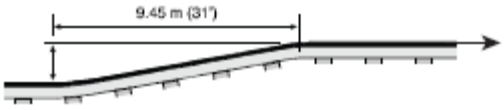
d. NOTE: It is possible to have several combinations of differences in cross level within any 31' or 62'. It is essential that the inspector determine the maximum difference.

e. WARP 31 is defined as the difference in cross level between any two points 31' apart in spirals.

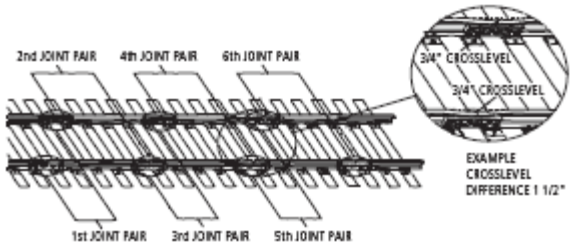
f. Warp in tangents, spirals and curves (WARP 62) is defined as the difference in cross level between any two points less than 62' apart.

g. Designated elevation at any point on a curve is determined by averaging the elevation of 11 points (the point of concern plus 5-points on either side) over a 155 foot track segment at 15.5 foot spacing. If the curve is less than 155 feet, then the average is taken through the full length of the body of the curve. The degree of curve is determined by averaging the degree of curvature over the same track segment as the elevation. Where superelevation is runout onto tangent track per the conditions in RM-1305, designated elevation in the spiral and tangent shall be based on the maximum allowable runout permitted.

13. The RUNOFF at the END of the RAISE, when surfacing track, or when surfacing into any fixed structure, in any 31' of track cannot exceed the URGENT limits for the Class track.



14. To control harmonics (Rock and Roll) on Class 2 through 5 jointed track with staggered joints the cross level differences shall not exceed 11/4 inches in all of six consecutive pairs of joints, as created by 7 low joints. Tracks with joints staggered less than 10 feet shall not be considered as having staggered joints. Joints within the 7 low joints outside of the regular joint spacing shall not be considered as joints.



* NOT DRAWN TO SCALE
JOINT STAGGER MUST EXCEED 10'

TABLE 1 PRIORITY DEFECTS CANADIAN AND US LINES

	Speed (mph)	TRACK CLASS 1	2	3	4	5
	Passenger	15	30	60	80	90*
	Freight +	10	25	40	60	80
WIDE GAUGE	The distance between the gauge points of the rails 5/8" below the top of the rail may not be more than	57-5/8"	57-1/4"	57-1/4"	57-1/4"	57-1/4"
ALIGNMENT TANGENT 62'	The deviation of the mid-offset from a 62 foot line may not be more than	3-3/4"	2-1/4"	1-3/8"	1-1/8"	3/8"
ALIGNMENT CURVE 62'	The deviation of the mid-ordinate from a 62 foot chord may not be more than	3-3/4"	2-1/4"	1-3/8"	1-1/8"	1/2"
ALIGNMENT CURVE 31'	The deviation of the mid-ordinate from a 31 foot chord may not be more than	No Limit	No Limit	7/8"	3/4"	3/8"
SURFACE	The deviation from uniform profile on either rail at the mid-ordinate of an 62' chord may not be more than	2"	1-1/2"	1-1/4"	1"	3/4"

TABLE 1 PRIORITY DEFECTS CANADIAN AND US LINES (continued)

			TRACK CLASS				
			1	2	3	4	5
	Speed (mph)	Passenger	15	30	60	80	90*
		Freight +	10	25	40	60	80
WARP 31'	Difference in cross level between any two points 31' apart in spiral may not be more than		1-7/8"	1-5/8"	1-1/8"	15/16"	5/8"
WARP 62' Tangents, Spirals and Curves (US only)	The difference in cross level between any two points less than 62' apart on tangents and curves may not be more than		2-1/2"	1-3/4"	1-1/2"	1-3/8"	1-1/8"
WARP 62' Tangents and Curves (CANADA only)	The difference in cross level between any two points less than 62' apart on tangents and curves may not be more than		2-1/4"	1-1/2"	1-3/8"	1-1/8"	3/4"
WARP 62' Spirals (CANADA only)	The difference in cross level between any two points less than (62') apart on spirals may not be more than		2-1/4"	1-3/4"	1-1/2"	1-3/8"	1 1/8"
CROSS LEVEL from DESIGN on Tangents and Curves	Deviation from zero cross level at any point on tangent or from designated elevation on curves between spirals may not be more than		1"	1"	1"	1"	11/16"
CROSS LEVEL from DESIGN on Spirals (CANADA only)	Deviation from designated elevation on spirals may not be more than		1"	1"	1"	3/4"	11/16"

* In Canada: 95 mph for Passenger trains and 100 mph for LRC trains

TABLE 2 URGENT DEFECTS CANADIAN AND US LINES

			TRACK CLASS				
			1	2	3	4	5
	Speed (mph)	Passenger	15	30	60	80	90
		Freight +	10	25	40	60	80
WIDE GAUGE	The distance between the gauge points of the rails 5/8" below the top of the rail may not be more than		58"	57-3/4"	57-3/4"	57-1/2"	57-1/2"
ALIGNMENT TANGENT 62'	The deviation of the mid-offset from a 62 foot line may not be more than		5"	3"	1-3/4"	1-1/2"	3/4"
ALIGNMENT CURVE 62'	The deviation of the mid-ordinate from a 62 foot chord may not be more than		5"	3"	1-3/4"	1-1/2"	5/8"
ALIGNMENT CURVE 31'	The deviation of the mid-ordinate from a 31 foot chord may not be more than		No Limit	No Limit	1 1/4"	1"	1/2"
SURFACE	The deviation from uniform profile on either rail at the mid-ordinate of an 62' chord may not be more than		3"	2-3/4"	2-1/4"	2"	1-1/4"
WARP 31'	Difference in cross level between any two points 31' apart in spirals may not be more than		2"	1-3/4"	1-1/4"	1"	3/4"

TABLE 2 URGENT DEFECTS CANADIAN AND US LINES (continued)

			TRACK CLASS				
			1	2	3	4	5
	Speed (mph)	Passenger	15	30	60	80	90*
		Freight +	10	25	40	60	80
WARP 62' Tangents, Spirals and Curves (US only)	The difference in cross level between any two points less than 62' apart on tangents and curves may not be more than		3"	2-1/4"	2"	1-3/4"	1-1/2"
WARP 62' Tangents and Curves (CANADA only)	The difference in cross level between any two points less than 62' apart on tangents and curves may not be more than		3"	2"	1-3/4"	1-1/4"	1"
WARP 62' Spirals (CANADA only)	The difference in cross level between any two points less than 62' apart on spirals may not be more than		3"	2-1/4"	2"	1-3/4"	1-1/2"*
CROSS LEVEL from DESIGN on TANGENTS & CURVES	Deviation from zero cross level at any point on tangent or from designated elevation on curves between spirals may not be more than		3"	2"	1-3/4"	1-1/4"	1"
CROSS LEVEL from DESIGN on SPIRALS (CANADA only)	Deviation from designated elevation on spirals may not be more than		1-3/4"	1-1/2"	1-1/4"	1"	3/4"
RUNOFF at END of a RAISE	The runoff in any 31' at the end of a raise may not be more than		3-1/2"	3"	2"	1-1/2"	1"
* In Canada: 95 mph for Passenger trains and 100 mph for LRC trains							

Table 3 ALLOWABLE TEMPORARY SLOW ORDERS FOR TEST CAR DEFECTS– CANADIAN LINES ONLY

FREIGHT SPEEDS

Class	Freight SPEED	DEFECT (inches)											
		Wide Gauge	Alignment Tangent 62'	Alignment Curve 62'	Alignment Curve 31'	Surface	Warp 31' Spirals	Warp 62' Tangents & Curves	Warp 62' Spirals	Cross-Level Tangents & Curves	Cross-Level Spirals	Runoff at End of Raise
1	10	58	5	5	No Limit	3	2	3	3	3	1-3/4	3-1/2
2	15	57-7/8	4-1/4	4-1/4	No Limit	2-7/8	1-7/8	2-5/8	2-3/4	2-5/8	1-5/8	3-5/16
	20	57-13/16	3-5/8	3-5/8	No Limit	2-13/16	1-13/16	2-5/16	2-1/2	2-5/16	1-9/16	3-1/8
	25	57-3/4	3	3	No Limit	2-3/4	1-3/4	2	2-1/4	2	1-1/2	3
3	30	57-3/4	2-1/2	2-1/2	1-1/4	2-9/16	1-9/16	1-7/8	2-1/8	1-7/8	1-3/8	2-5/8
	35	57-3/4	2-1/8	2-1/8	1-1/4	2-3/8	1-3/8	1-13/16	2-1/16	1-13/16	1-5/16	2-5/16
	40	57-3/4	1-3/4	1-3/4	1-1/4	2-1/4	1-1/4	1-3/4	2	1-3/4	1-1/4	2

Table 3 ALLOWABLE TEMPORARY SLOW ORDERS FOR TEST CAR DEFECTS– CANADIAN LINES ONLY FREIGHT SPEEDS (continued)

Class	Freight SPEED	DEFECT (Inches)										
		Wide Gauge	Alignment Tangent 62'	Alignment Curve 62'	Alignment Curve 31'	Surface	Warp 31' Spirals	Warp 62' Tangents & Curves	Warp 62' Spirals	Cross-Level Tangents & Curves	Cross-Level Spirals	Runoff at End of Raise
4	45	57-11/16	1-11/16	1-11/16	1-3/16	2-3/16	1-3/16	1-5/8	1-15/16	1-5/8	1-3/16	1-7/8
	50	57-5/8	1-5/8	1-5/8	1-1/8	2-1/8	1-1/8	1-1/2	1-7/8	1-1/2	1-1/8	1-3/4
	55	57-9/16	1-9/16	1-9/16	1-1/16	2-1/16	1-1/16	1-3/8	1-13/16	1-3/8	1-1/16	1-5/8
	60	57-1/2	1-1/2	1-1/2	1	2	1	1-1/4	1-3/4	1-1/4	1	1-1/2
5	65	57-1/2	1-5/16	1-1/4	7/8	1-13/16	15/16	1-3/16	1-11/16	1-3/16	15/16	1-3/8
	70	57-1/2	1-1/8	1-1/16	3/4	1-5/8	7/8	1-1/8	1-5/8	1-1/8	7/8	1-1/4
	75	57-1/2	15/16	13/16	5/8	1-7/16	13/16	1-1/16	1-9/16	1-1/16	13/16	1-1/8
	80	57-1/2	3/4	5/8	1/2	1-1/4	3/4	1	1-1/2	1	3/4	1

Note: These tables are used **IN CANADA** for where speed related track geometry defects are detected during track geometry (T.E.ST.) car Inspections, the tables may be used to determine the maximum Temporary Slow Order speed to be applied for the seventy-two (72) hour period immediately following the Inspection.

Table 4 ALLOWABLE TEMPORARY SLOW ORDERS FOR TEST CAR DEFECTS – CANADIAN LINES ONLY PASSENGER SPEEDS

Class	Freight SPEED	DEFECT (inches)										
		Wide Gauge	Alignment Tangent 62'	Alignment Curve 62'	Alignment Curve 31'	Surface	Warp 31' Spirals	Warp 62' Tangents & Curves	Warp 62' Spirals	Cross-Level Tangents & Curves	Cross-Level Spirals	Runoff at End of Raise
1	15	58	5	5	No Limit	3	2	3	3	3	1-3/4	3-1/2
2	20	57-7/8	4-1/4	4-1/4	No Limit	2-7/8	1-7/8	2-5/8	2-3/4	2-5/8	1-5/8	3-5/16
	25	57-13/16	3-5/8	3-5/8	No Limit	2-13/16	1-13/16	2-5/16	2-1/2	2-5/16	1-9/16	3-1/8
	30	57-3/4	3	3	No Limit	2-3/4	1-3/4	2	2-1/4	2	1-1/2	3
3	45	57-3/4	2-3/8	2-3/8	1-1/4	2-1/2	1-1/2	1-7/8	2-1/8	1-7/8	1-3/8	2-1/2
	50	57-3/4	2-1/8	2-1/8	1-1/4	2-3/8	1-3/8	1-13/16	2-1/16	1-13/16	1-5/16	2-5/16
	55	57-3/4	1-15/16	1-15/16	1-1/4	2-5/16	1-5/16	1-3/4	2-1/16	1-3/4	1-1/4	2-1/8
	60	57-3/4	1-3/4	1-3/4	1-1/4	2-1/4	1-1/4	1-3/4	2	1-3/4	1-1/4	2

Table 4 ALLOWABLE TEMPORARY SLOW ORDERS FOR TEST CAR DEFECTS – CANADIAN LINES ONLY

PASSENGER SPEEDS (continued)

Class	Freight SPEED	DEFECT (inches)											
		Wide Gauge	Alignment Tangent 62'	Alignment Curve 62'	Alignment Curve 31'	Surface	Warp 31' Spirals	Warp 62' Tangents & Curves	Warp 62' Spirals	Cross-Level Tangents & Curves	Cross-Level Spirals	Runoff at End of Raise
4	65	57-11/16	1-11/16	1-11/16	1-3/8	2-3/16	1-3/16	1-5/8	1-15/16	1-5/8	1-3/8	1-7/8
	70	57-5/8	1-5/8	1-5/8	1-1/8	2-1/8	1-1/8	1-1/2	1-7/8	1-1/2	1-1/8	1-3/4
	75	57-9/16	1-9/16	1-9/16	1-1/16	2-1/16	1-1/16	1-3/8	1-13/16	1-3/8	1-1/16	1-5/8
	80	57-1/2	1-1/2	1-1/2	1	2	1	1-1/4	1-3/4	1-1/4	1	1-1/2
5	85	57-1/2	1-1/4	1-3/16	13/16	1-3/4	7/8	1-1/8	1-11/16	1-1/8	7/8	1-5/16
	90	57-1/2	1	7/8	5/8	1-1/2	13/16	1-1/16	1-9/16	1-1/16	13/16	1-1/8
	95	57-1/2	3/4	5/8	1/2	1-1/4	3/4	1	1-1/2	1	3/4	1

Note: These tables are used IN CANADA for where speed related track geometry defects are detected during track geometry (T.E.ST.) car inspections, the tables may be used to determine the maximum Temporary Slow Order speed to be applied for the seventy-two (72) hour period

CN STANDARD FOR MINIMUM TRACK CONSTRUCTION STANDARDS

TS 8.0 - Minimum Track Construction Standards

1. The table below indicates the minimum standards for construction and upgrading for the various classes of track as defined by TC and the FRA.

MINIMUM TRACK CONSTRUCTION STANDARDS

Description	Class 4 and above	Class 2 & 3	Class 1
Rail Weight	Per Track Standard 1.0 or as specified by the Regional Chief Engineer		
Rail (CWR or Jointed)	CWR	Class 3 - CWR Class 2 - Jointed	Jointed
Tie Plates	100 % tie plated per Track Standard 3.0		
Rail Anchors	Per Track Standard 3.0		
Fasteners	Elastic Fasteners or Cut Spikes	Cut Spikes	
Ties Per Mile Concrete	2640	2640	2640
Wood No. 1	3110	3110	2980
Wood No. 2	N/A	N/A	2980

ENGINEERING TRACK STANDARDS

MINIMUM TRACK CONSTRUCTION STANDARDS (continued)

Description	Class 4 and above	Class 2 & 3	Class 1
Rail Weight	Per Track Standard 1.0 or as specified by the Regional Chief Engineer		
Track Ties	Concrete or Hardwood	Concrete or Hardwood	Softwood or Hardwood
Switch Ties	Hardwood	Hardwood	Hardwood
Ballast Crushed Rock	2-1/2" minus	2-1/2" minus	2" minus or AREMA Size No.5
Minimum Depth Below Bottom of Tie	12 Inches	12 Inches	6 Inches
Shoulder width	CWR–12"	Jointed-6"	
CWR–12"	Jointed-6"		
Walking Ballast*		AREMA Size No. 5	AREMA Size No. 5
Sub-ballast ** Minimum Depth	12 Inches	12 Inches	12 Inches
Maintained Top Width	22 ft.	22 ft.	22 ft.

*Where walking ballast is required, it shall be applied in a minimum 4" thick layer.

** As Specified by the Regional Chief Engineer.

CN
NC 7881

TRACK STANDARD
August 2006

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CN STANDARD FOR TRACK CLEARANCES

TS 8.1 - Track Clearances

1. The requirements of this Track Standard apply to all tracks over which the railway operates, regardless of location or ownership; and for all clearances regardless of whether they are temporary or permanent.

2. For new construction track centres shall comply with the following minimum distances between track centre lines:

Track Type	Canada	US
Adjacent Main Tracks	14 ft.	15 ft.
Main Track and Siding	14 ft.	15 ft.
Yard Tracks	14 ft.	14 ft.
Passenger Station Tracks Without Platform in Between	14 ft.	15 ft.

3. The minimum distance between track centre lines shall be increased to account for curvature and superelevation as follows:

   a. by adding 1 in. per degree of curve or 12 in. whichever is the lesser.

   b. where superelevation of the outer track exceeds the superelevation of the inner track by adding an additional 2 in. per 1 in. of difference in curve superelevation.

Non-compliance (Less than standard clearances):

4. Should it not be possible to construct to the above clearance measurements, the Regional Chief Engineer should ensure the proposed encroachment does not impact railway safety and that appropriate departments (Transportation, Engineering, CN Clearance Bureau, etc.) and in Canada, Transport Canada, where required, are advised of the less than standard clearance.

IN CANADA

5. The Regional Chief Engineer shall approve clearances less than those indicated on Track Standard Drawings.

6. Unless otherwise authorized in accordance with the STANDARD RESPECTING RAILWAY CLEARANCES, as approved by the Minister of Transport, the Railway requires the following minimum clearances on tangent track:

7. The clearance for structures over or beside the railway track, except railway bridges, snow sheds and overhead timber bridges, shall meet or exceed the dimensions shown on Track Standard Plan 3003. For new construction the railway requirement is as follows:

   a. Vertical: 23′ 0″ (clear headway above the top of the highest rail).

   b. Horizontal: 6′ 0″ from the gauge side of the nearest rail to the nearest part of any structure or obstruction at a height greater than 4′ 0″ above top of rail, and 3′-7 3/4″ from the gauge side of the nearest rail to the nearest part of any structure or obstruction at a height less than 4′ 0″ above top of rail.

8. The clearances for railway bridges, snow sheds and overhead timber bridges shall meet or exceed dimensions shown on TS Plan 3003.

9. The clearances for railway tunnels shall meet or exceed dimensions shown on TS Plan 3003.

10. The Clearances for industrial and private sidings over which the railway operates shall meet or exceed dimensions shown on TS Plan 3003.

IN THE UNITED STATES

Clearances

11. Horizontal and vertical clearances shall be in conformance with the applicable state law. For maintenance purposes the minimum horizontal and vertical clearances applicable will conform to state law.
12. Minimum Vertical Clearance dimension for new construction on tangent track shall be 23 feet.
13. Minimum Horizontal clearance dimension for new construction shall be 8"6".
14. Warning Signs are required where dimensions are less than those indicated on TS Plan 3003.
15. Overhead wires shall conform to the National Electric Safety Code with a minimum clearance of 27 ft. or as dictated by the Chief Engineer.

Track Centers

16. Track center distance must not decrease without authority of the Regional Chief Engineer.
17. Existing track centers between the main line and existing adjacent tracks must be maintained to a minimum centerline to centerline distance of 14 ft. Track centers measuring less than 13 ft. in any location should immediately be reported to the Regional Chief Engineer.

CN STANDARD FOR SIGNAL & COMMUNICATIONS SYSTEMS – PRECAUTIONARY MEASURES

TS 10 - Signal & Communications Systems – Precautionary Measures

GENERAL

1. Equipment operators must take care to avoid damage to bootlegs, bond wires, signal and communication wires and other apparatus.
2. All personnel must observe signal and communication devices. If any abnormal condition exists, they must immediately protect the traffic whether by rail or public road and advise the proper authorities of the abnormal condition.

UNDERGROUND CABLE

3. The table below is a guideline of the associated risk with these and other equivalent types of activities:

WORK ACTIVITY	RISK
Ditching	High
Undercutting	High
Culvert Replacement	High
Bridge Deck Replacement	High
Derailment Clean-up	High
Ballast Regulating	Medium
Mechanized Tie Replacement	Medium
Brooming	Low

NOTE: work activities must not start without prior consultation with the responsible S & C Supervisor and if necessary with the development and approval of a Method of Procedure. If in doubt, review the proposed work with the S & C Supervisor.

4. Prior to any excavation along the right-of-way, the local S & C employee must be notified a minimum of 48 hours in advance of work, except in case of emergencies.

a. Where it is reasonably practical, the qualified S & C employee shall remain at the excavation site while the work is being performed.

b. Permanent cable markers are installed only to indicate the presence of buried cable and are not meant to indicate the precise location of the cable.

c. Cables may run anywhere on the right-of-way, and at varying depths. Shallow cables may be encountered, especially near culverts, station platforms, underground passageways, and the ends of ducts at approaches to bridges and tunnels.

d. Buried signal and communication plant may include power distribution circuits energized at potentials as high as 7200 volts AC. Use extreme care when excavating near such facilities to avoid damage to cable or wire insulation. When necessary to protect persons excavating in proximity to hazardous equipment and cables, power distribution circuits in the affected area must be isolated or de-energized for work safety.

e. When it is necessary to isolate or de-energize 7200 Volt circuits for safety, a power clearance form will be generated by the responsible S & C employee. No excavation work shall begin until the foreman has confirmed that this clearance form is in effect. When the work is complete, the foreman shall insure that all employees involved in the work area are free and clear from the power distribution circuits, before reporting so to the responsible S & C employee.

f. Whenever excavating is done, in proximity to buried power distribution cables, it shall be done only by use of a vacuum truck or by hand digging using only tools with handles of wood or similar insulating material.

g. The foreman shall report the location of damaged cable and other signals and communications plant to the S & C employee immediately.

h. Temporary supports must be provided to ensure that exposed cable is never left unsupported for span lengths greater than 15 feet.

5. Cable installed in bridge troughing shall be treated in the same manner as underground cable and the above applicable requirements will be followed. The local S&C representative must be notified anytime bridge troughing is removed, repaired or disturbed in any way.

6. Where communications, signal, power and/or fibre optics cable is known or suspected to exist, stakes or flag masts may not be driven into the ground. At these locations, rail mounted flag staffs shall be used to display all track flags. This also applies to all locations with buried gas or fuel lines.

7. In all other areas, when driving shallow stakes such as grade or line stakes, or when placing flags for temporary track protection, staffs shall not be driven to a depth greater than 12 inches unless it is known to be clear of all cables and lines.

8. Track right-of-way sign posts must not be installed until a cable or utility locate has been performed by qualified Signals & Communications (and other Utility employees where applicable), and markings have been placed on the ground. Excavation of the signpost hole must be done in compliance with SCP-1005.

METRA SPECIFICATION FOR HIGH-CARBON STEEL TRACK SPIKES

NORTHEAST ILLINOIS RAILROAD CORP
SPECIFICATION No. 0274-83 March 22, 1985

SPECIFICATIONS FOR HIGH-CARBON STEEL TRACK SPIKES

1. SCOPE

(a) These specifications cover high-carbon steel track spikes.

(b) A supplementary requirement, Art. S1, of an optional nature is provided. It shall apply only when specified by the NIRC.

2. PROCESS

The steel shall be made by one or more of the following processes: open-hearth, acid-bessemer, electric-furnace, basic-oxygen.

3. CHEMICAL COMPOSITION

The steel shall conform to the following requirements as to chemical composition:

	Acid-Bessemer	Other Processes (Art.2)
Carbon, min, percent.....	0.20	0.30
Copper, when specified under supplementary requirement S1, min, percent.....	0.20	0.20

4. LADLE ANALYSIS

(a) A determination for carbon and copper, when copper is specified, shall be made of each heat of steel. This analysis shall be made from a test ingot taken during the pouring of the heat. The chemical composition thus determined shall be reported to the NIRC or their representative, and shall conform to the requirements specified in Art. 3.

(b) When ladle analysis cannot be furnished, the manufacturer shall submit a report of the chemical analysis made on three spikes selected at random from each 10-ton lot.

5. TENSILE PROPERTIES

The manufacturer may, at his option, substitute tension tests for the chemical analysis specified in Art. 3, in which case the finished spikes shall conform to the following requirements as to tensile properties:

NORTHEAST ILLINOIS RAILROAD CORP
SPECIFICATION No. 0274-83 March 22, 1985

Tensile strength, min, psi.....	70,000
Yield point, min, psi.....	0.5 tensile strength
Elongation in 2 in, min, percent.....	25

6. BENDING PROPERTIES

(a) The body of a full-size finished spike shall stand being bent cold through 120 deg around a pin, the diameter of which is not greater than the thickness of the spike without cracking on the outside of the bent portion.

(b) The head of a full-size finished spike shall stand being bent backwards to an angle of 55 deg with the line of the face of the spike, without cracking on the outside of the bent portion.

7. NUMBER OF TESTS

(a) When the option in Art. 5 is exercised, one tension test shall be made from each 10-ton lot or fraction thereof.

(b) One bend test of each kind specified in Arts. 6 (a) and 6 (b) shall be made from each lot of 5 tons or fraction thereof.

8. RETESTS

Spikes represented by bend tests failing to meet the requirements prescribed in Art. 6 (a) or 6 (b) may be annealed and resubmitted. If the spikes fail to meet the third test, they shall be rejected.

9. PERMISSIBLE VARIATIONS IN DIMENSIONS

The finished spikes shall conform to the dimensions specified by the purchaser, subject to the permissible variations specified in Table 1.

Table 1--Permissible Variations in Dimensions

	Permissible Variations From Specified Dimensions, Inches	
	Over	Under
Cross section.....	1/32	1/64
Head.....	3/32	1/32
Length, under head to point....	1/8	1/8
Angle under side of head.....	1 deg	1 deg

NORTHEAST ILLINOIS RAILROAD CORP
SPECIFICATION No. 0274-83 March 22, 1985

10. FINISH

All finished spikes shall be straight, with well formed heads, sharp points and be free from injurious defects and shall be finished in a workmanlike manner.

11. MARKING

A letter or brand indicating the manufacturer and also the letters "HC", indicating high carbon, shall be pressed on the head of each spike while it is being formed. When copper is specified, the letters "CU" shall be added.

12. INSPECTION

The inspector representing the NIRC shall have free entry at all times while work on the contract of the purchaser is being performed to all parts of the manufacturer's works, which concern the manufacture of the material ordered. The manufacturer shall afford the inspector, without charge, all reasonable facilities to satisfy himself that the material is being furnished in accordance with these specifications. All tests and inspections shall be made at the place of manufacture, prior to shipment, unless otherwise specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

13. REJECTION

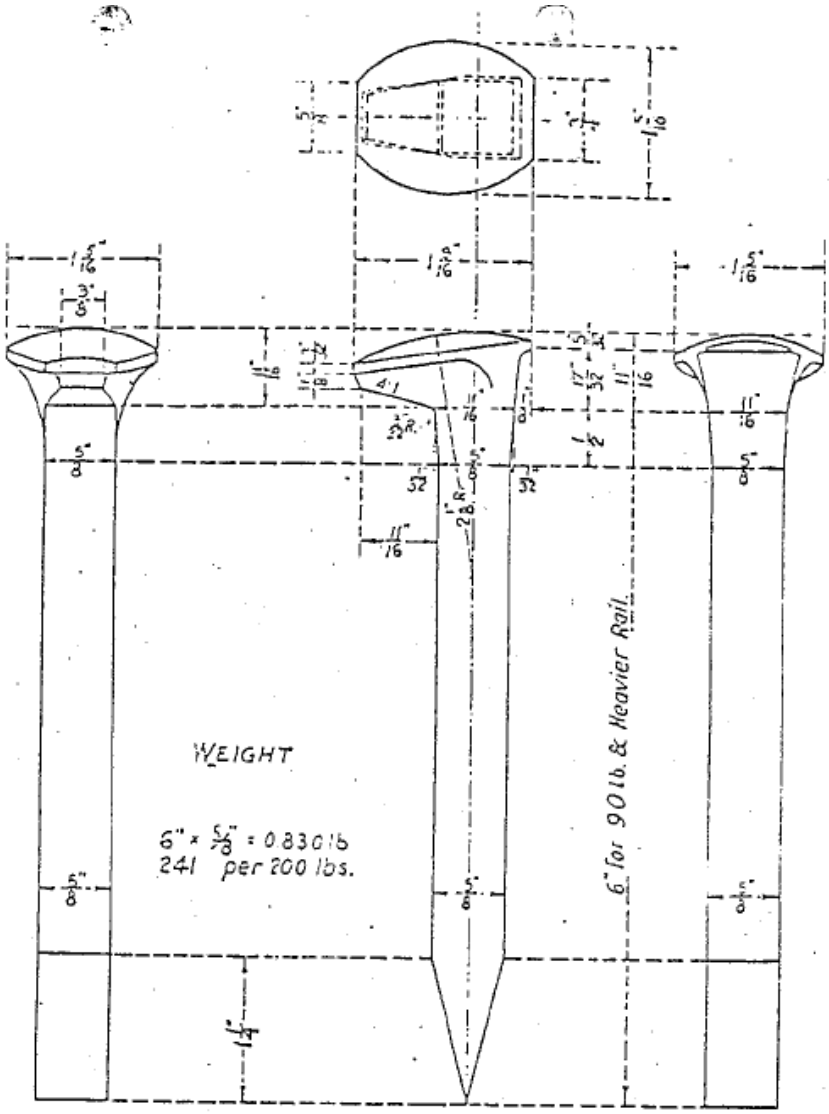
(a) Material failing to meet the requirements of these specifications will be rejected.

(b) Material that shows injurious defects subsequent to its acceptance at the manufacturer's works will be rejected and the manufacturer shall be notified.

SUPPLEMENTARY REQUIREMENT

The following supplementary requirement shall apply only when specified by the purchaser in the inquiry order and contract.

S1. Copper may be specified as shown in Arts. 3 and 4.



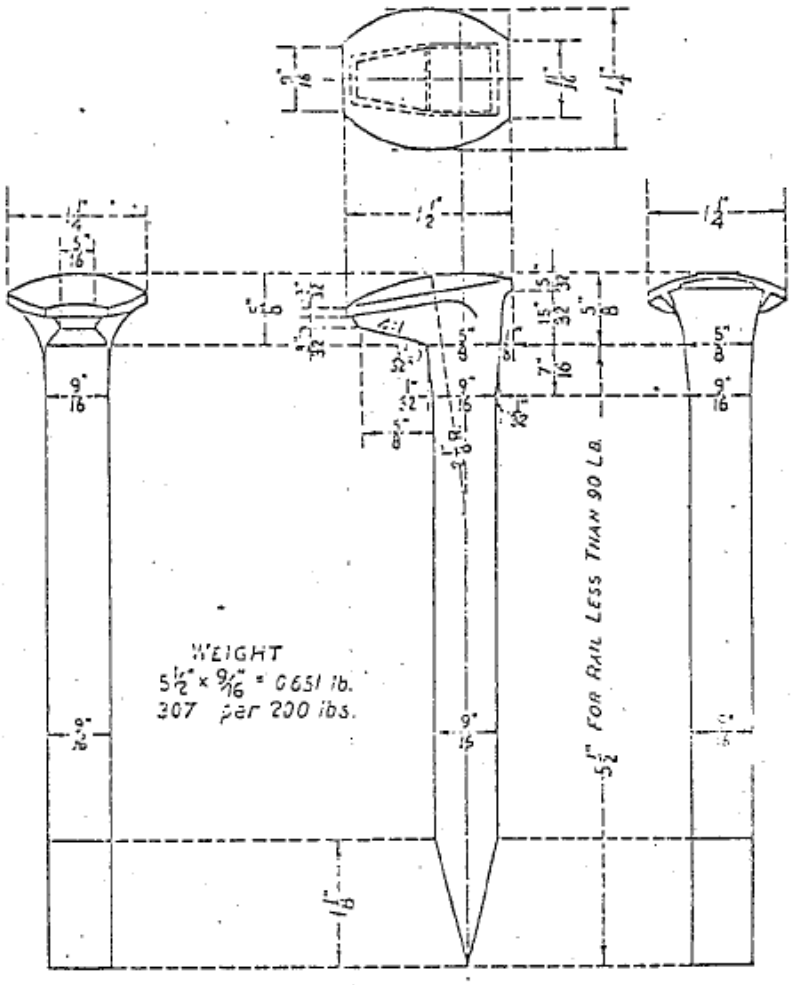
5/8" x 6" TRACK SPIKE

TRACK SPIKES

Regional Transportation Authority

Drg. 774-50-1
4/15/77

Reference: AREA.



9/16" x 5½" TRACK SPIKE

TRACK SPIKES

REGIONAL TRANSPORTATION AUTHORITY

REFERENCE: AREA.

Specification RTA-77-11

Page 4A of 4

METRA SPECIFICATION FOR PREPARED LIMESTONE BALLAST

NORTHEAST ILLINOIS RAILROAD CORPORATION

(METRA)

SPECIFICATION

FOR

PREPARED LIMESTONE BALLAST

SPECIFICATION NO. NIRC 0277-83

REVISED FEBRUARY 01, 2006

EXHIBIT 1-P

1.0 SCOPE

1.1 These specifications cover the requirements for grading and other significant physical properties of mineral aggregates for prepared limestone ballast.

2.0 GENERAL REQUIREMENTS:

2.1 Prepared limestone ballast shall be crushed limestone, free from injurious amounts of deleterious substances and conforming to the requirements of these specifications. The type or types, and sizes of prepared limestone ballast shall be designated by Metra.

2.2 The gradation of a ballast material is a prime consideration for the in-track performance of ballast materials. The gradation must provide the means to develop the compaction or density requirements for the ballast section and provide necessary void space to allow proper run off of ground water.

2.3 Ballast gradations must be graded uniformly from the top limit to the lower limit in Table 2 to provide proper density, uniform support, elasticity and to reduce deformation of the ballast section from repeated track loadings.

2.4 Metra mainline ballasts are graded as AREMA Gradation No. 3, Table 2. However, upon request other gradations complying with Table 2 may be requested.

3.0 PROPERTY REQUIREMENTS

3.1 PHYSICAL ANALYSIS

The methods of sampling and testing as defined by this specification are those in effect as of February 1, 2006 and may be revised or altered by Metra as needed.

3.1.1. Method of Sampling

Field samples shall be secured in accordance with the current ASTM Methods of Sampling, designation D 75. Test samples shall be reduced from field samples by the means of ASTM C 702.

3.1.2. Sieve Analysis

Sieve analysis shall be made in accordance with ASTM Method of Test, designation C 136.

3.1.3. Material Finer Than No. 200 Sieve

Material finer than the No. 200 sieve shall be determined in accordance with the ASTM Method of Test, designation C 117.

3.1.4. Bulk Specific Gravity and Absorption

The bulk specific gravity and percentage of absorption shall be determined in accordance with the ASTM Method of Test, designation C 127.

3.1.5. Percentage of Clay Lumps and Friable Particles

The percentage of clay lumps and friable particles shall be determined in accordance with the ASTM Method of Test, designation C 142.

3.1.6. Resistance to Degradation

The resistance to degradation shall be determined in accordance with the ASTM Method of Test, designation C 131 or C 535 using the grading as specified in Note # 1, Table 2. Materials having gradations containing particles retained on the 1 inch sieve

EXHIBIT 1-P

shall be tested by ASTM C 535. Materials having gradations with 100% passing the 1-inch sieve shall be tested by ASTM C 131.

3.1.7. **Sodium Sulfate Soundness**

Sodium Sulfate Soundness tests shall be made in accordance with the ASTM Method of Test, designation C 88.

3.1.8. **Unit Weight**

The weight per cubic foot shall be determined in accordance with the ASTM Method of Test, designation C 29.

3.1.9. **Percent of Flat and/or Elongated Particles**

The percent of flat or elongated particles shall be determined in accordance with ASTM Standard Test Method, designated D 4791. The dimension ratio used in this test method shall be 1:3.

3.2 CHEMICAL ANALYSIS

Chemical analysis of limestone or dolomitic limestone materials shall be performed. For carbonate materials, dolomitic limestones are defined as those materials which have a magnesium carbonate ($MgCO_3$) content of 28% to 36%. Those carbonate materials indicating magnesium carbonate values above 36% shall be defined as dolomites and carbonate materials below 28% shall be defined as limestones. The magnesium carbonate ($MgCO_3$) content of carbonate materials shall be tested and defined in accordance with ASTM C 25. Use "Standard Methods of Chemical Analysis of Limestone, Quick Lime and Hydrated Lime", or other test methods as may be approved or directed by the Metra representative.

3.3 LIMITING TEST VALUES

Table 1 outlines the limiting values of testing as may be defined by the designated test specifications. The values for unit weight and bulk specific gravity are minimum values while the remainder are maximum values.

Table 1. Recommended Limiting Values of Testing for Limestone or Dolomitic Limestone Ballast Material

Property	Limestone	Dolomitic Limestone	ASTM Test
Percent Material Passing No. 200 Sieve	1.0%	1.0%	C 117
Bulk Specific Gravity (See Note 2)	2.60	2.65	C 127
Absorption Percent	2.0	2.0	C 127
Clay Lumps and Friable Particles	0.5%	0.5%	C 142
Degradation	30%	30%	See Note 1

EXHIBIT 1-P

Soundness (Sodium Sulfate) 5 Cycles	5.0%	5.0%	C 88
Flat and/or Elongated Particles	5.0%	5.0%	D 4791

Note 1: Materials having gradations containing particles retained on the 1-inch sieve shall be tested by ASTM C 535. Materials having gradations with100% passing the 1-inch sieve shall be tested by ASTM C 131. Use grading most representative of ballast material gradation.
Note 2: The limit for bulk specific gravity is a minimum value. Limits for the remainder of the tests are maximum values.

4.0 GRADATIONS

Table 2 outlines the recommended gradations to which the materials are to be processed for use as track and yard ballast. The grading of the processed ballast shall be determined with laboratory sieves having square openings conforming to ASTM specification E 11.

Table 2. Metra Ballast Gradations

Size No. (See Note 1)	Nominal Size Square Opening	Percent Passing									
		3"	2-1/2"	2"	1-1/2"	1"	3/4"	1/2"	3/8"	No. 4	No. 8
24	2-1/2" - 3/4"	100	90-100		25-60		0-10	0-5	-	-	-
25	2-1/2" - 3/4"	100	80-100	60-85	50-70	25-50	-	5-20	0-10	0-3	-
3	2" - 1"	-	100	95-100	35-70	0-15	-	0-5	-	-	-
4A	2" - 3/4"	-	100	90-100	60-90	10-35	0-10	-	0-3	-	-
4	1-1/2" – 3/4"	-	-	100	90-100	20-55	0-15	-	0-5	-	-
5	1" - 3/8"	-	-	-	100	90-100	40-75	15-35	0-15	0-5	-
57	1" - No. 4	-	-	-	100	95-100	-	25-60	-	0-10	0-5

Note 1: Gradation Numbers 24, 25, 3, 4A and 4 are main line ballast materials. Gradation Numbers 5 and 57 are yard ballast materials.

5.0 PRODUCTION AND HANDLING

5.1 The aggregate production facility shall be of such a design to permit production and or blending without excessive working of the materials and the facility must be approved by Metra. The capacity of the production facility should be adequate to efficiently produce the anticipated daily loadings providing sufficient stockpiles to facilitate loadings without any delays.

5.2 Blending, stockpiling and other production and handling operations shall be managed by the producer to minimize segregation of the finished product. Stockpiling operations shall minimize as practical the breakage or excessive fall in stockpiling operations and the movement of wheeled or tracked machines over stockpiled materials shall be limited.

EXHIBIT 1-P

5.3 Processed ballast shall be washed and if necessary re-screened as necessary to remove fine particle contamination as defined by the specification or as directed by the Metra representative prior to stockpiling in the crushing/stockpiling operations and immediately after loading.

6.0 INSPECTION

6.1 Metra, or its representatives, reserve the right to visit the producers facility during usual business hours unscheduled for the following purposes:

a. Observe sampling and testing procedures to assure compliance with the requirements of these specifications.

b. Obtain representative samples of the prepared material being produced and shipped.

c. Review plant inspection, methods, quality control procedures, equipment and examine test results of current and previous tests.

6.2 The manufacturer shall provide the inspector with such assistance, materials, and laboratory testing equipment as necessary to perform on production site gradation and percent passing No. 200 Mesh Sieve analysis. Performance of these tests at the time of an unscheduled inspection visit is the right, but not the duty, of the inspector.

7.0 SAMPLING AND TESTING

7.1 The quality of a material to be used for ballast shall be determined prior to its acceptance by Metra. A series of tests as specified herein shall be made at a testing laboratory approved by Metra to establish the characteristics of the materials being tested.

7.2 Once a source has been accepted to supply ballast material, periodic quality control samples shall be taken to insure continued compliance with the specification. A representative sample of prepared limestone ballast shall be taken for gradation from each 5,000 tons of ballast being loaded for shipment. This sample shall be taken in accordance with ASTM D 75, and in the quantities as listed within that standard. A gradation report shall be prepared on each sample containing the following information: Source identification, date, sample number, shipment or car number, and the sieve analysis. The gradation specification shall appear on the test form.

7.3 In the event any two individual samples fail to meet the gradation requirement, immediate corrective action shall be taken to restore the production process to acceptable quality. Metra shall be advised in writing of the corrective action being taken. In the event of repeated failures, i.e. two or more samples failing in two successive shipments, Metra reserves the right to reject the shipment.

7.4 A full range of laboratory testing, as defined by this specification, shall be performed at least two times a year or as directed by the Metra representative, to insure the quality of the material being produced. If the supplier changes the location of the source or encounters changes within the supply source, laboratory testing must be performed on the new material to ensure compliance with specifications. Cost of testing shall be at supplier's expense.

7.5 The supplier shall provide the Metra Representative upon demand with certified results of ballast quality and gradation as conducted by a testing laboratory accepted by the Metra Representative. The supplier shall receive approval of the Metra Representative for the Testing Laboratory prior to performing the aforementioned tests.

8.0 MEASUREMENT AND PAYMENT

8.1 Ballast shall be measured on a per ton basis and payment shall be made on the number of tons of acceptable materials furnished. No allowance will be made for moisture content of

EXHIBIT 1-P

ballast materials loaded by any acceptable method. Weight tickets or records shall be maintained for a period of not less than six months for reference.

8.2 The number of tons shall be determined by one of the following methods and shall be approved by Metra:

a. Certified scale weights as determined by track scales (static or in motion weighing), truck scales or belt scales which load directly into the railcar.

b. Average weight agreements as mutually agreed upon by Metra and producer. The average net weight for each type and series of railcars shall be determined by Metra and producer to establish the average weight agreement per car. The average weight in the specified or type of cars shall be checked quarterly by Metra or as designated by the Metra Representative. The average weight will be calculated on lots of not less than ten (10) cars. Metra shall advise the producer if there is any variance in the average weight of the cars selected. Metra and the supplier will jointly make any changes in the loading methods to insure compliance with the weight agreement.

EXHIBIT 1-P

REQUIREMENTS FOR LIMESTONE TRACK BALLAST

1. The total dollar limitation of the purchase order(s) is not to exceed $ 2,000,000.

2. The purchase order(s) to be effective for a period of twenty-four months.

3. Track ballast (gradation sizes # 3, # 4 & # 5) and 3/4" & Smaller Washed Track Ballast (CA-14) per NIRC Specification #0277-83, revised February 1, 2006.

4. Ballast cars, equipped with control flow type doors, shall be provided by Metra.

5. Vendor shall be responsible for all round trip freight charges.

6. Quantities shown are for requirements known at time of this invitation for bids. These are for bidding purposes only.

7. Ballast car shipments will be in a minimum of five (5) cars at a time.

8. Vendor to specify routing to each location and the anticipated delivery turn-around times from quarry to destination.

9. Vendor must wash (water down) cars following loading for shipment. This to be in addition to washing and cleaning of ballast during crushing process.

10. At the time of each shipment, the vendor must provide Metra [FAX Attn. A. R. Bobby @ (312) 322-6919] with the following information;
    Bill of Lading - Showing car number or trucking company name
    Description and quantity of material
    Purchase order and line item numbers (Copy of invoice)

INVOICING: For billing purposes only, the total weight for all cars/trucks within a single shipment shall be rounded down to the nearest whole net ton.

EXAMPLE:	CAR #	Net Tons	Vendor invoiced amount;
	METX 2516	100.00	494.79 NT x $ 9.20 = $ 4,552.07
	METX 2517	98.65	
	METX 2518	99.06	Amount to be paid by Metra will be;
	METX 2519	97.65	494 NT x $ 9.20 = $ 4,544.80
	METX 2520	99.43	
		494.79	

METRA SPECIFICATION FOR STEEL RAILS

NORTHEAST ILLINOIS REGIONAL COMMUTER RAILROAD CORPORATION (METRA)
SPECIFICATION No. NIRC 0282-83 REVISED JANUARY 5, 2005

METRA SPECIFICATIONS FOR STEEL RAILS[1]

1.1 SCOPE

a. These specifications cover steel tee rails weighing 115 lb/yd and over for use in railway track.

b. Drawings of recommended rail sections are shown in Part 1, Design, Figure 4-1-1 through Figure 4-1-7 of the AREMA Manual for Railway Engineering.

c. ASTM Specifications A 1, A 2, and A 759 are referenced for tee rails weighing 60 lb/yd and over, girder rails, and crane rails, respectively.

d. Supplementary requirements Paragraph 1.17.1 and Paragraph 1.17.2 shall apply only when specified by the purchaser.

1.2 MANUFACTURE

a. The steel shall be made by either of the following processes: basic oxygen or electric furnace.

b. The steel shall be cast by a continuous process, or by other methods agreed by purchaser and manufacturer.

c. Sufficient discard shall be taken to insure freedom from injurious segregation and pipe.

d. Rails shall be furnished in the as-rolled (standard and low alloy), or head hardened (on-line or off-line processes) conditions.

1.3 CHEMICAL COMPOSITION AND MECHANICAL PROPERTIES

1.3.1 Chemical Composition

a. The chemical composition of a rail steel grade, determined as prescribed in Paragraph d, shall be within the limits found in the Product/Chemical Analysis Table for that rail steel grade. Current Tables are AREMA Manual for Railway Engineering Table 4-2-1-4-1a. and Table 4-2-1-4-2a.

b. Finished material representing the heat may be product tested. The product analysis shall be within the limits for product analyses specified in Paragraph a.

1

[1] AREMA References, Vol. 3, 1902, pp. 204, 208; Vol. 5, 1904, pp. 465, 469; Vol. 6, 1905, p. 183; Vol. 7, 1906, pp. 549, 573; Vol. 10, 1909, part 1, pp. 374, 393; Vol. 11, 1910, part 1, pp. 237, 255; Vol. 12, 1911, part 1, p. 467; Vol. 12, 1911, part 2, p. 12; Vol. 13, 1912, pp. 853, 1017; Vol. 14, 1913, pp. 181, 1103; Vol. 15, 1914, pp. 158, 375; Vol. 16, 1915, p. 1117; Vol. 21, 1920, pp. 1070, 1447; Vol. 26, 1925, pp. 619, 1413; Vol. 31, 1930, pp. 1455, 1770; Vol. 32, 1931, pp. 347, 816; Vol. 34, 1933, pp. 606, 821; Vol. 37, 1936, pp. 426, 991; Vol. 38, 1937, pp. 216, 635; Vol. 40 1939, pp. 596, 738; Vol. 43, 1942, pp. 575, 704; Vol. 47, 1946, pp. 373, 625; Vol. 52, 1951, pp. 596, 824; Vol. 54, 1953, pp. 1177, 1413; Vol. 55, 1954, pp. 775, 1098; Vol. 57, 1956, pp. 786, 1088; Vol. 58, 1957, pp. 962, 1248; Vol. 63, 1952, pp. 501, 768; Vol. 64, 1963, pp. 498, 690; Vol. 65, 1964, pp. 521, 851; Vol. 68, 1967, p. 408; Vol. 69, 1968, p. 356; Vol. 71, 1970, p. 223; Vol. 75, 1974, p. 479; Vol. 80, 1979, p. 82; Vol. 85, 1984, p. 13; Vol. 87, 1986, p. 69; Vol. 89, 1988, p. 71; Vol. 92, 1991, p. 58; Vol. 93, 1992, p. 57; Vol. 94, pg. 67; Vol. 94, p. 54; Vol. 96, p. 29, Vol. 97, p. 37. Reapproved with revisions 1996.

c. The chemical composition limits of alloy high-strength rail steel grades not shown in current AREMA Manual for Railway Engineering Product/Chemical Analysis Tables are subject to agreement of the purchaser and manufacturer.

d. Separate analyses shall be made from test samples representing the front, middle (optional), and back of the heat preferably taken during pouring of the heat. Determination may be made chemically or spectrographically. Any portion of the heat meeting the chemical analysis requirements of Paragraph a may be applied.

e. Upon request by the purchaser, samples shall be furnished to verify the analysis as determined in Paragraph d.

f. The analysis, most representative of the heat (clear of the transition zone for continuous cast steel), shall be recorded as the official heat analysis, but the purchaser shall have access to all chemical analysis determinations.

g. Rail heats shall be tested for hydrogen content using a sampling/analytical method or a direct measurement method. The testing shall be performed during the continuous casting process. Hydrogen content[1] shall be recorded and available for review or reporting at the request of the purchaser. The producer shall define the method used to determine hydrogen content, which of the following methods are used for hydrogen removal, and present evidence of applicable procedures used to control the final rail hydrogen.

- Vacuum Degassing.
- Bloom Controlled Cooling.
- Rail Controlled Cooling.

h. Product analysis limits may be applied only in testing for chemical composition after the rail manufacturing process is completed and will not supercede chemical composition limits done for the same heats when the steel is in the molten state.

1.3.2 Surface Hardness

a. Rails shall be produced as specified by the purchaser within the limits found in the Rail Hardness Table for that rail steel grade. Current Tables are AREMA Manual for Railway Engineering Table 4-2-1-4-1b. and Table 4-2-1-4-2b.

b. The Brinell hardness test, using a tungsten carbide indentor, shall be performed on a piece of rail at least 6 inches long cut from a rail of each heat of steel or heat-treatment lot, or from a ground/milled transverse sample cut from the 6 inch piece above. A test report shall be furnished to the purchaser.

(1) The test shall be made on the side or top of the rail head after decarburized material has been removed to permit an accurate determination of hardness. Alternately, the test may be made on the prepared transverse ground/milled sample no less than 3/8 inch in from all rail surfaces.

(2) The test shall otherwise be conducted in accordance with ASTM E 10, "Standard Test Method for Brinell Hardness of Metallic Materials," latest version.

[1] As a result of the use of different methods and reporting procedures, the comparison of hydrogen levels between various rail producers may not be appropriate.

c. If any test result fails to meet the specifications, two additional checks shall be made on the same piece. If both checks meet the specified hardness, the heat or heat treatment lot meets the hardness requirement. If either of the additional checks fails, two additional rails in the heat or lot shall be checked. Both of these checks must be satisfactory for the heat or lot to be accepted. If any one of these two checks fails, individual rails may be tested for acceptance.

d. If the results for off-line head hardened rails fail to meet the requirements of Paragraph a, the rails may be retreated at the option of the manufacturer, and such rails shall be re-tested in accordance with Paragraph b and Paragraph c.

1.3.3 Internal Hardness of High-Strength Rail

a. The internal hardness of high-strength rail of any rail steel grade shall be determined on a transverse specimen cut from the head and at least 6 inches from the end of the rail. The specimen shall be ground or milled so that the transverse surfaces are parallel.

b. The hardness shall be determined at intervals of not greater than 1/8 inch along traverses 1, 2, and 3 and at positions 4 and 5 as shown in AREMA Manual for Railway Engineering Figure 4-2-1. Hardness gradient of head hardened rail along lines 1, 2 and 3 shall be gradual towards the center of the rail, with no sharp drop or discontinuity. Traverse 2 can extend into the web of the rail (X + 1.6 inch) upon agreement between the purchaser and the manufacturer.

c. The hardness tests shall be conducted with either of the following methods: Rockwell (ASTM E18)[1], or Brinell (ASTM E10), using a tungsten carbide indentor. The results shall be reported in the units of the method used. The results shall be reported in Brinell (using AREMA - 4HRC to HB Conversion Table 42-1. If desired, Brinell hardness testing on a transverse specimen shall be performed as agreed upon by purchaser and manufacturer. Brinell indentations must be at least 3/16 inch apart from each other edge to edge

d. The hardness at a depth of 0.6 inch on lines 1, 2, and 3 and at points 4 and 5 of (depth of 3/8 inch) of AREMA Manual for Railway Engineering Figure 4-2-1 shall be 352 HB or higher for high strength rail. For the low alloy head hardened rail steel grade (LH) the hardness at a depth of 7/8 inch on lines 1, 2 and 3 shall be 341 HB or higher.

e. The testing frequency shall be one test per heat or 10,000 feet of rail, whichever is the smaller amount of rail.

f. If any test specimen fails to meet the required hardness, two additional test specimens shall be obtained from the same lot and tested. If both meet the requirements, the lot shall be accepted. If one of the specimens fails to meet the requirements, two additional rails from the lot shall be sampled and tested. Both of these tests must be satisfactory for the lot to be accepted. If one of the tests is unsatisfactory, individual rails may be sampled and tested for acceptance.

g. If the results for off-line head hardened rail fail to meet the requirement, the rails represented by the test may be re-treated and re-tested.

[1] ASTM E18 Standard Test Method for Rockwell Hardness and Rockwell superficial Hardness of Metallic Materials.

Table 42-1. AREMA HRC to HB Conversion for Rail Steels

HRC	HB	HRC	HB	HRC	HB
20	244	30	306	41.8	400
21	250	31	314	42	402
22	255	32	321	43	411
23	261	33	328	44	420
24	267	34	336	45	429
25	273	35	344	46	439
26	280	36	351	47	448
27	286	37	359	48	458
28	293	38	368	49	468
29	300	39	376	50	478
		40	384		
$HB = 165.77 + 2.3597HRC + 0.0777HRC^2$					

Developed by AREMA Committee Four specifically for rail steel.

1.3.4 Tensile Properties

a. Rails shall be produced as specified by the purchaser within the limits found in the Tensile Properties for that rail steel grade. Current Tables are AREMA Manual for Railway Engineering Table 4-2-1-4-1c. and Table 4-2-1-4-2c.

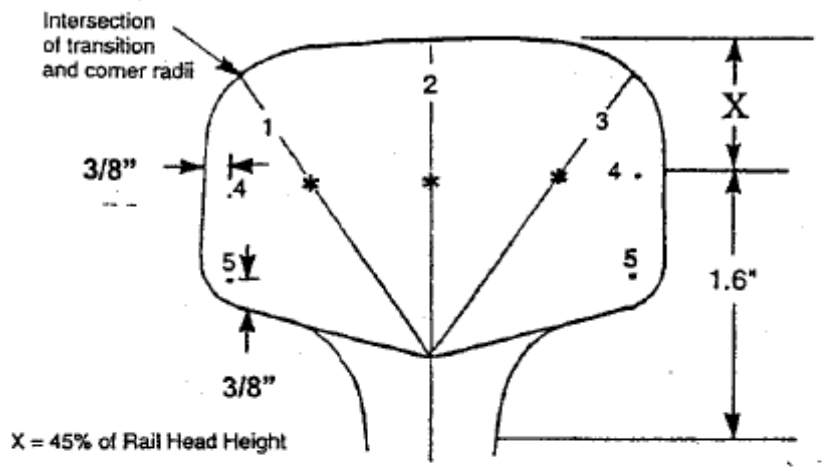
b. One longitudinal tension test specimen shall be taken from the gage corner of the rail head, centered 1/2 inch from the gage side and 1/2 inch from the running surface.

c. The specimen shall be 0.5 inch diameter and shall be tested per ASTM A370, Standard Test Methods and Definitions for Mechanical Testing of Steel Products.

d. Except as provided in Paragraph e, the test frequency shall be one test for each heat for the first one hundred heats, one test for every fifth heat for the second hundred heats and one test for every tenth heat thereafter for heats furnished to the same customer.

e. For high-strength rail of all steel grades, the testing frequency shall be one test per heat or 10,000 feet of rail, whichever is the smaller amount of rail.

NORTHEAST ILLINOIS REGIONAL COMMUTER RAILROAD CORPORATION (METRA)
SPECIFICATION No. NIRC 0282-83 REVISED JANUARY 5, 2005



	115#	119#	132#	133#	136#	140#	141#
X	3/4" 0.750"	27/32" 0.844"	25/32" 0.781"	7/8" 0.875"	7/8" 0.875"	15/16" 0.938"	1" 1.000"

Figure 42-1. Determining Internal Hardness of High Strength Rail

f. If any test specimen fails because of a malfunction of the test equipment or a flaw in the specimen, it shall be discarded and another one taken.

g. If a test specimen fails to meet the required tensile properties, two additional test specimens shall be cut from rails from the same lot and tested. If both meet the requirements, the lot shall be accepted. If one of the tests fails to meet the requirements, two additional rails from the lot shall be sampled and tested. Both of the tests must be satisfactory for the lot to be accepted. If one of these tests is unsatisfactory, individual rails may be sampled and tested for acceptance.

h. If the results for off-line head hardened rail fail to meet the requirements, the rails represented by the test may be re-treated and re-tested.

1.4 PROPERTIES OF AREMA RAIL GRADES

1.4.1 Standard AREMA Chemistry Rail

a. Product/Analysis for Standard Chemistry Rail Steel

Table 4-2-1-4-1a. Product/Chemical Analysis Table for Standard Chemistry Rail Steel

Elements	Notes	Chemical Analysis Weight Percent		Product Analysis, Weight Percent Allowance Beyond Limits of Specified Chemical Analysis	
		Minimum	Maximum	Under Minimum	Over Maximum
Carbon	1	0.74	0.84	0.04	0.04
Manganese		0.75	1.25	0.06	0.06
Phosphorus	2		0.020		0.008
Sulfur	3		0.020		0.008
Silicon		0.10	0.60	0.02	0.05
Nickel			0.25		
Chromium	1		0.25		
Molybdenum	1		0.060		
Vanadium			0.010		
Aluminum			0.010		
Other	4				
Note 1: The chemical composition of head-hardened rails will be subject to the requirements of standard strength rails, except as approved in writing by the purchaser. Any alteration of the chemical composition may require modification of welding procedures.					
Note 2: Up to 5% of the order may exceed 0.020 if purchaser and supplier agree, but in no case may the phosphorus exceed 0.025.					
Note 3: Up to 5% of the order may exceed 0.020 if purchaser and supplier agree, but in no case may the sulfur exceed 0.025.					
Note 4: Additional elements may be included in the chemistry and the chemical analysis when agreed upon by the purchaser and the supplier.					

b. Hardness of Standards Chemistry Rail Steel

Table 4-2-1-4-1b. Rail Hardness Table for Standard Chemistry Rail Steel

Type of Rail	Minimum Surface Brinell Hardness, HB
Standard Rail	300
High Strength Rail	370
Note 1: Hardness specified above shall be maintained in the head area only.	
Note 2: A fully pearlitic microstructure shall be maintained in the head.	
Note 3: If 410 HB is exceeded, the microstructure through the head shall be examined at 100X or higher for confirmation of a fully pearlitic microstructure in the head.	
Note 4: No untempered martensite shall be present within the rail.	

c. Tensile Properties of Standard Chemistry Rail Steel

Table 4-2-1-4-1c. Tensile Properties Table for Standard Chemistry Rail Steel

Description	Standard	High-Strength
Yield Strength, ksi, minimum	74.0	120.0
Tensile Strength, ksi, minimum	142.5	171.0
Elongation in 2 inches, percent, minimum	10 Note 1	10 Note 1
Note 1: Up to 5% of the order may be less than 10% elongation if purchaser's authorized		

d. Welding of Standard Chemistry Rail Steel

Standard strength rail steel does not require special welding procedures.

High strength rail steel may require air quenching of the weld area to achieve hardness and tensile properties consistent with the requirements for the as-rolled rail.

1.4.2 Low Alloy Rail Steel

a. Product/Analysis for Low Alloy Rail Steel

Table 4-2-1-4-2a. Product/Chemical Analysis Table for Low Alloy Rail Steel

Elements	Notes	Chemical Analysis Weight Percent Note 1				Product Analysis, Weight Percent Allowance Beyond Limits of Specified Chemical Analysis	
		Standard Strength		Intermediate and High Strength			
		Minimum	Maximum	Minimum	Maximum	Under Minimum	Over Maximum
Carbon		0.72	0.82	0.72	0.82		
Manganese		0.80	1.10	0.70	1.25		
Phosphorus	2		0.020		0.020		
Sulfur	3		0.020		0.020		
Chromium		0.25	0.40	0.40	0.70		
Silicon		0.10	0.50	0.10	1.00		
Nickel	5		0.15		0.15		
Molybdenum			0.050		0.050		
Vanadium			0.010		0.010		
Aluminum			0.005		0.005		
Copper	5		0.40		0.40		
Other	4						
Note 1: The chemical composition of low alloy intermediate and head-hardened rails will be subject to the requirements of standard strength low alloy rails, except as approved in writing by the purchaser. Any alteration of the chemical composition may require modification of welding procedures.							

Note 2: Up to 5% of the order may exceed 0.020 if purchaser and supplier agree, but in no case may the phosphorus exceed 0.025.
Note 3: Up to 5% of the order may exceed 0.020 if purchaser and supplier agree, but in no case may the sulfur exceed 0.025.
Note 4: Additional elements may be included in the chemistry and chemical analysis when agreed upon by the purchaser and the supplier.
Note 5: Copper content between 0.30 and 0.40 shall be acceptable if the ratio of nickel to copper > 1 : 3.

b. Hardness of Low Alloy Rail Steel

Table 4-2-1-4-2b. Rail Hardness Table for Low Alloy Rail Steel

Type of Rail	Minimum Surface Brinell Hardness, HB
Standard Strength Rail	300
Intermediate Strength Rail	325
High Strength Rail	370
Note 1: Hardness specified above shall be maintained in the head area only.	
Note 2: A fully pearlitic microstructure shall be maintained in the head.	
Note 3: If 410 HB is exceeded, the microstructure through the head shall be examined at 100X or higher for confirmation of a fully pearlitic microstructure in the head.	
Note 4: No untempered martensite shall be present within the rail.	

c. Tensile Properties of Low Alloy Rail Steel

Table 4-2-1-4-2c. Tensile Properties Table for Low Alloy Rail Steel

Description	Standard	Intermediate Strength	High-Strength
Yield Strength, ksi, minimum	74.0	80.0	120.0
Tensile Strength, ksi, minimum	142.5	147.0	171.0
Elongation in 2 inches, percent, minimum	10 Note 1	8.0	10 Note 1
Note 1: Up to 5% of the order may be less than 10% elongation if purchaser's authorized representative and supplier agree, but in no case may the elongation be less than 9%.			

d. Welding of Low Alloy Rail Steel

Welding of rails welded manufactured to this chemistry do not require post heating or quenching to achieve hardness.

1.5 SECTION

Table 4-2-2. Section Tolerances

Description	Tolerance, Inches			
	Rail		Trackwork Rail	
	Plus	Minus	Plus	Minus
Height of rail (measured within one foot from end)	0.030	0.015	0.030	0.015
Width of rail head (measured within one foot from end)	0.025	0.025	0.015	0.015
Thickness of web	0.040	0.020	0.040	0.020
Fishing template standout	0.060	0.000	0.030	0.000
Asymmetry of head with respect to base	0.050	0.050	0.030	0.030
Width of base	0.040	0.040	0.030	0.030
Flange height	0.025	0.015	0.015	0.015

Note 1: Base concavity shall not exceed 0.010 inch. Convexity is not permitted.
Note 2: No variation will be allowed in dimensions affecting the fit of the joint bars, except that the fishing template may stand out not to exceed 0.060 inch laterally.
Note 3: All four corners of the rail base shall have the radii according to the drawing ±1/32 inch. Any disputes shall be analyzed on an Optical Comparator.
Note 4: The section of the rails to be used in AREMA trackwork shall conform to the design specified by the purchaser subject to the tolerances listed under trackwork rail above.
Note 5: Head radius to be within (±) 2 inches per AREMA Manual for Railway Engineering Figure 4-2-40.
Note 6: On up to 5% of the order, the height of the rail plus tolerance can be between 0.030 and 0.040 inches, if the purchaser's authorized representative and the manufacturer agree. This exception does not apply to trackwork rail.

1.6 BRANDING AND STAMPING (2003)

a. Branding shall be rolled in raised characters on the side of the web of each rail at a minimum of every 16 feet in accordance with the following requirements:

(1) The data and order of arrangement of the branding shall be as shown in the following typical brand.

136	RE	Manufacturer	2003	III or 3
(Weight)	(Section)	(Mill Brand)	(Year Rolled)	(Month Rolled)

(2) The design of letters and numerals are determined by the manufacturer.

b. The web of each rail shall be hot stamped a minimum of 3 times per rail (short rails must contain a minimum of one full stamp) on the side opposite the brand, and shall not occur within 2 feet of either end of rails, and in accordance with the following requirements:
(1) The data shall be shown in the following typical stamping. The height of the letters and numerals shall be 5/8 inch.

SS, HH, LA, IH, or LH	297165	PSTU	12	BC
(Rail Type) SS = Standard Strength HH = Head Hardened LA = Low Alloy Standard Strength IH = Low Alloy Intermediate LH = Low Alloy Head Hardened	(Heat Number)	(Rail Letter)	(Strand and Bloom Number)	(Method of Hydrogen Elimination, if indicated in stamping)

(2) Rails from continuous cast blooms shall be identified by a designation for heat number, strand number, and bloom number. The rail shall be identified by an alphabetical designation beginning with "P", and succeeding "S", "T", "U", etc., consecutively, or any other identification of the position of the rail within the cast, as agreed between the purchaser and manufacturer.

NOTE: Strand and bloom numbers may be joined or may be coded at the manufacturer's option.

(3) The 5/8 inch stamped characters shall, have a flat or radius face (0.040 inch to 0.060 inch wide) with bevels on each side so as not to produce metallurgical stress risers. The letters and numbers shall be on a 10 degree angle from vertical and shall have rounded corners. The stamping shall be between 0.020 inch and 0.060 inch in depth along the center of the web. The design shall be as shown in AREMA Manual for Railway Engineering Figure 4-2-2.

(4) High-strength rail shall be identified in accordance with Paragraph 1.15-a.

Figure 4-2-2. Design of Special Letters and Numbers on a 10 Degree Angle for Rail Stamps, No Sharp Corners

1.7 HYDROGEN ELIMINATION

a. The rail shall be free from shatter cracks.

b. The above shall be accomplished by at least one of the following processes:

- Control Cooling of Rails (CC) (See Article 1.18).
- Control Cooling of Blooms (BC).
- Vacuum Treated (VT).

1.8 ULTRASONIC TESTING

a. Rails shall be ultrasonically tested for internal imperfections subject to the provisions of, Step b through, Step h.

b. Full length of the rail shall be tested using in line ultrasonic testing equipment provided by the manufacturer except, if agreed to between purchaser and manufacturer, rails may be tested in accordance with supplementary requirement Paragraph 1.17.2. The rail shall be free from rough surfaces, loose scale or foreign matter which would interfere with the ultrasonic detection of defects. Testing shall be done when the rail temperature is below 150 degrees F.

c. The calibration test rail shall be a full section rail of the same section as that being tested. The test rail shall be long enough to allow calibration at the same rate of speed as the production rail.

d. The size, shape, location and orientation of calibration references to be placed in the test rail shall be agreed upon by the purchaser and manufacturer. At least one reference shall be put into the test rail to represent each search unit in the system.

(1) The in-line testing system sensitivity level, using the calibration rail, shall be adjusted to detect a minimum 1/16 inch diameter defect anywhere in the sound path in the head, a minimum of 3/32 inch diameter in the web, and longitudinal imperfections exceeding 1/2 inch length and greater than 1/16 inch depth occurring in the base.

(2) Any indication equal to or greater than the references specified in, paragraph (1) when scanning the rail at the production speed shall be cause for initial rejection. A record shall be made of each suspect rail. This record shall be available to the purchaser's inspector.

e. The calibration rail shall be run through the ultrasonic testing equipment at the start of each shift or at least once each 8 hour operating turn and additionally at any section change or at any indication of equipment malfunction. A record shall be maintained by the manufacturer of each time the calibration test rail is run through the test system. This record shall be available to the purchaser's inspector.

f. In the event of a calibration failure, all rails processed since the last successful calibration shall be retested.

g. The suspect rail may be retested using manual nondestructive testing techniques before final rejection. The testing criteria of the manual nondestructive retesting shall be in accordance with, Step d. The method of inspection shall be agreed to between purchaser and manufacturer.

h. Rejected rails shall be cut back to sound metal as indicated by the ultrasonic testing subject to the length restrictions in Paragraph 1.11. The cut shall be a minimum of 12 inches from any indication.

1.9 INTERIOR CONDITION/MACROETCH STANDARDS

1.9.1 Sample Location and Frequency

a. *Continuous Cast Steel.* A test piece shall be macroetched representing a rail from each strand from the beginning of each sequence and whenever a new ladle is begun, which is the point representative of the lowest level in the tundish (i.e. the point of lowest ferrostatic pressure.) One additional sample from the end of each strand of the last heat in the sequence shall also be tested. A new tundish is considered to be the beginning of a new sequence.

b. Upon receipt the purchaser has the right to examine any rail from any part of a heat at his option, and if the purchaser determines that the rail sample selected is rejectionable, the entire heat shall be reevaluated according to Paragraph 1.9:4.

1.9.2 Sample Preparation

a. A full transverse section of the rail can be cut by abrasive or mechanical means as long as care is maintained in preventing metallurgical damage.

b. The face to be etched shall have at least a 125 microinch finish.

c. The sample shall be degreased and totally immersed in a hot (160 degrees to 180 degrees F) one to one mixture, by volume, of concentrated hydrochloric acid (38 volume percent) and water to sufficiently etch the specimen. Etching time shall be between ten and twenty minutes. The solution surface shall be at least one inch above the etched surface.

d. Upon removal from the bath, the sample shall be rinsed and brushed under hot water and dried. The sample shall not be blotted dry. A rust inhibitor may be applied to the etched face at the request of the purchaser.

1.9.3 Macroetch Evaluation

According to AREMA Manual for Railway Engineering Figure 4-2-3, the areas of cross section shall be defined as head, web, and base. Schematic descriptions of some rejectionable conditions are depicted in AREMA Manual for Railway Engineering Figure 4-2-4 through Figure 4-2-12. Photographs of rejectionable conditions are presented in AREMA Manual for Railway Engineering Paragraph 2.1.19.

1.9.3.1 Rejectionable Condition - Continuous Cast

a. Hydrogen flakes (AREMA Manual for Railway Engineering Figure 4-2-4).

b. Pipe; any size (AREMA Manual for Railway Engineering Figure 4-2-5 and Figure 4-2-6a./Figure 4-2-6b.).

c. Central web streaking extending into the head or base (AREMA Manual for Railway Engineering Figure 4-2-7 and Figure 4-2-8).

d. Streaking greater than 2 1/2 inches in length.

e. Scattered central web streaking from the web into the head and base (AREMA Manual for Railway Engineering Figure 4-2-9).

f. Scattered segregation extending more than one inch into the head or base (AREMA Manual for Railway Engineering Figure 4-2-10).

g. Subsurface porosity (AREMA Manual for Railway Engineering Figure 4-2-11).

h. Inverse or negative segregation having a width greater than 1/4 inch and extending more than 1/2 inch into the head or base.

i. Streaking greater than 1/8 inch in the head from radial streaks, radial cracks, halfway cracks, or hinged cracks.

j. Other defects that could cause premature failure (i.e. slag, refractory, etc.).

1.9.4 Retests

a. If any specimen fails to meet the macroetch standard for interior quality, two additional samples of rail representative of the same strand shall be obtained.

b. These retests shall be taken from positions selected by the manufacturer and the material from between the two retest positions shall be rejected.

c. If any retest fails, testing shall continue until acceptable internal quality is exhibited.

d. All rails represented by failed tests shall be rejected.

e. Short Rails - If finished rail from the beginning of a strand shows defects, it shall be cut back through successive rails to sound metal and accepted as short rail, subject to the requirements of Article 1.11.

1.9.5 Magnified Inspection

a. In the event that there is a question of the seriousness of the indication, further examination may be performed at higher magnification.

b. Inspect sample with stereo microscope up to 5X.

c. A polished sample may be inspected at 100X for metallographic interpretation.

1.9.6 Interior Condition / Microcleanliness Standards

1.9.6.1 Sample Frequency

The metallurgical cleanliness of the rail steel shall be determined from samples taken from the finished rail section. A minimum of every tenth heat must be tested. The purchaser reserves the right to require 100% testing of all heats should it be deemed necessary.

1.9.6.2 Sample Size and Location

A minimum of three one-inch long full section samples per heat tested shall be taken, one from the end of the first acceptable rail, one from the end of a rail representing the approximate middle of the heat, and one from the end of the last acceptable rail. Test specimens will be sectioned and surface analyzed as shown in AREMA Manual for Railway Engineering Figure 42-3.

1.9.6.3 Sample Preparation and Evaluation

Each 3/4" by 3/4" section (Sample A) shall be carefully prepared and evaluated according to ASTM Standard Practice E45, Method A. Each individual metallographic sample shall have a maximum average rating of 2 and a maximum individual rating of 3 for any inclusion type, thin or heavy. Results shall be made available to the purchaser upon request.

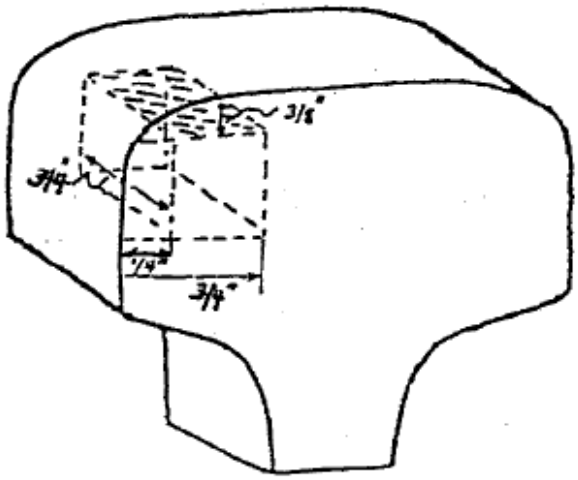


Figure 42-3. Sample A location in rail head - Shaded area denotes area to be analyzed

1.10 SURFACE CLASSIFICATION

Rails which do not contain surface imperfections in such number or of such character as will, in the judgment of the purchaser, render them unfit for recognized uses, shall be accepted.

1.10.1 Hot Marks

a. Rails with hot marks such as from shearing, scabs, pits, or hot scratches greater than 0.020 inch in depth shall be rejected.

b. Rails with guide marks in the head greater than 0.020 inch deep or greater than 0.062 inch wide shall be rejected.

1.10.2 Cold Scratches

a. Rails with longitudinal cold scratches, formed below 700 degrees F, exceeding 36 inches in length *and/or* 0.010 inch in depth shall be rejected.

b. Rails with transverse cold scratches, formed below 700 degrees F, which exceed 0.010 inch in depth shall be rejected.

1.10.3 Protrusions

a. Rails with any protrusion of excess metal extending from the surface of the rail, such as could be caused by a hole in the roll or a roll parting in the web shall be rejected if the protrusion affects the fit of the joint bar or causes the fishing template to stand out more than 1/16 inch laterally.

b. Rails with any protrusion in the web greater than 1/16 inch high and greater than 1/2 square inch in area shall be rejected.

c. No protrusion of excess metal shall be allowed on the head or the base of the rail.

1.10.4 Surface Conditioning

a. Surface imperfections may be corrected only by grinding and only with the purchaser's approval.

b. If the purchaser agrees to surface conditioning, a plan containing a specific description of the work to be performed must be furnished by the manufacturer to the purchaser for approval. The plan must ensure that no metallurgical damage is done to the rail.

1.11 Length

a. The standard length of rails shall be 80 feet, when corrected to a temperature of 60 degrees F Other standard lengths may be specified by the purchaser.

b. Up to 10 percent of standard length rail of the total tonnage accepted from each individual rolling will be accepted in shorter lengths as follows:

Standard Length of Order:	80 feet
Permissible Short Lengths:	78
	74
	70

c. Variations from the specified length will be permitted as follows:

	Length ≥ 70
Undrilled	-0, +6 inch
Drilled one end	-0, +6 inch
Drilled both ends	±7/8 inch

d. Standard short length variations other than those set forth in, paragraph b and paragraph c may be established by agreement between the purchaser and manufacturer.

e. Lengths of rails shall be designated with proper color paint as set forth in Article 1.15.

1.12 DRILLING

a. The purchaser's order shall specify the amount of right-hand drilled and left-hand drilled rails, drilled both-end rails and undrilled (blank) rails desired. The right-hand or left-hand end of the rail is determined by facing the side of the rail on which the brand (raised characters) appears.

(1) When right-hand and left-hand drilling is specified, at least the minimum quantity of each indicated by the purchaser will be supplied.

(2) Disposition of short rails which accrue from left-hand drilled, right-hand drilled, and undrilled (blank) rail production, and which are acceptable in accordance with paragraph b shall be established by agreement between the purchaser and the manufacturer.

b. Circular holes for joint bolts shall be drilled to conform to the following:

Rail Section	11525 RE	13225 RE	136 RE
Hole Spacing	9-1/2" X 6"	9-1/2" X 6"	9-1/2" X 6"
Hole Diameter	1-1/8"	1-1/8"	1-1/8"
Above Base	2-7/8" AB	3-3/32" AB	3-3/32" AB

(3) A variation of nothing under and 1/16 inch over in the size of the bolt holes will be permitted.

(4) A variation of 1/32 inch in the location of the holes will be permitted.

(5) The drilling process shall be controlled so as not to mechanically or metallurgically damage the rail.

c. Dressing of drilled rails shall be as follows:

(1) Chamfer the entrance and exit sides of the holes. Aim for 1/32 inch minimum chamfer at an aim 45 degree angle.

(2) Bevel grind the radius and sides of the rail head I/16 inch back (+1/32 inch, -0 inches) by 1/8 inch down (+1/16 inch, -0 inches when looking at the rail face.

1.13 WORKMANSHIP

1.13.1 Rail Straightness

a. Rails shall be straightened cold in a press or roller machine to remove twists, waves and kinks until they meet the surface and line requirements specified, as determined by visual inspection.

b. When placed head up on a horizontal support, rails that have ends higher than the middle will be accepted, if they have a uniform upsweep, the maximum ordinate of which does not exceed 3/4 inch in any 80 feet as illustrated in AREMA Manual for Railway Engineering Figure 4-2-4.

c. The uniform surface upsweep at the rail ends shall not exceed a maximum ordinate of 0.020 inch in 3 feet and the 0.020 inch maximum ordinate shall not occur at a point closer than 18 inches from the rail end as illustrated in AREMA Manual for Railway Engineering Figure 4-2-5.

d. Surface downsweep and droop shall not be accepted.

e. Deviations of the lateral (horizontal) line in either direction at the rail ends shall not exceed: (1) a maximum mid-ordinate of 0.020 inch in 3 feet using a straight edge and of 0.010 inch at the end quarter point as illustrated in AREMA Manual for Railway Engineering Figure 4-2-6a.; (2) a maximum of 0.040 inch measured by the tangent offset method at the end of the rail as illustrated in AREMA Manual for Railway Engineering Figure 4-2-6b.

f. Uniform lateral sidesweep in any 80 feet shall not exceed 3/4 inch as illustrated in AREMA Manual for Railway Engineering Figure 4-2-7.

g. When required, proof of compliance with, paragraph b shall be determined by string (wire) lining, and a straightedge and taper gage shall be used to determine rail end surface and line characteristics specified in paragraph c, paragraph d and paragraph e.

h. Rails shall be hot sawed, cold sawed, milled, abrasive wheel cut, or ground to length, as specified by purchaser on purchase order, with a variation in end squareness of not more than 1/32 inch allowed. The method of end finishing rails shall be such that the rail end shall not be metallurgically or mechanically damaged.

i. If the rail shows evidence of twist while being laid head up on the final inspection bed, it will be checked by inserting a taper or feeler gage between the base and the rail skid nearest the end. If the gap exceeds 0.060 inch the rail will be rejected. Alternatively, a twist gage may be used and if the rail exceeds 1.5 degrees in 80 feet the rail will be rejected. Rejected rails may be subject to straightening.

TOLERANCES FOR INSPECTION OF RAIL

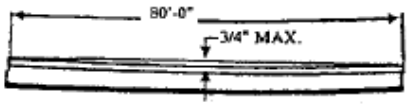


Figure 42-4. Side Elevation of Rail Uniform Upsweep Tolerance

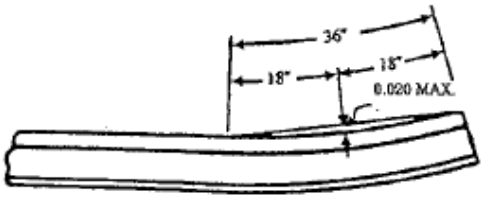


Figure 4-2-5. Side Elevation of Rail Uniform Upsweep Tolerance at Rail Ends

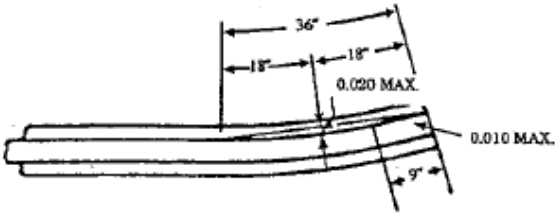


Figure 42-6a. Top View of Rail Lateral (Horizontal) Line Tolerance at Rail Ends

Figure 42-6b. Top View of Rail Lateral (Horizontal) Line Tolerance at Rail Ends

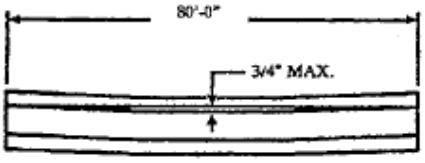


Figure 42-7. Top View of Uniform Lateral Sidesweep Tolerance

1.13.2 Evaluation of Residual Stresses in Rail

a. Purpose of the Test

(1) Manufacturing practices can induce residual stresses in rail that may result in web cracking or web distortion in service if the service stresses have sufficient magnitude and if stress risers exist. The purpose of the test shall be to evaluate the magnitude of these residual tensile or residual compressive stresses in the rail web.

(2) The web saw cut test shall be the primary method used to evaluate the magnitude of the residual stresses in rail.

b. Web Saw Cut Test Procedure

(1) Rail shall meet the below requirements of a web saw cut test conducted on a fully roller-straightened rail sample of a regular production rail. The rail ends not affected by the roller straightening process shall not be used for the test. For those production rails that are not roller-straightened, the rail shall also meet the following requirements of a web saw cut test.

(2) The test sample shall be 24" (0.61 m) in length and cut from a production rail. The sample end face furthest from the rail end shall be punch marked with two central, vertically aligned sharp cone pointed marks as shown in AREMA Manual for Railway Engineering Figure 4-2-8. The initial vertical distance between these two punch marks shall be measured with a calibrated vernier caliper and recorded. An alternate method shall be to use a calibrated caliper to measure the initial height of the dl burred end of the rail to be sawcut. The caliper measurement shall be taken at a distance no more than 0.25" (6 mm) from the rail end at the vertical centerline of the rail. The caliper point locations shall be marked and this measurement shall be recorded.

(3) The web of the test sample shall be saw cut as shown in AREMA Manual for Railway Engineering Figure 4-2-8 for a distance (L) of 16" (400 mm). The cut shall take place along the neutral axis in the web. If the rail closes during the saw cut, sufficient material shall be removed from the mouth of the saw cut to prevent the top portion of the rail from touching the bottom portion of the rail. The sawing process shall use procedures so as not to induce distortion or heating of the rail.

(4) Immediately after cutting, the distance between the two vertical punch marks shall again be measured with the vernier caliper and recorded. For the alternate method the rail height shall be remeasured by placing the caliper points at the same position as previously measured on the top and base of the rail. This value should be recorded. For either procedure, the value after subtracting the final measurement from the initial measurement is called the vertical displacement (d). The vertical displacement may be a positive or negative value depending upon whether the longitudinal and vertical residual tensile stresses of the rail sample are in tension (+) or compression (-).

c. Rail Acceptance Criteria

(1) Any rail demonstrating a vertical displacement (+ or -) of greater than 0.148" (3.75 mm) shall be rejected.

(2) For fully-hardened rails, that have significantly higher fracture toughness properties in the web of the rail, an alternate acceptance criteria based on stress intensity and fracture toughness

measurements can be used. If the stress intensity level is less than the fracture toughness level the rail shall be acceptable.

d. Retest Criteria

(1) Any rail that does not meet the acceptance criteria in Paragraph c (1) shall be accepted if a steel wedge forced into the mouth of the saw cut generates crack propagation and completed fracture through either the base or head of the rail.

(2) Alternately, any rail that does not meet the acceptance criteria in Paragraph c (1) shall be accepted if two additional rails from the same week's production are secured, saw cut tested and pass the acceptance criteria.

e. Testing Frequency

Residual stresses within rails are generated in critical locations of each manufacturer's process. Rail manufacturers are encouraged to develop and demonstrate a statistically sound continuous monitoring test for control of their critical processing steps during production of rail. These monitoring tests shall demonstrate to the satisfaction of the rail customer the existence of a positive correlation between the continuous process monitoring and the finished rails' acceptance saw cut test measurements. During development of this monitoring process, a saw cut test shall be taken at a frequency of one rail per 24 hours for a two-week period. Also, if major changes occur in the critical rail manufacturing processes in the course of production, tests must be taken at a frequency of one rail per 24 hours for a one-week period of that change. Once these steps have been taken, a rail shall be tested at a continuous frequency of at least one rail per week.

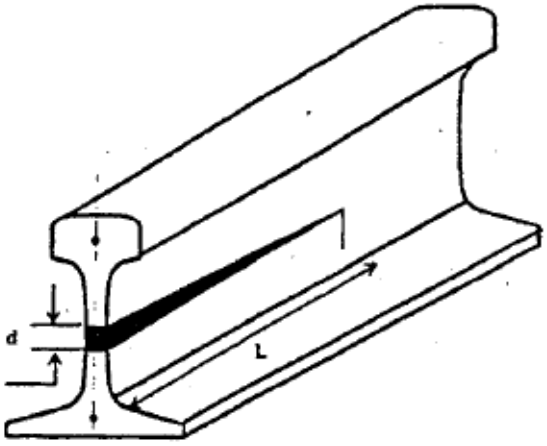


Figure 42-8. Rail - Web Saw Cut Test

d = displacement

L = saw cut length

1.14 ACCEPTANCE

a. To be accepted, the rails offered must fulfill all the requirements of these specifications.

b. No A-rails will be accepted.

c. Rails accepted shall be shipped and invoiced based on the calculated weight per yard for the rail section.

d. The rail producer shall furnish to the purchaser the following records of inspection and shipment by the method and in the form agreed upon between the purchaser and the producer.

(1) The chemical analysis of the rails shipped, listed by cast or ingot and heat number, and the specified chemical analysis elements. (See Paragraph 1.3.)

(2) The Brinell hardness of the rails shipped by cast or ingot and heat numbers, and the hardness pattern for hardened rails as agreed upon by purchaser and manufacturer. (See Paragraph 1.4.)

(3) The method of hydrogen elimination.

(4) A shipping statement of the rails shipped which will include the number of pieces of each length, and the total tons shipped in each vehicle (rail car or ship).

(5) A statement that all rails supplied meet the ultrasonic requirements. (See Paragraph 1.8.)

(6) A statement that all macroetched samples representing the rails supplied meet the Macroetch requirements. (See Paragraph 1.9.)

1.15 MARKINGS

a. High-strength rails shall be marked by either a metal plate permanently attached to the neutral axis, hot stamped, or in the brand which gives the manufacturer, type and/or method of treatment. Heat treated rail shall be paint-marked orange. Alloy rail shall be paint-marked aluminum color.

b. Non AREMA (Industrial Quality) rails shall be paint-marked yellow.

c. Short rails (less than 80 feet) shall be paint-marked green.

e. Trackwork rails shall be paint-marked white.

f. Rail length shall be painted on the end faces or in a manner acceptable to the purchaser or manufacturer.

g. Individual rails shall be paint-marked only one color, according to the order listed above.

h. Paint markings will appear on the top of the head at one end only, at least 3 feet from the end.

1.16 LOADING

All rails shall be handled carefully to avoid damage and shall be loaded by means of pyramid loading with the branding on all rails facing the same direction. Rails of different markings shall not be intermixed in loading, but shall be segregated and loaded head up. If there are not enough rails of one marking for a full car, smaller groups consisting of tiers of different markings as approved by the purchaser, may be loaded onto one car.

1.17 SUPPLEMENTARY REQUIREMENTS

The following supplementary requirements shall apply only when specified by the purchaser in the inquiry, order, and contract.

1.17.1 End Hardening

The drilled ends may be specified to be end hardened. When so specified, end hardening and chamfering shall be in accordance with paragraph a through paragraph g.

a. End-hardened rails may be hot stamped with letters "CH" in the web of the rail ahead of the heat number.

b. Water shall not be used as a quenching medium except in oil-water or polymer-water emulsion process approved by the purchaser.

c. Longitudinal and transverse sections showing the typical distribution of the hardness pattern produced by any proposed process shall, upon request of purchaser, be submitted for approval before production on the contract is started.

d. The heat-affected zone defined as the region in which the hardness is above that of the parent metal shall cover the full width of the rail head and extend longitudinally a minimum of 1 1/2 inches from the end of the rail. The effective hardness zone 1/2 inch from the end of the rail shall be at least 1/4 inch deep.

e. The hardness measured at a spot on the center line of the head 1/4 inch to 1/2 inch from the end of the rail shall show a Brinell hardness number range of 341 to 401 when decarburized surface has been removed. A report of hardness determination representing the product shall be given to the purchaser or his representative.

f. The manufacturer reserves the right to retreat any rails which fail to meet the required Brinell hardness number range.

g. Chamfering rail ends shall be done in such a manner as will avoid formation of grinding cracks.

1.17.2 Manual Ultrasonic Testing

a. The rail may be specified by the purchaser to be ultrasonically tested for internal imperfections subject to the provisions of paragraph b.

b. Manual Ultrasonic Test of Web at the Rail Ends for Weld Plant Application.

(1) Manual End testing shall be performed using standard ultrasonic testing equipment acceptable to the purchaser and manufacturer.

(2) The search unit shall be a standard dual element crystal or similar transducer acceptable to the purchaser and manufacturer.

(3) The calibration test block shall be of the following characteristics: Material 4340 AISI Steel/Nickel plated, manufactured in accordance with ASTM E428. As an alternate, reference standards may be fabricated from a section of rail as agreed upon between the purchaser and manufacturer.

(4) Dimensions of the calibration test block and calibration references shall be agreed upon by the purchaser and manufacturer. (For calibration reference the recommended thickness of the block should approximate the thickness of the rail web and contain a 1/16 inch flat bottom hole drilled to one-half the thickness.)

(5) Calibration of the instrument shall be performed before the commencement of testing, every 100 rail ends thereafter, and after any test delay exceeding 30 minutes.

(6) When the search unit is coupled to the calibration test block, the indication height from the calibration reference shall serve as a reference level for the test. (Recommended reference levels should appear from 40% to 80% of the maximum height on the cathode ray tube graticule.)

(7) Couplant shall be distributed over the entire web area at least 12 inches from the end of the rail and the search unit moved over the entire area in vertical and/or horizontal sweeps.

(8) An indication equal to or exceeding the reference level shall be cause for rejection.

(9) Rejected rails may be cut back to sound metal as indicated by the ultrasonic testing, subject to the length restrictions in Paragraph 1.11.

1.18 APPENDIX 1

Inasmuch as the controlled cooling of rails has proved a successful method for the elimination of hydrogen, the following procedure is presented as one which will meet the requirements of Paragraph 1.7, paragraph a.

a. All rails shall be cooled on the hot beds or runways until full transformation is accomplished and then charged immediately into the containers. In no case should the rail be charged at a temperature below 725 degrees E

b. The temperature of the rails before charging shall be determined at the head of the rail at least 12 inches from the end.

c. The cover shall be placed on the container immediately after completion of the charge and shall remain in place for at least 10 hours. After removal or raising of the lid of the container, no rail shall be removed until the temperature of the top layer of rails has fallen to 300 degrees F or lower.

d. The temperature of an outside rail or between an outside rail and the adjacent rail in the bottom tier of the container, at a location not less than 12 inches nor more than 36 inches from the rail end, shall be recorded. This temperature shall be the control for judging rate of cooling.

e. The container shall be so protected and insulated that the control temperature shall not drop below 300 degrees F in 7 hours for rails 100 lbs per yd in weight or heavier from the time the bottom tier is placed in the container and 5 hours for rails of less than 100 lbs per yd in weight. If this cooling requirement is not met, the rails shall be considered control-cooled, provided that the temperature at a location not less than 12 inches from the end of a rail at approximately the center of the middle tier does not drop below 300 degrees F in less than 15 hours.

f. The manufacturer shall maintain a complete record of the process for each container of rails.

1.19 APPENDIX 2

These photomacrographs as found in the latest edition of the AREMA Manual for Railway Engineering are intended to supplement the Macroetch standards presented in Paragraph 1.9 and

depict rejectionable conditions. The macrographs are presented in the order found in AREMA Manual for Railway Engineering Table 4-2-3.

1.20 APPENDIX 3

The figures in this paragraph as found in the latest edition of the AREMA Manual for Railway Engineering represent drawings of gages for determining compliance with AREMA rail section tolerances per Article 1.5. The gage drawings are presented in the order found in AREMA Manual for Railway Engineering Table 4-2-4.

METRA SPECIFICATION FOR TIMBER CROSS TIES

METRA
SPECIFICATION NO. 0286-83 **REVISED: JANUARY 20, 1992**
TIMBER CROSS TIES

1.0 MATERIAL

1.1 Kinds of wood. Prior to manufacturing ties, producers shall ascertain which of the following kinds of wood suitable for cross ties will be accepted:

Ashes	Beech	Birches
Elms	Gums	Locusts
Oaks	Walnuts	Cherries
Maples		

Or such others as may be specifically ordered.

2.0 PHYSICAL REQUIREMENTS

2.1 General Quality. Except as hereinafter provided, all ties shall be free from any defects that may impair their strength or durability as cross ties, such as decay, large splits, large shakes, large or numerous holes or knots, grain with slant greater than one in fifteen.

3.0 DESIGN

3.1 The length and dimensions of cross ties shall be specified in the request for quotations.

3.2 Except as hereinafter provided, cross ties shall measure as follows throughout the rail bearing areas. The rail bearing areas as used here and hereafter are defined as those sections of the tie between 20" and 40" from its middle:

Size	Thickness & Width Measurements	Width of Narrower Face
3	6"x8"	8"
5	7"x9"	9"

4.0 MANUFACTURER

4.1 Except as hereinafter provided, all ties shall be straight, well manufactured, cut square at the ends, have bottom and top parallel, and have bark entirely removed.

5.0 INSPECTION

5.1 Cross ties will be inspected at suitable and convenient places, at point of shipment or at destination as may be agreed between the supplier and Metra.

Metra's representatives shall have free entry to the manufacturing facilities at all times while the work of outstanding contract is being executed.

5.2 Material subject to inspection must be sorted for quality prior to Metra inspection.

5.3 Ties to be presented for inspection in a suitable manner and in sufficient quantities to cause an adequate number per day to be accepted according to current industry standards.

5.4 Inspectors will make reasonable close examination of the top, bottom, sides and ends of each tie. Each cross tie will be judged independently, without regard for the decisions on others in the same lot.

5.5 Manufacturer shall submit certified reports to establish moisture content and preservative retention.

6.0 TOLERANCES

6.1 Decay is not allowed. "Blue Stain" is not decay and is permissible in any wood.

6.2 Holes: Within the rail bearing areas a large hole is one more than 1/2" in diameter and 3" deep. Outside the rail bearing areas a large hole is one having a diameter more than 1/4 the width of the surface on which it appears and a depth of more than 3". Numerous holes are any number equalling a large hole in damaging effect. Such holes may be caused in manufacture or otherwise.

6.3 Knots. Within the rail bearing areas a large knot is one having an average diameter more than 1/4 the width of the surface on which it appears, but such a knot will be allowed if it is located outside the rail bearing areas. Numerous knots are any number equalling a large knot in damaging effect.

6.4 Shakes: Allowable provided largest dimension measuring length is not more than 1/3 of width and provided they do not extend nearer than 1" to any surface.

6.5 Splits: A split is a separation of the wood extending from one surface to an opposite or adjacent surface. In unseasoned cross ties, a split not more than 1/8" wide and/or 4" long is acceptable. In a seasoned cross tie, a split no more than 1/8" wide and/or longer than the width of the face across which it occurs is acceptable. In seasoned cross ties, a split exceeding this limit is acceptable provided anti-splitting devices approved by the Authority are properly applied.

METRA
SPECIFICATION NO. 0286-83 **REVISED: JANUARY 20, 1992**
TIMBER CROSS TIES

7.0 MANUFACTURER

7.1 A cross tie will be considered straight: (1) when a straight line along the top from the middle of one end to the middle of the other end is entirely within the tie; and (2) when a straight line along a side from the middle of one end to the middle of the other end is everywhere more than 1 1/2" from the top and the bottom of the ties.

7.2 A cross tie is not well manufactured when its surfaces are cut into with score marks more than 1/2" deep.

7.3 The top and bottom of the cross tie will be considered parallel if any difference in the thickness at the sides or ends does not exceed 1/8".

7.4 Dimensions:

a. For unseasoned cross ties the thicknesses and widths specified are minimal. For cross ties seasoned to a condition suitable for preservative treatment the specified thicknesses and widths are considered met if the ties are not more than 1/4" thinner or narrower than the specified sizes. Wane outside the rail bearing areas is not cause for degrading. Ties over 1" thicker or wider than the specified sizes may be rejected. Ties over 2" longer or 1" shorter than the specified lengths may be rejected.

b. All thickness, width and face dimensions apply to the rail bearing areas of the tie. All determinations of width will be made on top of the tie, which is the narrower of the horizontal surfaces, or the one with the narrower or no heartwood if both horizontal surfaces are the same width.

7.5 All cross ties ends shall be provided with 6"x7 1/2" nail plate anti-splitting devices, as follows:

a. Nail plates shall be of at least 18 gauge galvanized steel conforming to ASTM A446 Grade 4 and galvanizing conforming to ASTM A525.

b. Nail plates shall be applied onto each cross section end of the tie by means of a mechanical device capable of squeezing the splits together and applying the plates in one continuous operation.

c. Nail plate anti-splitting devices shall be located to cover the greatest area of splitting.

METRA
SPECIFICATION NO. 0286-83 **REVISED: JANUARY 20, 1992**
TIMBER CROSS TIES

7.6 All freshly cut ties shall be incised on all four sides prior to seasoning to check splitting and improve drying. Incisor teeth shall be no thicker than 7/32", shall penetrate 3/4" and shall conform to industry standard pattern.

7.7 If necessary, adzing shall be on the top of the tie across its full width to a depth not greater than necessary for a full, smooth and true bearing under the tie plates.

8.0 IDENTIFICATION

8.1 Cross ties shall be marked prior to preservative treatment in accordance with the AREA Specifications.

8.2 The marking shall identify the authority (METRA) the manufacturer and the month and year of preservative treatment.

8.3 The marking shall be located on one of the nail plates.

8.4 The letters and numerals marked shall be at least 1/2 inch high.

9.0 DELIVERY

9.1 Place and manner of delivery to be as specified in request for quotation, or as agreed between supplier and Metra.

9.2 When delivered in railroad gondolas, ties must be loaded crosswise to the sides of the cars and have all banding broken and removed.

9.3 Loading must not exceed the height of the car sides.

10.0 ACCEPTANCE

10.1 All ties are at the owner's risk until accepted. All rejected ties shall be returned within one month after inspection to a location specified by the manufacturer at no expense to Metra.

11.0 TREATMENT

11.1 All ties to be seasoned and treated in accordance with the latest revision of the American Wood Preservers Association (AWPA) Standard C6-78. The average retention shall be eight pounds per cubic foot of wood using a solution of 60% creosote and 40% coal tar. The creosote-coal tar solution shall conform to AWPA Standard P2-68.

RLD/als

METRA SPECIFICATION FOR PREFABRICATED INSULATED JOINTS

METRA SPECIFICATION NO. 0351-83 MAY 12, 2003
PREFABRICATED INSULATED JOINTS

1.0 SCOPE

1.1 This specification covers prefabricated insulated joint assemblies.

2.0 FABRICATION

2.1 Insulated joint assembly to be manufactured from rails supplied by vendor. Vendor to supply new controlled cooled or vacuum degassed head harden rail. No "A" will be accepted. Vendor to supply Metra with rail certificate from Rail Mill. Only current year New rail will be accepted.

2.2 This joint assembly is to be manufactured to the lengths as indicated on the purchase order.

2.3 Splice bars are to be 36" (inches) in length and toe less in design. Drilling to be in accordance with AREMA.

115#	3-1/2" x 6" x 6"	2-7/8" A.B.	1 1/8" hole
136#	3-1/2" x 6" x 6"	3-3/32 A.B.	1 1/8" hole

2.4 Bolts to be ASTM high strength bolts having minimum diameter of 1" (inch).

2.5 End post to be a minimum 3/16" thick. Upon assemblies the entire joint are must be covered with a non-magnetic paint.

2.5 Rail ends, which are within the splice bars, must be beveled per AREMA 4-M-2 and detail 1005-40 and end hardened per AREMA 51.1 to a Brinell hardness ranging from 341-401. When a cut is made for the insulated joint the sharp edge should be removed by grinding.

3.0 SCOPE OF SPECIFICATION

All insulated joint assemblies to be warranted against defects in materials and workmanship for a period of at least (3) years from date of acceptance.

4.0 DELIVERY

4.1 Place and manner of delivery to be as agreed between supplier and NIRC or as specified in request for quotation.

METRA SPECIFICATION NO. 0351-83 MAY 12, 2003
PREFABRICATED INSULATED JOINTS

5.0 **MARKING**

5.1 All items shipped shall be labeled for identification. Method of display to be in the form of a metal tag and to contain the following:

Rail Section, Manufacture, Date and NIRC

5.2 Rail section (115 or 136) to be stenciled on the ball of each end of slug with 2" white numbers.

6.0 **INSPECTION**

6.1 Insulated joints assemblies will be inspected at suitable and convenient places, at point of shipment or at destination as may be agreed between the supplier and the NIRC. All assemblies are at the owner's risk until accepted. All rejected assemblies shall be returned specified by the Manufacturer at no expense to NIRC.

7.0 **RAIL LENGTHS**

7.1 Overall length with two component segment for 19 foot 6 inch slug rail is:
8 foot 3 inch and 11 foot 3 inch.

7.2 Overall length with two component segment for 16 foot slug rail is:
6 foot 6 inch and 9 foot 6 inch.

7.3 Overall length with two component segment for 13 foot slug rail is:
8 foot and 5 foot.

7.4 Prefabricated insulated joint slugs to be drill as follows:

115#	9 ½" x 6"	A.B. 2 7/8"	1 1/8" hole
132#	9 ½" x 6"	A.B. 3 3/32"	1 1/8" hole
136#	9 ½" x 6"	A.B. 3 3/32"	1 1/8" hole

METRA SPECIFICATION FOR FILTER FABRIC

NIRC
SPECIFICATION NO. 0358-83

February 12, 1981
Revised: February 1, 1990

1.0 SCOPE:

1.1 Specification covers procurement of material required in stabilizing subgrade and providing a filter blanket under track components.

2.0 DESCRIPTION:

2.1 Filter fabric material to be used in the installation of railroad turnouts, grade crossings and rehabilitation of platform area.

3.0 GENERAL REQUIREMENTS:

3.1 Fabric material must be inert to soils, fungus, mildew and rot.

3.2 Fabric must be nonwoven, spun bonded and needle punched.

3.3 Material must retain 75% of initial properties after 90 days exposure to direct sunlight.

3.4 Material must retain 75% of initial properties after 90 days exposure to direct sunlight.

4.0 FABRIC PROPERTIES:

4.1 Thickness: 150 mils

4.2 Grab Strength: 390/330 lbs.

4.3 Tensile Elongation: 75/85%

4.4 Puncture Strength: 155 lbs.

4.5 Trapezoidal Tear: 135/120 lbs.

4.6 Mullen Burst: 550 PSI

4.7 Equivalent Opening Size: 70-120

4.8 Water Permeability: .052 cm/sec

5.0 BID REQUIREMENTS:

5.1 Fabric material to be a minimum 14' in width, and roll length not to exceed 300' in length.

Bids are to be based on a per linear foot basis.

NIRC
SPECIFICATION NO. 0358-83

February 12, 1981
Revised: February 1, 1990

Approval of all material is subject to the Metra's Department Head - Engineering.

/llc

METRA SPECIFICATION FOR LOW-CARBON STEEL TIE PLATES

Metra
Specification No. 439-83

SPECIFICATION FOR LOW-CARBON STEEL TIE PLATES

(A.R.E.A. Specification modified to meet Metra Requirements Specifications for Low-Carbon Steel Tie Plates-1968)

1. Scope

These specifications cover low-carbon steel tie plates for use in railroad track.

2. Process

The steel shall be made by one or more of the following processes: Open-hearth, electric-furnace, basic-oxygen.

3. Chemical Composition

The steel shall conform to the following requirements as to chemical composition:

Carbon, min, percent.....0.15
Phosphorus, max, percent.....0.05

4. Ladle Analysis

(a) An analysis of each heat of open-hearth, electric-furnace or basic-oxygen steel shall be made to determine the percentages of carbon and phosphorus.

(b) The analysis prescribed in Art. 4 (a) shall be made by the manufacturer from a test ingot taken during the pouring of the heat. The chemical composition thus determined shall be reported to the Metra or his representative, and the percentages of carbon and phosphorus, and also copper, when copper is specified, shall conform to the requirements specified in Art. 3.

5. Check Analysis

An analysis may be made by Metra from a finished tie plate representing each heat of open-hearth, electric-furnance or basic-oxygen steel. The carbon content, and also copper, when copper is specified, thus determined shall not be less than that specified in Art. 3, and the phosphorus content shall not exceed that specified in Art. 3 by more than 25 percent.

Metra
Specification No. 439-83

6. Bending Properties

(a) Bend Tests - The bend test specimen specified in Art. 7 shall stand being bent cold through 180 deg around a pin the diameter of which is not greater than the thickness of the specimen without cracking on the outside of the bent portion.

(b) Optional Bent Tests - If preferred by the manufacturer the following bend test may be substituted for that described in Art. 6 (a): A piece of the rolled bar shall stand being bent cold through 90 deg around a pin the diameter of which is not greater than the thickness of the section where bent, without cracking on the outside of the bent portion. The term "thickness" includes vertical height of ribs and shoulder where they are transverse to direction of pin.

7. Test Specimens

Bend test specimens shall be taken from the finished tie plates, or from the rolled bars, and longitudinally with the direction of rolling. They shall be rectangular in section, not less than 1/2 inch in width between the planed sides, and shall have two faces as rolled. They shall be free from ribs or projections. Where the design of the tie plates is such that the specimen cannot be taken between the ribs or projections, these ribs or projections shall, in preparing the specimen, be planed off even with the main surface of the tie plate.

8. Number of Tests

(a) One bend test shall be made from each heat of open-hearth, electric-furnace or basic-oxygen steel, or from each 25 tons where heats are not identified.

(b) If any test specimen shows defective machining or develops flaws, it may be discarded and another specimen substituted.

9. Permissible Variations in Dimensions

The tie plates shall conform to the dimensions specified by Metra, subject to the following permissible variations:

(a) For tie plates with shoulders parallel to the direction of rolling, a variation of 1/32 in. in thickness, 1/8 in. in rolled width and 3/16 in. in sheared length will be permitted.

(b) A variation of 0.025 in. in flatness of the rail seat will be permitted.

Metra
Specification No. 439-83

13. Rejection

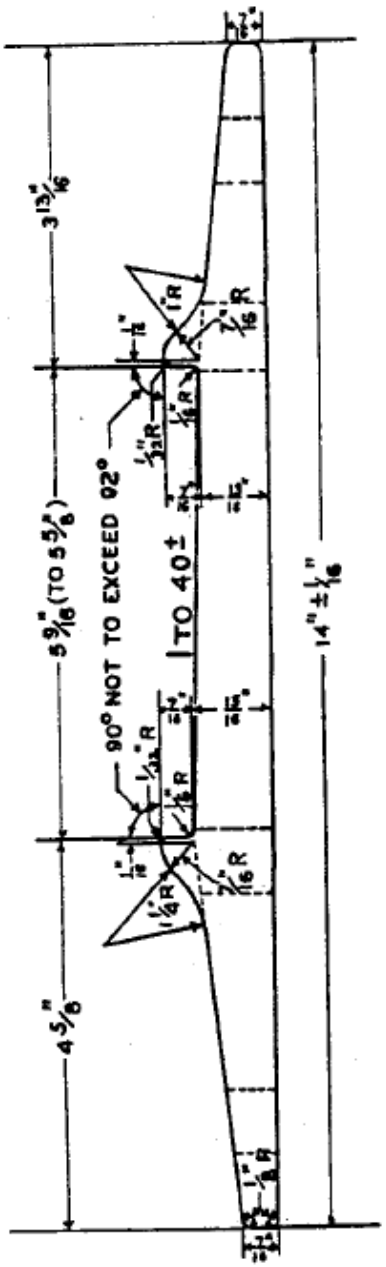
(a) Unless otherwise specified, any rejection based on tests made in accordance with Art. 5 shall be reported to the manufacturer within five working days from the receipt of samples by Metra.

(b) Material that shows injurious defects subsequent to its acceptance at the manufacturer's works will be rejected, and the manufacturer shall be notified.

14. Rehearing

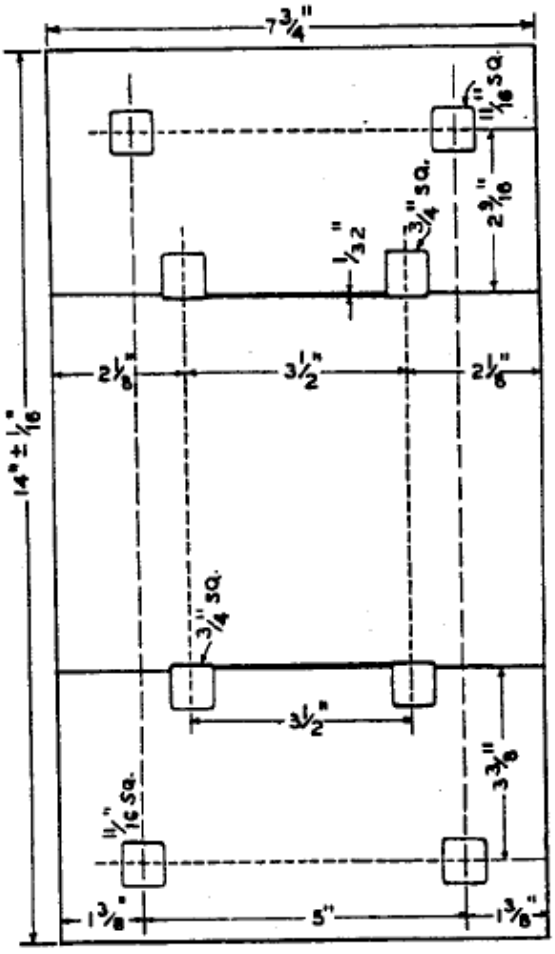
Samples tested in accordance with Art. 5 that represent rejected material shall be preserved for two weeks from the date of the test report. In case of dissatisfaction with the results of the test, the manufacturer may request a rehearing within that time.

SCALE ½" = 1"



NOTE: ALL SQUARE SPIKE HOLES SHALL HAVE 1/16" FILLETS IN CORNERS.

SCALE ⅜" = 1"



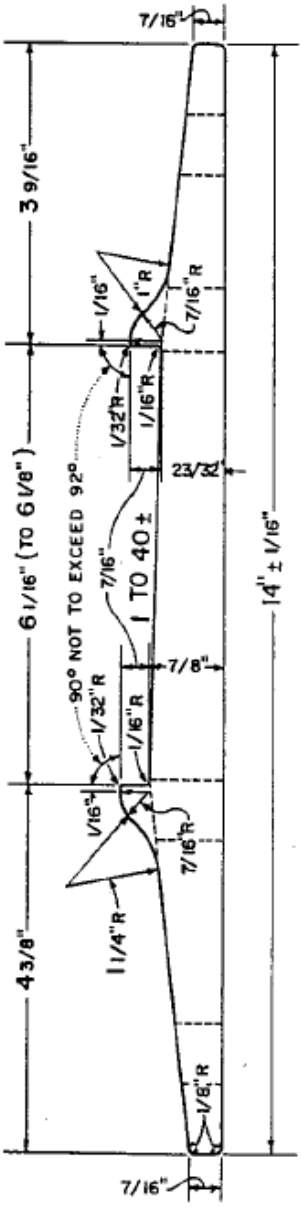
PUNCHING A-B SPIKE HOLES

TABLE OF QUNTITIES AND WEIGHTS				
NUMBER			WEIGHT	
PER 39 FT. RAIL	PER TRACK MILE	PER NET TON	EACH (LBS.)	PER TRACK MILE (NET TONS)
22	6040	87.3	22.90	64.11

A.R.E.A. PLAN NO. 8

DOUBLE SHOULDER TIE PLATE
115 lb Rail

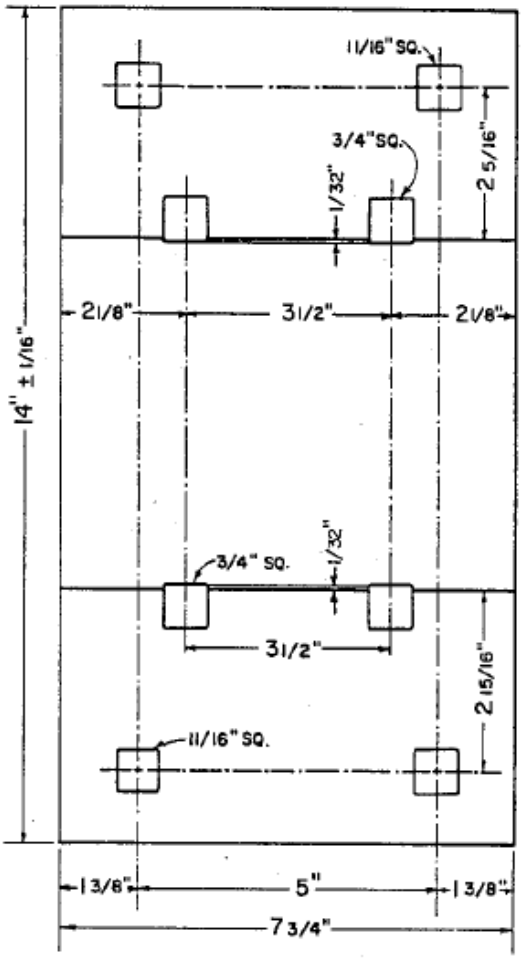
Northeast Illinois Regional Commuter Railroad Corp.



NOTE: ALL SQUARE SPIKE HOLES SHALL HAVE 1/16" FILLETS IN CORNERS

ESTIMATED WEIGHT – 22.45 LB. EA.

A.R.E.A. PLAN NO 12



PUNCHING A-8 SPIKE HOLES

Nº	DATE	DESCRIPTION

REVISIONS

NORTHEAST ILLINOIS RAILROAD CORP.
ENGINEERING DEPARTMENT CHICAGO, ILLINOIS

DOUBLE SHOULDER TIE PLATE FOR 132#- 136# RAIL

SCALE: NONE DATE: 3-12-85

DRWG. Nº 2-16

METRA SPECIFICATION FOR ALUMINOTHERMIC RAIL JOINT FIELD WELD KITS

Aluminothermic Rail Joint Field Weld Kits **January 7, 1992**
Metra Specification No. 0-895-92

SCOPE:

These specifications cover suitable Aluminothermic (thermite) rail joint field welding kits for use in railway track, and are referred to as "Field Weld Kits" in this specification.

GENERAL:

The American Society for Testing Materials (ASTM) Handbook and Webster define thermite, thermite reaction and thermite welding as follows:

THERMITE - A mixture of finely divided aluminum with an oxide of iron or other metal.

THERMITE REACTION - Strongly exothermic self-propagating reaction where finely divided aluminum reacts with a metal oxide. A proper mixture of aluminum and iron oxide produces sufficient heat to weld steel.

THERMITE WELDING - Welding with heat produced by the reaction of aluminum with a metal oxide. Filler metal is obtained from the reduction of the appropriate oxide.

When ignited, the reaction within the thermite mixture develops a temperature approaching 5000°F and produces a filler metal of about 3500°F which, when introduced into a gap between the rails, welds or fuses the ends together. The reaction metal is generally iron which has been enriched with alloys to produce a filler metal assimilating the characteristics of the rail steel being welded.

REQUIREMENTS

I. All requested procedures and instructions pertaining to field welding shall be written and be capable of being understood and performed by current skilled members of the railroad crafts.

II. All materials supplied shall be packaged in a manner which will permit ease of handling, storage and field use and minimize the possibility of damage to the material during shipping or when exposed to the field environment. All packages shall be required to include an identification system indicating the following:

A. Rail section for which the components are manufactured.

B. List of any and all precautionary procedures to be followed in handling, storage, and application.

C. Date after which the contractor is no longer able to guarantee the acceptability of the various components.

III. The charge reaction shall take place in a separate ceramic lined crucible.

IV. The charge shall self tap into disposable prefabricated molds.

V. The field weld kits shall be of the quick pre-heat type.

VI. Pre-heating is to be accomplished through use of a gasoline pre-heater.

VII. Molds to be of the prefabricated type.

VIII. Width of Weld to be 1" plus or minus 1/8".

IX. The contractor shall prepare, in accordance with the procedures approved by Metra's Department Head-Engineering a minimum of three (3) sample Aluminothermic rail joint field welds for each of the rail sections requested by Metra. The rail for the tests are to be supplied by the Contractor. All tests are to be completed prior to bid opening.

Completed welds then to be analyzed at a Metra approved laboratory to determine the acceptability in accordance with one or all of the following qualification tests:

A. ULTRONIC TESTS - Welds shall be subject to ultrasonic testing in accordance with ASTM E-317, Evaluating Performance Characteristics of Pulse-Echo Ultrasonic Testing Systems; ASTM E-164, Ultrasonic Contact Examination of Weldments; and American Society of Nondestructive Testing Recommended Practice No. SN7-TC-1A. Acceptance criteria shall be as follows:

1. Welds showing a response that is less than 50 percent of the primary reference level shall be acceptable.

2. Welds showing a response greater than 50 percent but that do not exceed the primary reference level are acceptable, provided that all of the following apply:

   (a) The defects are evaluated as slag or porosity.

   (b) The largest defect does not exceed 1/16 inch in its largest dimension.

   (c) The total area of the defects do not exceed 0.060 square inches.

   (d) Any cracks that show in the finished weld are cause to reject the weld.

(e) Any pit holes that show in the web and base of the weld are cause to reject the weld.

3. Welds showing a response that exceeds the primary reference level shall be identified as nonconforming.

B. SLOW BEND TEST - A second sample weld shall be subjected to the slow bend test described in the "Proceedings of the AREA", Volume 68. The acceptance criteria for this test shall be a minimum deflection of 1 inch and a minimum modulus of rupture of 100,000 pounds per square inch for the control cooled sample. For a sample containing hardened rail the deflection shall be a minimum of 0.50 inches and the modulus of rupture a minimum of 100,000 pounds per square inch. Result must indicate a ductile rather than a brittle fracture.

C. HARDNESS TEST - A third sample weld shall be longitudinally sectioned for a distance of one foot each side of the weld, micro-etched, and Brinell Hardness tested in accordance with the procedure given in ASTM-E-10, Brinell Hardness of Metallic Materials.

The rail shall be tested for hardness on the sectioned face on both sides of the weld, at points at 1/2 inch increments on three lines until the hardness is that of the parent metal. One test line will be at the center of the head, the second at the center of the web and the third at the center of the base. The parent metal hardness shall be reached not more than 6 inches from the weld center line.

The micro-etched section shall be reviewed for compliance with the field weld requirements of full penetration and complete fusion.

The weld material and heat affected rail shall have a range of Brinell hardness numbers as follows:

(a) 341 to 388 when joining hardened rail.

(b) 220 to 325 when joining control cooled rail.

(c) 220 to 325 for the weld material and control cooled rail and 341 to 388 for the heat treated rail.

(d) The weld material in the zone of the original welding gap shall have a hardness of 300 to 330 for control cooled rail and a hardness of 350 to 385 for hardened rail.

X. All requirements must be met on either flame, saw, or abrasive disc cut rail ends.

XI. All material at time of acceptance shall be guaranteed by the Contractor for one year not to deteriorate to the extent that it

would not be possible to make acceptable thermite welds. The material will be protected from the environment and maintained in the area where the temperature could range from 35°F to 110°F and the relative humidity would not exceed 95%.

XII. Any specialized equipment needed to perform the welds (other than those specified on the request for quotation or in this Specification) will be furnished without cost to the Corporation.

XIII. To be accepted all material must fulfill all the requirements of these specifications.

SECTION 2.3 SPECIFICATION FOR THE QUALITY ASSURANCE OF ELECTRIC-FLASH BUTT WELDING OF RAIL[1]

— 1993 —

2.3.1 SCOPE (1994)

This specification covers mechanical properties, dimensional tolerances, and test procedures necessary for assuring quality of electric-flash butt welds of all rails manufactured to current AREMA specifications. The following is intended to cover initial process qualification and routine quality assurance requirements and procedures.

2.3.2 REQUIREMENTS (1994)

2.3.2.1 Bond Integrity

The bond between the two joining rail ends shall contain no more than one ⅛ inch diameter discontinuity.

2.3.2.2 Magnetic Particle Inspection

Magnetic particle inspection techniques when applied to rail welds shall meet the AREMA Specification for Fabrication of Continuous Welded Rail.

2.3.2.3 Hardness Criteria

a. No welds shall have hardness values greater than 400 BHN or 43 Rc.

b. Hardness within the weld shall be within ±30 BHN points or ±5 Rc of parent rails head hardness except at decarburized centerline and at the spherodized edge of the heat affected zone.

2.3.2.4 Dimensional Tolerances

All welds shall meet the AREMA Specification for Fabrication of Continuous Welded Rail.

2.3.2.5 Microstructure

a. The desired microstructure is 100% pearlite. When untempered martensite occurs, the welding practice should be altered to pass the bend test

b. No electrode burns allowed (no martensite, no displaced metal, and no transfer of copper at electrode contact).

2.3.2.6 Slow Bend Tests

All welds shall meet or exceed the appropriate requirements shown in Table 4-2-5.

Table 4-2-5. Weld Requirements

Grade	Modulus of Rupture (lbs/in^3)	Deflection (inch)
Soft Carbon (248 BHN min)	100,000	1.5
Standard Carbon (300 BHN min)	120,000	1.0
High Strength (341 BHN min)	125,000	0.75

[1] References, Vol. 94 (1994), p. 58.

2.3.2.7 Macroetch – Acceptance Criteria

a. The bond line shall be perpendicular to the rail rolling direction.

b. The bond line should not display any areas of excessive acid attack.

2.3.3 PROCEDURES (1994)

2.3.3.1 Bond Integrity

Bond integrity shall be determined from the fracture faces of the slow bend test samples.

2.3.3.2 Magnetic Particle Inspection

Refer to Paragraph 2.3.2.2.

2.3.3.3 Hardness Criteria

a. Rc hardness values or equivalent shall be measured 5 mm below the running surface, on the vertical longitudinal section at ⅛ inch intervals.

b. The complete welded zone into the parent rail shall be tested.

c. The center measurement shall be on the weld bond line.

2.3.3.4 Dimensional Tolerances

Refer to Paragraph 2.3.2.4.

2.3.3.5 Microstructure

a. The micro shall be removed from the section in question.

b. If there are no questionable areas, microstructure evaluation is not necessary.

c. Micro shall be prepared by standard metallographic procedures to reveal martensite.

2.3.3.6 Slow Bend Test

a. Slow bend tests shall be conducted as shown in Figure 4-2-43.

b. One outboard support shall be able to compensate for any misalignment in the base.

c. The load rate shall not exceed 100,000#/min.

2.3.3.7 Macroetch

a. Macroetch shall be a vertical section taken in the rolling direction along the centerline of the rail and shall include an unaffected area of each parent rail.

b. Macroetch procedures as specified in , Paragraph 2.1.9, shall be followed where applicable.

2.3.3.8 Frequency of Testing

Welds shall be tested to the frequencies found in Table 4-2-6 whenever grade of rail, size of rail or manufacturer of rail is changed.

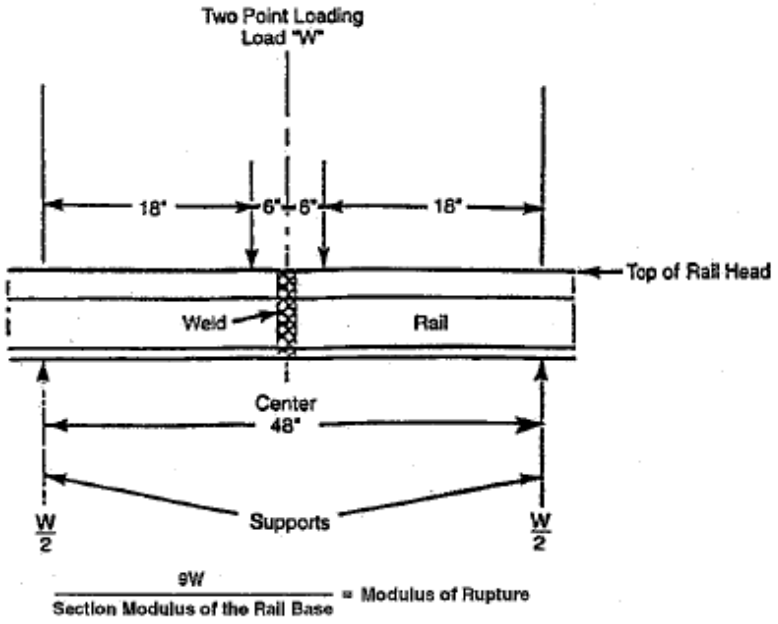


Figure 4-2-43. Loading Arrangement for the Slow Bend Test for Deriving the Modulus of Rupture

Table 4-2-6. Frequency of Testing

Test	Initial Qualification	Quality Assurance
Bond Integrity	1	1 per yr + whatever the buyer specifies
Macrostructure	1	2 per yr + whatever the buyer specifies
Hardness	1	1 per yr + whatever the buyer specifies
Microstructure	As needed	As needed
Dimensions	Every Weld	Every Weld
Magnaflux	Every Weld	Every Weld
Slow Bend Test	1	1 per yr + whatever the buyer specifies

METRA SPECIFICATION FOR HIGH-CARBON STEEL JOINT BARS

Regional Transportation Authority
Specification No. RTA-77-15b

April 25, 1977

SPECIFICATIONS FOR HIGH-CARBON STEEL JOINT BARS
(Reference, AREA, 1969)

1. Scope

These specifications cover high-carbon-steel joint bars for general use in standard railroad tracks. They may be used for the joint bars of insulated joints.

2. Process

The steel shall be made by one or more of the following processes: open hearth, basic oxygen or electric-furnace.

3. Discard

Sufficient discard shall be made from each ingot to insure freedom from piping and undue segregation.

4. Heating

Joint bars shall be uniformly heated for punching, slotting and shaping.

5. Chemical Composition

The steel shall conform to the following requirements as to chemical composition:

Carbon	not under 0.45 percent
Phosphorus	not over 0.04 percent

6. Ladle Analysis

An analysis of each heat of steel shall be made by the manufacturer to determine the percentages of carbon, manganese, phosphorus, and sulfur. This analysis shall be made from a test ingot taken during the pouring of the heat. The chemical composition thus determined shall be reported to the Authority or their representative, and the percentages of carbon and phosphorus shall conform to the requirements specified in Art. 5.

7. Check Analysis

An analysis may be made by the Authority from a finished joint bar representing each heat. The percentage of carbon thus determined

shall conform to the requirement specified in Art. 5, and the phosphorus content shall not exceed that specified by more than 25 percent.

8. Tensile Properties

The material shall conform to the following requirements as to tensile properties:

Tensile strength, min, psi	85,000
Elongation in 2 in, min, percent	15

9. Bending Properties

(a) Bend Test.

The bend test specimen specified in Art. 10 shall stand being bent cold through 90 deg without cracking on the outside of the bent portion around a pin the diameter of which is not greater than three times the thickness of the specimen.

(b) Optional Bend Test

If preferred by the manufacturer and approved by the Authority the following bend test may be substituted for that described in Par. (a): A piece of the finished bar shall stand being bent cold through 45 deg without cracking on the outside of the bent portion around a pin the diameter of which is not greater than three times the greatest thickness of the section.

10. Test Specimens

Tension and bend test specimens shall be taken from the finished joint bars. Tension test specemens shall be machined to the form and dimensions shown in Fig. 1. Bend test specimens may be ½ in. square in section

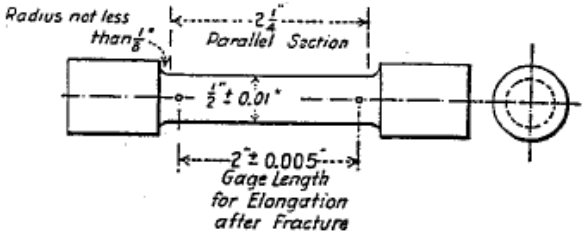


Fig. 1—Standard 2-in gage length tension test specimen

Note.—The gage length, parallel section, and fillets shall be as shown, but the ends may be of any shape to fit the holders of the testing machine in such a way that the load shall be axial.

or rectangular in section with two parallel faces as rolled and with corners rounded to a radius not over 1/16 in.

11. Number of Tests

(a) One tension and one bend test shall be made from each heat.

(b) If any test specimen shows defective machining or develops flaws it may be discarded and another specimen substituted.

(c) If the percentage of elongation of any tension test specimen is less than that specified in Art. 8 and any part of the fracture is more than 3/4 in from the center of the gage length, as indicated by scribe scratches marked on the specimen before testing, a retest shall be allowed.

12. Workmanship

The joint bars shall be smoothly rolled, true to template, and shall accurately fit the rails for which they are intended. The bars shall be sheared to length, and the punching and slotting shall conform to the dimensions specified by the Authority. A variation of plus or minus 1/32 in from the specified size of holes, of plus or minus 1/16 in from the specified location of holes, and of plus or minus 1/8 in from the specified length of joint bar will be permitted. Any variation from a straight line in a vertical plane shall be such as will make the bars high in the center. The camber in either plane shall not exceed 1/32 in. in 24-in bars and 1/16 in. in 36-in bars.

13. Finish

The finished joint bars shall be free from injurious defects and shall have a workmanlike finish.

14. Marking and Stamping

The name or brand of the manufacturer, the section designation, and the year of manufacture shall be rolled in raised letters and figures on the side of the rolled bars, and a portion of this marking shall appear on each finished joint bar. A serial number representing the heat shall be hot stamped on the outside of the web of each bar, near one end. The name of the Authority "RTA" shall appear on each finished joint bar.

15. Inspection

The inspector representing the Authority shall have free entry, at all times while work on the contract of the Authority is being performed, to all parts of the manufacturer's works which concern the manufacture of the material ordered. The manufacturer shall afford the inspector, without charge, all reasonable facilities to satisfy him that the material is being furnished in accordance with these specifications. All tests (except check analyses) and inspection shall be made at the place of manufacture prior to shipment, unless otherwise specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

16. Rejection

(a) Unless otherwise specified, any rejection based on tests made in accordance with Art. 7 shall be reported to the manufacturer within five working days from the receipt of samples by the Authority.

(b) Material that shows injurious defects subsequent to its acceptance at the manufacturer's works will be rejected, and the manufacturer shall be notified.

17. Rehearing

Samples tested in accordance with Art. 7, which represent rejected joint bars, shall be preserved for 2 weeks from the date of the test report. In case of dissatisfaction with the results of the tests, the manufacturer may request a rehearing within that time.

DUCT – METRA POWER AND FIBER

Description. This work consists of furnishing and installing underground duct systems for the temporary and permanent relocation of portions of Metra's 2400V and 4160V AC electrical power distribution lines and SCADA/communication system currently supported overhead from catenary structures.

Materials. Underground duct systems shall be constructed with four-inch diameter rigid galvanized steel conduit conforming to Section 810 of the Standard Specifications. All materials and installation shall conform to the requirements of the latest revision of the National Electric Code.

Junction boxes shall be NEMA 4X stainless steel. Each box shall have a minimum size as required by the National Electric Code and be large enough to accommodate 30 feet of additional cable for use by Metra in extending each run to the top of catenary structures and connecting them to existing aerial lines. All junction boxes shall be able to accommodate locks. Metra will provide the locks. Junction boxes for electrical cables shall have "Danger – High Voltage" signs.

Hand holes shall be IDOT Standard 814001 medium duty as described in Section 814 of the Standard Specifications. Hand hole covers for electrical power distribution lines shall be permanently marked "DANGER – HIGH VOLTAGE – KEEP OUT".

Metra will provide and install any additional conduit above junction boxes on catenary structures for use in pulling electrical and SCADA cables up to existing aerial facilities.

All ducts furnished for this work shall be new. Portions of ducts initially furnished for temporary runs shall be removed and preserved for re-use as permanent ducts between existing Catenary Structure 20.51 and new Catenary Structure #2. All remaining portions of ducts and associated hardware installed as temporary ones shall be removed after they are no longer needed by Metra.

Construction Requirements. This work shall be performed in the following three phases:

- **Phase 1** - At the beginning of the project as part of pre-stage track and catenary structure construction, the Contractor shall furnish and install two temporary ducts between existing Catenary Structures 20.51 and 20.97. These initially installed ducts will be necessary to enable the underground relocation of the existing aerial 2400V and 4160V AC electrical lines before construction of new catenary support structures below them between existing Metra Tracks 1 and 2 can begin. These pre-stage ducts shall be installed underground immediately adjacent to the east side of existing Metra Track 1 for their full length. Before installation, the Contractor shall coordinate their locations with Metra to assure they do not conflict with any existing railroad signal cables and/or signal cables that the Railroad will also have to relocate to the same general area along the east side of Metra Track 1. The Contractor shall also coordinate the duct locations with the locations of foundations for new catenary structures to be constructed between existing Metra Tracks 1 and 2. The Contractor shall furnish and mount one new junction box to each of Catenary Structures 20.51 and 20.97 for termination of the pair of electrical ducts. The Contractor shall furnish and install hand holes for the pair of conduits at locations shown on the plans for pulling of cables in them.

- **Phase 2** – After construction of earthwork and subgrade but before placement of ballast and construction of track for temporary run-around Metra Tracks 1 and 2, the Contractor shall furnish and install three additional new temporary ducts between Catenary Structures 20.51 and 20.97. At both the beginning and end of where the temporary run-around tracks diverge from existing tracks, the three ducts shall be pushed under existing Metra Track 2 and follow the alignment of the temporary tracks. Two of these ducts will be required for relocating along the temporary tracks the temporary electrical service initially placed in Phase 1 along existing Metra Track 1. The third duct will be required for Metra to relocate its aerial SCADA cable. These three ducts must be placed and cables pulled in them before replacement of the Metra railroad structure over 159th Street can begin.

  Before beginning installation of the three ducts, the Contractor shall coordinate their locations with Metra to assure they do not conflict with any existing railroad signal cables or one that the Railroad will also have to relocate along a portion of the temporary run-around tracks. The Contractor shall coordinate the location of the ducts with the locations of the foundations for new catenary structures that will have to be constructed between temporary run-around Metra Tracks 1 and 2. The Contractor shall furnish and mount two additional junction boxes to each of Catenary Structures 20.51 and 20.97 – one box at each structure for the termination of the pair of temporary electrical ducts and one box at each structure for the termination of the SCADA duct. The contractor shall also furnish and install additional hand holes at locations shown on the plans – separate ones for the pair of electrical ducts and for the third duct for the SCADA.

  Metra will require the electrical cables installed into the first pair of ducts during Phase 1 along existing Track 1 to remain in service until electrical power can be cut over to the new ones installed in the second pair during Phase 2. The cut over to the new ones along the temporary run-around must be completed before reconstruction of the Metra two-track portion of the railroad structure over 159th Street can begin. After Metra makes the electrical cutover of power to the second pair, the contractor shall remove the first pair and associated cables, hand holes and hardware placed during Phase 1. Portions of removed duct shall be preserved for re-use during Phase 3. The junction box furnished and mounted to catenary structure 20.97 during Phase 1 shall be removed and preserved for re-use during Phase 3 as a permanent junction box for electrical cables terminating at new Catenary Structure #2.

- **Phase 3** - After completion of the Metra two-track portion of the railroad structure over 159th Street, the Contractor shall install two additional permanent ducts for the permanent underground relocation of Metra's AC 2400V and 4160V power distribution lines between existing catenary Structure 20.51 and new permanent Catenary Support Structure #2. The contractor shall re-use portions of the two four-inch ducts previously furnished and installed during Phase 1 and then removed at the end of Phase 2. They shall be installed midway between permanent Metra Tracks 1 & 2. Before beginning installation work, the Contractor shall coordinate with Metra on their specific location to assure they do not conflict with any existing railroad signal cables and/or a permanent cable that the Railroad will have to place between Tracks 1 & 2 in this area. The junction box previously furnished and installed during Phase 1 and then removed at the end of Stage 2 at Catenary Structure 20.97 shall be re-used and re-mounted by the Contractor as a permanent junction box for the two electrical ducts at newly constructed Catenary Support Structure #2. The junction box previously furnished and installed during pre-stage work at Catenary Structure 20.51 shall be left in place and used as a permanent junction box for the two electrical cables at that structure.

After completion of the Metra two-track portion of the railroad structure over 159th Street, Metra will install a new aerial SCADA cable attached to permanent catenary structures between Catenary Structures 20.51 and 20.97. After the cut over of service to that new aerial cable, the Contractor shall remove the temporary duct and its cable, hand holes and any associated hardware that had been placed between Catenary Structures 20.51 and 20.97 and following the temporary Metra run-around tracks.

After completion of the railroad structure, Metra will also install new permanent aerial wires for its 4160V and 2400V power distribution systems between new Catenary Structure #2 and existing Catenary Structure 20.97. The permanent electrical system will run underground in the newly installed conduits between Catenary Structure 20.51 and new Catenary Structure #2. After the cutover of service to the permanent electrical systems, the Contractor shall remove the temporary cables, their two ducts, hand holes, junction boxes and any associated hardware previously placed during Phase 2 between Catenary Structures 20.51 and 20.97.

Conduit placed underground in trenches shall be at a minimum depth of 36 inches. Trenching and backfill shall be performed in accordance with section 815 of the Standard Specifications for Road and Bridge Construction. All conduits under tracks shall be at a minimum depth of 5'-6" below base of rail. The conduit shall be installed in accordance with Section 810 of the Standard Specifications for Road and Bridge Construction at the minimum depths as indicated above.

All trenching and installation of conduit adjacent to railroad tracks shall be coordinated with Metra. The Contractor shall be responsible for arranging with and obtaining approval from Metra for all track outage windows needed to perform work having to be performed adjacent to active tracks. Prior to performing any trenching or excavation, the Contractor shall prepare and submit to Metra for prior approval a proposed plan including equipment and procedures for performing the work.

Conduit bends shall use long sweeping elbows. Hand holes shall be installed per Section 814 of the Standard Specifications for Road and Bridge Construction. Junction boxes shall be attached to existing Catenary Structures 20.51 and 20.97 and new Catenary Structure #2 a distance of five feet above the ground using stainless steel brackets and hardware. The connection of all conduits to junction boxes shall be made with electrically-insulated collars that are approved by Metra. Conduits shall have no conductive contact with junction boxes or catenary support structures.

All materials furnished for temporary duct systems and not re-used and incorporated into permanent construction shall be removed and disposed of by the contractor as part of this work.

Method of Measurement. Furnishing and installing duct systems for temporary and permanent relocation of portions of Metra's 2400V and 4160V AC electrical power distribution lines and SCADA/communication system will be measured for payment as feet installed in place. Measurements will be made in straight lines along the centerline of the conduit between changes in direction and to the center of the junction boxes and/or hand holes as shown on plans. Vertical conduit shall be measured from center of 3' depth to center of junction box. Changes in depth to go under tracks will not be measured. Furnishing and installing of hand holes, junction boxes and all other associate hardware to provide a complete and continuous duct system will not be measured separately for payment.

Basis of Payment. All work for furnishing and installing temporary duct for re-routing Metra AC power distribution and SCADA systems will be paid for at the contract unit price per foot for the pay item DUCT – METRA POWER AND FIBER upon completion of construction. This payment will be considered to include the cost of furnishing hand holes, junction boxes, isolation collars and all equipment, labor, materials brackets and other incidentals necessary to complete the work for a complete duct system. This payment will also be considered to include the cost for removal and disposal of all conduits, hand holes junction boxes and other materials not incorporated into permanent construction.

All work required for installation of permanent duct systems for re-routing Metra AC power distribution systems will be paid for at the contract unit price per foot for the pay item RE-USE DUCT – METRA POWER upon completion of construction. This payment will be considered to include furnishing and installing any incidental materials, equipment and labor needed to complete the work.

Furnishing, installing and removing SCADA cable will be paid for separately under the pay item ELECTRICAL CABLE – METRA FIBER.

Furnishing, installing and removing electrical cables will be paid for separately under the following pay items

- ELECTRICAL CABLE – METRA 4160V POWER
- ELECTRICAL CABLE – METRA 2400V POWER

ELECTRICAL CABLE – METRA FIBER

Description. This work consists of furnishing, installing in an underground duct and later removing a temporary SCADA/Communications fiber optic cable. The cable shall be installed in an underground duct between junction boxes mounted to Catenary Structures 20.51 and 20.97 along Metra Track #1 following the temporary run-around of that track as described in the specification for “Duct – Metra Power and Fiber”.

Materials. Fiber optic cable shall be armored outdoor cable single mode fiber with 2 bundles of 12 fibers for a total of 24 fibers. The optical characteristics of the fiber shall be equivalent to Lightscope ZWP type 8W single mode fiber. The fiber optic cable shall be Commscope Part # O-024-CA-8W-F12NS or approved equal.

Substitution for this cable shall be submitted for approval by Metra before purchasing.

Construction Requirements. The contractor shall supply enough excess cable for Metra to use in pulling it from the two junction boxes up the catenary structures to where its fibers will be spliced with those of the existing overhead cable. A minimum of 30 feet of excess cable at each end shall be provided and neatly coiled in the terminating junction boxes. The cable shall be continuous over its length with no intermediate splices of its fibers permitted.

Care shall be given to assure the cables are installed without damaging their insulation or exterior jackets. Cable lubricant shall be used when pulling cables into conduits. The lubricant shall be non-injurious to conduits, conductors, insulation or jackets. Cable pulling apparatus shall have no sharp edges or protrusions which could damage cables or raceways. Wire and

cable shall not be bent to a radius less than the manufacturer's recommended bending radius during or after installation. All installations shall follow the requirements of the latest revision of the National Electric Code.

The cable shall be installed directly from the reels on which the cable is shipped. Dragging or laying cable on the ground will not be permitted.

Metra will make all connections of the fibers of the temporary cable to those of the existing aerial SCADA/Communication cable. All installations shall follow the requirements of the latest revision of the National Electric Code.

The Contractor shall install the fiber optic cable per Section 871 of the Standard Specifications for Road and Bridge Construction for installation in a conduit.

After Metra installs and places in service a permanent aerial replacement cable, the contractor shall remove and dispose of the temporary cable.

Method of Measurement. Furnishing of the SCADA/Communications fiber optic cable and installing it in conduit will be measured for payment in feet in place. Measurements will be made in straight lines between changes in direction and include the excess cable coiled and placed in the terminating junction boxes.

Basis of Payment. This work will be paid for at the contract unit price per foot installed for ELECTRICAL CABLE – METRA FIBER upon completion of construction, which price shall include all materials, labor, equipment, miscellaneous hardware and incidentals to furnish and install the cable and to later remove and dispose of it.

ELECTRICAL CABLE - METRA POWER

Description. This work consists of furnishing and installing electric cables for the temporary and permanent underground relocation of portions of Metra's aerial power distribution for 4160-volt three-phase system for light and power and 2400-volt single-phase system for normal and auxiliary signals. The cables shall be installed in ducts between junction boxes mounted to catenary structures during several construction stages over the course of the project as described in the specification for "Duct – Metra Power and Fiber".

Materials. Each cable for the 4160 volt and 2400 volt systems shall contain four #2 AWG stranded copper conductors with uni-type shielding. The four conductors for each system shall be spun wrapped together into one cable. The minimum voltage rating of each cable shall be 5000 Volts.

Details for manufacturing of proposed cables shall be submitted to and be approved by Metra before placing an order with the cable manufacturer.

Construction Requirements. For each construction stage requiring furnishing and installation of underground cables, the contractor shall furnish a four-conductor cable for the 4160-volt distribution system and install it in one four-inch duct and furnish a four-conductor cable for the 2400-volt system and install it in a separate parallel four-inch duct as shown in the plans.

Metra will make all connections between the conductors of the installed underground cables and those of its existing aerial ones. The contractor shall supply enough excess cable at each catenary-mounted terminating junction box to allow Metra to pull it up the catenary structures and splice the conductors with those of the existing overhead ones. A minimum of 30 feet of excess cable, contiguous with the portion placed in duct, shall be provided and be neatly coiled and placed in each of the terminating junction boxes. All cables shall be furnished and installed continuous over their full length between terminating junction boxes with no intermediate splices permitted.

Care shall be given to assure the cables are installed without damaging their insulation or exterior jackets. Cable lubricant shall be used when pulling cables into conduits. The lubricant shall be non-injurious to conduits, conductors, insulation or jackets. Cable pulling apparatus shall have no sharp edges or protrusions which could damage cables or raceways. Wire and cable shall not be bent to a radius less than the manufacturer's recommended bending radius during or after installation. All installations shall follow the requirements of the latest revision of the National Electric Code.

The cable shall be installed directly from the reels on which the cable is shipped. Dragging or laying cable on the ground will not be permitted.

All temporary cable placed in ducts shall be removed and disposed of by the contractor after they are no longer needed by Metra.

Method of Measurement. Furnishing and installing electric cable for Metra power will be measured for payment in feet in place. Measurements will be made in straight lines between changes in direction and include the required excess cable placed in terminating junction boxes.

Basis of Payment. Furnishing and installing temporary or permanent cable for the two AC power distribution systems will be paid for at the contract unit price per foot for ELECTRICAL CABLE – METRA 4160V POWER and ELECTRICAL CABLE – METRA 2400V POWER. The unit price for these pay items will be considered to include the cost of furnishing the four-conductor cable systems and all associated labor, equipment, hardware and incidentals necessary to complete the installation. The price will also be considered to include all costs associated with the removal and disposal of all temporary cable.

METRA CONDUIT, 4 INCH DIAMETER, GALVANIZED STEEL

Description. This work shall consist of the furnishing of conduit and all associated couplers for installation by Metra's signal department, as shown on the "Metra Signals" plans.

Materials. The materials shall conform to Section 1088 of the Standard Specifications.

All equipment shall be submitted for approval by Metra before purchasing.

Construction Requirements. All equipment will be installed by Metra.

Method of Measurement. Furnishing of conduit for Metra signals will be measured for payment in feet.

Basis of Payment. The furnishing of this conduit will be paid for at the contract unit price per foot for METRA CONDUIT, 4 INCH DIAMETER, GALVANIZED STEEL.

SIGNALS METRA – CABLES

Description. This work shall consist of the furnishing of signal cables for the new permanent and temporary Metra signal system located between existing signal cases 20.40 and 20.99.

Materials. The materials shall conform to the Metra Signal Specification for Insulated Wire and Jacketed Railroad Signal Cable Specification No. 0069-05 dated July 11, 2005 that follows this special provision.

All equipment shall be standard railroad components used by Metra. All of these components shall be purchased from a Metra-approved distributor. All equipment shall be submitted for approval by Metra before purchasing.

Construction Requirements. All equipment will be installed by Metra.

Method of Measurement. Furnishing of cable for Metra signals will be measured for payment in feet as supplied of each type listed below.

Basis of Payment. Furnishing of cable for Metra signals will be paid for at the contract unit price per foot supplied for each of the following types listed, upon delivery of approved cables:

1. SIGNALS METRA – 5C #9 POWER CABLE
2. SIGNALS METRA – 19C #14 MULTI-CONDUCTOR CABLE
3. SIGNALS METRA – CASE WIRE #10
4. SIGNALS METRA – 2C #6 TRACK CABLE
5. SIGNALS METRA – 2-5C #6 SIGNAL CABLE

METRA SIGNAL SPECIFICATION FOR INSULATED WIRE AND JACKETED RAILROAD SIGNAL CABLE

METRA SIGNAL
SPECIFICATION NO. 0069-05
INSULATED WIRE AND JACKETED RAILWAY SIGNAL CABLE

July 11, 2005

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SECTION I: GENERAL (ALL CONSTRUCTIONS)

1.0 SCOPE

1.1 This Specification provides for single and multi-conductor insulated and jacketed cable for continuous operation in wet or dry locations, whether installed in the ground; in conduits or ducts; aerially; in ducts or any combination of these installations on circuits rated at 0 to 600 volts AC or DC.

1.1a This Specification also provides for single conductor insulated and jacketed wire for installation in wired housings on circuits rated as above.

1.2 The requirements of this section shall apply to wire and cable unless otherwise specified. Wire and cable shall meet or exceed the tests and requirements or insulation, jacketing and assemblies specified by Association of American Railway Engineering and Maintenance-of-Way Association (AREMA) Communications & Signals Manual of Recommended Practices, Part(s) 10.3.10, 10.3.14, 10.3.16, and 10.3.17 as they relate to specific types and as referred to by these Specifications and Appendices A through G. Reference to Specifications or publications of Insulated Cable Engineers Association (ICEA), American Society for Testing Materials (ASTM), American National Standards Institute (ANSI), and others imply current issues.

1.3 The materials provided and workmanship performed shall be consistently of the highest quality assuring durability for the life of the product. Failure to conform to the highest standards of the industry shall be cause for rejection.

1.4 Metra's Chief Engineering Officer or his authorized representative shall be the final authority for deciding as to whether a competitive item conforms to these requirements and complies with the intention of this Specification.

1.5 This Specification is intended to be descriptive, not restrictive, and is solely for the purpose of indicating the type and quality of wire or cable that will meet with the approval of Metra.

1.6 Capacities and properties listed herein are to be interpreted as minimums. Variations from these values and requirements will be judged as to their effect and ability to perform as intended.

1.7 It shall be the responsibility of the Manufacturer to make certain that all parts and components fit and function together properly.

1.8 Where brand, manufacturer or product names are indicated in this Specification, they are included only for the purpose of establishing identification and general description of the item. Wherever such names appear, the term "or Metra approved equivalent" is considered to follow.

1.9 The Manufacturer offering a bid shall be qualified as to its facilities and its capabilities to produce a consistent quality product. As evidence of the Manufacturer's ability, the materials proposed for the wire and cable construction shall meet or exceed the requirements of this Specification.

1.10 Metra reserves the right to judge the adequacy of the Manufacturer's Quality Assurance Program and organization in relation to the degree of reliability required of the cable. A copy of the Manufacturer's Quality Assurance Program, particularly as related to signal wire and cable, shall be furnished to Metra on request.

2.0 IDENTIFICATION

2.1 Multi-Conductor Cable: Each length of cable shall be permanently identified as to manufacturer and year of manufacture at intervals of not less than three feet on moisture resistant tape under the jacket. The cable shall also be marked, by printing on the surface of the jacket, as to the application and make-up of cable. For example, a cable to be installed directly in-ground and that has 7 #14 AWG conductors shall be marked "7 #14 DIRECT BURIAL" and, if to be installed aerially, it would be marked "7 #14 AERIAL" at intervals not less than three feet.

2.2 Track Wire: Manufacturer's identification and AWG size is to be accomplished by printing on the surface of the jacket.

2.3 Single Conductor Case Wire: The reel or carton in which the case wire is to be shipped will be marked with manufacturer's identification, AWG size, and amount shipped on side of reel or on carton shipped.

3.0 SPLICING

Current written instructions for splicing shall be promptly provided by the Manufacturer for each make-up of cable supplied, unless presently on file with Metra's Chief Engineering Officer.

4.0 MARKING

4.1 Reel and Cable Information: Each reel shall contain on the outside and inside flange, plainly legible and printed in a weather resistant manner, the Manufacturer's name, Metra's purchase order number; the length of each section of cable, the number and gauge of conductors; and the name and shipping address of Metra.

4.2 Reel Rolling Instruction: An arrow shall be painted on one head of each reel pointing the opposite direction from the outer end of the cable with the words "ROLL THIS WAY" stenciled under the arrow.

5.0 SHIPPING

5.1 All cable except case wire shall be shipped on reels adequately protected from damage during shipment by heavy wrapping or wood lagging.

5.2 Shipping Lengths:

A. Unless specifically noted, all cable shall be furnished in exactly 1000-foot lengths.
B. #16 AWG case wire shall be furnished on a 1000-foot spool.
C. #10 AWG case wire shall be furnished on a 500-foot spool.

5.3 Reel Design: Each length of cable shall be wound on a separate reel. The reels shall be designated and constructed as non-returnable but be substantial enough to withstand reasonable handling. The reel shall be so constructed that the inner end of the cable will be accessible but protected from injury. The diameter of the drum shall be at least 14 times the diameter of the cable to prevent damage to the cable while reeling. The arbor hole shall admit a spindle 2-1/2 inches in diameter without binding.

5.4 Cable Winding on Reels: Cable shall be tightly wound in layers on a reel. Both ends of the cable shall be sealed to prevent moisture and securely fastened so they will not come loose during shipping.

6.0 CERTIFIED TEST REPORTS

6.1 As evidence of the Manufacturer's ability to provide insulation meeting the requirements of this Specification, he shall furnish certified test reports (Appendix G) of the requirements outlined in Appendix A, unless presently on file with Metra's Chief Engineering Officer.

6.2 When specified, other electrical and physical test reports, required by this Specification, shall be furnished to Metra for finished single and multi-conductor cable and wire no later than the time of shipment to Metra. Each

test document shall, in addition to the test results, indicate the date the tests were performed and the signature of the engineer conducting the tests.

7.0 METRA'S INSPECTIONS AND TESTS

7.1 Inspection: Metra reserves the right to make such inspections and tests as necessary to determine if the cable meets the requirements of this Specification. Metra's inspector shall have the right to reject cable that is defective in any respect.

7.2 Determination of Tests: The Manufacturer shall give Metra at least ten days advance notice of the date the cable will be ready for testing so Metra, at its discretion, may be present during the tests.

7.3 Types of Tests: Tests shall be made on samples at random at the place of production. Each reel selected and the corresponding sample shall be identified. The tests required and the quantities of samples shall be those required in ICEA Standard Publication S-95-658, Part 6. The Manufacturer shall provide, at the point of production, the apparatus and labor for making any or all of the following tests under supervision of the Metra inspector.

Such tests may include:

A. Conductor size and physical characteristics.
B. Insulation high voltage and resistance tests.
C. Physical dimensions.
D. Final high voltage, insulation resistance and conductor resistance on shipping reels.
E. Special tests on materials in coverings.

8.0 REJECTED CABLE

Wire or cable which does not meet the requirements of this Specification and the Purchase Order will be rejected. Wire or cable which shows defects or non-compliance after arrival at the destination, may be rejected and the Manufacturer upon request, shall advise disposition of defective material in question and pay for return transportation charges of the rejected material.

9.0 WARRANTY

The Manufacturer shall expressly warrant that the insulated wire and cable furnished under this Specification shall be free of defects in materials, design and workmanship for a minimum of 40 years when product is used in the application for which it was specified.

SECTION II: TECHNICAL (ALL CONSTRUCTIONS)

1.0 CONDUCTORS

1.1 Solid Conductors: Conductor shall be soft or annealed copper coated in accordance with ASTM B-33 for tin coated conductors or B-189 for alloy coated conductors or bare copper conductors per ASTM B-3. No factory splices or brazes shall be made on solid conductors after final drawing. The conductors shall be solid in sizes 16 through 6 AWG unless otherwise specified. Provided that no sulfur is used in the curing process, bare copper conductors are acceptable, otherwise conductors shall be tin coated.

1.2 Stranded Conductors: The wires shall be soft or annealed copper and stranded in accordance with ASTM B-8, latest revision and tinned or lead alloy coated to conform to ASTM designation B-33 or B-189, latest revision, where applicable.

1.3 Resistance of Conductor: The direct current resistance of conductors shall conform to ICEA Standard Publication S-95 658 Part 2.

2.0 CONDUCTOR INSULATION

2.1 The conductor insulation shall be an Ethylene-Propylene rubber compound, meeting the electrical and physical properties listed in Appendix B.

2.2 The conductor insulation shall be applied directly to the surface of the conductor by the continuous tube method and shall adhere tightly to that surface but be free of stripping and leave the conductor clean.

2.3 Multi-conductor cables for direct burial or in ducts shall have minimum conductor insulation thickness per Table I (underground). Multi-conductor cables for installation above grade shall have conductor insulation thickness per Table I (aerial).

TABLE I

TYPE	CONDUCTOR AWG	CONDUCTOR INSULATION THICKNESS	AC TEST VOLTAGE	DC TEST VOLTAGE
Underground	18 to 16	62 MILS	6,000	18,000
Underground	15 to 8	78 MILS	8,000	24,000
Underground	7 to 4	94 MILS	9,500	28,000
Aerial	18 to 16	47 MILS	5,000	15,000
Aerial	15 to 8	62 MILS	6,000	18,000
Aerial	7 to 4	78 MILS	8,000	24,000

2.4 Insulation minimum spot thickness shall not be less than 90 percent of specified value. The minimum average insulation thickness shall not be less than the specified value.

3.0 MANUFACTURER'S TESTING OF INDIVIDUAL INSULATED CONDUCTORS

3.1 Dry "Spark" Test: The single insulated conductors shall be passed through high voltage test electrodes with a minimum test level equal to 95 volts/MIL of insulation on all sizes using an AC spark test to ensure detection of any damage to the insulation prior to cabling.

3.2 AC Test (Wet Tank): Every individual conductor, before any further assembly steps, shall be randomly wound on spools and immersed in water, (the top of the reel is to be at least two feet below the surface of the water) for not less than 12 hours, then subjected to an AC voltage test for five minutes while still submerged. The insulation must withstand test voltages listed in Table I without any signs of puncture, overheating, or failure. The voltage is to be applied between conductor and "grounded" water.

3.3 Insulation Resistance Testing: Immediately after the AC test, and while the insulated conductor is still submerged, an insulation resistance test shall be made on each length of conductor. The insulation resistance constant "K" in the following formula, when corrected to 15.6°C (60°F), shall not be less than 25,000 megohms per 1000 feet.

$$R = K \operatorname{Log}\left(\frac{D}{d}\right)$$

R = Insulation resistance in megohms/1000 feet at 15.6°C (60°F)
K = Insulation resistance constant of material used in megohms per 1000 feet
D = Diameter over conductor insulation
d = Diameter under conductor insulation

3.3 DC Test: Immediately after the insulation resistance test and while still submerged, each coil of insulated conductor shall be subjected to and withstand the DC test voltages shown in Table I for five minutes. The sequence of these tests is not important so long as sufficient time is allowed between the DC test and insulation resistance test to prevent polarization from affecting the test results.

3.4 AC Test: All references to AC test voltage shall imply that the frequency is 60 Hz.

SECTION III: UNDERGROUND AND AERIAL MULTI-CONDUCTOR CABLE

1.0 GENERAL REQUIREMENTS

1.1 The required number of conductors shall be cabled helically with the adjacent layers wound in opposite directions in accordance with ICEA Standard Publication S-95-658, Part 5.

1.2 Each conductor shall be numbered sequentially using surface printing at six-inch maximum intervals. The numbering shall be applied as to prevent loss or transfer of identification during manufacturing or installation handling.

1.3 To serve as a tracer, one conductor in each layer shall be colored red.

1.4 The assembled cable shall be capable of separation without damage to the individual conductors.

1.5 When required to provide a firm circular cross-section, flame and moisture resistant (non-wicking) fillers compatible with other cable components shall be used.

1.6 The minimum thickness of the outer jacket at any one point shall not be less than 80 percent of the minimum average thickness of the jacket specified in Table III.

2.0 ASSEMBLY AND OUTER JACKET

2.1 Underground direct burial or duct cables (UGC) shall be made by assembling individual conductors of thickness as specified in Section II, Table I.

2.1.1a Individual conductors shall be cabled with fillers as specified in Section III, paragraph 1.5, when necessary and covered with a shock absorbing layer of moisture resistant core tape or an extruded elastomeric material.

2.1.1b When a core tape is used, the assembled core is to be covered with a minimum 10 MIL helically applied, compound-filled tape with a minimum overlap of 12.5 percent.

2.1.1c The compound-filled tape shall be compatible with the conductor insulation.

2.1.1d When extruded material is used, the assembled core is to be covered with the thickness of extruded material specified in Table II.

TABLE II

CALCULATED CORE DIAMETER – INCHES	AVERAGE CUSHION LAYER THICKNESS
0 to 1.5	47 MILS
1.5 and LARGER	62 MILS

2.1.2 For mechanical protection, underground cable shall have a flat, 7 MIL Copper 194 tape or a flat, 10 MIL bronze tape helically applied so that a minimum 20 percent overlap is obtained.

2.1.3 The outer jacket shall be made of extruded, black, low density, high molecular weight polyethylene as specified by ASTM D-1248 for Type 1, Class C, Grade E5 material and with the physical properties as specified in Appendix C with thickness in accordance with Table III.

TABLE III

CALCULATED CORE DIAMETER – INCHES	POLYETHYLENE JACKET - THICKNESS
0 to 0.425	47 MILS
0.426 to 0.700	62 MILS
0.701 to 1.050	78 MILS
1.051 to1.500	94 MILS
1.501 to 2.000	109 MILS
2.001 AND LARGER	140 MILS

2.1.4 A ripcord shall be provided parallel and beneath the outer jacket and each layer to facilitate stripping. The cord is to be strong enough to separate material without breaking.

2.2 Aerial cables shall be made by assembling individual conductors specified in Section II, Table I.

2.2.1a Individual conductors shall be cabled with fillers as specified in Section III, paragraph 1.5 when necessary and covered with a shock-absorbing layer of moisture resistant core tape or an extruded elastomeric material.

2.2.1b When a core tape is used, the assembled core is to be covered with a minimum 10 MIL helically applied, compound filled tape with a minimum overlap of 12.5 percent.

2.2.1c The compound filled tape shall be compatible with the conductor insulation.

2.2.1d When extruded material is used, the assembled core is to be covered with the thickness of extruded material specified in Table II.

2.2.2 The outer jacket shall be made of neoprene, meeting the physical properties specified in Appendix D, and with thickness as specified in Table IV.

TABLE IV

CALCULATED CORE DIAMETER – INCHES	NEOPRENE JACKET THICKNESS
0 to 0.425	62 MILS
0.426 to 0.700	78 MILS
0.701 to 1.050	94 MILS
1.051 to 1.500	109 MILS
1.501 to 2.000	125 MILS

2.2.3 A ripcord shall be provided parallel and beneath the outer jacket and each layer to facilitate stripping. The cord is to be strong enough to separate material without breaking.

3.0 TESTING

3.1 Dry "Spark" Test shall be made as specified in Section II, paragraph 3.1.

3.2 Final tests to be made while on shipping reel.

3.2.a An AC voltage not less than twice the water test voltage shall be applied for one minute between individual conductors in the cable. The metallic shield if used shall be grounded.

3.2.b The DC resistance of each conductor of each length of finished cable shall be measured and recorded.

3.2.c The shield continuity of each length of finished cable shall be tested and verified.

3.3 Test results must meet or exceed the criteria established in this Specification and its Appendices.

SECTION IV: UNDERGROUND AND AERIAL 3-CONDUCTOR 600V POWER CABLE

1.0 GENERAL REQUIREMENTS

1.1 Each conductor shall be numbered sequentially using surface printing at six-inch maximum intervals.

1.2 The assembled cable shall be capable of separation without damage to the individual conductors.

1.3 A firm circular cross-section shall be provided using flame and moisture resistant (non-wicking) fillers compatible with other cable components.

1.4 The minimum thickness of the individual conductor insulation shall not be less than that specified in Table V. The average thickness of the outer jacket shall be 80 mils. The minimum thickness of the outer jacket shall not be less than 64 mils.

TABLE V

CONDUCTOR SIZE	INSULATION THICKNESS
#2 AWG	45 MILS
#1/0 AWG	55 MILS
#4/0 AWG	55 MILS
500 MCM	65 MILS

2.0 ASSEMBLY AND OUTER JACKET

2.1 The conductors shall be cabled in accordance with UL 1277 using fillers, as necessary, with a cable tape overall.

2.2 The outer jacket compound shall meet or exceed the requirements of UL 1581. The outer jacket shall comply with UL 1277. The jacket shall be UL listed as Type TC cable that is sunlight resistant and also suitable for direct burial.

2.3 A smaller, 4th conductor shall also be included in the makeup of the cable. This smaller conductor shall be used for a ground wire and shall be sized as specified in Table VI.

TABLE VI

CONDUCTOR SIZE	GROUND WIRE SIZE
#2 AWG	#6 AWG
#1/0 AWG	#6 AWG
#4/0 AWG	#4 AWG
500 MCM	#2 AWG

3.0 TESTING

3.1 Dry "spark" test shall be made as specified in Section II, paragraph 3.1.

3.2 Final tests to be made while on shipping reel.

3.3 An AC voltage not less than twice the water test voltage shall be applied for one minute between individual conductors in the cable.

3.4 The test results must meet or exceed the criteria established in this Specification and its Appendices.

SECTION V: TRACK CABLE – TWISTED PAIR

1.0 SINGLE CONDUCTOR UNDERGROUND TRACK WIRE

1.1 The solid conductor shall meet the requirements of Section II, paragraph 1.1 and 1.3.

1.2 The conductor insulation shall meet the requirements of Section II, paragraph 2.1, 2.2 and 2.4 with thickness per Table VII.

1.3 The outer jacket shall meet the requirements of Section III, paragraph 2.1.3 and thickness per Table VII.

2.0 DUPLEX TRACK CABLE

2.1 A twisted pair shall be formed from two individually insulated and jacketed conductors as in this Section, paragraphs 1.1 through 1.3, above. The pair shall be constructed with two twists per foot.

2.2 One of the insulated and jacketed conductors used in this construction shall be prominently marked for easy identification.

3.0 TESTING

Each single insulated and jacketed track wire of the duplex track cable shall pass the requirements of Section II, paragraphs 3.1 through 3.5, except voltages specified in 3.2 and 3.4 shall be from Table VII.

TABLE VII

CONDUCTOR SIZE - AWG	THICKNESS OF INSULATION	THICKNESS OF POLYETHYLENE JACKET	AC – FIVE MINUTE TEST VOLTAGE	DC – FIVE MINUTE TEST VOLTAGE
6	94 MILS	62 MILS	11,000	33,000
9	78 MILS	62 MILS	6,000	18,000

SECTION VI: CASE WIRE

1.0 SINGLE CONDUCTOR CASE WIRE

1.1 The conductors shall meet the requirements of Section II, paragraph 1.2 and 1.3.

1.2 The conductor insulation shall meet the requirements of Section II, paragraphs 2.1, 2.2 and 2.4 with minimum thickness as specified in Table VIII or IX.

1.3 The insulation jacket of AWG sizes 10 and 16 shall be of nylon braid. Nylon braid jacketing (Table VIII – Case with Nylon Jacket) shall be a five MIL tight nylon braid suitably finished with lacquer overall. The overall construction shall be as required in Table VIII.

TABLE VIII – CASE WIRE WITH NYLON JACKET

SIZE - AWG	NUMBER OF STRANDS	INSULATION THICKNESS	JACKET THICKNESS	AC TEST VOLTAGE	DC TEST VOLTAGE
10	37	47 MILS	5 MILS	4,500	9,000
16	19	31 MILS	5 MILS	3,000	6,000

1.4 The insulation jacket of AWG size 6 shall be of chorosulfonated-polyethylene. The insulation jacket and overall construction shall meet the requirements of Table IX (Case Wire with Alternate Jacket).

1.5 Alternate jackets, if specified for any other wire, may be neoprene (Appendix D), cross-linked polyethylene (Appendix E), or low smoke chlorosulfonated-polyethylene (Appendix F) with thickness as specified in Table IX. Alternate jacket color shall be black unless a different color is specified.

TABLE IX – CASE WIRE WITH ALTERNATE JACKET

SIZE - AWG	NUMBER OF STRANDS	INSULATION THICKNESS	JACKET THICKNESS	AC TEST VOLTAGE	DC TEST VOLTAGE
6	7	47 MILS	30 MILS	5,000	15,000
10	37	47 MILS	16 MILS	5,000	15,000
12	19	47 MILS	16 MILS	5,000	15,000
14	19	31 MILS	16 MILS	3,000	10,000
16	19	31 MILS	16 MILS	3,000	10,000

2.0 TESTING

Single conductor insulated case wire shall pass the requirements of Section II, paragraphs 3.1 through 3.5, except voltages specified in 3.2 and 3.4 shall be from Table VIII for nylon jacketed wire or Table IX for alternate jackets.

SECTION VII: CODE CABLE

1.0 CONDUCTORS

The conductor shall be solid copper in accordance with ASTM B-3-95. No factory splices or brazes shall be made in the solid conductor after final drawing.

2.0 INSULATION

Low density, natural, high molecular weight polyethylene compound shall comply with ASTM D-1248, Type I, Class A, Grade E5 (with maximum dielectric constant of 2.3) and shall meet the physical properties of Appendix C. The minimum average thickness of insulation of the #10 AWG wire shall be 78 MILS.

3.0 ASSEMBLY

3.1 The two insulated conductors shall be twisted together to form a balanced pair. The cable pair shall conform to Table X.

TABLE X

(Electrical Characteristics at 20 kHz, Zo = 101 Ohms)

CONDUCTOR SIZE – AWG	ATTENUATION	MUTUAL CAPACITANCE	CAPACITY UNBALANCE
10	0.69 db/mile	0.808 uf/mile	3 percent

3.2 A belt of natural high molecular weight polyethylene shall be extruded over the twisted pair and into the interstices and shall meet all the requirements described in this Section, paragraph 2.0 above. The nominal diameter of this belt shall be 0.64 inches.

3.3 For mechanical protection a five MIL flat copper tape shall be applied helically with a minimum 12.5 percent overlap over the extruded 0.64-inch belt.

3.4 The outer jacket shall be made of extruded, black, low density, high molecular weight polyethylene as specified in ASTM D-1248-74, Type 1, Class C, Grade J3 material and with the physical properties as specified in Appendix C, with thickness of 78 MILS.

4.0 TESTING

Cable shall be tested in accordance with Section III, paragraphs 3.1, 3.2 and 3.3.

APPENDIX A: INSULATION QUALIFICATION REQUIREMENTS

When tested with the methods described below, the insulation successfully passing constitutes evidence of its acceptability for use in single and multi-conductor cable and wire as described by these Specifications.

1.0 VOLTAGE AGING

1.1 The dielectric strength stability of the insulating material shall be demonstrated by voltage aging a minimum of ten feet of a single conductor #14 AWG or larger size with 80 MIL or thicker insulation. The cable shall be tested in free air with the ends securely terminated.

1.2 Apply one of the following stresses to voltage age the sample:

60 Hz AC VOLTAGE PER MIL OF INSULATION	TIME - YEARS
225	2
180	3
135	5

1.3 Use the voltage-aged sample from this Appendix, Section 1.2 and apply an AC voltage in 5 kV steps for five minutes of each step until breakdown. Start the test at the voltage level used in this Appendix Section 1.2.

1.4 No cable breakdown shall occur during the voltage-aging test up to and including a voltage stress of 350 volts/MIL.

2.0 THERMAL AGING

2.1 The insulation shall be tested in a circulating air oven on 80 MIL thick slabs of material as follows and shall meet or exceed both of the results stipulated.

2.2 After 168 hours in an oven at 121°C:

Tensile strength, percent of unaged value	85
Elongation at rupture, percent of unaged value	85

2.3 After additional 168 hours at 150°C:

Tensile strength, percent of unaged value	85
Elongation at rupture, percent of unaged value	60

APPENDIX A: INSULATION QUALIFICATION REQUIREMENTS (continued)

3.0 LONG TERM MOISTURE RESISTANCE

3.1 A single conductor #14 AWG or larger in size with 80 MILS or thicker insulation shall have at least ten feet submerged in water at 20°C. The insulated conductor without any jacket over the insulation shall be continuously energized under one of the conditions shown below:

DC VOLTAGE PER MIL OF INSULATION	TIME - YEARS
325	2
280	3
240	4
200	6

4.0 TEST RESULTS

4.1 No insulation failure shall occur at any point during a test period.

4.2 The results of insulation qualification tests must be recorded and certified on the Insulation Qualification Test report included in this Specification as Appendix G.

APPENDIX B: ETHYLENE-PROPYLENE RUBBER INSULATION

When tested in accordance with ICEA S-58-516, the insulation shall meet the following guaranteed values:

Physical Properties

1. Original Requirements:

A.	Tensile strength, minimum PSI.	1,000
B.	Tensile stress at 200 percent elongation, minimum PSI.	600
C.	Elongation at rupture, minimum percent.	300

2. Aging Requirements:

After air oven heat test at 121°C for 168 hours

A.	Tensile strength, minimum percent of unaged value.	85
B.	Elongation at rupture, minimum percent of unaged value.	85

Hot creep test at 150°C

A.	Hot creep elongation, maximum percent.	50
B.	Hot creep set, maximum percent of unaged value.	5

3. Accelerated water absorption:

168 hours at 70°C, Mg/square inch maximum	8

4. Cold bend requirement:

One hour at –40°C	No Cracks

5. Ozone resistance

168 hours at 250 ppm Ozone	No Cracks

APPENDIX B: ETHYLENE-PROPYLENE RUBBER INSULATION (continued)

Electrical Properties

1. AC Voltage Test:

   Apply 100 volts per MIL of insulation for five minutes after a period of 12 hours immersion in water. Voltage shall be applied between the conductor and grounded water. — No Punctures

2. Insulation Resistance:

   Resistance Constant K = megohm/1000 feet at 15.6°C — 25,000

3. Accelerated Water Absorption:

   80-volt/MIL insulation at 75°C

A.	Dielectric Constant:	One day maximum	4.0
B.	Increase in Capacitance:	1-14 days, maximum percent	3.5
C.	Increase in Capacitance:	7-14 days, maximum percent	1.5
D.	Stability Factor:	After 14 days	1.0

4. Capacity and Power Factor:

Specific inductive capacity, maximum percent	4.0
Power factor, maximum percent	2.0

5. Long Term Water Stability:

   Test specimen of #14 AWG conductor with 47 MILS of insulation according to ICEA Standards Publication T-22-294 with the following modifications:

   A. 90°C water temperature – in lieu of 50°C.
   B. 52 week test duration – in lieu of 16 weeks.
   C. 3,300 volts AC withstood – in lieu of 5,000 volts AC withstood.

   Insulation shall not fail under the continuous DC stress or the applied AC test voltage and meet the requirements below:

A.	Dielectric constant after 52 weeks, maximum percent.	4.5
B.	Stability factor after 52 weeks, maximum percent.	1.5
C.	Power factor after 52 weeks, maximum percent.	2.5

APPENDIX C: POLYETHYLENE JACKETING

Physical Properties

1.	Original Properties:	
	Tensile strength, minimum PSI	1,400
	Elongated at rupture, minimum percent	350
2.	After air oven aging for 48 hours at 100°C:	
	Tensile strength, minimum percent of unaged value	85
	Elongation at rupture, minimum percent of unaged value	75
3.	Oil Immersion, four hours at 70°C.:	
	Tensile strength, minimum percent of unaged value	75
	Elongation at rupture, minimum percent of unaged value	75
4.	Accelerated Water Absorption:	
	168 hours at 70°C, Mg/square inch, maximum	5
5.	Shrink Back, 24 hours at 100°C:	
	Percent minimum	5
6.	Cold Bend:	
	One hour at –55°C then bent 180° uniformly around mandrel not greater than three times diameter of cable	No Cracks
7.	Heat Distortion, one hour at 90°C:	
	Maximum percent distortion	25
8.	Absorption Coefficient:	
	Reciprocal function of light transmission, minimum	320
9.	Environmental Stress Cracking:	
	Immerse in reagent Igepal CO-630 – 48 hours at 50°C	No Cracks
10.	Impact after four hours at -45°C:	
	Strike with one-inch diameter flat surface with three foot/pound force – VISUAL	No Cracks

APPENDIX D: NEOPRENE JACKETING

Physical Properties

1.	Original Properties:		
	Tensile strength, minimum PSI		1,800
	Tensile strength at 200 percent elongation, minimum PSI		500
	Elongated at rupture, minimum percent		300
	Set in two-inch gauge length, maximum percent		20
2.	After air oven aging for 168 hours at 100°C:		
	Tensile strength, per cent original, minimum of unaged value		50
	Elongation at rupture, percent original, minimum of unaged value		20
3.	Oil Immersion, aging 18 hours in ASTM #20.L at 121°C:		
	Tensile strength, percent original, minimum		60
	Elongation at rupture, percent original, minimum		60
4.	Accelerated Water Absorption:		
	168 hours at 70°C, Mg/square inch, maximum		35
5.	Cold Bend, 24 hours at –35°C:		
	Bend 180° around mandrel		
	0. to .80 O.D.:	8 x O.D. of cable	
	.80 O.D. and over:	10 x O.D. of cable	No Cracks
6.	Vertical Flame Test:		
	ICEA #S-19-81, paragraph 6.19.6		Pass
7.	Ozone Distortion:		
	24 hours in 150 ppm Ozone		No Cracks
8.	Heat Distortion:		
	One hour in air oven at 121°C		
	Maximum percent distortion		15

APPENDIX E: CROSS-LINKED POLYETHYLENE JACKETING

Physical Properties

1.	Original Properties:	
	Tensile strength, minimum PSI	1,800
	Elongated at rupture, minimum percent	250
2.	After Air Oven Aging for 168 Hours at 158°C:	
	Tensile strength, percent minimum of unaged value	85
	Elongation at rupture, minimum percent of unaged value	85
3.	Accelerated Water Absorption:	
	168 hours at 70°C, Mg/square inch, maximum	8
4.	Heat Distortion:	
	One hour at 121°C, percent of unaged value	30
5.	Flame Test:	
	Vertical Flame Test	Pass
6.	Cold Bend Test:	
	One hour at –55°C and then bent 180° uniformly around mandrel not greater than three times diameter of cable.	No Cracks
7.	Ozone Resistance:	
	24 hours in 150 ppm Ozone	No Cracks

APPENDIX F: CHLOROSULFONATED-POLYETHYLENE JACKETING

Physical Properties

1.	Original Properties:	
	Tensile strength, minimum PSI	1,500
	Elongated at rupture, minimum percent	125
2.	After Air Oven Aging for 168 Hours at 100°C:	
	Tensile strength, percent minimum of unaged	60
	Elongation at rupture, percent minimum of unaged	60
3.	Accelerated Water Absorption:	
	168 hours at 70°C, Mg/square inch, maximum	35
4.	Smoke Properties per ASTM E666:	
	Flaming mode –	
	D_S – four minute maximum	20
	D_M – (corrected) maximum	150
	Non-flaming mode –	
	D_S – four minute maximum	50
	D_M – (corrected) maximum	350
5.	Heat distortion:	
	One hour at 121°C, percent of unaged	40
6.	Vertical Flame Test:	
	Per ICEA #S-19-81, paragraph 6.19.6	Pass
7.	Cold Bend Test:	
	One hour at –55°C and then bent 180° uniformly around mandrel not greater than three times diameter of cable.	No Cracks
8.	Ozone Resistance:	
	24 hours in 150 ppm Ozone	No Cracks

APPENDIX G: INSULATION QUALIFICATION TEST REPORT

CABLE MANUFACTURER

Metra Specifications call for rather specific qualification tests on the insulation. These tests involve voltage aging, thermal aging and long-term moisture resistance. Ethylene-Propylene Rubber insulation used in railroad signal cable was tested according to Metra Specification 0069-02. Standard factory production cables were used as samples.

SUMMARY AND CONCLUSIONS

Ethylene-Propylene Rubber insulation, tested in accordance with the procedures below, meets or exceeds the requirements of Metra Specification 0069-02.

_____ _____

Certified by: Date:

RESULTS

Voltage Aging

The dielectric strength stability shall have been demonstrated by voltage aging, a tested sample of a single conductor #14 AWG or larger size wire with 80 MIL or thicker insulation. The conductor shall be tested in free air with a minimum of ten feet between terminals. One of the following voltage stresses shall have been applied to voltage age the sample.

TEST VOLTAGE 60 Hz AC VOLTS PER MIL	AGING TIME DURATION
225	2 years
180	3 years
135	5 years

No insulation failure shall occur within the test period.

Ethylene-Propylene Rubber insulation _____ MILS thick on a # _____ AWG copper conductor of _____ length was placed in free air at 20°C for _____ years at a stress of _____ volts/MIL. No failure occurred during the test period.

Voltage at breakdown as specified in Appendix A, paragraph 1.3 was _____ volts.

_____
Date Test(s) Performed

Thermal Aging

The insulation shall be tested in a circulating air oven on 80 MIL thick slabs of material and shall meet or exceed both of the results stipulated in Metra Specification 0069-02, Appendix A, paragraphs 2.2 and 2.3

The insulation tested as above gave the following results:

TEST	RESULTS
Tensile Strength – Initial	PSI
Tensile Strength – After 168 hours at 121°C	PSI
Tensile Strength – After additional 168 hours at 150°C	PSI
Elongation at Rupture – Initial	%
Elongation at Rupture – After 168 hours at 121°C	%
Elongation at Rupture – After additional 168 hours at 150°C	%

_____
Date Test(s) Performed

Long Term Moisture Resistance

A single conductor #14 AWG or larger size with 80 MILS or thicker insulation, shall have at least 10 feet submerged in water at 20°C. The insulated conductor without any jacket over the insulation shall be continuously energized under one of the conditions shown below:

DC VOLTAGE VOLTS PER MIL	TIME
325	2 months
280	3 months
240	4 months
200	6 months

No insulation failure shall occur within the test period.

Unjacketed insulation ____ MILS thick on a # _____ AWG copper conductor of _____ length was placed in tap water at 20°C for _____ months at a stress of _____ volts/MIL. No failure occurred during the test period.

_____
Date Test(s) Performed

Description. This work shall consist of the furnishing of new insulated bondstrand for the new permanent and temporary Metra signal system located between existing signal cases 20.40 and 20.99.

Materials. The materials shall conform to the Metra Signal Specification for Bondstrand Specification No. 0019-02 dated February 7, 2002 that follows this special provision.

All equipment shall be standard railroad components used by Metra. All of these components shall be purchased from a Metra-approved distributor. All equipment shall be submitted for approval by Metra before purchasing.

Construction Requirements. All equipment will be installed by Metra.

Method of Measurement. Furnishing of cable for Metra signals will be measured for payment in feet as supplied of each type listed below.

Basis of Payment. Furnishing of cable for Metra signals will be paid for at the contract unit price per foot supplied for each of the following types listed, upon delivery of the following bondstrand:

SIGNALS METRA – INSULATED BONDSTRAND

METRA SIGNAL SPECIFICATION FOR BONDSTRAND

METRA SIGNAL
SPECIFICATION NO. 0019-02
BONDSTRAND

February 7, 2002

1.0 SCOPE

1.1 This Specification is for furnishing bondstrand cable. The unit(s) furnished on this Specification shall be of the most current design. The material, equipment and workmanship shall be of the highest commercial quality.

1.2 Failure to conform to the highest standards of the industry shall be cause for rejection.

1.3 Metra's Chief Engineering Officer or his duly authorized representative shall be the final authority for deciding as to whether a competitive item conforms to these requirements and complies with the intention of this Specification.

1.4 This Specification is intended to be descriptive, but not restrictive and is solely for the purpose of indicating the type and quality of articles that will meet the approval of Metra.

1.5 Capacities and dimensions listed herein shall be interpreted as minimums; variation from the values listed will be judged as to their effect and ability to perform the work intended.

1.6 It shall be the responsibility of the Manufacturer to make certain that all parts and components fit and function together properly.

1.7 Where brand, manufacturer or product names are indicated in this Specification, they are included only for the purpose of establishing identification and general descriptions of the item. Wherever such names appear, the term “or Metra approved equivalent” is considered to follow.

1.8 The article(s)/unit(s) submitted under this Specification must be in production and must have had a previous, satisfactory in-service performance record of at least two years on three Class I railroads. Proof of performance statement(s) shall be provided, upon request, with confirming statement(s) from previous purchaser(s). Failure to provide proof may be cause for rejection.

2.0 GENERAL REQUIREMENTS

2.1 Bondstrand cable shall meet the requirements established by the American Railway Engineering and Maintenance-of-Way (AREMA) Communications & Signals Manual of Recommended Practices, Part 10.3.12.

2.2 3/16 bondstrand cable shall have an outer diameter of bare cable of 0.1875 inches: 5/16 bondstrand cable shall have an outer diameter of bare cable of 0.300 inches.

2.3 The maximum resistance per 1000 feet of cable at 20°C shall be 0.625 Ohms.

2.4 Conductor shall be cadmium bronze and steel galvanized wire.

2.5 The cable shall consist of 133 hard-drawn wires.

2.6 The completed cable shall be made up of seven 19-strand concentric wires.

2.7 The insulating jacket shall be black PVC with a thickness of 60 mils.

3.0 SUBMITTAL

Catalog cuts, drawings, descriptions, etc., of the Manufacturer's typical current production from which the submittal will be based shall be included with the quotation.

4.0 IDENTIFICATION AND SHIPPING

4.1 Bondstrand cable shall be plainly marked with Manufacturer's references including serial and model numbers.

4.2 The product shall be assembled or packed as to permit convenient handling and to protect against loss or damage during shipment. Loose pieces shall be tightly taped or wired to the bondstrand or shipping pallet or, packed separately but firmly attached to the product.

4.3 A detailed list of packages and their contents shall be provided for all shipments. One copy will be included with shipment and one copy will be sent directly to Metra's Chief Engineering Officer. Metra Engineering's copy will be mailed not later than the shipping date of the equipment.

5.0 INSPECTION AT SHIPMENT

Metra will inspect the unit(s) after delivery and contact the Manufacturer listing any items not conforming to this Specification. The Manufacturer shall provide a timely schedule to furnish, deliver to destination and install or correct, without charge to Metra, such items. Failure to respond appropriately shall be cause for rejection with return of rejected units at the Manufacturer's total expense.

6.0 GUARANTEE

The Manufacturer shall replace (furnish, deliver to destination and install or correct) without charge, any part of material, which fails within a period of one year of date of installation from defects of material, design, manufacture and/or workmanship.

7.0 DEMONSTRATION

7.1 If requested prior to purchase, bidder shall arrange for inspection before one or more of Metra's representatives, of the basic unit to be furnished. Failure of a unit to be equal to or better than the quality herein specified by Metra shall be cause for rejection of Bid. Such inspection shall be performed at no cost to Metra within a distance of not more than 50 miles from Metra's headquarters at 547 West Jackson Boulevard, Chicago, unless otherwise agreed upon by Metra.

7.2 Metra or its Representative reserves the right to inspect all equipment at Manufacturer's plant prior to shipment.

SIGNALS METRA – COLOR LIGHT SIGNAL UNITS

Description. This work shall consist of the furnishing of color light signal units and number boards for new Metra signals located on the Catenary Bridge Structure as shown in the plans.

Materials. The materials shall conform to the Metra Signal Specification for Color Light Signal Units Specification No. 0043-02, dated February 7, 2002 that follows this special provision. Number boards shall be furnished with horizontal mounting frame as described in section 3.8.8 of that Metra Signal Specification.

This work includes all hardware required to permanently attach the color light signal units to the catenary bridge structure. Signals shall include top of mast mounting hardware. See the special provision Catenary Bridge Structure for requirements for this structure.

All equipment shall be standard railroad components used by Metra. All of these components shall be purchased from a Metra-approved distributor. All equipment shall be submitted for approval by Metra before purchasing.

Construction Requirements. All equipment will be installed by Metra.

Method of Measurement. Furnishing Metra signal units will be measured for payment as each for every type listed below.

Basis of Payment. Furnishing Metra signal units will be paid for at the contract unit price each for the following types listed, upon delivery of approved equipment.

1. SIGNALS METRA – 3 LIGHT COLORLIGHT UNIT
2. SIGNALS METRA – NUMBER BOARDS

METRA SPECIFICATION FOR COLOR LIGHT SIGNAL UNITS

METRA SIGNAL
SPECIFICATION NO. 0043-02
COLOR LIGHT SIGNAL UNITS

February 7, 2002

1.0 SCOPE

1.1 This Specification is for furnishing color light signal unit(s) of the doublet lens type. The unit(s) furnished on this Specification shall be of the most current design. The material, equipment and workmanship shall be of the highest commercial quality.

1.2 Failure to conform to the highest standards of the industry shall be cause for rejection.

1.3 Metra's Chief Engineering Officer or his duly authorized representative shall be the final authority for deciding as to whether a competitive item conforms to these requirements and complies with the intention of this Specification.

1.4 This Specification is intended to be descriptive, but not restrictive and is solely for the purpose of indicating the type and quality of articles that will meet the approval of Metra.

1.5 Capacities and dimensions listed herein shall be interpreted as minimum; variation from the values listed will be judged as to their effect and ability to perform the work intended.

1.6 It shall be the responsibility of the Manufacturer to make certain that all parts and components fit and function together properly.

1.7 Where brand, manufacturer or product names are indicated in this Specification, they are included only for the purpose of establishing identification and general descriptions of the item. Wherever such names appear, the term “or Metra approved equivalent” is considered to follow.

1.8 The article(s)/unit(s) submitted under this Specification must be in production and must have had a previous, satisfactory in-service performance record of at least two years on three Class I railroads. Proof of performance statement(s) shall be provided, upon request, with confirming statement(s) from previous purchaser(s). Failure to provide proof may be cause for rejection.

2.0 GENERAL REQUIREMENTS / STANDARDS

2.1 American Mechanical Engineering standards shall apply to threaded parts.

2.2 The color light signal unit(s) shall meet the requirements established by the American Railway Engineering and Maintenance-of-Way Association (AREMA) Communications & Signals Manual of Recommended Practices, Part 7.1.1, except as modified by any requirements of this Specification.

2.3 The color light signal ladder, mast, base and platforms, when specified, shall meet or exceed the requirements of AREMA Communications & Signals Manual of Recommended Practices, Parts 7.2.1, 7.2.41A and 7.2.41B.

3.0 DESIGN

3.1 General

The general design dimensions and structure of the signal unit(s) shall conform to figures 1 through 5 within this specification.

3.2 Signal Case and Light Units

3.2.1 The signal case shall be aluminum, weather-tight, and shall be equipped with suitable doors or covers locked with a hasp with a lug. The lug shall have a minimum opening of 1/2-inch for application of a screw type or key lock. The doors or covers when opened shall permit easy access to all parts.

3.2.2 The signal shall be of modular design and display one, two, three or four colors, with color lenses provided and arranged for a vertical configuration.

3.2.3 The wire entrance in a dwarf signal case shall allow for the use of a five conductor No. 6 AWG underground cable including the outer jacket.

3.2.4 The light unit lamp socket and all optical elements for an 8-3/8-inch outer lens configuration shall be removable as a unit from the rear of the signal case without removing or loosening more than four fasteners or disturbing the alignment of any of the components. Fasteners shall be integral to the case or captive to the removable unit.

3.3 Electric lamps shall be 25 watt, 10 volt, S11, SC, CC-6 bulbs. (AREMA Communications & Signals Manual of Recommended Practices, Part 14.2.1). Bulbs shall be rated for a minimum of 12,000 hours similar to Velcorp/GEM part #RS-1025V-SF or Metra approved equivalent.

3.4 Transformers, if specified, shall be provided in each lamp compartment with insulating caps over all terminals that the voltage is over 50 volts AC or DC.

3.5 Resistors, if specified, shall be provided in each lamp compartment.

3.6 Lenses

3.6.1 Outer lenses shall be 6-3/8 inches or 8-3/8 inches.

3.6.2 Lens shall be plastic.

3.6.3 A close-up signal aspect shall be displayed and the close-up refracting lens shall be molded as part of the outer lens.

3.7 Mast Mounted Signals without Junction Box Bases

3.7.1 Mounting shall be top-of-mast unless otherwise specified and shall provide means to prevent physical injury to wires or cable at the entrance to the signal.

3.7.2 The signal shall be wired with insulated case wire that is a minimum of No. 16 AWG and of a Metra approved type.

3.7.3 Signals shall be designed for mast mounting and shall be shipped complete and ready for assembly. Typical signal aspects and signal masts are shown in Figures 1 (back-to-back signal), 2 (double armed 3 and 2 aspect), 3 (double armed 3 and 4 aspect), 4 (single arm 3 aspect) and 5 (dwarf).

3.7.4 Ground signals having a single signal head shall have the head designed for top of mast mounting. Lower signal heads shall mount on tubular mast brackets (Safetran No. 042256-4X) in front of the masts. The red aspects shall be on six-foot centers. Outer lenses for all aspects shall be 8-3/8 inches.

3.7.5 A foundation, when specified, shall be provided and shall be of such design as to solidly hold the mounted signal so that it cannot be moved or affected by normal vibration. Physical dimensions and materials of the foundation shall be as specified. Foundations shall meet the requirements of Metra Specification No. 0027-01, Signal Foundations.

3.7.6 Masts shall be five-inch aluminum tubing minimum Schedule 80 or stronger and incorporate a welded aluminum base plate with four vertical support gussets. The base plate shall be designed for mounting on 11-11/16" x 11-11/16" foundations mounting bolts, leveling nuts and washers. An aluminum trim section shall mount around the outside of the base and extend down to the foundation to close the opening between the base and the foundation.

3.7.7 Ladders and platforms shall be aluminum. Front platforms shall be provided and shall allow access to the front of the signal head via an offset platform to one side of the signal. Ladders shall be vertical and mounted behind the signal for single direction signals. The ladder shall mount on the field side for back-to-back signals. Ladder rung width shall be at least 8 inches. Handrails shall be provided for each platform. All fasteners used to assemble the platforms, masts and ladders shall be stainless steel.

3.7.8 Signal numbers, when specified, shall be black letters on a white, reflective background. The numbers shall be mounted below the bottom signal head.

The overall dimensions of the number plates shall be 5-1/2" x 8" and be furnished complete with vertical mounting frame (Safetran No. 036117-583) for wayside signals and horizontal mounting frame (Safetran No. 036117-584) for wayside signal bridges and cantilevers.

3.7.9 An external aluminum junction box case shall be mounted to the mast nominally 48 inches above the top of the foundation. The junction box shall be 12" x 18" and provide room for a minimum of five double AAR terminals for each signal head. Terminals shall be provided with insulating test links (Safetran No. 024620-1X). The double hinged door of the weather tight case shall be gasketed, tight closing and lockable with a minimum 1/2-inch diameter opening to accept a Metra padlock.

3.8 Mast Mounted Signals with Junction Box Bases

3.8.1 Mounting shall be top-of-mast unless otherwise specified and shall provide means to prevent physical injury to wires or cable at the entrance to the signal.

3.8.2 The signal shall be wired with insulated case wire that is a minimum of No. 16 AWG and of a Metra approved type.

3.8.3 Signals shall be designed for mast mounting and shall be shipped complete and ready for assembly. Typical signal aspects and signal masts are shown in Figures 1 (back-to-back signal), 2 (double armed 3 and 2 aspect), 3 (double armed 3 and 4 aspect), 4 (single arm 3 aspect) and 5 (dwarf).

3.8.4 Ground signals having a single signal head shall have the head designed for top of mast mounting. Lower signal heads shall mount on tubular mast brackets (Safetran No. 042256-4X) in front of the masts. The red aspects shall be on six-foot centers. Outer lenses for all aspects shall be 8-3/8 inches.

3.8.5 A foundation, when specified, shall be provided and shall be of such design as to solidly hold the mounted signal so that it cannot be moved or affected by normal vibration. Physical dimensions and materials of the foundation shall be as specified. Foundations shall meet the requirements of Metra Specification No. 0027-01, Signal Foundations.

3.8.6 Masts shall be five-inch aluminum tubing minimum Schedule 80 or stronger and incorporate a welded aluminum base late with four vertical support gussets. The base plate shall be designed for mounting on 11-11/16" x 11-11/16" foundations mounting bolts, leveling nuts and washers. An aluminum trim section shall mount around the outside of the base and extend down to the foundation to close the opening between the base and the foundation.

3.8.7 Ladders and platforms shall be aluminum. Front platforms shall be provided and shall allow access to the front of the signal head via an offset platform to one side of the signal. Ladders shall be vertical and mounted behind the signal for single direction signals. The ladder shall mount on the field side for back-to-back signals. Ladder rung width shall be at least eight inches. Handrails shall be provided for each platform. All fasteners used to assemble the platforms, masts and ladders shall be stainless steel.

3.8.8 Signal numbers, when specified shall be black letters on a white, reflective background. The numbers shall be mounted below the bottom signal head. The overall dimensions of the number plates shall be 5-1/2" x 8" and be furnished complete with vertical mounting frame (Safetran No. 036117-583) for wayside signals and horizontal mounting frame (Safetran No. 036117-584) for wayside signal bridges and cantilevers.

3.9 Foundation Mounted Signals

3.9.1 The signal shall be wired with insulated case wire that is a minimum of No. 16 AWG and of a Metra approved type.

3.9.2 Ground signals shall have a single signal head and shall have the head designed for top of foundation mounting. Outer lenses for all aspects shall be 6-3/8 inches.

3.9.3 A foundation shall be provided and shall be of such design as to solidly hold the mounted signal so that it cannot be moved or affected by normal vibration. Physical dimensions and materials of the foundation shall be as specified. Foundations shall meet the requirements of Metra Specification No. 0027-01, Signal Foundations.

4.0 SUBMITTAL

4.1 Catalog cuts, drawings, descriptions, etc., of the Manufacturer's typical current production from which the submittal will be based shall be included with the quotation.

4.2 Detailed shop drawings of the color light signal unit(s) are to be furnished within 15 days of the award of the contract, and be approved by Metra's Chief Engineering Officer before manufacture begins.

5.0 IDENTIFICATION AND SHIPPING

5.1 The signal unit(s) shall be plainly marked with Manufacturer's references including serial and model numbers.

5.2 The product shall be assembled or packed as to permit convenient handling and to protect against loss or damage during shipment. Loose pieces shall be tightly taped or wired to the color light signal unit(s) or shipping pallet or, packed separately but firmly attached to the product.

5.3 A detailed list of packages and their contents shall be provided for all shipments. One copy will be included with shipment and one copy will be sent directly to Metra's Chief Engineering Officer. Metra Engineering's copy will be mailed not later than the shipping date of the equipment.

5.4 Manufacturer shall notify Metra of shipping date 48 hours prior to shipment.

6.0 INSPECTION AT SHIPMENT

Metra will inspect the unit(s) after delivery and contact the Manufacturer listing any items not conforming to this Specification. The Manufacturer shall provide a timely schedule to furnish, deliver to destination and install or correct, without charge to Metra, such items. Failure to respond appropriately shall be cause for rejection with return of rejected units at the Manufacturer's total expense.

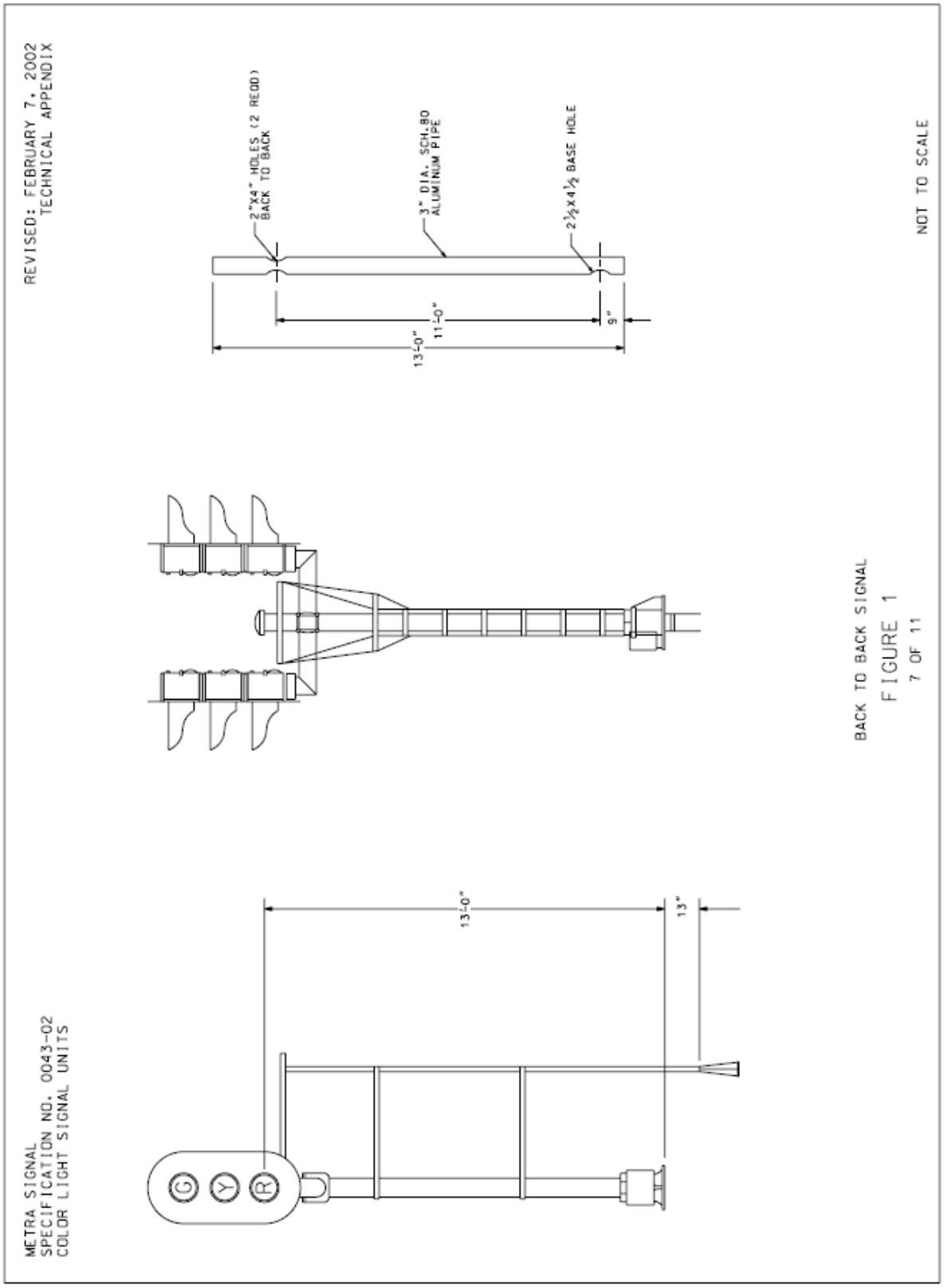
7.0 GUARANTEE

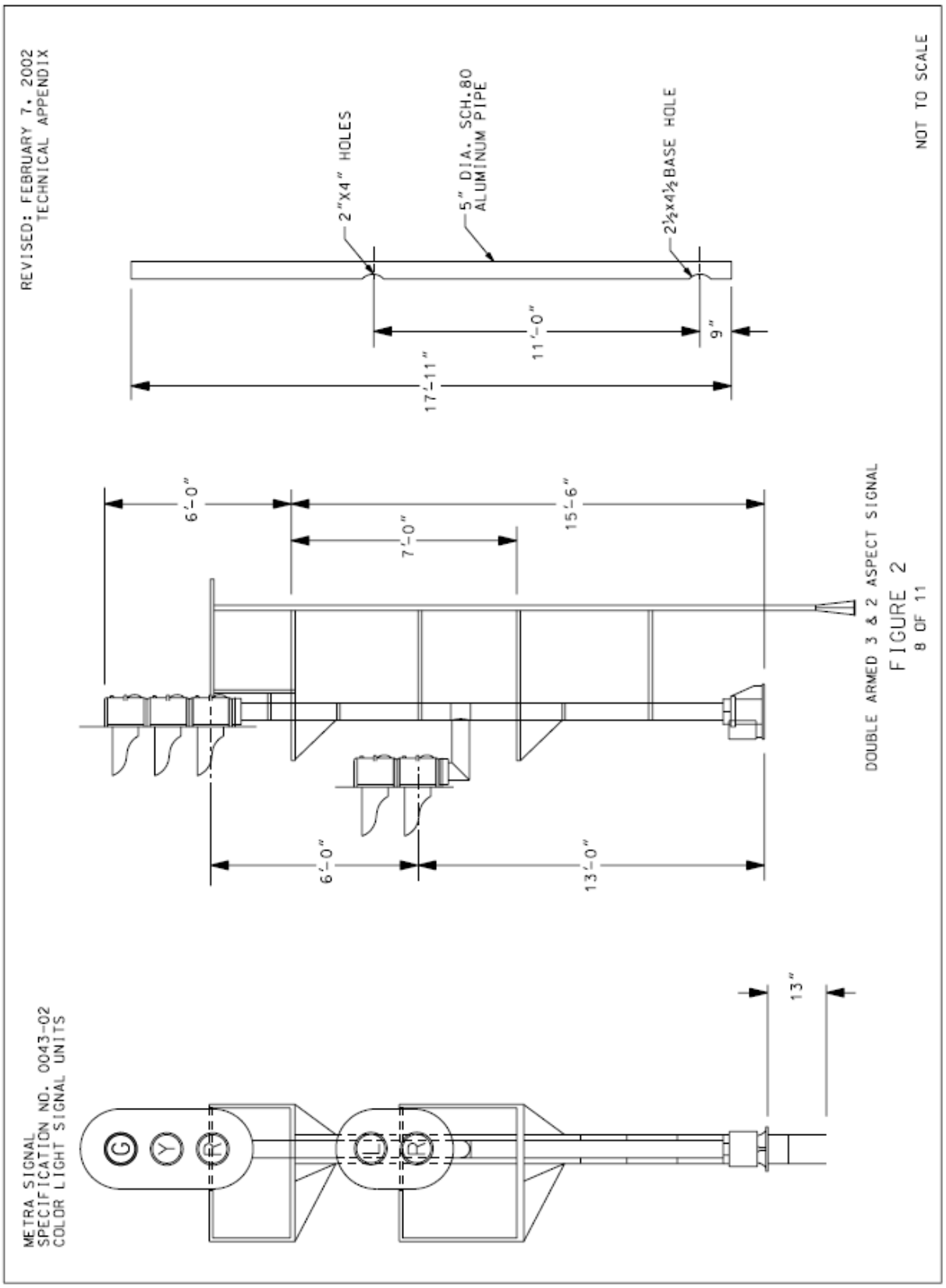
The Manufacturer shall replace (furnish, deliver to destination and install or correct) without charge, any part of material, which fails within a period of one year of date of installation from defects of material, design, manufacture and/or workmanship.

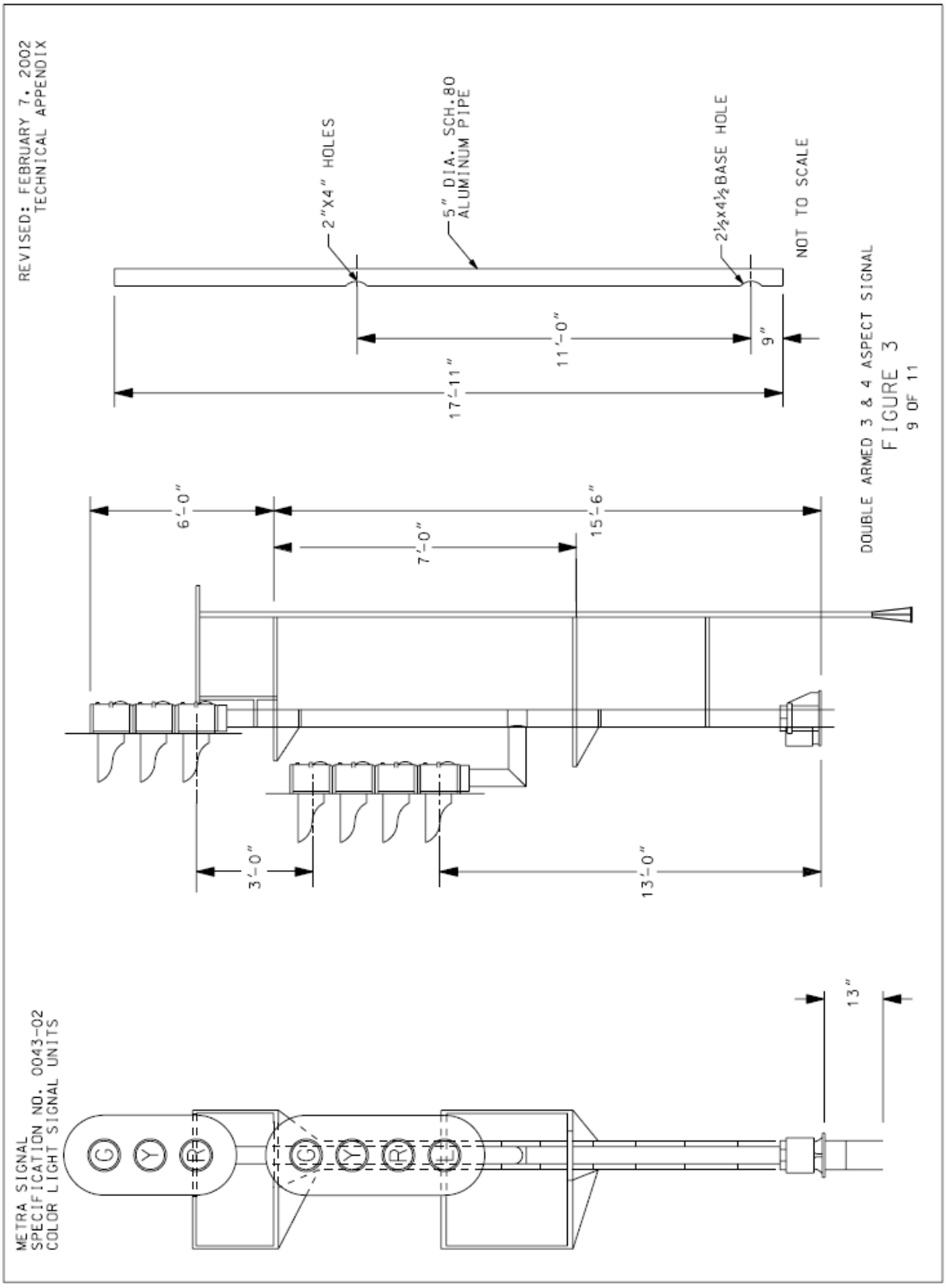
8.0 DEMONSTRATION

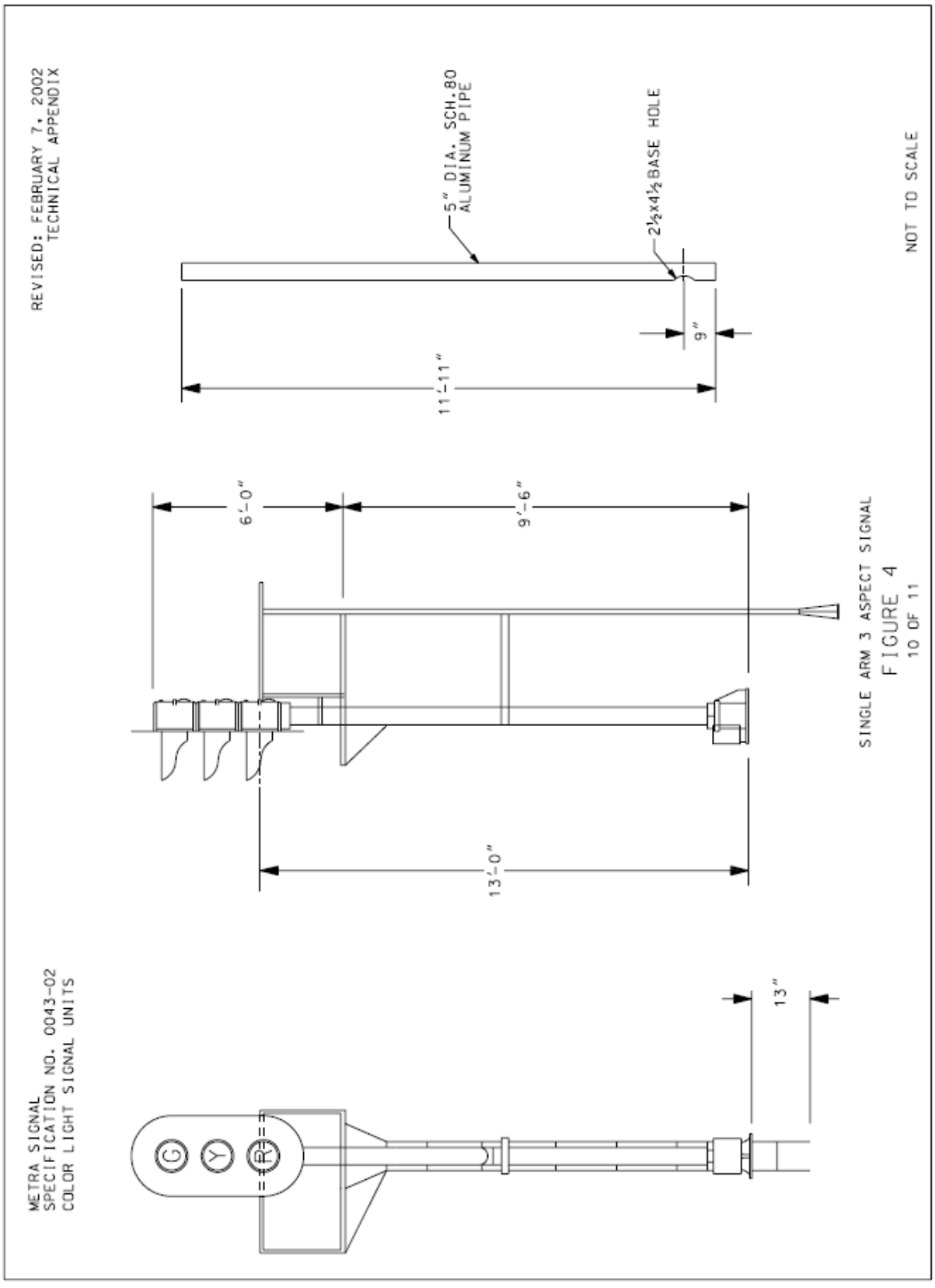
8.1 If requested prior to purchase, bidder shall arrange for inspection before one or more of Metra's representatives, the basic unit to be furnished. Failure of a unit to be equal to or better than the quality herein specified by Metra shall be cause for rejection of Bid. Such inspection shall be performed at no cost to Metra within a distance of not more than 50 miles from Metra's headquarters at 547 West Jackson Boulevard, Chicago, unless otherwise agreed upon by Metra.

8.2 Metra or its Representative reserves the right to inspect all equipment at Manufacturer's plant prior to shipment.


REVISED: FEBRUARY 7, 2002
TECHNICAL APPENDIX
2"X4" HOLES (2 REQD)
BACK TO BACK
3" DIA. SCH.80
ALUMINUM PIPE
2½X4½ BASE HOLE
13'-0"
11'-0"
9"
NOT TO SCALE
BACK TO BACK SIGNAL
FIGURE 1
7 OF 11
13'-0"
13"
G
Y
R
METRA SIGNAL
SPECIFICATION NO. 0043-02
COLOR LIGHT SIGNAL UNITS

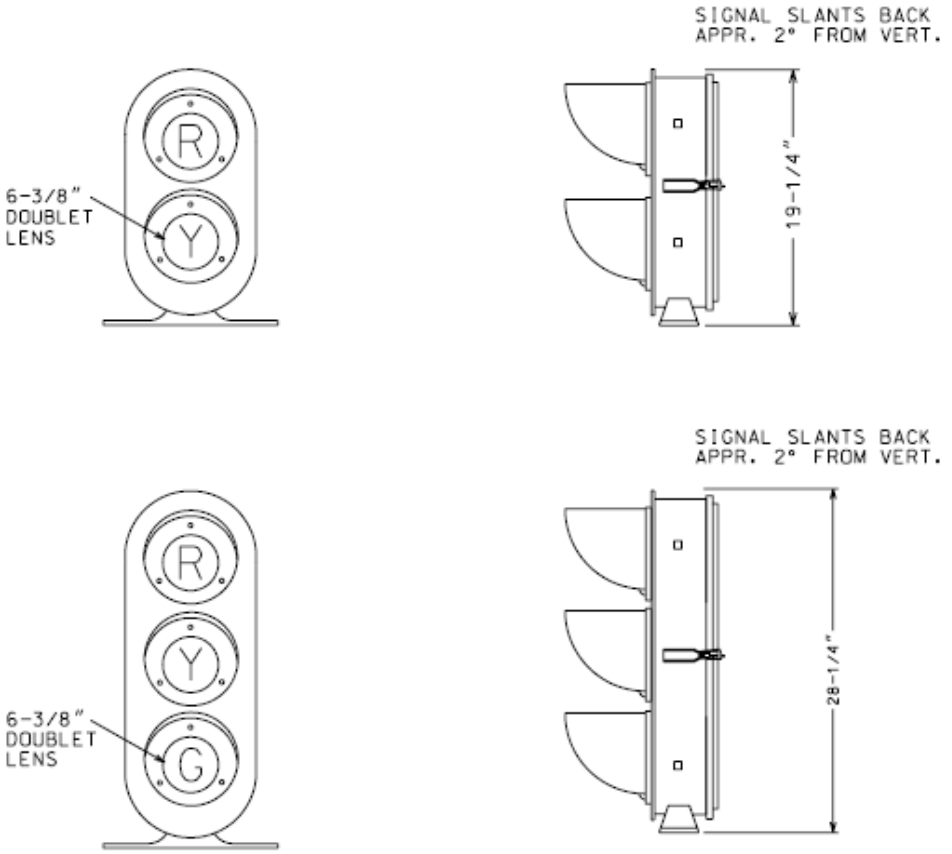

REVISED: FEBRUARY 7, 2002
TECHNICAL APPENDIX
NOT TO SCALE
2"X4" HOLES
5" DIA. SCH.80 ALUMINUM PIPE
2½x4½ BASE HOLE
11'-0"
9"
17'-11"
6'-0"
7'-0"
15'-6"
6'-0"
13'-0"
13"
G
Y
R
LT
R
METRA SIGNAL
SPECIFICATION NO. 0043-02
COLOR LIGHT SIGNAL UNITS
DOUBLE ARMED 3 & 2 ASPECT SIGNAL
FIGURE 2
8 OF 11


REVISED: FEBRUARY 7, 2002
TECHNICAL APPENDIX
2"X4" HOLES
5" DIA. SCH.80 ALUMINUM PIPE
2½x4½ BASE HOLE
NOT TO SCALE
17'-11"
11'-0"
9"
6'-0"
7'-0"
15'-6"
3'-0"
13'-0"
DOUBLE ARMED 3 & 4 ASPECT SIGNAL
FIGURE 3
9 OF 11
13"
METRA SIGNAL
SPECIFICATION NO. 0043-02
COLOR LIGHT SIGNAL UNITS
G
Y
R


REVISED: FEBRUARY 7, 2002
TECHNICAL APPENDIX
5" DIA. SCH.80
ALUMINUM PIPE
2½x4½ BASE HOLE
9"
11'-11"
NOT TO SCALE
6'-0"
9'-6"
13'-0"
SINGLE ARM 3 ASPECT SIGNAL
FIGURE 4
10 OF 11
13"
METRA SIGNAL
SPECIFICATION NO. 0043-02
COLOR LIGHT SIGNAL UNITS
G
Y
R

METRA SIGNAL
SPECIFICATION NO. 0043-02
COLOR LIGHT SIGNAL UNITS

REVISED: FEBRUARY 7, 2002
TECHNICAL APPENDIX



DWARF SIGNAL

FIGURE 5

11 OF 11

NOT TO SCALE

SIGNALS METRA – MISCELLANEOUS SIGNAL MATERIAL

Description. This work shall consist of the furnishing of miscellaneous new signal material for the Metra signal system located between existing signal cases 20.40 and 20.99.

Materials. The materials shall conform to the Metra Signal Specification for Miscellaneous Signal Material Specification No. 0031-02, dated February 7, 2002 that follows this special provision.

The specific requirements for these materials shall be obtained by the Contractor from Metra and only those materials approved by Metra will be considered acceptable for procurement for this project under the pay items listed below.

For the W-10 Transformer, the following ratings shall apply: primary - 115 volts 60 cycles, secondary - 15-25 volts; and the maximum current shall be 10 amps.

Lightning Arrester shall be suitable for use on circuits of 0 to 16 volts dc without circuit source impedance restrictions. Lightning Arresters shall be suitable for use on circuits of 0 to 175 volts AC or interrupted DC which have sufficient source impedance to limit the follow-through current, after a surge, to 15 amps maximum. Lightning Arrester type shall be designed to have a DC breakdown voltage of 1000 volts or lower.

Equalizer shall have a minimum resistance of 1000 ohms at rated circuit voltage. Equalizer shall be suitable for use on circuits of 0 to 16 volts AC or DC without circuit impedance restrictions. Equalizer may be used on circuits having voltages higher than 16 volts AC or DC, only when the circuits limit the follow-through current, after a surge, to 15 amps maximum. Equalizer shall be designed to have a DC breakdown voltage of 250 volts or lower. Equalizer shall be designed to have a maximum impulse sparkover voltage not exceeding 1000 volts peak for an impulse with a 10 KV/microsecond risetime.

Insulated Joint Kits shall be furnished as specified in the Metra Specification No. 0351-83 for Prefabricated Insulated Joints that follows the special provision Construction of Track.

All equipment shall be standard railroad components used by Metra. All of these components shall be purchased from a Metra-approved distributor. All equipment shall be submitted for approval by Metra before purchasing.

Construction Requirements. All equipment will be installed by Metra.

Method of Measurement. Miscellaneous material for Metra signals will be measured for payment as each for every type listed below.

Basis of Payment. Furnishing of miscellaneous material for Metra signals will be paid for at the contract unit price each for the following types listed, upon delivery of approved equipment.

1. SIGNALS METRA – MISC. - W-10 TRANSFORMER
2. SIGNALS METRA – MISC. – BATTERY FILTER
3. SIGNALS METRA – MISC. – LIGHTNING ARRESTER
4. SIGNALS METRA – MISC. – EQUALIZER
5. SIGNALS METRA – MISC. – RESISTORS 5 WATT
6. SIGNALS METRA – MISC. – FUSE 6 AMP
7. SIGNALS METRA – MISC. – FUSE 30 AMP
8. SIGNALS METRA – MISC. – FUSE 40 AMP

9. SIGNALS METRA – TRACK CIRCUIT RAIL CONNECTORS
10. SIGNALS METRA – BOOTLEGS
11. SIGNALS METRA – INSULATED JOINT KIT
12. SIGNALS METRA – AFO TRANSCEIVER

METRA SPECIFICATION FOR MISCELLANEOUS SIGNAL MATERIAL

METRA SIGNAL
SPECIFICATION NO. 0031-02
MISCELLANEOUS SIGNAL MATERIAL

February 7, 2002

1.0 SCOPE

This Specification is for furnishing various signal items as listed in General Requirements (P-2.0). The unit(s) furnished on this Specification shall be of the most current design. The material, equipment and workmanship shall be of the highest commercial quality.

1.2 Failure to conform to the highest standards of the industry shall be cause for rejection.

1.3 Metra's Chief Engineering Officer or his duly authorized representative shall be the final authority for deciding as to whether a competitive item conforms to these requirements and complies with the intention of this Specification.

1.4 This Specification is intended to be descriptive, but not restrictive and is solely for the purpose of indicating the type and quality of articles that will meet the approval of Metra.

1.5 Capacities and dimensions listed herein shall be interpreted as minimum; variation from the values listed will be judged as to their effect and ability to perform the work intended.

1.6 It shall be the responsibility of the Manufacturer to make certain that all parts and components fit and function together properly.

1.7 Where brand, manufacturer or product names are indicated in this Specification, they are included only for the purpose of establishing identification and general descriptions of the item. Wherever such names appear, the term “or Metra approved equivalent” is considered to follow.

1.8 The article(s)/unit(s) submitted under this Specification must be in production and must have had a previous, satisfactory in-service performance record of at least two years on three Class I railroads. Proof of performance statement(s) shall be provided, upon request, with confirming statement(s) from previous purchaser(s). Failure to provide proof may be cause for rejection.

2.0 GENERAL REQUIREMENTS

Miscellaneous signal material shall meet all American Railway Engineering and Maintenance-of-Way Association (AREMA) Communications & Signals Manual of Recommended Practices specifications including but not limited to those parts listed below:

2.1	Transformers:	14.2.10, 14.2.25
2.2	Lightning Arresters:	11.3.1
2.3	Binding Posts:	14.1.10
2.4	Terminal Blocks:	14.1.5, 14.6.20
2.5	Resistors:	14.2.15

3.0 SUBMITTAL

3.1 Catalog cuts, drawings, descriptions, etc., of the Manufacturer's typical current production from which the submittal will be based shall be included with the quotation.

3.2 Detailed shop drawings of miscellaneous signal material(s) are to be furnished within 15 days of the award of the contract, and be approved by Metra's Chief Engineering Officer before manufacture begins.

4.0 IDENTIFICATION AND SHIPPING

4.1 All unit(s) shall be plainly marked with Manufacturer's references including serial and model numbers.

4.2 The product shall be assembled or packed as to permit convenient handling and to protect against loss or damage during shipment. Loose pieces shall be tightly taped or wired to the miscellaneous signal material(s) or shipping pallet or, packed separately but firmly attached to the product.

4.3 A detailed list of packages and their contents shall be provided for all shipments. One copy will be included with shipment and one copy will be sent directly to Metra's Chief Engineering Officer. Metra Engineering's copy will be mailed not later than the shipping date of the equipment.

5.0 INSPECTION AT SHIPMENT

Metra will inspect the unit(s) after delivery and contact the Manufacturer listing any items not conforming to this Specification. The Manufacturer shall provide a timely schedule to furnish, deliver to destination and install or correct, without charge to Metra, such items. Failure to respond appropriately shall be cause for rejection with return of rejected units at the Manufacturer's total expense.

6.0 GUARANTEE

The Manufacturer shall replace (furnish, deliver to destination and install or correct) without charge, any part of material, which fails within a period of one year of date of installation from defects of material, design, manufacture and/or workmanship.

7.0 DEMONSTRATION

7.1 If requested prior to purchase, bidder shall arrange for inspection before one or more of Metra's representatives, of the basic unit to be furnished. Failure of a unit to be equal to or better than the quality herein specified by Metra shall be cause for rejection of Bid. Such inspection shall be performed at no cost to Metra within a distance of not more than 50 miles from Metra's headquarters at 547 West Jackson Boulevard, Chicago, unless otherwise agreed upon by Metra.

7.2 Metra or its Representative reserves the right to inspect all equipment at Manufacturer's plant prior to shipment.

SIGNALS METRA – RECTIFIER

Description. This work shall consist of the furnishing of new rectifiers for new Metra signal system located between existing signal cases 20.40 and 20.99.

Materials. The materials shall conform to the Metra Signal Specification for Electronically Controlled Constant Voltage Rectifier Specification No. 0790-02, dated February 7, 2002 that follows this special provision.

Rectifier (20 Amp) shall be 12 volts and 20 amps. Rectifier (40 Amp) shall be 12 volts and 40 amps.

All equipment shall be standard railroad components used by Metra. All of these components shall be purchased from a Metra-approved distributor. All equipment shall be submitted for approval by Metra before purchasing.

Construction Requirements. All equipment will be installed by Metra.

Method of Measurement. Furnishing of relays for Metra signal rectifiers will be measured for payment as each for every type listed below.

Basis of Payment. Furnishing of relays for Metra signal rectifiers will be paid for at the contract unit price each for the following types listed, upon delivery of approved equipment.

1. SIGNALS METRA – MISC. – RECTIFIER (20 AMP)
2. SIGNALS METRA – MISC. – RECTIFIER (40 AMP)

METRA SPECIFICATION FOR RECTIFIER

METRA SIGNAL
SPECIFICATION NO. 0790-02
ELECTRONICALLY CONTROLLED
CONSTANT VOLTAGE RECTIFIER

February 7, 2002

1.0 SCOPE

1.1 This Specification is for furnishing electronically controlled constant voltage rectifier. The unit(s) furnished on this Specification shall be of the most current design. The material, equipment and workmanship shall be of the highest commercial quality.

1.2 Failure to conform to the highest standards of the industry shall be cause for rejection.

1.3 Metra's Chief Engineering Officer or his duly authorized representative shall be the final authority for deciding as to whether a competitive item conforms to these requirements and complies with the intention of this Specification.

1.4 This Specification is intended to be descriptive, but not restrictive and is solely for the purpose of indicating the type and quality of articles that will meet the approval of Metra.

1.5 Capacities and dimensions listed herein shall be interpreted as minimums; variation from the values listed will be judged as to their effect and ability to perform the work intended.

1.6 It shall be the responsibility of the Manufacturer to make certain that all parts and components fit and function together properly.

1.7 Where brand, manufacturer or product names are indicated in this Specification, they are included only for the purpose of establishing identification and general descriptions of the item. Wherever such names appear, the term "or Metra approved equivalent" is considered to follow.

1.8 The article(s)/unit(s) submitted under this Specification must be in production and must have had a previous, satisfactory in-service performance record of at least two years on three Class I railroads. Proof of performance statement(s) shall be provided, upon request, with confirming statement(s) from previous purchaser(s). Failure to provide proof may be cause for rejection.

2.0 GENERAL REQUIREMENTS

2.1 Electronically controlled constant voltage rectifiers shall meet all applicable requirements of the American Railway Engineering and Right-of-Way Association (AREMA) Communications & Signals Manual of Recommended Practices including, but not limited to, Part 9.2.1.

2.2 The unit(s) shall be capable of operating from an AC supply of nominally 120/240 volts, 60 Hz AC. AC terminals shall be provided with insulating caps and shields (Safetran 023408-5X or equivalent). Any external surge protection required shall be provided with each unit.

2.3 The output shall be programmable for various amounts of cells of lead acid battery nominally 2.25 volts DC per cell. (See Table 1 for number of cells.) The coarse output setting shall be plainly shown on the control board indication by cell type and number. A fine output adjustment shall be provided. The adjustments shall be suitable for valve regulated lead-acid batteries.

2.4 The current output rating as shown in Table 1 shall be continuous plus 10 percent intermittent. A meter capable of indicating the maximum continuous current output of the unit shall be a part of the unit.

TABLE 1

RECTIFIER USE	NOMINAL VOLTAGE	MAXIMUM CURRENT	CELLS OF LEAD-ACID
Track Circuit	6V	5A	1
Operating Battery	12V	10A	6
Operating Battery	12V	20A	6
Operating Battery	12V	40A	6
Crossing Gates	14V	40A	7
Low Voltage Switch Machines	24V	30A	12
High Voltage Switch Machines	110V	8A	55

2.5 The unit shall be designed for wall or shelf mounting without need for cooling airflow at the mounting surface.

2.6 A manual resetting AC input circuit breaker shall be accessible without disassembly of the unit.

2.7 The unit shall be temperature compensated to operate from minus 40° Fahrenheit to plus 160° Fahrenheit. The temperature probe shall be 25 feet long.

2.8 DC output ripple shall be limited to less than 1.0V peak to peak, without battery, at maximum rated output.

2.9 DC output voltage shall be maintained at plus/minus 1 percent of the setting throughout the operating range.

3.0 MANUALS

One Installation and Maintenance Manual shall be furnished with each unit.

4.0 SUBMITTAL

Catalog cuts, drawings, descriptions, etc., of the Manufacture's typical current production from which the submittal will be based shall be included with the quotation.

5.0 IDENTIFICATION AND SHIPPING

5.1 Electronically controlled constant voltage rectifier unit(s) shall be plainly marked with manufacturer's references including serial and model numbers.

5.2 Loose pieces shall be packed separately, but be firmly attached to the product.

5.3 A detailed list of packages and their contents shall be provided for all shipments. One copy will be included with shipment and one copy will be sent directly to Metra's Chief Engineering Officer. Metra Engineering's copy will be mailed not later than the shipping date of the equipment.

5.4 Manufacturer shall notify Metra of shipping date 48 hours prior to shipment.

6.0 INSPECTION AT SHIPMENT

Metra will inspect the unit(s) after delivery and contact the Manufacturer listing any items not conforming to this Specification. The Manufacturer shall provide a timely schedule to furnish, deliver to destination and install or correct, without charge to Metra, such items. Failure to respond appropriately shall be cause for rejection with return of rejected units at the Manufacturer's total expense.

7.0 GUARANTEE

The Manufacturer shall replace (furnish, deliver to destination and install or correct) without charge, any part of material that fails within a period of one year of date of installation from defects of material, design, manufacture and/or workmanship.

8.0 DEMONSTRATION

8.1 If requested prior to purchase, bidder shall arrange for inspection before one or more of Metra's representatives, of the basic unit to be furnished. Failure of a unit to be equal to or better than the quality herein specified by Metra shall be

cause for rejection of Bid. Such inspection shall be performed at no cost to Metra within a distance of not more than 50 miles from Metra's headquarters at 547 West Jackson Boulevard, Chicago, unless otherwise agreed upon by Metra.

8.2 Metra or its Representative reserves the right to inspect all equipment at Manufacturer's plant prior to shipment.

SIGNALS METRA – RELAY CASE

Description. This work shall consist of the furnishing of new signal relay cases for new Metra signal system located between existing signal cases 20.40 and 20.99.

Materials. The materials shall conform to the Metra Signal Specification for Signal Relay Case Specification No. 0021-02, dated February 7, 2002 that follows this special provision.

All equipment shall be standard railroad components used by Metra. All of these components shall be purchased from a Metra-approved distributor. All equipment shall be submitted for approval by Metra before purchasing.

Construction Requirements. All equipment will be installed by Metra.

Method of Measurement. Furnishing of relays for Metra signal relay cases will be measured for payment as each for every type listed below.

Basis of Payment. Furnishing of relays for Metra signal cases will be paid for at the contract unit price each for the following types listed, upon delivery of approved equipment.

1. SIGNALS METRA – RELAY CASE E

METRA SPECIFICATION FOR SIGNAL RELAY CASE

METRA SIGNAL
SPECIFICATION NO. 0021-02
SIGNAL RELAY CASE

February 7, 2002

1.0 SCOPE

1.1 This Specification is for furnishing a signal relay case. The unit(s) furnished on this Specification shall be of the most current design. The material, equipment and workmanship shall be of the highest commercial quality.

1.2 Failure to conform to the highest standards of the industry shall be cause for rejection.

1.3 Metra's Chief Engineering Officer or his duly authorized representative shall be the final authority for deciding as to whether a competitive item conforms to these requirements and complies with the intention of this Specification.

1.4 This Specification is intended to be descriptive, but not restrictive and is solely for the purpose of indicating the type and quality of articles that will meet the approval of Metra.

1.5 Capacities and dimensions listed herein shall be interpreted as minimum; variation from the values listed will be judged as to their effect and ability to perform the work intended.

1.6 It shall be the responsibility of the Manufacturer to make certain that all parts and components fit and function together properly.

1.7 Where brand, manufacturer or product names are indicated in this Specification, they are included only for the purpose of establishing identification and general descriptions of the item. Wherever such names appear, the term "or Metra approved equivalent" is considered to follow.

1.8 The article(s)/unit(s) submitted under this Specification must be in production and must have had a previous, satisfactory in-service performance record of at least two years on three Class I railroads. Proof of performance statement(s) shall be provided, upon request, with confirming statement(s) from previous purchaser(s). Failure to provide proof may be cause for rejection.

2.0 GENERAL REQUIREMENTS

2.1 Shape

The relay case shall be rectangular and the large sides will be the front and back. The case shall have a slant roof pitched to the back. The case size shall be specified by size designation with length and height and depth in inches as shown in Table 1.

Table 1 – Relay Case Size

SIZE DESIGNATION	NAME	HxWxD (Inches)	DOORS		SHELVES
			F	B	
A	Pole Case	28x16x14	1	0	1
B	Low Single	62x41x24	1	1	3
C	Low Double	62x60x24	2	2	3
D	High Single	74x41x24	1	1	4
E	High Double	74x60x24	2	2	4
F	High Quadruple	74x116x24	4	4	4
G	*High Quadruple	74x116x12	4	0	4

* = not a standard size

2.2 Arrangement

2.2.1 Cases B through F will have a terminal board in front of the back door. Cases A and G will have the terminal board on the back wall. The terminal board shall be 3/4-inch A-C plywood and be mounted to fill the case height and width.

2.2.2 A copper prime ground plate mounted at the bottom center of the back of the terminal board of cases B through F and in the front of cases A and C shall be provided. A minimum of eight AAR terminals shall be provided on the plate for grounding. One terminal shall connect the ground plate to the AC service grounded neutral in the load center and to a terminal mounted on the metal frame of the case with #6 AWG copper with green insulation.

2.3 Materials and Finish

2.3.1 An aluminum case shall be constructed of 0.100-inch minimum sheet aluminum, Alloy 5052 H32, or equivalent. All structural joints shall be welded. All joints shall be sealed and weatherproofed.

2.3.2 A steel case shall be constructed of minimum 12-gauge steel. All structural joints shall be welded. All joints shall be sealed and weatherproofed.

2.3.3 The interior shall be finished gray including shelves, racks, shelf brackets and backboards.

2.4 Access

2.4.1 Front and back doors shall be provided for all cases as specified in Table 1. Each door shall have at least one screened vent provided with a commercially available filter and that can be closed for winter. The vent shall have a guard on the inside to prevent a rod 1/4-inch in diameter from entering the case.

2.4.2 The door(s) shall be provided with a three-point latching system and facilities having a minimum 1/2-inch diameter opening for locking with a Metra padlock. The door shall be made weatherproof by use of a neoprene gasket secured in a suitable channel.

2.4.3 The door(s) shall be held open by a bracket at 90° and 180°.

2.5 Mounting Facilities

2.5.1 Cases B through G shall be constructed to mount on a minimum of two case pedestal foundations, one at each end. The foundation-mounting bolt may be external or project into the case. Case A shall be constructed to be flush mounted or pole mounted.

2.5.2 Foundations as specified in Metra Specification No. 0027-01, Signal Foundations, shall be provided with all necessary mounting hardware.

2.5.3 Additional foundations recommended by the Manufacturer must be included with the bid.

2.6 Cable Openings

2.6.1 Cases B through F shall have at least two knockouts in the floor behind the terminal board. Cases A and G shall have at least two knockouts in the floor in front of the terminal board. The knockouts shall be at least four inches in diameter. Two underground cable entrance collars shall be provided. The collars shall be screw type with three feet of pipe attached for cases B through G and six feet attached for Case A.

2.6.2 The case shall be provided with at least two knockouts for aerial cable located at the rear corners of the case behind the terminal board. One cable entrance with messenger attachment eyebolt shall be provided, if specified.

2.7 Appurtenances

2.7.1 Case(s) designed for shelf relay mounting shall be provided with sponge rubber matting that will cover the entire length and width of the shelf. Shelves shall be mounted on brackets that fit into keyways of vertical internal members. The shelves shall be vertically adjustable in approximately two-

inch increments for spacing and spaced 14 inches apart. The shelves shall be 3/4-inch A-C plywood and have a minimum depth of 12 inches. The shelves shall extend the full width of the case. The front of the shelf shall have a securely fastened, smooth, wood trim strip (7/16 by 1-1/4-inch "Modern Stop" or equivalent) that extends 3/8-inch above the rubber mat. The sponge rubber mat shall be Neoprene EPDM-SBR blend, medium firm, 1/4-inch thick and black in color similar to Durkee-Atwood NES42. Floor type matting is not acceptable for shelves.

2.7.2 Case(s) designed for plug-in relay mounting shall be provided with mounting cross bars and a wireway or wire cabling means for one-half side of the case. The other side will be a backboard only. The finish of the bars and backboard shall be gray.

2.8 Accessories

2.8.1 For cases B through G, a duplex GFCI outlet shall be provided on the terminal board adjacent to the load center.

2.8.2 For cases B through G, a load center (Square D, Model No. Q06-12L100S) shall be provided on the top left side of the terminal board and equipped with a 30A double pole breaker and four 15A single pole breakers. Two AC surge suppressors (Joslyn 1259-21) shall be mounted on the load center.

2.8.3 A pull chain light socket and 100-watt bulb shall be provided in the front and back of cases B through E. Two pull chain light sockets and 100-watt bulbs shall be provided in the front and back of case F. A pull chain light socket and 100-watt bulb shall be provided in the left and right front of case G.

3.0 SUBMITTAL

3.1 Catalog cuts, drawings, descriptions, etc., of the Manufacturer's typical current production from which the submittal will be based shall be included with the quotation.

3.2 Detailed shop drawings of the signal relay case(s) are to be furnished within 15 days of the award of the contract, and be approved by Metra's Chief Engineering Officer before manufacture begins.

4.0 IDENTIFICATION AND SHIPPING

4.1 Case unit(s) shall be plainly marked with Manufacturer's references including serial and model numbers.

4.2 The product shall be assembled or packed as to permit convenient handling and to protect against loss or damage during shipment. Loose pieces shall be

tightly taped or wired inside the case or to the shipping pallet or, packed separately but firmly attached to the product.

4.3 A detailed list of packages and their contents shall be provided for all shipments. One copy will be included with shipment and one copy will be sent directly to Metra's Chief Engineering Officer. Metra Engineering's copy will be mailed not later than the shipping date of the equipment.

4.4 Manufacturer shall notify Metra of shipping date 48 hours prior to shipment.

5.0 INSPECTION AT SHIPMENT

Metra will inspect the unit(s) after delivery and contact the Manufacturer listing any items not conforming to this Specification. The Manufacturer shall provide a timely schedule to furnish, deliver to destination and install or correct, without charge to Metra, such items. Failure to respond appropriately shall be cause for rejection with return of rejected units at the Manufacturer's total expense.

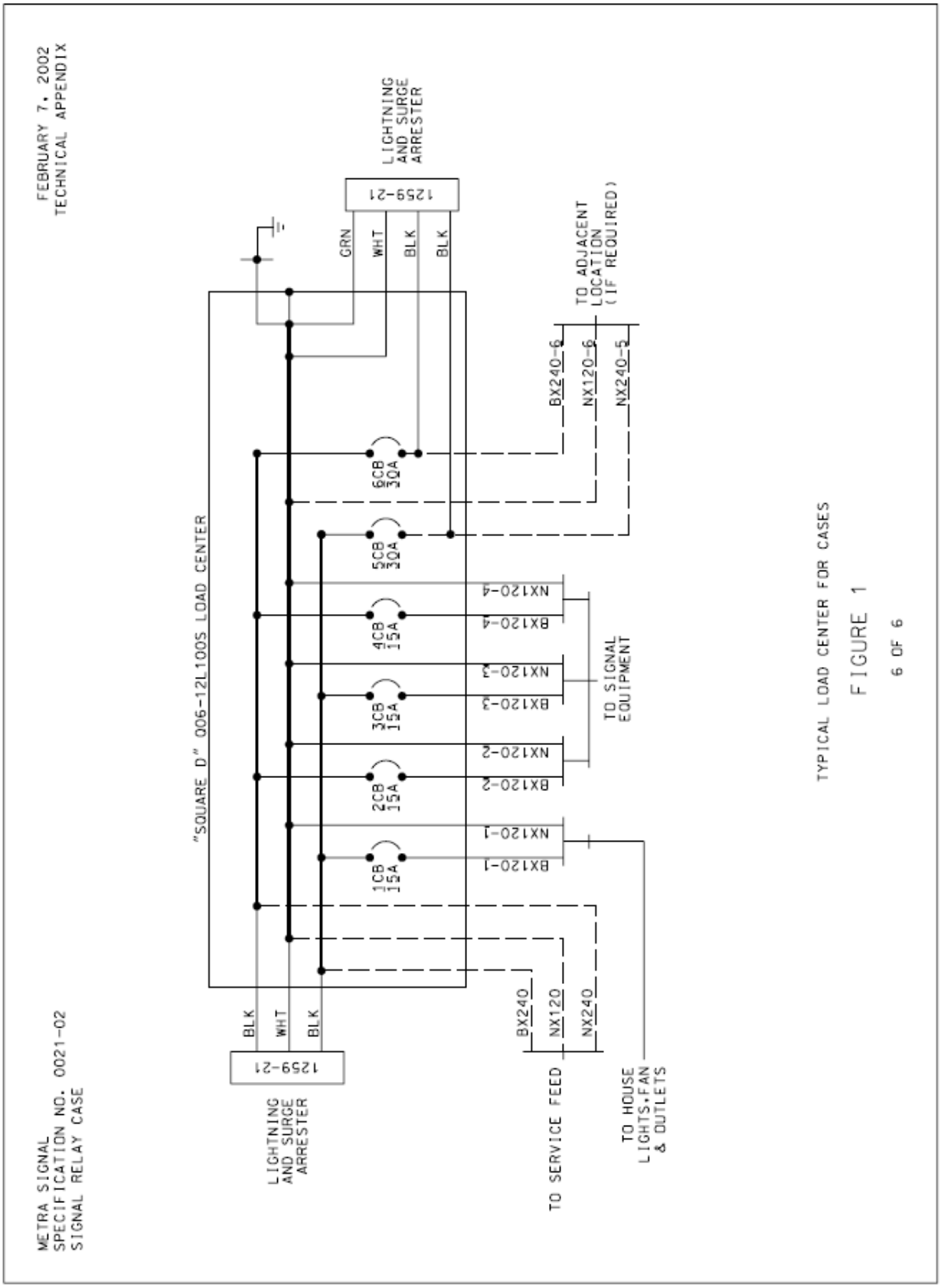
6.0 GUARANTEE

The Manufacturer shall replace (furnish, deliver to destination and install or correct) without charge, any part of material, which fails within a period of one year of date of installation from defects of material, design, manufacture and/or workmanship.

7.0 DEMONSTRATION

7.1 If requested prior to purchase, bidder shall arrange for inspection before one or more of Metra's representatives, of the basic unit to be furnished. Failure of a unit to be equal to or better than the quality herein specified by Metra shall be cause for rejection of Bid. Such inspection shall be performed at no cost to Metra within a distance of not more than 50 miles from Metra's headquarters at 547 West Jackson Boulevard, Chicago, unless otherwise agreed upon by Metra.

7.2 Metra or its Representative reserves the right to inspect all equipment at Manufacturer's plant prior to shipment.


METRA SIGNAL
SPECIFICATION NO. 0021-02
SIGNAL RELAY CASE
FEBRUARY 7, 2002
TECHNICAL APPENDIX
LIGHTNING AND SURGE ARRESTER
1259-21
GRN
WHT
BLK
BLK
TO ADJACENT LOCATION (IF REQUIRED)
BX240-6
NX120-6
NX240-5
6CB 30A
5CB 30A
4CB 15A
3CB 15A
2CB 15A
1CB 15A
"SQUARE D" QO6-12L100S LOAD CENTER
NX120-4
BX120-4
NX120-3
BX120-3
NX120-2
BX120-2
NX120-1
BX120-1
TO SIGNAL EQUIPMENT
BLK
WHT
BLK
1259-21
LIGHTNING AND SURGE ARRESTER
BX240
NX120
NX240
TO SERVICE FEED
TO HOUSE LIGHTS, FAN & OUTLETS
TYPICAL LOAD CENTER FOR CASES
FIGURE 1
6 OF 6

SIGNALS METRA - RELAYS

Description. This work shall consist of the furnishing of signal relays for new Metra signal system located between existing signal cases 20.40 and 20.99. All installation and wiring of signal relays and timers shall be performed by Metra.

Materials. The materials shall conform to the Metra Signal Specification for Signal Relays Specification No. 0017-02, dated February 7, 2002 that follows this special provision.

All equipment shall be standard railroad components used by Metra. All of these components shall be purchased from a Metra-approved distributor. All equipment shall be submitted for approval by Metra before purchasing.

Construction Requirements. All equipment will be installed by Metra.

Method of Measurement. Furnishing of relays for Metra signals will be measured for payment as each for every type listed below.

Basis of Payment. Furnishing of relays for Metra signals will be paid for at the contract unit price each for the following types listed, upon delivery of approved equipment.

1. SIGNALS METRA – VITAL RELAY (FN-27 FLASHER)
2. SIGNALS METRA – VITAL RELAY (MODEL-15 SPEC 1588 TRACK RELAY)
3. SIGNALS METRA – VITAL RELAY (MODEL-15 SPEC 1989 TRACK RELAY)
4. SIGNALS METRA – VITAL RELAY (DP-21 150 OHM HD RELAY)
5. SIGNALS METRA – VITAL RELAY (DP-21 250 OHM HD RELAY)
6. SIGNALS METRA – VITAL RELAY (ORDINARY ACTING 670 OHM 4FB RELAY)
7. SIGNALS METRA – VITAL RELAY (SLOW ACTING 400 OHM RELAY)
8. SIGNALS METRA – VITAL RELAY (SLV-13 POWER TRANSFER RELAY)
9. SIGNALS METRA - VITAL PLUG-IN RELAY (500 OHM)
10. SIGNALS METRA – TIMER RELAY (SET FOR 5 MINUTES)

METRA SPECIFICATION FOR SIGNAL RELAYS

METRA SIGNAL
SPECIFICATION NO. 0017-02
SIGNAL RELAYS

February 7, 2002

1.0 SCOPE

1.1 This Specification is for furnishing vital or non-vital signal relays. The unit(s) furnished on this Specification shall be of the most current design. The material, equipment and workmanship shall be of the highest commercial quality.

1.2 Failure to conform to the highest standards of the industry shall be cause for rejection.

1.3 Metra's Chief Engineering Officer or his duly authorized representative shall be the final authority for deciding as to whether a competitive item conforms to these requirements and complies with the intention of this Specification.

1.4 This Specification is intended to be descriptive, but not restrictive and is solely for the purpose of indicating the type and quality of articles that will meet the approval of Metra.

1.5 Capacities and dimensions listed herein shall be interpreted as minimum; variation from the values listed will be judged as to their effect and ability to perform the work intended.

1.6 It shall be the responsibility of the Manufacturer to make certain that all parts and components fit and function together properly.

1.7 Where brand, manufacturer or product names are indicated in this Specification, they are included only for the purpose of establishing identification and general descriptions of the item. Wherever such names appear, the term “or Metra approved equivalent” is considered to follow.

1.8 The article(s)/unit(s) submitted under this Specification must be in production and must have had a previous, satisfactory in-service performance record of at least two years on three Class I railroads. Proof of performance statement(s) shall be provided, upon request, with confirming statement(s) from previous purchaser(s). Failure to provide proof may be cause for rejection.

2.0 GENERAL REQUIREMENTS

2.1 Standards

2.1.1 Vital or non-vital signal relays shall meet the requirements of the American Railway Engineering and Maintenance-of-Way Association (AREMA) Communications & Signals Manual of Recommended Practices as noted.

2.2 Operating Voltage

2.2.1 All relays shall be designed to operated in a voltage range of 30 volts or less.

3.0 VITAL RELAYS

3.1 General Requirements

3.1.1 Unless specified, all vital relays shall have dependent, break-before-make contacts.

3.1.2 Vital relays shall have all contact posts designated as required in AREMA Communications & Signals Manual of Recommended Practices, Part 6.1.50.

3.1.3 Capacity:

The capacity of relays with standard contacts shall be rated at 4A continuous AC or DC at 30 volts or less. Standard contacts shall be silver-to-silver impregnated carbon front and silver-to-silver back.

Relays designated "Heavy Duty" shall be rated at 15A continuous AC or DC at 30 volts or less. "Heavy Duty" shall also be suitable for 4A continuous AC or DC at 175 volts or less. Contacts rated "Heavy Duty" shall be silver-to-silver impregnated carbon front and back.

3.1.4 The case shall be plastic.

3.1.5 Trunions shall be adjustable type.

3.1.6 Shipping screws shall be used to hold armatures. Vane relays shall be secured.

3.1.7 Spring bases shall be provided with shelf type relays.

3.1.8 Plug boards with accessory kits shall be provided for plug-in relays.

3.2 Specific Requirements

3.2.1 Vital relays shall meet the applicable requirements of AREMA Communications & Signals Manual of Recommended Practices, Parts 6.1.5, 6.1.10, 6.1.15, 6.1.20, 6.1.21, 6.1.25, 6.1.30, 6.1.35, 6.1.40, 6.1.45 and 6.2.1.

3.2.2 Timing relays shall be of the microprocessor type with at least two front-back dependent contacts and one check contact. Timing range shall be in one-second increments, from one second to at least seven minutes, or may be a single, fixed time. There shall be indications of time running and time expired. All AREMA and FRA requisites for seals and operation shall be met.

3.2.3 High current type switch control relays shall have one contact equipped with a magnetic blowout feature to interrupt high currents and minimize contact wear. The contact shall be capable of interrupting the normal electric motor switch machine current 10,000 times without its resistance exceeding ten Ohms, measured at five Amperes.

4.0 NON-VITAL RELAYS

4.1 Specific Requirements

4.1.1 Non-vital relays shall be plug-in type, in accordance with the requirements of AREMA Communications & Signals Manual of Recommended Practices, Part 6.3.

4.1.2 Each non-vital relay shall be equipped with a minimum of six front-back contacts. Stationary contact shall be bifurcated silver, palladium or approved equivalent.

4.1.3 Each non-vital relay shall meet or exceed the following requirements:

A. Maximum Temperature Rise	175°F at 30 volts DC
B. Insulation Resistance	1 megohm
C. Ambient Operating Temperature	-40°F to +160°F
D. Dielectric Strength	3000 volts RMS, 60 Hz between all mutually insulated parts
E. Mechanical Life	100 million cycle operations
F. Electric Life	10 million operations (0.5 Ampere resistive load at 25°C
G. Contact Resistance	
Before Life:	30 milliohms maximum, at 6 volts DC, 100 ma
After Life:	200 milliohms maximum, at 6 volts DC, 100 ma

4.1.4 Non-vital relays shall be mounted in racks and shall be protected by dustproof transparent covers that do not support combustion.

4.1.5 The design of the relay covers shall permit viewing of relays without disassembly or other mechanical manipulation, to determine whether each relay is picked up or dropped out.

5.0 SUBMITTAL

5.1 Catalog cuts, drawings, descriptions, etc., of the Manufacturer's typical current production from which the submittal will be based shall be included with the quotation.

6.0 IDENTIFICATION AND SHIPPING

6.1 Signal relay(s) shall be plainly marked with Manufacturer's references including serial and model numbers.

6.2 The product shall be assembled or packed as to permit convenient handling and to protect against loss or damage during shipment. Loose pieces shall be tightly taped or wired to the signal relays or shipping pallet or, packed separately but firmly attached to the product.

6.3 A detailed list of packages and their contents shall be provided for all shipments. One copy will be included with shipment and one copy will be sent directly to Metra's Chief Engineering Officer. Metra Engineering's copy will be mailed not later than the shipping date of the equipment.

7.0 INSPECTION AT SHIPMENT

Metra will inspect the unit(s) after delivery and contact the Manufacturer listing any items not conforming to this Specification. The Manufacturer shall provide a timely schedule to furnish, deliver to destination and install or correct, without charge to Metra, such items. Failure to respond appropriately shall be cause for rejection with return of rejected units at the Manufacturer's total expense.

8.0 GUARANTEE

The Manufacturer shall replace (furnish, deliver to destination and install or correct) without charge, any part of material, which fails within a period of one year of date of installation from defects of material, design, manufacture and/or workmanship.

9.0 DEMONSTRATION

9.1 If requested prior to purchase, bidder shall arrange for inspection before one or more of Metra's representatives, of the basic unit to be furnished. Failure of a unit to be equal to or better than the quality herein specified by Metra shall be cause for rejection of Bid. Such inspection shall be performed at no cost to Metra within a distance of not more than 50 miles from Metra's headquarters at 547 West Jackson Boulevard, Chicago, unless otherwise agreed upon by Metra.

9.2 Metra or its Representative reserves the right to inspect all equipment at Manufacturer's plant prior to shipment.

SIGNALS METRA – SIGNAL CASE FOUNDATIONS

Description. This work shall consist of the furnishing of foundations for the new signal relay cases required for the Metra signal system located between existing signal cases 20.40 and 20.99.

Materials. The materials shall conform to the Metra Signal Specification for Signal Foundations Specification No. 0027-02, dated February 7, 2002 that follows this special provision.

All equipment shall be standard railroad components used by Metra. All of these components shall be purchased from a Metra-approved distributor. All equipment shall be submitted for approval by Metra before purchasing.

Construction Requirements. All equipment will be installed by Metra.

Method of Measurement. Signal case foundations for Metra Signals will be measured for payment as each for every type listed.

Basis of Payment. This work will be paid for at the contract unit price each for SIGNALS METRA – SIGNAL CASE FOUNDATIONS of each upon delivery of approved equipment.

METRA SPECIFICATION FOR SIGNAL FOUNDATION

METRA SIGNAL
SPECIFICATION NO. 0027-02
SIGNAL FOUNDATIONS

February 7, 2002

1.0 SCOPE

1.1 This Specification is for furnishing a signal foundation. The unit(s) furnished on this Specification shall be of the most current design. The material, equipment and workmanship shall be of the highest commercial quality.

1.2 Failure to conform to the highest standards of the industry shall be cause for rejection.

1.3 Metra's Chief Engineering Officer or his duly authorized representative shall be the final authority for deciding as to whether a competitive item conforms to these requirements and complies with the intention of this Specification.

1.4 This Specification is intended to be descriptive, but not restrictive and is solely for the purpose of indicating the type and quality of articles that will meet the approval of Metra.

1.5 Capacities and dimensions listed herein shall be interpreted as minimum; variation from the values listed will be judged as to their effect and ability to perform the work intended.

1.6 It shall be the responsibility of the Manufacturer to make certain that all parts and components fit and function together properly.

1.7 Where brand, manufacturer or product names are indicated in this Specification, they are included only for the purpose of establishing identification and general descriptions of the item. Wherever such names appear, the term "or Metra approved equivalent" is considered to follow.

1.8 The article(s)/unit(s) submitted under this Specification must be in production and must have had a previous, satisfactory in-service performance record of at least two years on three Class I railroads. Proof of performance statement(s) shall be provided, upon request, with confirming statement(s) from previous purchaser(s). Failure to provide proof may be cause for rejection.

2.0 GENERAL REQUIREMENTS

2.1 The foundations described in this Specification shall conform to the applicable portions of the American Railway Engineering and Maintenance-of-Way Association (AREMA) Communications & Signals Manual of Recommended Practices as follows:

Manual Parts:	14.4.1A	14.4.1B	14.4.2A	14.4.2B
	14.4.3A	14.4.3B	14.4.3C	14.4.10
	14.4.11	15.1.4	15.1.5	15.3.1

2.2 Foundation Material

2.2.1 Precast concrete foundations shall conform to the applicable portions of the AREMA requirements for reinforcement, aggregate, mix, air entrapment, and compressive strength.

2.2.2 Steel foundations shall be fabricated from minimum 2-1/2 by 2-1/2 by 1/4-inch steel angle and minimum 1/4-inch steel plate welded together and be hot-dipped galvanized after all fabricating is completed as required.

2.3 Accessories

2.3.1 One bolt, nut and washer shall be furnished for each signal-mounting hole for foundations. The bolts, nuts, washers and all cast-in-place retaining fasteners shall be hot-dipped galvanized.

2.3.2 Accessories such as foundation mounting adapters shall be constructed of the same materials as steel foundations and be hot-dipped galvanized after all fabrication is completed.

3.0 DESIGN

3.1 Shape

3.1.1 Precast concrete foundations shall generally conform to the typical arrangements in Figure 1.

3.1.2 Metal foundations shall generally conform to the typical arrangements in Figure 2.

3.2 Signal Mounting

3.2.1 Signals shall be mounted on bolts that project through the top of the foundation. Bolt projection shall be at least 2-3/4-inches. Bolt diameter shall be one inch for all four to seven foot foundations, 3/4-inch for all others.

3.2.2 Bolt spacing and arrangement shall not weaken the foundation.

3.3 Dimensions

3.3.1 Precast foundations shall have interlocked center pieces in one-foot increments. The base and top shall make the foundations size as specified plus/minus two inches.

3.3.2 Foundation materials and dimensions shall be as shown in Table 1.

TABLE 1

FOUNDATION MATERIALS AND DIMENSIONS

TYPE	MATERIAL	BOLT SPACING	LENGTH
House	Galvanized Steel	None	30 in.
Pedestrian Crossing Flasher	Galvanized Steel	9-1/2" x 9-1/2"	3 ft.
Case	Galvanized Steel	18-1/2"	4 ft.
Crossing Flasher	Galvanized Steel	11-11/16" x 11-11/16"	4 ft.
Crossing Gate	Precast Concrete	11-11/16" x 11-11/16"	6 ft.
Wayside Signal	Precast Concrete	11-11/16" x 11-11/16"	6 ft.
Rotatable Cantilever	Precast Concrete	11-11/16" x 11-11/16"	7 ft.
Single Masted Walkout Cantilever	Precast Concrete	19" x 19"	6 ft.
Double Masted Walkout Cantilever	Precast Concrete	19" x 19"	7 ft.

3.4 Cable Outlet

3.4.1 A cable outlet or facility at least two inches in diameter shall be provided for dwarf signal or steel flasher foundations and at least three inches in diameter for larger foundations.

3.4.2 If the cable outlet includes a bend, it shall have a radius not less than 26 inches.

4.0 SUBMITTAL

4.1 Catalog cuts, drawings, descriptions, etc., of the Manufacturer's typical current production from which the submittal will be based shall be included with the quotation.

4.2 Detailed shop drawings of the signal foundation(s) are to be furnished within 15 days of the award of the contract, and be approved by Metra's Chief Engineering Officer before manufacture begins.

5.0 IDENTIFICATION AND SHIPPING

5.1 Foundation unit(s) shall be plainly marked with Manufacturer's references including serial and model numbers.

5.2 The product shall be assembled or packed as to permit convenient handling and to protect against loss or damage during shipment. Loose pieces shall be tightly taped or wired to the signal foundation(s) or shipping pallet or, packed separately but firmly attached to the product.

5.3 A detailed list of packages and their contents shall be provided for all shipments. One copy will be included with shipment and one copy will be sent directly to Metra's Chief Engineering Officer. Metra Engineering's copy will be mailed not later than the shipping date of the equipment.

5.4 Manufacturer shall notify Metra of the shipping date 48 hours prior to shipment.

6.0 INSPECTION AT SHIPMENT

Metra will inspect the unit(s) after delivery and contact the Manufacturer listing any items not conforming to this Specification. The Manufacturer shall provide a timely schedule to furnish, deliver to destination and install or correct, without charge to Metra, such items. Failure to respond appropriately shall be cause for rejection with return of rejected units at the Manufacturer's total expense.

7.0 GUARANTEE

The Manufacturer shall replace (furnish, deliver to destination and install or correct) without charge, any part of material, which fails within a period of one year of date of installation from defects of material, design, manufacture and/or workmanship.

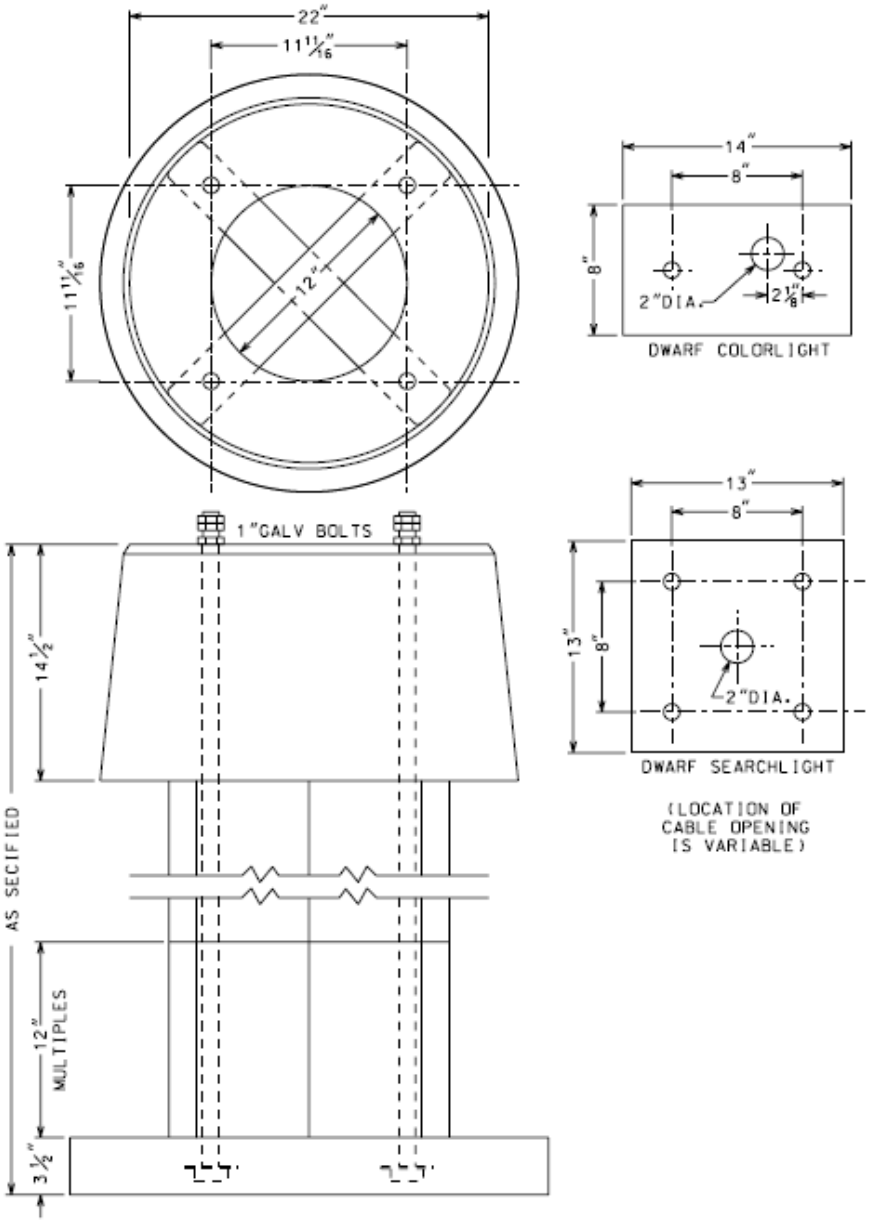
8.0 DEMONSTRATION

8.1 If requested prior to purchase, bidder shall arrange for inspection before one or more of Metra's representatives, of the basic unit to be furnished. Failure of a unit to be equal to or better than the quality herein specified by Metra shall be cause for rejection of Bid. Such inspection shall be performed at no cost to Metra within a distance of not more than 50 miles from Metra's headquarters at 547 West Jackson Boulevard, Chicago, unless otherwise agreed upon by Metra.

8.2 Metra or its Representative reserves the right to inspect all equipment at Manufacturer's plant prior to shipment.

METRA SIGNAL
SPECIFICATION NO. 0027-02
SIGNAL FOUNDATIONS

REVISED: FEBRUARY 7, 2002
TECHNICAL APPENDIX



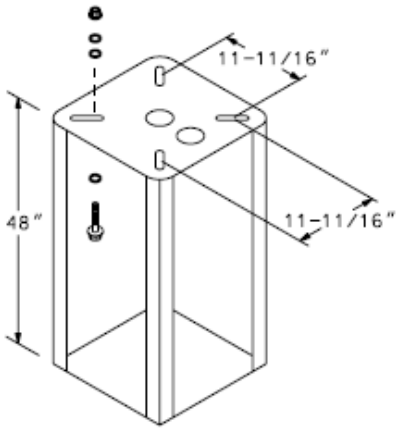
CROSSING GATE, WAYSIDE SIGNAL AND ROTATABLE CANTILEVER

FIGURE 1

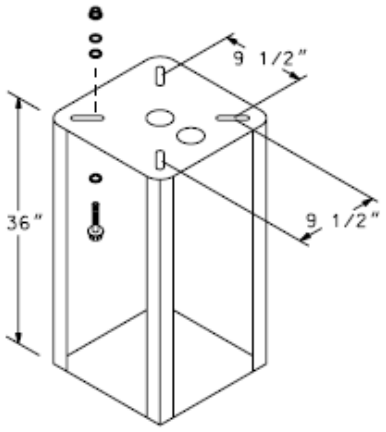
5 OF 7

METRA SIGNAL
SPECIFICATION NO. 0027-02
SIGNAL FOUNDATIONS

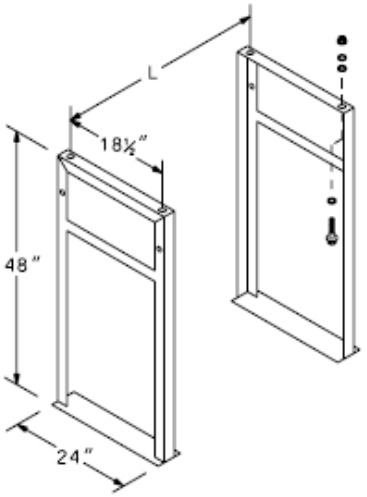
REVISED: FEBRUARY 7, 2002
TECHNICAL APPENDIX



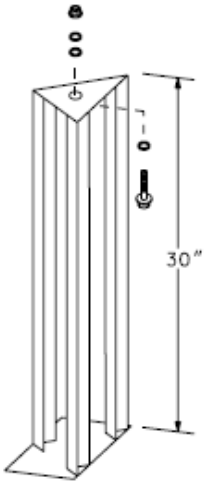
CROSSING FLASHER



PEDESTRIAN CROSSING FLASHER

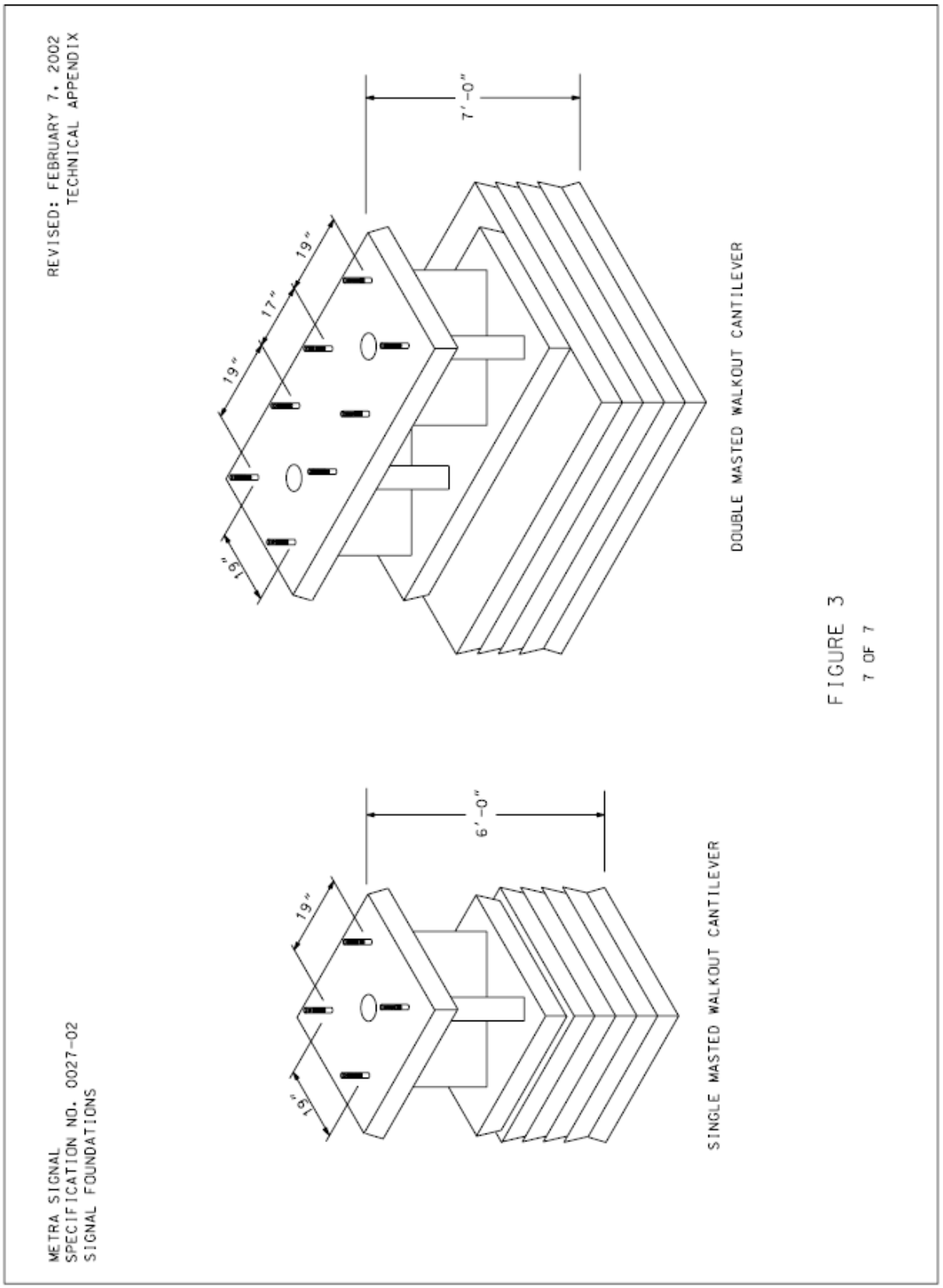


CASE PIERS



RELAY HOUSE CORNER

FIGURE 2
6 OF 7


METRA SIGNAL
SPECIFICATION NO. 0027-02
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TECHNICAL APPENDIX
7'-0"
19"
17"
19"
19"
DOUBLE MASTED WALKOUT CANTILEVER
6'-0"
19"
19"
SINGLE MASTED WALKOUT CANTILEVER
FIGURE 3
7 OF 7

SIGNALS METRA – ELECTRIC SWITCH LOCK

Description. This work shall consist of the furnishing of Hand Throw Lever Locking Type Electric Switch Locks for the Metra signal system located between existing signal cases 20.40 and 20.99.

Materials. The materials shall conform to the Metra Signal Specification for Hand Throw Lever Locking Type Electric Switch Locks Specification No. 0845-02 dated February 7, 2002 that follows this special provision.

All equipment shall be standard railroad components used by Metra. All of these components shall be purchased from a Metra-approved distributor. All equipment shall be submitted for approval by Metra before purchasing.

Construction Requirements. All equipment will be installed by Metra.

Method of Measurement. Furnishing of hand throw electric locks with connecting rods will be measured for payment as each for every type listed below.

Basis of Payment. Furnishing of Hand Throw Electric Lock with Connecting Rods will be paid for at the contract unit price per each for the following items listed, upon delivery of approved case:

1. SIGNALS METRA – HAND THROW ELECTRIC LOCK WITH CONNECTING RODS
2. SIGNALS METRA - SWITCH CIRCUIT CONTROLLER
3. SIGNALS METRA - JUNCTION BOX – SWITCH LOCK

METRA SPECIFICATION FOR ELECTRIC SWITCH LOCK

METRA SIGNAL
SPECIFICATION NO. 0845-02
HAND THROW LEVER LOCKING TYPE
ELECTRIC SWITCH LOCK LAYOUT

February 7, 2002

1.0 SCOPE

1.1 This Specification is for furnishing a hand throw lever locking type electric switch lock layout, complete with circuit controller, junction box, rods, conduits and fittings. The unit(s) furnished on this Specification shall be of the most current design. The material, equipment and workmanship shall be of the highest commercial quality.

1.2 Failure to conform to the highest standards of the industry shall be cause for rejection.

1.3 Metra's Chief Engineering Officer or his duly authorized representative shall be the final authority for deciding as to whether a competitive item conforms to these requirements and complies with the intention of this Specification.

1.4 This Specification is intended to be descriptive, but not restrictive and is solely for the purpose of indicating the type and quality of articles that will meet the approval of Metra.

1.5 Capacities and dimensions listed herein shall be interpreted as minimums; variation from the values listed will be judged as to their effect and ability to perform the work intended.

1.6 It shall be the responsibility of the Manufacturer to make certain that all parts and components fit and function together properly.

1.7 Where brand, manufacturer or product names are indicated in this Specification, they are included only for the purpose of establishing identification and general descriptions of the item. Wherever such names appear, the term "or Metra approved equivalent" is considered to follow.

1.8 The article(s)/unit(s) submitted under this Specification must be in production and must have had a previous, satisfactory in-service performance record of at least two years on three Class I railroads. Proof of performance statement(s) shall be provided, upon request, with confirming statement(s) from previous purchaser(s). Failure to provide proof may be cause for rejection.

2.0 GENERAL REQUIREMENTS

2.1 The electric switch lock shall be GRS, Model 10 or Metra approved equivalent, and shall conform to AREMA Communications & Signals Manual of Recommended Practices, Part 12.5.5 and be compatible with all track work.

2.2 The hand throw lever locking type electric switch lock layout and accessories, including all mounting hardware, shall be as shown in Figure 1.

2.3 The switch circuit controller and associated hardware provided as part of the layout shall be Alstom Model 7K; US&S U5 or Metra approved equivalent, and shall conform to AREMA Communications & Signals Manual of Recommended Practices, Part 12.5.1, complete with circuit controller rod and swivel point lug.

2.4 A junction box shall be supplied complete with foundation and, all conduits and fittings for connection to the electric lock and the switch circuit controller.

2.5 Electrical contacts shall be made of silver, riveted and soldered to phosphor bronze or Metra approved equivalent contact springs. Contacts shall be readily accessible for adjustment when cover is removed.

2.6 The wire and cable termination posts for the electric lock layout components shall conform to the AREMA Communications & Signals Manual of Recommended Practices, Part 14.1.8 and shall be numbered with stencils or other approved identifying markings.

2.7 The electric lock mechanism shall be supplied with an internal wiring diagram, protected by a plastic laminate, and shall be fastened to the inside of the mechanism cover.

2.8 The electric lock shall be provided with an emergency release lever contact located on one end of the case and be arranged so that it can be sealed in its locked position. Release shall have a cover that cannot be opened until the switch padlock has been removed.

2.9 The electric lock shall function satisfactorily when the applied voltage is reduced to 80 percent of the rated voltage at a temperature of 68 degrees Fahrenheit.

2.10 A protected indicator light utilizing a low wattage bulb shall be provided as an integral part of the mechanism and display an external indication when the electric lock is in the unlocked position.

2.11 The electric lock and junction box shall be provided with two 1-1/2 inch diameter-wiring inlets.

3.0 SUBMITTAL

3.1 Catalog cuts, drawings, descriptions, etc. of the manufacture's typical current production from which the submittal will be based shall be included with the quotation.

3.2 Detailed shop drawings of the electric lock layout are to be furnished within 15 days of the award of the contract, and be approved by Metra's Chief Engineering Officer before manufacture begins.

4.0 IDENTIFICATION AND SHIPPING

4.1 Electric lock unit(s) shall be plainly marked with Manufacturer's references including serial and model numbers.

4.2 The product shall be assembled or packed as to permit convenient handling and to protect against loss or damage during shipment. Loose pieces shall be tightly taped or wired to the electric lock unit(s) or shipping pallet or, packed separately but be firmly attached to the product.

4.3 Installation and maintenance manuals shall be provided with each unit.

4.4 A detailed list of packages and their contents shall be provided for all shipments. One copy will be included with shipment and one copy will be sent directly to Metra's Chief Engineering Officer. Metra Engineering's copy will be mailed not later than the shipping date of the equipment.

4.5 Manufacturer shall notify Metra of shipping date 48 hours prior to shipment.

5.0 INSPECTION AT SHIPMENT

Metra will inspect the units after delivery and contact the Manufacturer listing any items not conforming to this Specification. The Manufacturer shall provide a timely schedule to furnish, deliver to destination and install or correct, without charge to Metra, such items. Failure to respond appropriately shall be cause for rejection with return of rejected units at the Manufacturer's total expense.

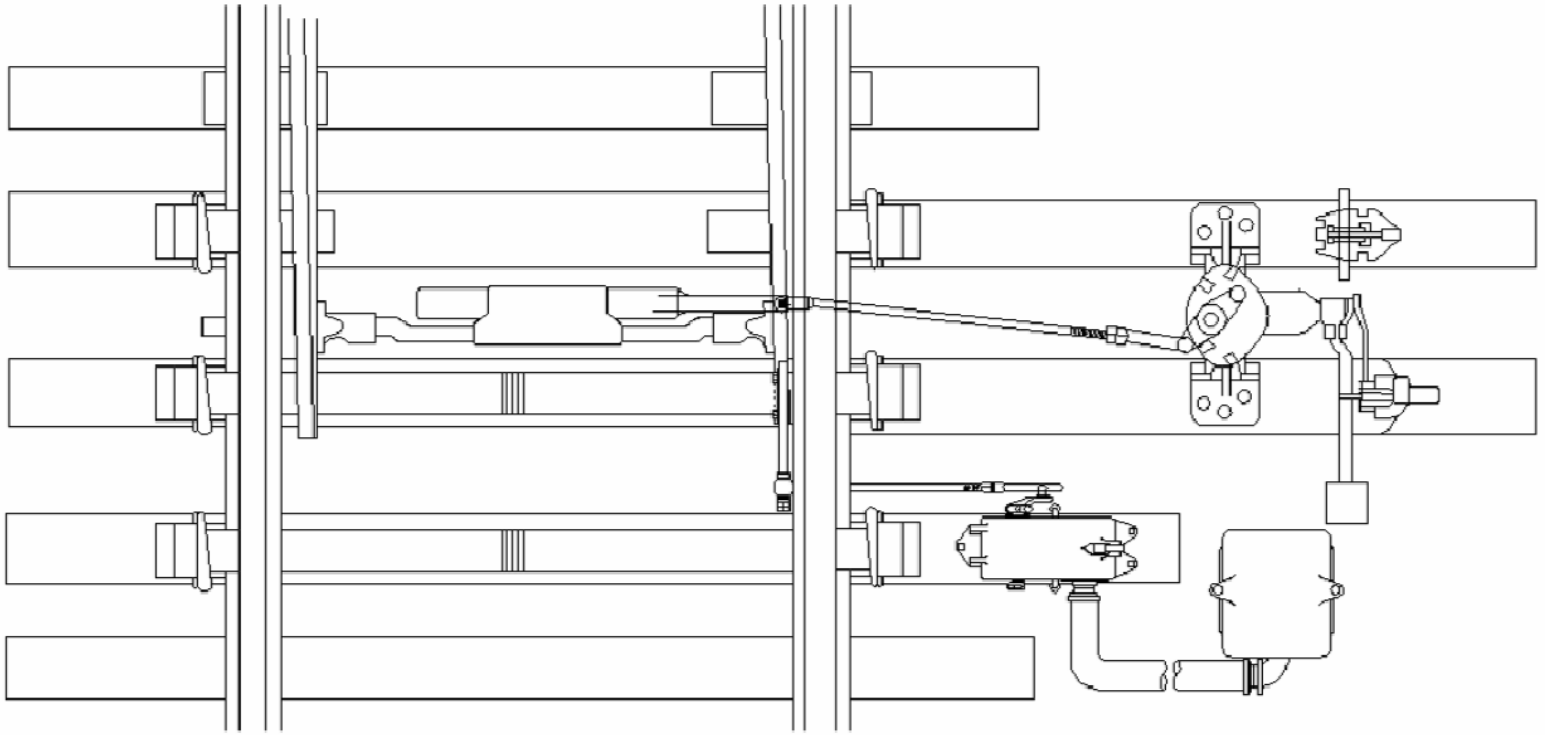
6.0 GUARANTEE

The Manufacturer shall replace (furnish, deliver to destination and install or correct) without charge, any part of material that fails within a period of one year of date of installation from defects of material, design, manufacture and/or workmanship.

7.0 DEMONSTRATION

7.1 If requested prior to purchase, bidder shall arrange for inspection before one or more of Metra's representatives, of the basic unit to be furnished. Failure of a unit to be equal to or better than the quality herein specified by Metra shall be cause for rejection of Bid. Such inspection shall be performed at no cost to Metra within a distance of not more than 50 miles from Metra's headquarters at 547 West Jackson Boulevard, Chicago, unless otherwise agreed upon by Metra.

7.2 Metra or its Representative reserves the right to inspect all equipment at Manufacturer's plant prior to shipment.



SWITCH CIRCUIT CONTROLLER AND SWITCH HAND THROW LEVER TYPE LAYOUT

FIGURE 1

PERMANENT STEEL SHEET PILING
Effective: December 15, 1993 Revised: January 1, 2007

Description. This work shall consist of furnishing and installing the permanent sheet piling to the limits and tolerances shown on the plans according to Section 512 of the Standard Specifications.

Material. The sheet piling shall be made of steel and shall be new material. The sheeting shall have a minimum yield strength of 38.5 ksi (265 MPa) unless otherwise specified. The sheeting shall be identifiable and in good condition free of bends and other structural defects. The Contractor shall furnish a copy of the published sheet pile section properties to the Engineer for verification purposes. The Engineer's approval will be required prior to driving any sheeting. All driven sheeting not approved by the Engineer shall be removed at the Contractor's expense.

The Contractor shall select from the following table, a sheet pile section to be used for each wall section with an "effective section modulus" equal to or larger than that specified on the plans.

SHEET PILE SECTION DESIGNATION	EFFECTIVE SECTION MODULUS * in^3/ft. ($10^3 mm^3$/m)	SHEET PILE SECTION DESIGNATION	EFFECTIVE SECTION MODULUS * in^3/ft. ($10^3 mm^3$/m)
SZ-10	3.5 (189)	SZ-22	13.5 (728)
SZ-11	4.0 (216)	SPZ-23.5	13.6 (729)
SZ-12	5.1 (277)	PZ-22	15.3 (823)
SZ-14	6.2 (331)	SZ-222	18.0 (968)
CZ-67	6.5 (349)	SZ-24	19.9 (1072)
SZ-15	6.6 (356)	CZ-114RD	20.1 (1082)
CZ-72	7.3 (393)	PZC-13	20.4 (1098)
SZ-14.5	8.3 (445)	SZ-25	20.5 (1105)
SPZ-16	8.4 (452)	PLZ-23	20.7 (1113)
CZ-84	8.9 (480)	SPZ-23	21.4 (1153)
CZ-95RD	10.2 (550)	CZ-114	21.7 (1165)
CZ-95	10.5 (566)	SZ-27	22.4 (1206)
SZ-18	10.9 (588)	PLZ-25	23.0 (1236)
SPZ-19.5	11.2 (604)	SPZ-26	24.4 (1311)
CZ-101	11.3 (609)	CZ-128	24.8 (1332)
Z-20	12.0 (648)	PZ-27	25.5 (1371)
CZ-107	12.1 (653)	CZ-141	27.9 (1497)
SZ-21	12.5 (674)	PZC-18	28.3 (1520)
SPZ-22	12.7 (682)	CZ-148	29.4 (1581)
CZ-113	12.9 (695)	PZ-35	43.6 (2344)
		PZ-40	54.6 (2932)

***** Effective Section Modulus is computed by taking the effects of corrosion loss allowances and the Hartman reduction factor.

The selection of the sheet pile section shall not relieve the Contractor of the responsibility to satisfy all details including minimum clearances, cover, embedments, reinforcement, shear stud locations, interlocking, and field cutting. Any modifications of the plans to accommodate the Contractor's selection shall be paid for by the Contractor and subject to the approval of the Engineer.

Construction. The Contractor shall verify locations of all underground utilities before driving any sheet piling. Any disturbance or damage to existing structures, utilities or other property, caused by the Contractor's operation, shall be repaired by the Contractor in a manner satisfactory to the Engineer at no additional cost to the Department. The Contractor shall be responsible for determining the appropriate equipment necessary to drive the sheeting to the tip elevation(s) specified on the plans or according to the Contractor's approved design. The sheet piling shall be driven, as a minimum, to the tip elevation(s) specified, prior to commencing any related construction. If unable to reach the minimum tip elevation, the adequacy of the sheet piling design will require re-evaluation by the Department prior to allowing construction adjacent to the sheet piling in question.

Method of Measurement. This work will be measured in place in square feet (square meters). Sheet piling associated with other work in this contract or for permanent sheet piling that is cut off or driven beyond those dimensions shown on the plans will not be measured for payment.

Basis of Payment. This work will be paid for at the contract unit price per square foot (square meter) for PERMANENT STEEL SHEET PILING at the location shown on the plans.

CLEANING AND PAINTING NEW METAL STRUCTURES
Effective Date: September 13, 1994 Revised Date: January 1, 2007

Description. The material and construction requirements that apply to cleaning and painting new structural steel shall be according to the applicable portion of Sections 506 of the Standard Specifications except as modified herein. The three coat paint system shall be the system as specified on the plans and as defined herein.

Materials. All materials to be used on an individual structure shall be produced by the same manufacturer. The Bureau of Materials and Physical Research has established a list of all products that have met preliminary requirements. Each batch of material must be tested and approved by that bureau before use.

The paint materials shall meet the requirements of the following articles of the Standard Specification:

Item	Article
(a) Inorganic Zinc-Rich Primer	1008.02
(b) Waterborne Acrylic	1008.04
(c) Aluminum Epoxy Mastic	1008.03
(d) Organic Zinc-Rich Primer (Note 1)	
(e) Epoxy Intermediate (Note 1)	
(f) Aliphatic Urethane (Note 1)	

Note 1: These material requirements shall be according to the Special Provision for the Organic Zinc-Rich Paint System.

Submittals. At least 30 days prior to beginning field painting, the Contractor shall submit for the Engineer's review and acceptance, the following applicable plans, certifications and information for completing the field work. Field painting can not proceed until the submittals are accepted by the Engineer. Qualifications, certifications and QC plans for shop cleaning and painting shall be available for review by the QA Inspector.

a) Contractor/Personnel Qualifications. Except for miscellaneous steel items such as bearings, side retainers, expansion joint devices, and other items allowed by the Engineer, or unless stated otherwise in the contract, the shop painting Contractors shall be certified to perform the work as follows: the shop painting Contractor shall possess AISC Sophisticated Paint Endorsement or SSPC-QP3 certification. Evidence of current qualifications shall be provided.

Personnel managing the shop and field Quality Control program(s) for this work shall possess a minimum classification as a National Association of Corrosion Engineers (NACE) Coating Inspector Technician, or shall provide evidence of successful inspection of 3 projects of similar or greater complexity and scope that have been completed in the last 2 years. Copies of the certification and/or experience shall be provided.

The personnel performing the QC tests for this work shall be trained in coatings inspection and the use of the testing instruments. Documentation of training shall be provided.

b) Quality Control (QC) Program. The shop and field QC Programs shall identify the following; the instrumentation that will be used, a schedule of required measurements and observations, procedures for correcting unacceptable work, and procedures for improving surface preparation and painting quality as a result of quality control findings. The field program shall incorporate the IDOT Quality Control Daily Report form, as supplied by the Engineer.

c) Field Cleaning and Painting Inspection Access Plan. The inspection access plan for use by Contractor QC personnel for ongoing inspections and by the Engineer during Quality Assurance (QA) observations.

d) Surface Preparation/Painting Plan. The surface preparation/painting plan shall include the methods of surface preparation and type of equipment to be utilized for solvent cleaning, abrasive blast cleaning, washing, and power tool cleaning. The plan shall include the manufacturer's names of the materials that will be used, including Product Data Sheets and Material Safety Data Sheets (MSDS).

A letter or written instructions from the coating manufacturer shall be included, indicating the required drying time for each coat at the minimum, normal, and maximum application temperatures before the coating can be exposed to temperatures or moisture conditions that are outside of the published application parameters.

Field Quality Control (QC) Inspections. The Contractor shall perform first line, in process QC inspections of each phase of the work. The Contractor shall implement the submitted and accepted QC Program to insure that the work accomplished complies with these specifications. The Contractor shall use the IDOT Quality Control Daily Report form supplied by the Engineer to record the results of quality control tests. The completed reports shall be turned into the Engineer before work resumes the following day.

The Contractor shall have available at the shop or on the field site, all of the necessary inspection and testing equipment. The equipment shall be available for the Engineer's use when requested.

Field Quality Assurance (QA) Observations. The Engineer will conduct QA observations of any or all phases of the work. The Engineer's observations in no way relieve the Contractor of the responsibility to provide all necessary daily QC inspections of his/her own and to comply with all requirements of this Specification.

The Engineer has the right to reject any work that was performed without adequate provision for QA observations.

The Engineer will issue a Non-Conformance Report when cleaning and painting work is found to be in violation of the specification requirements, and is not corrected to bring it into compliance before proceeding with the next phase of work.

Inspection Access and Lighting. The Contractor shall facilitate the Engineer's observations as required, including allowing ample time to view the work. The Contractor shall furnish, erect and move scaffolding or other mechanical equipment to permit close observation of all surfaces to be cleaned and painted. This equipment shall be provided during all phases of the work. Examples of acceptable access structures include:

Mechanical lifting equipment, such as, scissor trucks, hydraulic booms, etc.
Platforms suspended from the structure comprised of trusses or other stiff supporting members and including rails and kick boards.
Simple catenary supports are permitted only if independent life lines for attaching a fall arrest system according to Occupational Safety and Health Administration (OSHA) regulations are provided.

When the surface to be inspected is more than 6 ft. (1.8 m) above the ground or water surface, the Contractor shall provide the Engineer with a safety harness and a lifeline according to OSHA regulations. The lifeline and attachment shall not direct the fall into oncoming traffic. The Contractor shall provide a method of attaching the lifeline to the structure independent of the inspection facility or any support of the platform. When the inspection facility is more than 2 1/2 ft. (800 mm) above the ground, the Contractor shall provide an approved means of access onto the platform.

The Contractor shall provide artificial lighting in areas where natural light is inadequate, as determined by the Engineer, to allow proper cleaning, inspection, and painting. Illumination for inspection shall be at least 30 foot candles (325 LUX). Illumination for cleaning and painting, including the working platforms, access, and entryways shall be at least 20 foot candles (215 LUX).

Construction Requirements. The Contractor shall be responsible for any damage caused to persons, vehicles, or property, except as indemnified by the Response Action Contractor Indemnification Act. Whenever the intended purposes of the protective devices are not being accomplished, as determined by the Engineer, work shall be immediately suspended until corrections are made. Painted surfaces damaged by any Contractor's operation shall be removed and repainted, as directed by the Engineer, at the Contractor's expense.

The Contractor shall comply with the provisions of the Illinois Environmental Protection Act. Paint drips, spills, and overspray are not permitted to escape into the air or onto any other surfaces or surrounding property not intended to be painted. Containment shall be used to control paint drips, spills, and overspray, and shall be dropped and all equipment secured when sustained wind speeds of 40 mph (64 kph) or greater occur, unless the containment design necessitates action at lower wind speeds. The contractor shall evaluate project-specific conditions to determine the specific type and extent of containment needed to control the paint emissions and shall submit a plan for containing or controlling paint debris (droplets, spills, overspray, etc.) to the Engineer for approval prior to starting the work. Approval shall not relieve the Contractor of their ultimate responsibility for controlling paint debris from escaping the work zone.

Surface and Weather Conditions. Surfaces to be painted after cleaning shall remain free of moisture and other contaminants. The Contractor shall control his/her operations to insure that dust, dirt, or moisture does not come in contact with surfaces cleaned or painted that day.

The surface temperature shall be at least 5°F (3°C) above the dew point during final surface preparation operations. The paint manufacturers' published literature shall be followed for specific temperature, dew point, and humidity restrictions during the application of each coat.

The Contractor shall monitor temperature, dew point, and humidity every 4 hours during surface preparation and coating application in the specific areas where the work is being performed. The frequency of monitoring shall increase if weather conditions are changing. The Engineer has the right to reject any work that was performed under unfavorable weather conditions. Rejected work shall be removed, recleaned, and repainted at the Contractor's expense.

Seasonal Restrictions on Field Cleaning and Painting. Field cleaning and painting work shall be accomplished between April 15 and October 31 unless authorized otherwise by the Engineer in writing.

Inorganic Zinc-rich/ Waterborne Acrylic Paint system. This system shall be for shop and field application of the coating system, shop application of the intermediate and top coats will not be allowed.

In the shop, all structural steel designated to be painted shall be given one coat of inorganic zinc rich primer. In the field, before the application of the intermediate coat, the prime coat and any newly installed fasteners shall be spot solvent cleaned per SSPC-SP 1 and all surfaces pressure washed to remove dirt, oil, lubricants, oxidation products, and foreign substances. Washing shall involve the use of potable water at a pressure between 1000 psi (7 MPa) and 5000 psi (34 MPa) and according to "Low Pressure Water Cleaning" of SSPC-SP12. Paint spray equipment shall not be used to perform the water cleaning. All damaged shop primed areas shall then be spot cleaned per SSPC-SP3 and spot primed with aluminum epoxy mastic.

The structural steel shall then receive one full intermediate coat and one full topcoat of waterborne acrylic paint.

a) Paint drips, spills, and overspray must be controlled. If containment is used to control paint drips, spills, and overspray, the containment shall be dropped and all equipment secured when sustained wind speeds of 40 mph (64 kph) or greater occur. When the protective coverings need to be attached to the structure, they shall be attached by bolting, clamping, or similar means. Welding or drilling into the structure is prohibited unless approved by the Engineer in writing.

b) Coating Dry Film Thickness (dft), measured according to SSPC-PA2:
Zinc Primer: 3 mils (75 microns) min., 6 mils (150 microns) max.
Epoxy Mastic: 5 mils (125 microns) min., 7 mils (180 microns) max.
Intermediate Coat: 2 mils (50 microns) min., 4 mils (100 microns) max.
Topcoat: 2 mils (50 microns) min., 4 mils (100 microns) max.

The total dry film thickness, excluding the spot areas touched up with epoxy mastic, shall be between 7 and 14 mils (180 and 355 microns).

c) The pressure washing requirement above may be waived if the QC and QA Inspectors verify the primed surfaces have not been contaminated.

d) Damage to the paint system shall be spot cleaned using SSPC-SP3. The cleaned areas shall be spot painted with a penetrating sealer as recommended by the manufacturer, which shall overlap onto the existing topcoat. Then the aluminum epoxy mastic shall be spot applied not to go beyond the area painted with the sealer. The acrylic intermediate and topcoat shall be spot applied to the mastic with at least a 6 inch (150 mm) overlap onto the existing topcoat.

Organic Zinc-Rich/ Epoxy/ Urethane Paint System. This system shall be for full shop application of the coating system, all contact surfaces shall be masked off prior to application of the intermediate and top coats.

Additional Surface Preparation. In addition to the requirements of Section 3.2.9 of the AASHTO/AWS D1.5/D1.5:2002 Bridge Welding Code (breaking thermal cut corners of stress carrying members), rolled and thermal cut corners to be painted with organic zinc primer shall be broken if they are sharper than a 1/16 in. (1.5 mm) radius. Corners shall be broken by a single pass of a grinder or other suitable device at a 45 degree angle to each adjoining surface prior to final blast cleaning, so the resulting corner approximates a 1/16 in. (1.5 mm) or larger radius after blasting. Surface anomalies (burrs, fins, deformations) shall also be treated to meet this criteria before priming.

In the shop, all structural steel designated to be painted shall be given one coat of organic zinc rich primer. Before the application of the intermediate coat, the prime coat and any newly installed fasteners shall be spot solvent cleaned per SSPC-SP 1 and all surfaces pressure washed to remove dirt, oil, lubricants, oxidation products, and foreign substances. Washing shall involve the use of potable water at a pressure between 1000 psi (7 MPa) and 5000 psi (34 MPa) and according to “Low Pressure Water Cleaning” of SSPC-SP12. Paint spray equipment

shall not be used to perform the water cleaning. All damaged shop primed areas shall then be spot cleaned per SSPC-SP3, and the structural steel shall then receive one full intermediate coat of epoxy and one full topcoat of aliphatic urethane.

(a) Paint drips, spills, and overspray must be controlled. If containment is used to control paint drips, spills, and overspray, the containment shall be dropped and all equipment secured when sustained wind speeds of 40 mph (64 kph) or greater occur. When the protective coverings need to be attached to the structure, they shall be attached by bolting, clamping, or similar means. Welding or drilling into the structure is prohibited unless approved by the Engineer in writing.

(b) Coating Dry Film Thickness (dft), measured according to SSPC-PA2:
Organic Zinc-Rich Primer: 3 mils (75 microns) min., 5 mils (125 microns) max.
Aluminum Epoxy Mastic: 5 mils (125 microns) min., 7 mils (180 microns) max.
Epoxy Intermediate Coat: 3 mils (75 microns) min., 6 mils (150 microns) max.
Aliphatic Urethane Top Coat: 2.5 mils (65 microns) min., 4 mils (100 microns) max.

(c) The total dry film thickness, excluding the spot areas touched up with epoxy mastic, shall be between 8.5 and 15 mils (215 and 375 microns).

(d) When specified on the plans or as requested by the Contractor, and approved by the Engineer, the epoxy intermediate and aliphatic urethane top coats shall be applied in the shop. All faying surfaces of field connections shall be masked off after priming and shall not receive the intermediate or top coats in the shop. The intermediate and top coats for field connections shall be applied, in the field, after erection of the structural steel is completed. The pressure washing requirement above may be waived if the QC and QA Inspectors verify the primed surfaces have not been contaminated.

(e) Erection and handling damage to the shop applied system shall be spot cleaned using SSPC-SP3. The surrounding coating at each repair location shall be feathered for a minimum distance of 1 1/2 in. (40 mm) to achieve a smooth transition between the prepared areas and the existing coating. The existing coating in the feathered area shall be roughened to insure proper adhesion of the repair coats. The areas cleaned to bare metal shall be spot painted with aluminum epoxy mastic. The intermediate and finish coat shall be spot applied to with at least a 6 inch (150 mm) overlap onto the existing finish coat.

Aluminum Epoxy Mastic/ Waterborne Acrylic Paint system. This system shall be for shop or field application of the entire coating system.

Before priming with aluminum epoxy mastic the steel the surfaces to be primed shall be prepared according to SSPC SP6 for Commercial Blast Cleaning. In the field, before the application of the intermediate coat, the prime coat and any newly installed fasteners shall be spot solvent cleaned per SSPC-SP 1 and all surfaces pressure washed to remove dirt, oil, lubricants, oxidation products, and foreign substances. Washing shall involve the use of potable water at a pressure between 1000 psi (7 MPa) and 5000 psi (34 MPa) and according to “Low

Pressure Water Cleaning" of SSPC-SP12. Paint spray equipment shall not be used to perform the water cleaning. All damaged shop primed areas shall then be spot cleaned per SSPC-SP3 and spot primed with aluminum epoxy mastic. The structural steel shall then receive one full intermediate coat of aluminum epoxy mastic and one full topcoat of waterborne acrylic paint.

d) Paint drips, spills, and overspray must be controlled. If containment is used to control paint drips, spills, and overspray, the containment shall be dropped and all equipment secured when sustained wind speeds of 40 mph (64 kph) or greater occur. When the protective coverings need to be attached to the structure, they shall be attached by bolting, clamping, or similar means. Welding or drilling into the structure is prohibited unless approved by the Engineer in writing.

e) Coating Dry Film Thickness (dft), measured according to SSPC-PA2:
Epoxy Mastic Primer: 5 mils (125 microns) min., 7 mils (180 microns) max.
Epoxy Mastic Intermediate Coat: 5 mils (125 microns) min., 7 mils (180 microns) max.

Acrylic Topcoat: 2 mils (50 microns) min., 4 mils (100 microns) max.

The total dry film thickness, excluding the spot areas touched up with epoxy mastic, shall be between 12 and 18 mils (300 and 460 microns).

f) The pressure washing requirement above may be waived if the QC and QA Inspectors verify the primed surfaces have not been contaminated.

d) Damage to the paint system shall be spot cleaned using SSPC-SP3. The cleaned areas shall be spot painted with a penetrating sealer as recommended by the manufacturer, which shall overlap onto the existing topcoat. Then the aluminum epoxy mastic shall be spot applied not to go beyond the area painted with the sealer. The acrylic topcoat shall be spot applied to the mastic with at least a 6 inch (150 mm) overlap onto the existing topcoat.

The paint manufacturer's product data sheets shall be available for QA review in the shop and submitted to the Engineer prior to start of field work and the requirements as outlined in the data sheets shall be followed.

Special Instructions.

Painting Date/System Code. At the completion of the work, the Contractor shall stencil in contrasting color paint the date of painting the bridge, the painting Contractors name, and the paint type code from the Structure Information and Procedure Manual for the system used. The letters shall be capitals, not less than 2 in. (50 mm) and not more than 3 in. (75 mm) in height.

The stencil shall contain the following wording "PAINTED BY (insert the name of the painting Contractor)" and shall show the month and year in which the painting was completed, followed by "CODE S" for the Inorganic Zinc/ Acrylic System, "CODE X" for the Organic Zinc/ Epoxy/ Urethane System, "CODE AB" for the Organic Zinc/ Epoxy/ Urethane System (shop applied), and "CODE U" for the Aluminum Epoxy Mastic/ Acrylic System all stenciled on successive lines. This information shall be stenciled on the cover plate of a truss end post near the top of the railing, or on the outside face of an outside stringer near both ends of the bridge facing traffic, or at some equally visible surface designated by the Engineer.

Method of Measurement. Shop cleaning and painting new structures will not be measured for payment. Field cleaning and painting will not be measured for payment except when performed under a contract that contains a separate pay item for this work.

Basis of Payment. This work will be paid for according to Article 506.07.

TEMPORARY SOIL RETENTION SYSTEM

Effective: December 30, 2002 Revised: January 1, 2007

Description: This work shall consist of designing, furnishing, installing, adjusting for stage construction when required and subsequent removal of the temporary soil retention system according to the dimensions and details shown on the plans and in the approved design submittal.

General: The temporary soil retention system shall be designed by the Contractor as a minimum, to retain the exposed surface area specified in the plans or as directed by the Engineer.

The design calculations and details for the temporary soil retention system proposed by the Contractor shall be submitted to the Engineer for approval. The calculations shall be prepared and sealed by an Illinois Licensed Structural Engineer. This approval will not relieve the Contractor of responsibility for the safety of the excavation. Approval shall be contingent upon acceptance by all involved utilities and/or railroads.

Construction: The Contractor shall verify locations of all underground utilities before installing any of the soil retention system components or commencing any excavation. Any disturbance or damage to existing structures, utilities or other property, caused by the Contractor's operation, shall be repaired by the Contractor in a manner satisfactory to the Engineer at no additional cost to the Department. The soil retention system shall be installed according to the Contractor's approved design, or as directed by the Engineer, prior to commencing any related excavation. If unable to install the temporary soil retention system as specified in the approved design, the Contractor shall have the adequacy of the design re-evaluated. Any reevaluation shall be submitted to the Engineer for approval prior to commencing the excavation adjacent to the area in question. The Contractor shall not excavate below the maximum excavation line shown in the approved design without the prior permission of the Engineer. The temporary soil retention system shall remain in place until the Engineer determines it is no longer required.

The temporary soil retention system shall be removed and disposed of by the Contractor when directed by the Engineer. When allowed, the Contractor may elect to cut off a portion of the temporary soil retention system leaving the remainder in place. The remaining temporary soil retention system shall be removed to a depth which will not interfere with the new construction, and as a minimum, to a depth of 12 in. (300 mm) below the finished grade, or as directed by the Engineer. Removed system components shall become the property of the Contractor.

When an obstruction is encountered, the Contractor shall notify the Engineer and upon concurrence of the Engineer, the Contractor shall begin working to break up, push aside, or remove the obstruction. An obstruction shall be defined as any object (such as but not limited to, boulders, logs, old foundations etc.) where its presence was not obvious or specifically noted on the plans prior to bidding, that cannot be driven or installed through or around, with normal driving or installation procedures, but requires additional excavation or other procedures to remove or miss the obstruction.

Method of Measurement: The temporary soil retention system furnished and installed according to the Contractor's approved design or as directed by the Engineer will be measured for payment in place, in square feet (square meters). The area measured shall be the vertical exposed surface area envelope of the excavation supported by temporary soil retention system.

Any temporary soil retention system cut off, left in place, or installed beyond those dimensions shown on the contract plans or the approved contractor's design without the written permission of the Engineer, shall not be measured for payment but shall be done at the contractor's own expense.

Basis of Payment: This work will be paid for at the contract unit price per square foot (square meter) for TEMPORARY SOIL RETENTION SYSTEM.

Payment for any excavation, related solely to the installation and removal of the temporary soil retention system and/or its components, shall not be paid for separately but shall be included in the unit bid price for TEMPORARY SOIL RETENTION SYSTEM. Other excavation, performed in conjunction with this work, will not be included in this item but shall be paid for as specified elsewhere in this contract.

Obstruction mitigation shall be paid for according to Article 109.04 of the Standard Specifications.

PIPE UNDERDRAINS FOR STRUCTURES
Effective: May 17, 2000 Revised: January 1, 2007

Description: This work shall consist of furnishing and installing a pipe underdrain system as shown on the plans, as specified herein, and as directed by the Engineer.

Materials: Materials shall meet the requirements as set forth below:

The perforated pipe drain shall be according to Article 601.02 of the Standard Specifications. Outlet pipes or pipes connecting to a separate storm sewer system shall not be perforated.

The drainage aggregate shall be a combination of one or more of the following gradations, FA1, FA2, CA5, CA7, CA8, CA11, or CA13 thru 15, according to Sections 1003 and 1004 of the Standard Specifications.

The fabric surrounding the drainage aggregate shall be Geotechnical Fabric for French Drains according to Article 1080.05 of the Standard Specifications.

Construction Requirements: All work shall be according to the applicable requirements of Section 601 of the Standard Specifications except as modified below.

The pipe underdrains shall consist of a perforated pipe drain situated at the bottom of an area of drainage aggregate wrapped completely in geotechnical fabric and shall be installed to the lines and gradients as shown on the plans.

Method of Measurement: Pipe Underdrains for Structures shall be measured for payment in feet (meters), in place. Measurement shall be along the centerline of the pipe underdrains. All connectors, outlet pipes, elbows, and all other miscellaneous items shall be included in the measurement. Concrete headwalls shall be included in the cost of Pipe Underdrains for Structures, but shall not be included in the measurement for payment.

Basis of Payment: This work will be paid for at the contract unit price per foot (meter) for PIPE UNDERDRAINS FOR STRUCTURES of the diameter specified,. Furnishing and installation of the drainage aggregate, geotechnical fabric, forming holes in structural elements and any excavation required, will not be paid for separately, but shall be included in the cost of the pipe underdrains for structures.

POROUS GRANULAR EMBANKMENT (SPECIAL)
Effective: September 28, 2005 Revised: January 1, 2007

Description: This work shall consist of furnishing, and placing porous granular embankment (special) material as detailed on the plans, according to Section 207 except as modified herein.

Materials: The gradation of the porous granular material may be any of the following CA 8 thru CA 18, FA 1 thru FA 4, FA 7 thru FA 9, and FA 20 according to Articles 1003 and 1004.

Construction: The porous granular embankment (special) shall be installed according to Section 207, except that it shall be uncompacted.

Basis of Payment: This work will be paid for at the contract unit price per Cubic Yard (Cubic Meter) for POROUS GRANULAR EMBANKMENT (SPECIAL).

SLIPFORM PARAPET
Effective: June 1, 2007

The following shall be added to the end of Article 503.16(b) of the Standard Specifications.

(3) Slipforming parapets. Unless otherwise prohibited on the plans or when conduit is longitudinally embedded in the parapet(s), at the option of the Contractor, concrete parapets on bridge decks may be constructed by slipforming in lieu of the conventional forming methods. The slipform machine shall have automatic horizontal and vertical grade control and be approved by the Engineer.

The concrete mix design may combine two or more coarse aggregate sizes, consisting of CA-7, CA-11, CA-13, CA-14, and CA-16, provided a CA-7 or CA-11 is included in the blend in a proportion approved by the Engineer.

The slipform machine speed shall not exceed 3 ft (0.9 m) per minute. Any section of parapet placed with the slipform machine moving in excess of the maximum allowed speed will be rejected. Any time the speed of the machine drops below 0.5 ft (150 mm) per minute will be considered a stoppage of the slipforming operation, portions of parapet placed with three or more intermittent stoppages within any 15 ft (4.6 m) length will be rejected. The contractor shall schedule concrete delivery to maintain a uniform delivery rate of concrete into the slipform machine. If delivery of concrete from the truck into the slipforming machine is interrupted by more than 15 minutes, the portion of the wall within the limits of the slipform machine will be rejected. Any portion of the parapet where the slipforming operation is interrupted or stopped within the 15 minute window may be subject to coring to verify acceptance.

If the Contractor elects to slipform, the parapet cross-sectional area and reinforcement bar clearances shall be revised according to the detail for the Concrete Parapet Slipforming Option.

The Contractor may propose supplemental reinforcement stiffening details subject to the approval of the Engineer.

The use of cast-in-place anchorage devices for attaching appurtenances and/or railings to the parapets will not be allowed in conjunction with slipforming of parapets. Alternates means for making these attachments shall be as detailed on the plans or as approved by the Engineer.

All reinforcement bar intersections within the parapet cross section shall be 100 percent tied to maintain rigidity during concrete placement. At pre-planned sawcut joints in the parapet, Glass Fiber Reinforced Polymer (GFRP) reinforcement shall be used to maintain the rigidity of the reinforcement cage across the proposed joints as detail for the Concrete Parapet Slipforming Option.

Glass Fiber Reinforced Polymer (GFRP) reinforcement shall be subject to approval by the Engineer. Other non-ferrous reinforcement may be proposed for use but shall be subject to approval by the Engineer.

The contractor may use additional stiffening reinforcement bars to prevent movement of the reinforcement cage subject to approval by the Engineer. Clearances for these bars shall be the same as shown for the required bars and these bars shall be epoxy coated. If the additional reinforcement is used, it shall be at no additional cost to the Department.

For projects with plan details specifying parapet joints spaced greater than 20 ft (6 m) apart, additional sawcut joints, spaced between 10 ft (3 m) and 20 ft (6 m), shall be placed as directed by the Engineer. The horizontal reinforcement extending through the proposed joints shall be precut to provide a minimum of 4 in. (100 mm) gap, centered over the joint, between rebar ends. The ends of the reinforcement shall be repaired according to Article 508.05.

After the slipform machine has been set to proper grade and prior to concrete placement, the clearance between the slipform machine inside faces and reinforcement bars shall be checked during a dry run by the Contractor in the presence of the Engineer. The dry run shall not begin until the entire reinforcing cage has been tied and the Engineer has verified and approved the placement and tying of the reinforcing bars. Any reinforcement bars found to be out of place by more than ½ in. (13 mm), or any dimensions between bars differing from the plans by more than ½ in. (13 mm) shall be re-tied to the plan dimensions.

During the dry run and in the presence of the Engineer, the Contractor shall check the clearance of the reinforcement bars from the inside faces of the slipform mold. In all locations, the Contractor shall ensure the reinforcement bars have the minimum cover distance shown on the plans. This dry run check shall be made for the full distance that is anticipated to be placed in the subsequent pour. Reinforcement bars found to have less than the minimum clearance shall be adjusted and the dry run will be performed again, at least in any locations that have been readjusted.

For parapets adjacent to the watertable, the contractor shall, for the duration of the construction and curing of the parapet, provide and maintain an inspection platform along the back face of the parapet. The inspection platform shall be rigidly attached to the bridge superstructure and be of such design to allow ready movement of inspection personnel along the entire length of the bridge.

The aluminum cracker plates as detailed in the plans shall be securely tied in place and shall be coated or otherwise treated to minimize their potential reaction with wet concrete. In lieu of chamfer strips at horizontal and vertical edges, radii may be used. Prior to slipforming, the Contractor shall verify proper operation of the vibrators using a mechanical measuring device subject to approval by the Engineer.

The top portion of the joint shall be sawcut as shown in Detail for the Concrete Parapet Slipforming Option. Sawing of the joints shall commence as soon as the concrete has hardened sufficiently to permit sawing without excessive raveling. All joints shall be sawed to the full thickness before uncontrolled shrinkage cracking takes place but no later than 8 hours after concrete placement. The sawcut shall be approximately 3/8 in. (10 mm) wide and shall be performed with a power circular concrete saw. The joints shall be sealed with an approved polyurethane sealant, conforming to ASTM C 920, Type S, Grade NS, Class 25, Use T, to a minimum depth of 1/2 in. (12 mm), with surface preparation and installation according to the manufacturer's written instructions. Cork, hemp or other compressible material may be used as a backer. The sawcut will not require chamfered edges.

Ends of the parapet shall be formed and the forms securely braced. When slipforming of parapets with cross sectional discontinuities such as light standards, junction boxes or other embedded appurtenances except for name plates, is allowed, the parapet shall be formed for a minimum distance of 4 ft (1.2 m) on each side of the discontinuity.

For acceptance and rejection purposes a parapet section shall be defined as the length of parapet between adjacent vertical parapet joints.

The maximum variance of actual to proposed longitudinal alignment shall not exceed ±3/4 in. (20 mm) with no more than 1/4 inch in 10 ft (6 mm in 3 m). Notwithstanding this tolerance, abrupt variance in actual alignment of 1/2 inch in 10 ft (13 mm in 3 m) will be cause for rejection of the parapet section.

In addition, all surfaces shall be checked with a 10 ft (3 m) straight edge furnished and used by the Contractor as the concrete is extruded from the slipform mold. Continued variations in the barrier surface exceeding 1/4 inch in 10 ft (6 mm in 3 m) will not be permitted and remedial action shall immediately be taken to correct the problem.

The use of equipment or methods which result in dimensions outside the tolerance limits shall be discontinued. Parapet sections having dimensions outside the tolerance limits will be rejected.

Any visible indication that less than specified cover of concrete over the reinforcing bars has been obtained, or of any cracking, tearing or honeycombing of the plastic concrete, or any location showing diagonal or horizontal cracking will be cause for rejection of the parapet section in which they are found.

The vertical surfaces at the base of the barrier within 3 in. (75 mm) of the deck surface shall be trowelled true after passage of the slipform machine. Any deformations or bulges remaining after the initial set shall be removed by grinding after the concrete has hardened. Hand finishing of minor sporadic surface defects may be allowed at the discretion of the Engineer.

After the parapet has been finished and within 30 minutes of discharge from the slipform paving machine, the parapet surface shall be sealed with a linseed oil emulsion curing compound according to Articles 1022.01(d). The sealer shall be applied with a mechanical sprayer according to Article 1101.09(b). Two separate applications, applied at least 1 minute apart, each at the rate of 1 gallon / 250 sq ft (0.16 L / sq m) will be required. At locations where the coating is discontinuous or where pin holes show or where the coating is damaged, an additional coating of curing compound shall be applied at the above specified rate.

Slipformed parapets shall be cured according to either Article 1020.13(a)(3) or Article 1020.13(a)(5). For either method, a soaker hose shall be placed on the top surface of the parapet, and the curing material kept wet with a continuous supply of water for the entire curing period. The cotton mats or burlap covering shall be held in place with brackets or other method approved by the Engineer.

A maximum of three random 4 in. (100 mm) diameter cores per 100 ft (30 m) of parapet shall be taken as directed by the Engineer, but no less than three random cores shall be taken for each parapet pour. Separate parapets poured on the same date shall be considered separate pours. Random cores will not be measured for payment.

The Engineer will mark additional locations for cores where, in the sole opinion of the Engineer, the quality of the slipformed parapet is suspect.

Any cores showing voids of any size adjacent to the reinforcement bars, or showing voids not adjacent to reinforcement bars of 1/4 square inch (160 square millimeters) in area or more, or showing signs of segregation, or showing signs of cracking shall be considered failures and the parapet section from which it was taken will be rejected.

Rejected parapet sections shall be removed and replaced for the full depth cross-section of the parapet. The minimum length of parapet removed and replaced shall be 3 ft (1 m). Additional cores may be required to determine the longitudinal extent of removal and replacement if it can not be determined and agreed upon by other means (i.e. visual, sounding, non-destructive testing, etc.).

Any parapet section with more than one half of its length rejected or with remaining segments less than 10 ft (3 m) in length shall be removed and replaced in its entirety.

If reinforcement bars are damaged during the removal and replacement, additional removal and replacement shall be done, as necessary, to ensure minimum splice length of replacement bars. Any damage to epoxy coating of bars shall be repaired according to Article 508.05.

All core holes will be filled with a non-shrink grout meeting the requirements of Section 1024.

Basis of Payment. When the contractor, at his/her option, constructs the parapet using slipforming methods, no adjustment in the quantities for Concrete Superstructures and Reinforcement Bars, Epoxy Coated to accommodate this option will be allowed. Compensation under the contract bid items for Concrete Superstructures and Reinforcement Bars, Epoxy Coated shall cover the cost of all work required for the construction of the parapet and for any additional costs of work or materials associated with slipforming methods.

DEMOLITION PLANS FOR REMOVAL OF EXISTING STRUCTURES
Effective: September 5, 2007

Add to the beginning of Article 501.02 of the Standard Specifications.

"The Contractor shall submit a demolition plan to the Engineer for approval, detailing the proposed methods of demolition and the amount, location(s) and type(s) of equipment to be used. With the exception of removal of single box culverts, for work adjacent to or over an active roadway, railroad or navigable waterway, the demolition plan shall include an assessment of the structure's condition and an evaluation of the structure's strength and stability during demolition and shall be sealed by an Illinois Licensed Structural Engineer."

ALKALI-SILICA REACTION FOR CAST-IN-PLACE CONCRETE (BDE)
Effective: August 1, 2007

Description. This special provision is intended to reduce the risk of a deleterious alkali-silica reaction in concrete exposed to humid or wet conditions. The special provision is not intended or adequate for concrete exposed to potassium acetate, potassium formate, sodium acetate or

sodium formate. The special provision shall not apply to the dry environment (humidity less than 60 percent) found inside buildings for residential or commercial occupancy. The special provision shall also not apply to precast products or precast prestressed products.

Aggregate Expansion Values. Each coarse and fine aggregate will be tested by the Department for alkali reaction according to ASTM C 1260. The test will be performed with Type I or II cement having a total equivalent alkali content ($Na_2O + 0.658K_2O$) of 0.90 percent or greater. The Engineer will determine the assigned expansion value for each aggregate, and these values will be made available on the Department's Alkali-Silica Potential Reactivity Rating List. The Engineer may differentiate aggregate based on ledge, production method, gradation number, or other factors. An expansion value of 0.05 percent will be assigned to limestone or dolomite coarse aggregates and 0.03 percent to limestone or dolomite fine aggregates (manufactured stone sand); however the Department reserves the right to perform the ASTM C 1260 test.

Aggregate Groups. Each combination of aggregates used in a mixture will be assigned to an aggregate group. The point at which the coarse aggregate and fine aggregate expansion values intersect in the following table will determine the group.

AGGREGATE GROUPS			
Coarse Aggregate or Coarse Aggregate Blend ASTM C 1260 Expansion	Fine Aggregate or Fine Aggregate Blend ASTM C 1260 Expansion		
	≤ 0.16%	> 0.16% - 0.27%	> 0.27%
≤ 0.16%	Group I	Group II	Group III
> 0.16% - 0.27%	Group II	Group II	Group III
> 0.27%	Group III	Group III	Group IV

Mixture Options. Based upon the aggregate group, the following mixture options shall be used; however, the Department may prohibit a mixture option if field performance shows a deleterious alkali-silica reaction or Department testing indicates the mixture may experience a deleterious alkali-silica reaction.

Group I - Mixture options are not applicable. Use any cement or finely divided mineral.
Group II - Mixture options 1, 2, 3, 4, or 5 shall be used.
Group III - Mixture options 1, 2 and 3 combined, 4, or 5 shall be used.
Group IV - Mixture options 1, 2 and 4 combined, or 5 shall be used.

For Class PP-3 concrete the mixture options are not applicable, and any cement may be used with the specified finely divided minerals.

a) Mixture Option 1. The coarse or fine aggregates shall be blended to place the material in a group that will allow the selected cement or finely divided mineral to be used.

   When a coarse or fine aggregate is blended, the weighted expansion value shall be calculated separately for the coarse and fine aggregate as follows:

Weighted Expansion Value = (a/100 x A) + (b/100 x B) + (c/100 x C) + …

Where: a, b, c... = percentage of aggregate in the blend;
A, B, C…= expansion value for that aggregate.

b) Mixture Option 2. A finely divided mineral shall be used as described in 1), 2), 3), or 4) that follow. The replacement ratio is defined as "finely divided mineral:portland cement".

1) Class F Fly Ash. For Class PV, BS, MS, DS, SC, and SI concrete and cement aggregate mixture II (CAM II), Class F fly ash shall replace 15 percent of the portland cement at a minimum replacement ratio of 1.5:1.

2) Class C Fly Ash. For Class PV, MS, SC, and SI Concrete, Class C fly ash with 18 percent to less than 26.5 percent calcium oxide content, and less than 2.0 percent loss on ignition, shall replace 20 percent of the portland cement at a minimum replacement ratio of 1:1; or at a minimum replacement ratio of 1.25:1 if the loss on ignition is 2.0 percent or greater. Class C fly ash with less than 18 percent calcium oxide content shall replace 20 percent of the portland cement at a minimum replacement ratio of 1.25:1.

For Class PP-1, RR, BS, and DS concrete and CAM II, Class C fly ash with less than 26.5 percent calcium oxide content shall replace 15 percent of the portland cement at a minimum replacement ratio of 1.5:1.

3) Ground Granulated Blast-Furnace Slag. For Class PV, BS, MS, SI, DS, and SC concrete, ground granulated blast-furnace slag shall replace 25 percent of the portland cement at a minimum replacement ratio of 1:1.

For Class PP-1 and RR concrete, ground granulated blast-furnace slag shall replace 15 percent of the portland cement at a minimum replacement ratio of 1.5:1.

For Class PP-2, ground granulated blast-furnace slag shall replace 25 to 30 percent of the portland cement at a minimum replacement ratio of 1:1.

4) Microsilica or High Reactivity Metakaolin. Microsilica solids or high reactivity metakaolin shall be added to the mixture at a minimum 25 lb/cu yd (15 kg/cu m) or 27 lb/cu yd (16 kg/cu m) respectively.

c) Mixture Option 3. The cement used shall have a maximum total equivalent alkali content ($Na_2O + 0.658K_2O$) of 0.60 percent. When aggregate in Group II is involved, any finely divided mineral may be used with a portland cement.

d) Mixture Option 4. The cement used shall have a maximum total equivalent alkali content ($Na_2O + 0.658K_2O$) of 0.45 percent. When aggregate in Group II or III is involved, any finely divided mineral may be used with a portland cement.

e) Mixture Option 5. The proposed cement or finely divided mineral may be used if the ASTM C 1567 expansion value is ≤ 0.16 percent when performed on the aggregate in the concrete mixture with the highest ASTM C 1260 test result. The ASTM C 1567 test

will be valid for two years, unless the Engineer determines the materials have changed significantly. For latex concrete, the ASTM C 1567 test shall be performed without the latex. The 0.20 percent autoclave expansion limit in ASTM C 1567 shall not apply.

If during the two year time period the Contractor needs to replace the cement, and the replacement cement has an equal or lower total equivalent alkali content ($Na_2O + 0.658K_2O$), a new ASTM C 1567 test will not be required.

Testing. If an individual aggregate has an ASTM C 1260 expansion value > 0.16 percent, an ASTM C 1293 test may be performed by the Contractor to evaluate the Department's ASTM C 1260 test result. The ASTM C 1293 test shall be performed with Type I or II cement having a total equivalent alkali content ($Na_2O + 0.658K_2O$) of 0.80 percent or greater. The interior vertical wall of the ASTM C 1293 recommended container (pail) shall be half covered with a wick of absorbent material consisting of blotting paper. If the testing laboratory desires to use an alternate container or wick of absorbent material, ASTM C 1293 test results with an alkali-reactive aggregate of known expansion characteristics shall be provided to the Engineer for review and approval. If the expansion is less than 0.040 percent after one year, the aggregate will be assigned an ASTM C 1260 expansion value of 0.08 percent that will be valid for two years, unless the Engineer determines the aggregate has changed significantly.

The Engineer reserves the right to verify a Contractor's ASTM C 1293 or 1567 test result. The Engineer will not accept the result if the precision and bias for the test methods are not met.

The laboratory performing the ASTM C 1567 test shall be inspected for Hydraulic Cement - Physical Tests by the Cement and Concrete Reference Laboratory (CCRL) and shall be approved by the Department. The laboratory performing the ASTM C 1293 test shall be inspected for Portland Cement Concrete by CCRL and shall be approved by the Department.

CEMENT (BDE)
Effective: January 1, 2007 Revised: November 1, 2007

Revise Section 1001 of the Standard Specifications to read:

"**SECTION 1001. CEMENT**

1001.01 Cement Types. Cement shall be according to the following.

(a) Portland Cement. Acceptance of portland cement shall be according to the current Bureau of Materials and Physical Research's Policy Memorandum, "Portland or Blended Cement Acceptance Procedure for Qualified and Non-Qualified Plants".

Portland cement shall be according to ASTM C 150, and shall meet the standard physical and chemical requirements. Type I or Type II may be used for cast-in-place, precast, and precast prestressed concrete. Type III may be used according to Article 1020.04, or when approved by the Engineer. All other cements referenced in ASTM C 150 may be used when approved by the Engineer.

The total of all organic processing additions shall be a maximum of 1.0 percent by weight (mass) of the cement and the total of all inorganic processing additions shall be a maximum of 4.0 percent by weight (mass) of the cement. Organic processing additions shall be limited to grinding aids that improve the flowability of cement, reduce pack set, and improve grinding efficiency. Inorganic processing additions shall be limited to granulated blast-furnace slag according to the chemical requirements of AASHTO M 302 and Class C fly ash according to the chemical requirements of AASHTO M 295.

(b) Portland-Pozzolan Cement. Acceptance of portland-pozzolan cement shall be according to the current Bureau of Materials and Physical Research's Policy Memorandum, "Portland or Blended Cement Acceptance Procedure for Qualified and Non-Qualified Plants".

Portland-pozzolan cement shall be according to ASTM C 595 and shall meet the standard physical and chemical requirements. Type IP or I(PM) may be used for cast-in-place, precast, and precast prestressed concrete, except when Class PP concrete is used. The pozzolan constituent for Type IP shall be a maximum of 21 percent of the weight (mass) of the portland-pozzolan cement. All other cements referenced in ASTM C 595 may be used when approved by the Engineer.

For cast-in-place construction, portland-pozzolan cements shall not be used in concrete mixtures when the air temperature is below 40 ºF (4 ºC) without permission of the Engineer. If permission is given, the mix design strength requirement may require the Contractor to increase the cement or eliminate the cement factor reduction for a water-reducing or high range water-reducing admixture which is permitted according to Article 1020.05(b).

The total of all organic processing additions shall be a maximum of 1.0 percent by weight (mass) of the cement. Organic processing additions shall be limited to grinding aids as defined in (a) above. Inorganic processing additions shall not be used.

(c) Portland Blast-Furnace Slag Cement. Acceptance of portland blast-furnace slag cement shall be according to the current Bureau of Materials and Physical Research's Policy Memorandum, "Portland or Blended Cement Acceptance Procedure for Qualified and Non-Qualified Plants".

Portland blast-furnace slag cement shall be according to ASTM C 595 and shall meet the standard physical and chemical requirements. Type I(SM) slag-modified portland cement may be used for cast-in-place, precast, and precast prestressed concrete, except when Class PP concrete is used. All other cements referenced in ASTM C 595 may be used when approved by the Engineer.

For cast-in-place construction, portland blast-furnace slag cements shall not be used in concrete mixtures when the air temperature is below 40 ºF (4 ºC) without permission of the Engineer. If permission is given, the mix design strength requirement may require the Contractor to increase the cement or eliminate the cement factor reduction for a water-reducing or high range water-reducing admixture which is permitted according to Article 1020.05(b).

The total of all organic processing additions shall be a maximum of 1.0 percent by weight (mass) of the cement. Organic processing additions shall be limited to grinding aids as defined in (a) above. Inorganic processing additions shall not be used.

(d) Rapid Hardening Cement. Rapid hardening cement shall be used according to Article 1020.04 or when approved by the Engineer. The cement shall be on the Department's current "Approved List of Packaged, Dry, Rapid Hardening Cementitious Materials for Concrete Repairs", and shall be according to the following.

(1) The cement shall have a maximum final set of 25 minutes, according to Illinois Modified ASTM C 191.

(2) The cement shall have a minimum compressive strength of 2000 psi (13,800 kPa) at 3.0 hours, and 4000 psi (27,600 kPa) at 24.0 hours, according to Illinois Modified ASTM C 109.

(3) The cement shall have a maximum drying shrinkage of 0.050 percent at seven days, according to Illinois Modified ASTM C 596.

(4) The cement shall have a maximum expansion of 0.020 percent at 14 days, according to Illinois Modified ASTM C 1038.

(5) The cement shall have a minimum 80 percent relative dynamic modulus of elasticity; and shall not have a weight (mass) gain in excess of 0.15 percent or a weight (mass) loss in excess of 1.0 percent, after 100 cycles, according to Illinois Modified AASHTO T 161, Procedure B. At 100 cycles, the specimens are measured and weighed at 73 ºF (23 ºC).

(e) Calcium Aluminate Cement. Calcium aluminate cement shall be used when specified by the Engineer. The cement shall meet the standard physical requirements for Type I cement according to ASTM C 150, except the time of setting shall not apply. The chemical requirements shall be determined according to ASTM C 114 and shall be as follows: minimum 38 percent aluminum oxide (Al_2O_3), maximum 42 percent calcium oxide (CaO), maximum 1 percent magnesium oxide (MgO), maximum 0.4 percent sulfur trioxide (SO_3), maximum 1 percent loss on ignition, and maximum 3.5 percent insoluble residue.

1001.02 Uniformity of Color. Cement contained in single loads or in shipments of several loads to the same project shall not have visible differences in color.

1001.03 Mixing Brands and Types. Different brands or different types of cement from the same manufacturing plant, or the same brand or type from different plants shall not be mixed or used alternately in the same item of construction unless approved by the Engineer.

1001.04 Storage. Cement shall be stored and protected against damage, such as dampness which may cause partial set or hardened lumps. Different brands or different types of cement from the same manufacturing plant, or the same brand or type from different plants shall be kept separate."

CONCRETE BARRIER (BDE)
Effective: January 1, 2008

Add the following paragraph, after the first paragraph of Article 637.12 of the Standard Specifications:

"When a double face concrete barrier with a variable cross-section is required, and the variation exceeds 3 in. (75 mm), the barrier will be paid for at the contract unit price per foot (meter) for CONCRETE BARRIER, VARIABLE CROSS-SECTION, of the height specified."

DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION (BDE)
Effective: September 1, 2000 Revised: January 1, 2007

FEDERAL OBLIGATION. The Department of Transportation, as a recipient of federal financial assistance, is required to take all necessary and reasonable steps to ensure nondiscrimination in the award and administration of contracts. Consequently, the federal regulatory provisions of 49 CFR part 26 apply to this contract concerning the utilization of disadvantaged business enterprises. For the purposes of this Special Provision, a disadvantaged business enterprise (DBE) means a business certified by the Department in accordance with the requirements of 49 CFR part 26 and listed in the DBE Directory or most recent addendum.

STATE OBLIGATION. This Special Provision will also be used by the Department to satisfy the requirements of the Business Enterprise for Minorities, Females, and Persons with Disabilities Act, 30 ILCS 575. When this Special Provision is used to satisfy state law requirements on 100 percent state-funded contracts, the federal government has no involvement in such contracts (not a federal-aid contract) and no responsibility to oversee the implementation of this Special Provision by the Department on those contracts. DBE participation on 100 percent state-funded contracts will not be credited toward fulfilling the Department's annual overall DBE goal required by the US Department of Transportation to comply with the federal DBE program requirements.

CONTRACTOR ASSURANCE. The Contractor makes the following assurance and agrees to include the assurance in each subcontract that the Contractor signs with a subcontractor:

> The Contractor, subrecipient, or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of contracts funded in whole or in part with federal or state funds. Failure by the Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate.

OVERALL GOAL SET FOR THE DEPARTMENT. As a requirement of compliance with 49 CFR part 26, the Department has set an overall goal for DBE participation in its federally assisted contracts. That goal applies to all federal-aid funds the Department will expend in its federally assisted contracts for the subject reporting fiscal year. The Department is required to make a good faith effort to achieve the overall goal. The dollar amount paid to all approved DBE firms performing work called for in this contract is eligible to be credited toward fulfillment of the Department's overall goal.

CONTRACT GOAL TO BE ACHIEVED BY THE CONTRACTOR. This contract includes a specific DBE utilization goal established by the Department. The goal has been included because the Department has determined that the work of this contract has subcontracting opportunities that may be suitable for performance by DBE companies. This determination is based on an assessment of the type of work, the location of the work, and the availability of DBE companies to do a part of the work. The assessment indicates that, in the absence of unlawful discrimination, and in an arena of fair and open competition, DBE companies can be expected to perform **3.0%** of the work. This percentage is set as the DBE participation goal for this contract. Consequently, in addition to the other award criteria established for this contract, the Department will award this contract to a bidder who makes a good faith effort to meet this goal of DBE participation in the performance of the work. A bidder makes a good faith effort for award consideration if either of the following is done in accordance with the procedures set forth in this Special Provision:

(a) The bidder documents that firmly committed DBE participation has been obtained to meet the goal; or

(b) The bidder documents that a good faith effort has been made to meet the goal, even though the effort did not succeed in obtaining enough DBE participation to meet the goal.

DBE LOCATOR REFERENCES. Bidders may consult the DBE Directory as a reference source for DBE companies certified by the Department. In addition, the Department maintains a letting and item specific DBE locator information system whereby DBE companies can register their interest in providing quotes on particular bid items advertised for letting. Information concerning DBE companies willing to quote work for particular contracts may be obtained by contacting the Department's Bureau of Small Business Enterprises at telephone number (217)785-4611, or by visiting the Department's web site at www.dot.il.gov.

BIDDING PROCEDURES. Compliance with the bidding procedures of this Special Provision is required prior to the award of the contract and the failure of the as-read low bidder to comply will render the bid not responsive.

(a) In order to assure the timely award of the contract, the as-read low bidder shall submit a Disadvantaged Business Utilization Plan on Department form SBE 2026 within seven working days after the date of letting. To meet the seven day requirement, the bidder may send the Plan by certified mail or delivery service within the seven working day period. If a question arises concerning the mailing date of a Plan, the mailing date will be established by the U.S. Postal Service postmark on the original certified mail receipt from the U.S. Postal Service or the receipt issued by a delivery service. It is the responsibility of the bidder to ensure that the postmark or receipt date is affixed within the seven working days if the bidder intends to rely upon mailing or delivery to satisfy the submission day requirement. The Plan is to be submitted to the Department of Transportation, Bureau of Small Business Enterprises, Contract Compliance Section, 2300 South Dirksen Parkway, Room 319, Springfield, Illinois 62764 (Telefax: (217)785-1524). It is the responsibility of the bidder to obtain confirmation of telefax delivery. The Department will not accept a Utilization Plan if it does not meet the seven day submittal requirement and the bid will be declared not responsive. In the event the bid is declared not responsive due to a failure to submit a Plan or failure to comply with the bidding

procedures set forth herein, the Department may elect to cause the forfeiture of the penal sum of the bidder's proposal guaranty, and may deny authorization to bid the project if re-advertised for bids. The Department reserves the right to invite any other bidder to submit a Utilization Plan at any time for award consideration or to extend the time for award.

(b) The Utilization Plan shall indicate that the bidder either has obtained sufficient DBE participation commitments to meet the contract goal or has not obtained enough DBE participation commitments in spite of a good faith effort to meet the goal. The Utilization Plan shall further provide the name, telephone number, and telefax number of a responsible official of the bidder designated for purposes of notification of plan approval or disapproval under the procedures of this Special Provision.

(c) The Utilization Plan shall include a DBE Participation Commitment Statement, Department form SBE 2025, for each DBE proposed for the performance of work to achieve the contract goal. The signatures on these forms must be original signatures. All elements of information indicated on the said form shall be provided, including but not limited to the following:

(1) The name and address of each DBE to be used;

(2) A description, including pay item numbers, of the commercially useful work to be done by each DBE;

(3) The price to be paid to each DBE for the identified work specifically stating the quantity, unit price, and total subcontract price for the work to be completed by the DBE. If partial pay items are to be performed by the DBE, indicate the portion of each item, a unit price where appropriate and the subcontract price amount;

(4) A commitment statement signed by the bidder and each DBE evidencing availability and intent to perform commercially useful work on the project; and

(5) If the bidder is a joint venture comprised of DBE firms and non-DBE firms, the plan must also include a clear identification of the portion of the work to be performed by the DBE partner(s).

(d) The contract will not be awarded until the Utilization Plan submitted by the bidder is approved. The Utilization Plan will be approved by the Department if the Plan commits sufficient commercially useful DBE work performance to meet the contract goal. The Utilization Plan will not be approved by the Department if the Plan does not commit sufficient DBE performance to meet the contract goal unless the bidder documents that it made a good faith effort to meet the goal. The good faith procedures of Section VIII of this special provision apply. If the Utilization Plan is not approved because it is deficient in a technical matter, unless waived by the Department, the bidder will be notified and will be allowed no less than a five working day period in order to cure the deficiency.

CALCULATING DBE PARTICIPATION. The Utilization Plan values represent work anticipated to be performed and paid for upon satisfactory completion. The Department is only able to count toward the achievement of the overall goal and the contract goal the value of payments

made for the work actually performed by DBE companies. In addition, a DBE must perform a commercially useful function on the contract to be counted. A commercially useful function is generally performed when the DBE is responsible for the work and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. The Department and Contractor are governed by the provisions of 49 CFR part 26.55(c) on questions of commercially useful functions as it affects the work. Specific counting guidelines are provided in 49 CFR part 26.55, the provisions of which govern over the summary contained herein.

(a) DBE as the Contractor: 100 percent goal credit for that portion of the work performed by the DBE's own forces, including the cost of materials and supplies. Work that a DBE subcontracts to a non-DBE firm does not count toward the DBE goals.

(b) DBE as a joint venture Contractor: 100 percent goal credit for that portion of the total dollar value of the contract equal to the distinct, clearly defined portion of the work performed by the DBE's own forces.

(c) DBE as a subcontractor: 100 percent goal credit for the work of the subcontract performed by the DBE's own forces, including the cost of materials and supplies, excluding the purchase of materials and supplies or the lease of equipment by the DBE subcontractor from the prime Contractor or its affiliates. Work that a DBE subcontractor in turn subcontracts to a non-DBE firm does not count toward the DBE goal.

(d) DBE as a trucker: 100 percent goal credit for trucking participation provided the DBE is responsible for the management and supervision of the entire trucking operation for which it is responsible. At least one truck owned, operated, licensed, and insured by the DBE must be used on the contact. Credit will be given for the full value of all such DBE trucks operated using DBE employed drivers. Goal credit will be limited to the value of the reasonable fee or commission received by the DBE if trucks are leased from a non-DBE company.

(e) DBE as a material supplier:

(1) 60 percent goal credit for the cost of the materials or supplies purchased from a DBE regular dealer.

(2) 100 percent goal credit for the cost of materials or supplies obtained from a DBE manufacturer.

(3) 100 percent credit for the value of reasonable fees and commissions for the procurement of materials and supplies if not a regular dealer or manufacturer.

GOOD FAITH EFFORT PROCEDURES. If the bidder cannot obtain sufficient DBE commitments to meet the contract goal, the bidder must document in the Utilization Plan the good faith efforts made in the attempt to meet the goal. This means that the bidder must show that all necessary and reasonable steps were taken to achieve the contract goal. Necessary and reasonable steps are those which could reasonably be expected to obtain sufficient DBE participation. The Department will consider the quality, quantity, and intensity of the kinds of

efforts that the bidder has made. Mere *pro forma* efforts are not good faith efforts; rather, the bidder is expected to have taken those efforts that would be reasonably expected of a bidder actively and aggressively trying to obtain DBE participation sufficient to meet the contract goal.

(a) The following is a list of types of action that the Department will consider as part of the evaluation of the bidder's good faith efforts to obtain participation. These listed factors are not intended to be a mandatory checklist and are not intended to be exhaustive. Other factors or efforts brought to the attention of the Department may be relevant in appropriate cases, and will be considered by the Department.

(1) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBE companies that have the capability to perform the work of the contract. The bidder must solicit this interest within sufficient time to allow the DBE companies to respond to the solicitation. The bidder must determine with certainty if the DBE companies are interested by taking appropriate steps to follow up initial solicitations.

(2) Selecting portions of the work to be performed by DBE companies in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the prime Contractor might otherwise prefer to perform these work items with its own forces.

(3) Providing interested DBE companies with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.

(4) a. Negotiating in good faith with interested DBE companies. It is the bidder's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of DBE companies that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBE companies to perform the work.

b. A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBE companies is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also, the ability or desire of a bidder to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Bidders are not, however, required to accept higher quotes from DBE companies if the price difference is excessive or unreasonable.

(5) Not rejecting DBE companies as being unqualified without sound reasons based on a thorough investigation of their capabilities. The bidder's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the bidder's efforts to meet the project goal.

(6) Making efforts to assist interested DBE companies in obtaining bonding, lines of credit, or insurance as required by the recipient or Contractor.

(7) Making efforts to assist interested DBE companies in obtaining necessary equipment, supplies, materials, or related assistance or services.

(8) Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBE companies.

(b) If the Department determines that the bidder has made a good faith effort to secure the work commitment of DBE companies to meet the contract goal, the Department will award the contract provided that it is otherwise eligible for award. If the Department determines that a good faith effort has not been made, the Department will notify the bidder of that preliminary determination by contacting the responsible company official designated in the Utilization Plan. The preliminary determination shall include a statement of reasons why good faith efforts have not been found, and may include additional good faith efforts that the bidder could take. The notification will designate a five working day period during which the bidder shall take additional efforts. The bidder is not limited by a statement of additional efforts, but may take other action beyond any stated additional efforts in order to obtain additional DBE commitments. The bidder shall submit an amended Utilization Plan if additional DBE commitments to meet the contract goal are secured. If additional DBE commitments sufficient to meet the contract goal are not secured, the bidder shall report the final good faith efforts made in the time allotted. All additional efforts taken by the bidder will be considered as part of the bidder's good faith efforts. If the bidder is not able to meet the goal after taking additional efforts, the Department will make a pre-final determination of the good faith efforts of the bidder and will notify the designated responsible company official of the reasons for an adverse determination.

(c) The bidder may request administrative reconsideration of a pre-final determination adverse to the bidder within the five working days after the notification date of the determination by delivering the request to the Department of Transportation, Bureau of Small Business Enterprises, Contract Compliance Section, 2300 South Dirksen Parkway, Room 319, Springfield, Illinois 62764 (Telefax: (217)785-1524). Deposit of the request in the United States mail on or before the fifth business day shall not be deemed delivery. The pre-final determination shall become final if a request is not made and delivered. A request may provide additional written documentation and/or argument concerning the issue of whether an adequate good faith effort was made to meet the contract goal. In addition, the request shall be considered a consent by the bidder to extend the time for award. The request will be forwarded to the Department's

Reconsideration Officer. The Reconsideration Officer will extend an opportunity to the bidder to meet in person in order to consider all issues of whether the bidder made a good faith effort to meet the goal. After the review by the Reconsideration Officer, the bidder will be sent a written decision within ten working days after receipt of the request for reconsideration, explaining the basis for finding that the bidder did or did not meet the goal or make adequate good faith efforts to do so. A final decision by the Reconsideration Officer that a good faith effort was made shall approve the Utilization Plan submitted by the bidder and shall clear the contract for award. A final decision that a good faith effort was not made shall render the bid not responsive.

CONTRACT COMPLIANCE. Compliance with this Special Provision is an essential part of the contract. The Department is prohibited by federal regulations from crediting the participation of a DBE included in the Utilization Plan toward either the contract goal or the Department's overall goal until the amount to be applied toward the goals has been paid to the DBE. The following administrative procedures and remedies govern the compliance by the Contractor with the contractual obligations established by the Utilization Plan. After approval of the Plan and award of the contract, the Utilization Plan and individual DBE Participation Statements become part of the contract. If the Contractor did not succeed in obtaining enough DBE participation to achieve the advertised contract goal, and the Utilization Plan was approved and contract awarded based upon a determination of good faith, the total dollar value of DBE work calculated in the approved Utilization Plan as a percentage of the awarded contract value shall become the amended contract goal.

(a) No amendment to the Utilization Plan may be made without prior written approval from the Department's Bureau of Small Business Enterprises. All requests for amendment to the Utilization Plan shall be submitted to the Department of Transportation, Bureau of Small Business Enterprises, Contract Compliance Section, 2300 South Dirksen Parkway, Room 319, Springfield, Illinois 62764. Telephone number (217) 785-4611. Telefax number (217) 785-1524.

(b) All work indicated for performance by an approved DBE shall be performed, managed, and supervised by the DBE executing the Participation Statement. The Contractor shall not terminate for convenience a DBE listed in the Utilization Plan and then perform the work of the terminated DBE with its own forces, those of an affiliate or those of another subcontractor, whether DBE or not, without first obtaining the written consent of the Bureau of Small Business Enterprises to amend the Utilization Plan. If a DBE listed in the Utilization Plan is terminated for reasons other than convenience, or fails to complete its work on the contract for any reason, the Contractor shall make good faith efforts to find another DBE to substitute for the terminated DBE. The good faith efforts shall be directed at finding another DBE to perform at least the same amount of work under the contract as the DBE that was terminated, but only to the extent needed to meet the contract goal or the amended contract goal. The Contractor shall notify the Bureau of Small Business Enterprises of any termination for reasons other than convenience, and shall obtain approval for inclusion of the substitute DBE in the Utilization Plan. If good faith efforts following a termination of a DBE for cause are not successful, the Contractor shall contact the Bureau and provide a full accounting of the efforts undertaken to obtain substitute DBE participation. The Bureau will evaluate the good faith efforts in light of all circumstances surrounding the performance status of the contract, and determine whether the contract goal should be amended.

(c) The Contractor shall maintain a record of payments for work performed to the DBE participants. The records shall be made available to the Department for inspection upon request. After the performance of the final item of work or delivery of material by a DBE and final payment therefor to the DBE by the Contractor, but not later than thirty calendar days after payment has been made by the Department to the Contractor for such work or material, the Contractor shall submit a DBE Payment Report on Department form SBE 2115 to the Regional Engineer. If full and final payment has not been made to the DBE, the Report shall indicate whether a disagreement as to the payment required exists between the Contractor and the DBE or if the Contractor believes that the work has not been satisfactorily completed. If the Contractor does not have the full amount of work indicated in the Utilization Plan performed by the DBE companies indicated in the Plan, the Department will deduct from contract payments to the Contractor the amount of the goal not achieved as liquidated and ascertained damages.

(d) The Department reserves the right to withhold payment to the Contractor to enforce the provisions of this Special Provision. Final payment shall not be made on the contract until such time as the Contractor submits sufficient documentation demonstrating achievement of the goal in accordance with this Special Provision or after liquidated damages have been determined and collected.

(e) Notwithstanding any other provision of the contract, including but not limited to Article 109.09 of the Standard Specifications, the Contractor may request administrative reconsideration of a decision to deduct the amount of the goal not achieved as liquidated damages. A request to reconsider shall be delivered to the Contract Compliance Section and shall be handled and considered in the same manner as set forth in paragraph (c) of "Good Faith Effort Procedures" of this Special Provision, except a final decision that a good faith effort was not made during contract performance to achieve the goal agreed to in the Utilization Plan shall be the final administrative decision of the Department.

DOWEL BARS (BDE)
Effective: April 1, 2007 Revised: January 1, 2008

Revise the fifth and sixth sentences of Article 1006.11(b) of the Standard Specifications to read:

"The bars shall be epoxy coated according to AASHTO M 284, except the thickness of the epoxy shall be 7 to 12 mils (0.18 to 0.30 mm) and patching of the ends will not be required. The epoxy coating applicator shall be certified according to the current Bureau of Materials and Physical Research Policy Memorandum, "Epoxy Coating Plant Certification Procedure". The Department will maintain an approved list."

ENGINEER'S FIELD OFFICE TYPE A (BDE)
Effective: April 1, 2007

Add the following to Article 670.02 of the Standard Specifications:

"(n) One wireless data router with wireless network connection to access the Department's network for the exclusive use of the Engineer. The wireless data router shall operate within a temperature range of 32 to 131°F (0 to 55°C) and have the following capabilities.

(1) Connection.

a. CDMA wireless technology with authentication and identification system for security.

b. CDMA based EV-DO(rev.A) transmission capabilities.

c. EVDO(rev.A) shall be backward compatible through both EVDO(rev0) and 1XRTT.

d. Connection shall be capable of compression in order to optimize the connection speed.

(2) Router.

a. A minimum of four ethernet ports for wired connection.

b. Capable of 802.11b & g for wireless LAN interface.

c. Configurable ability to port data to fax capabilities through the router using efax or IP fax devices.

d. Automatic receipt of IP addresses with DHCP server.

e. Configurable OFDM (Orthogonal Frequency Division Multiplexing) technology.

(3) Security.

a. Configurable capable of 64-bit or 128-bit WEP encryption, and WPA-PSK authentication wireless security (WiFi Protected Access - Pre-shared Key Mode).

b. Configurable LAN security: NAT with DHCP, PPTP VPN pass-through, MAC filtering, IP filtering, and filter scheduling.

c. Configurable firewall security at the router."

EQUIPMENT RENTAL RATES (BDE)
Effective: August 2, 2007 Revised: January 2, 2008

Replace the second and third paragraphs of Article 105.07(b)(4)a. of the Standard Specifications with the following:

"Equipment idled which cannot be used on other work, and which is authorized to standby on the project site by the Engineer, will be paid for according to Article 109.04(b)(4)."

Replace Article 109.04(b)(4) of the Standard Specifications with the following:

"(4) Equipment. Equipment used for extra work shall be authorized by the Engineer. The equipment shall be specifically described, be of suitable size and capacity for the work to be performed, and be in good operating condition. For such equipment, the Contractor will be paid as follows.

a. Contractor Owned Equipment. Contractor owned equipment will be paid for by the hour using the applicable FHWA hourly rate from the "Equipment Watch Rental Rate Blue Book" (Blue Book) in effect when the force account work begins. The FHWA hourly rate is calculated as follows.

FHWA hourly rate = (monthly rate/176) x (model year adj.) x (Illinois adj.) + EOC

Where: EOC = Estimated Operating Costs per hour (from the Blue Book)

The time allowed will be the actual time the equipment is operating on the extra work. For the time required to move the equipment to and from the site of the extra work and any authorized idle (standby) time, payment will be made at the following hourly rate: 0.5 x (FHWA hourly rate - EOC).

All time allowed shall fall within the working hours authorized for the extra work.

The rates above include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs, overhaul and maintenance of any kind, depreciation, storage, overhead, profits, insurance, and all incidentals. The rates do not include labor.

The Contractor shall submit to the Engineer sufficient information for each piece of equipment and its attachments to enable the Engineer to determine the proper equipment category. If a rate is not established in the Blue Book for a particular piece of equipment, the Engineer will establish a rate for that piece of equipment that is consistent with its cost and use in the industry.

b. Rented Equipment. Whenever it is necessary for the Contractor to rent equipment to perform extra work, the rental and transportation costs of the equipment plus five percent for overhead will be paid. In no case shall the rental rates exceed those of established distributors or equipment rental agencies.

All prices shall be agreed to in writing before the equipment is used."

EROSION AND SEDIMENT CONTROL DEFICIENCY DEDUCTION (BDE)
Effective: April 1, 2007

Revise Article 105.03(a) of the Standard Specifications to read:

"(a) Erosion and Sediment Control Deficiency Deduction. When the Engineer is notified or determines an erosion and/or sediment control deficiency(s) exists, he/she will notify and direct the Contractor to correct the deficiency within a specified time. The specified time,

which begins upon notification to the Contractor, will be from 1/2 hour to 1 week based on the urgency of the situation and the nature of the deficiency. The Engineer will be the sole judge.

A deficiency may be any lack of repair, maintenance, or implementation of erosion and/or sediment control devices included in the contract, or any failure to comply with the conditions of the National Pollutant Discharge Elimination System (NPDES) Storm Water Permit for Construction Site Activities. A deficiency may also be applied to situations where corrective action is not an option such as the failure to participate in a jobsite inspection of the project, failure to install required measures prior to initiating earth moving operations, disregard of concrete washout requirements, or other disregard of the NPDES permit.

If the Contractor fails to correct a deficiency within the specified time, a daily monetary deduction will be imposed for each calendar day or fraction thereof the deficiency exists. The calendar day(s) will begin with notification to the Contractor and end with the Engineer's acceptance of the correction. The daily monetary deduction will be either $1000.00 or 0.05 percent of the awarded contract value, whichever is greater. For those deficiencies where corrective action was not an option, the monetary deduction will be immediate and will be valued at one calendar day."

HMA - HAULING ON PARTIALLY COMPLETED FULL-DEPTH PAVEMENT (BDE)
Effective: January 1, 2008

Revise Article 407.08 of the Standard Specifications to read:

"**407.08 Hauling on the Partially Completed Full-Depth Pavement.** Legally loaded trucks will be permitted on the partially completed full-depth HMA pavement only to deliver HMA mixture to the paver, provided the last lift has cooled a minimum of 12 hours. Hauling shall be limited to the distances shown in the following tables. The pavement surface temperature shall be measured using an infrared gun. The use of water to cool the pavement to permit hauling will not be allowed. The Contractor's traffic pattern shall minimize hauling on the partially completed pavement and shall vary across the width of the pavement such that "tracking" of vehicles, one directly behind the other, does not occur.

MAXIMUM HAULING DISTANCE FOR PAVEMENT SURFACE TEMPERATURE BELOW 105 ºF (40 ºC)				
Total In-Place Thickness Being Hauled On, in. (mm)	Thickness of Lift Being Placed			
	3 in. (75 mm) or less		More than 3 in. (75 mm)	
	Modified Soil Subgrade	Granular Subbase	Modified Soil Subgrade	Granular Subbase
3.0 to 4.0 (75 to 100)	0.75 miles (1200 m)	1.0 mile (1600 m)	0.50 miles (800 m)	0.75 miles (1200 m)
4.1 to 5.0 (101 to 125)	1.0 mile (1600 m)	1.5 miles (2400 m)	0.75 miles (1200 m)	1.0 mile (1600 m)
5.1 to 6.0 (126 to 150)	2.0 miles (3200 m)	2.5 miles (4000 m)	1.5 miles (2400 m)	2.0 miles (3200 m)
6.1 to 8.0 (151 to 200)	2.5 miles (4000 m)	3.0 miles (4800 m)	2.0 miles (3200 m)	2.5 miles (4000 m)
Over 8.0 (200)	No Restrictions			

MAXIMUM HAULING DISTANCE FOR PAVEMENT SURFACE TEMPERATURE OF 105 ºF (40 ºC) AND ABOVE				
Total In-Place Thickness Being Hauled On, in. (mm)	Thickness of Lift Being Placed			
	3 in. (75 mm) or less		More than 3 in. (75 mm)	
	Modified Soil Subgrade	Granular Subbase	Modified Soil Subgrade	Granular Subbase
3.0 to 4.0 (75 to 100)	0.50 miles (800 m)	0.75 miles (1200 m)	0.25 miles (400 m)	0.50 miles (800 m)
4.1 to 5.0 (101 to 125)	0.75 miles (1200 m)	1.0 mile (1600 m)	0.50 miles (800 m)	0.75 miles (1200 m)
5.1 to 6.0 (126 to 150)	1.0 mile (1600 m)	1.5 miles (2400 m)	0.75 miles (1200 m)	1.0 mile (1600 m)
6.1 to 8.0 (151 to 200)	2.0 miles (3200 m)	2.5 miles (4000 m)	1.5 miles (2400 m)	2.0 miles (3200 m)
Over 8.0 (200)	No Restrictions			

Permissive hauling on the partially completed pavement shall not relieve the Contractor of his/her responsibility for damage to the pavement. Any portion of the full-depth HMA pavement that is damaged by hauling shall be removed and replaced, or otherwise repaired to the satisfaction of the Engineer.

Crossovers used to transfer haul trucks from one roadway to the other shall be at least 1000 ft (300 m) apart and shall be constructed of material that will prevent tracking of dust or mud on the completed HMA lifts. The Contractor shall construct, maintain, and remove all crossovers."

HOT-MIX ASPHALT - FIELD VOIDS IN THE MINERAL AGGREGATE (BDE)
Effective: April 1, 2007 Revised: April 1, 2008

Add the following to the table in Article 1030.05(d)(2)a. of the Standard Specifications:

"Parameter	Frequency of Tests High ESAL Mixture Low ESAL Mixture	Frequency of Tests All Other Mixtures	Test Method See Manual of Test Procedures for Materials
VMA	Day's production ≥ 1200 tons: 1 per half day of production	N/A	Illinois-Modified AASHTO R 35
Note 5.	Day's production < 1200 tons: 1 per half day of production for first 2 days and 1 per day thereafter (first sample of the day)		

Note 5. The G_{sb} used in the voids in the mineral aggregate (VMA) calculation shall be the same average G_{sb} value listed in the mix design."

Add the following to the Control Limits table in Article 1030.05(d)(4) of the Standard Specifications:

"CONTROL LIMITS			
Parameter	High ESAL Low ESAL Individual Test	High ESAL Low ESAL Moving Avg. of 4	All Other Individual Test
VMA	-0.7 % 2/	-0.5 % 2/	N/A

2/ Allowable limit below minimum design VMA requirement"

Add the following to the table in Article 1030.05(d)(5) of the Standard Specifications:

"CONTROL CHART REQUIREMENTS	High ESAL Low ESAL	All Other
	VMA"	

Revise the heading of Article 1030.05(d)(6)a.1. of the Standard Specifications to read:

"1. Voids, VMA, and Asphalt Binder Content."

Revise the first sentence of the first paragraph of Article 1030.05(d)(6)a.1.(a.) of the Standard Specifications to read:

"If the retest for voids, VMA, or asphalt binder content exceeds control limits, HMA production shall cease and immediate corrective action shall be instituted by the Contractor."

Revise the table in Article 1030.05(e) of the Standard Specifications to read:

"Test Parameter	Acceptable Limits of Precision
% Passing: 1/	
1/2 in. (12.5 mm)	5.0 %
No. 4 (4.75 mm)	5.0 %
No. 8 (2.36 mm)	3.0 %
No. 30 (600 μm)	2.0 %
Total Dust Content No. 200 (75 μm) 1/	2.2 %
Asphalt Binder Content	0.3 %
Maximum Specific Gravity of Mixture	0.026
Bulk Specific Gravity	0.030
VMA	1.4 %
Density (% Compaction)	1.0 % (Correlated)

1/ Based on washed ignition."

HOT-MIX ASPHALT – PLANT TEST FREQUENCY (BDE)
Effective: April 1, 2008

Revise the table in Article 1030.05(d)(2)a. of the Standard Specifications to read:

"Parameter	Frequency of Tests High ESAL Mixture Low ESAL Mixture	Frequency of Tests All Other Mixtures	Test Method See Manual of Test Procedures for Materials
Aggregate Gradation Hot bins for batch and continuous plants. Individual cold-feed or combined belt-feed for drier drum plants. % passing sieves: 1/2 in. (12.5 mm), No. 4 (4.75 mm), No. 8 (2.36 mm), No. 30 (600 μm) No. 200 (75 μm) Note 1.	1 dry gradation per day of production (either morning or afternoon sample). and 1 washed ignition oven test on the mix per day of production (conduct in the afternoon if dry gradation is conducted in the morning or vice versa). Note 3. Note 4.	1 gradation per day of production. The first day of production shall be a washed ignition oven test on the mix. Thereafter, the testing shall alternate between dry gradation and washed ignition oven test on the mix. Note 4.	Illinois Procedure
Asphalt Binder Content by Ignition Oven Note 2.	1 per half day of production	1 per day	Illinois-Modified AASHTO T 308
Air Voids Bulk Specific Gravity of Gyratory Sample	Day's production ≥ 1200 tons: 1 per half day of production	1 per day	Illinois-Modified AASHTO T 312
	Day's production < 1200 tons: 1 per half day of production for first 2 days and 1 per day thereafter (first sample of the day)		
Maximum Specific Gravity of Mixture	Day's production ≥ 1200 tons: 1 per half day of production	1 per day	Illinois-Modified AASHTO T 209"
	Day's production < 1200 tons: 1 per half day of production for first 2 days and 1 per day thereafter (first sample of the day)		

HOT-MIX ASPHALT – TRANSPORTATION (BDE)
Effective: April 1, 2008

Revise Article 1030.08 of the Standard Specifications to read:

"**1030.08 Transportation.** Vehicles used in transporting HMA shall have clean and tight beds. The beds shall be sprayed with asphalt release agents from the Department's approved list. In lieu of a release agent, the Contractor may use a light spray of water with a light scatter of manufactured sand (FA 20 or FA 21) evenly distributed over the bed of the vehicle. After spraying, the bed of the vehicle shall be in a completely raised position and it shall remain in this position until all excess asphalt release agent or water has been drained.

When the air temperature is below 60 ºF (15 ºC), the bed, including the end, endgate, sides and bottom shall be insulated with fiberboard, plywood or other approved insulating material and shall have a thickness of not less than 3/4 in (20 mm). When the insulation is placed inside the bed, the insulation shall be covered with sheet steel approved by the Engineer. Each vehicle shall be equipped with a cover of canvas or other suitable material meeting the approval of the Engineer which shall be used if any one of the following conditions is present.

(a) Ambient air temperature is below 60 ºF (15 ºC).

(b) The weather is inclement.

(c) The temperature of the HMA immediately behind the paver screed is below 250 ºF (120 ºC).

The cover shall extend down over the sides and ends of the bed for a distance of approximately 12 in. (300 mm) and shall be fastened securely. The covering shall be rolled back before the load is dumped into the finishing machine."

IMPACT ATTENUATORS (BDE)
Effective: November 1, 2003 Revised: January 1, 2007

Description. This work shall consist of furnishing and installing impact attenuators of the category and test level specified.

Materials. Materials shall meet the requirements of the impact attenuator manufacturer and the following:

Item	Article/Section
(a) Fine Aggregate (Note 1)	1003.01
(b) Steel Posts, Structural Shapes, and Plates	1006.04
(c) Rail Elements, End Section Plates, and Splice Plates	1006.25
(d) Bolts, Nuts, Washers and Hardware	1006.25
(e) Hollow Structural Tubing	1006.27(b)
(f) Wood Posts and Wood Blockouts	1007.01, 1007.02, 1007.06
(g) Preservative Treatment	1007.12

Note 1. Fine aggregate shall be FA 1 or FA 2, Class A quality. The sand shall be unbagged and shall have a maximum moisture content of five percent.

CONSTRUCTION REQUIREMENTS

General. Impact attenuators shall meet the testing criteria contained in National Cooperative Highway Research Program (NCHRP) Report 350 for the test level specified and shall be on the Department's approved list. Fully redirective and partially redirective attenuators shall also be designed for bi-directional impacts.

Installation. Regrading of slopes or approaches for the installation shall be as shown on the plans.

Attenuator bases, when required by the manufacturer, shall be constructed on a prepared subgrade according to the manufacturer's specifications. The surface of the base shall be slightly sloped or crowned to facilitate drainage. For sand modules, the perimeter of each module and the specified weight (mass) of sand in each module shall be painted on the surface of the base.

Impact attenuators shall be installed according to the manufacturer's specifications and include all necessary transitions between the impact attenuator and the item to which it is attached.

Method of Measurement. This work will be measured for payment as each, where each is defined as one complete installation.

Basis of Payment. This work, will be paid for at the contract unit price per each for IMPACT ATTENUATORS (FULLY REDIRECTIVE, NARROW); IMPACT ATTENUATORS (FULLY REDIRECTIVE, WIDE); IMPACT ATTENUATORS (FULLY REDIRECTIVE, RESETTABLE); IMPACT ATTENUATORS (SEVERE USE, NARROW); IMPACT ATTENUATORS (SEVERE USE, WIDE); IMPACT ATTENUATORS (PARTIALLY REDIRECTIVE); or IMPACT ATTENUATORS (NON-REDIRECTIVE), of the test level specified.

Regrading of slopes or approaches will be paid for according to Section 202 and/or Section 204 of the Standard Specifications.

IMPACT ATTENUATORS, TEMPORARY (BDE)
Effective: November 1, 2003 Revised: January 1, 2007

Description. This work shall consist of furnishing, installing, maintaining, and removing temporary impact attenuators of the category and test level specified.

Materials. Materials shall meet the requirements of the impact attenuator manufacturer and the following:

Item	Article/Section
(a) Fine Aggregate (Note 1)	1003.01
(b) Steel Posts, Structural Shapes, and Plates	1006.04
(c) Rail Elements, End Section Plates, and Splice Plates	1006.25
(d) Bolts, Nuts, Washers and Hardware	1006.25
(e) Hollow Structural Tubing	1006.27(b)
(f) Wood Posts and Wood Blockouts	1007.01, 1007.02, 1007.06
(g) Preservative Treatment	1007.12
(h) Packaged Rapid Hardening Mortar	1018.01

Note 1. Fine aggregate shall be FA 1 or FA 2, Class A quality. The sand shall be unbagged and shall have a maximum moisture content of five percent.

CONSTRUCTION REQUIREMENTS

General. Impact Attenuators shall meet the testing criteria contained in National Cooperative Highway Research Program (NCHRP) Report 350 for the test level specified and shall be on the Department's approved list.

Installation. Regrading of slopes or approaches for the installation shall be as shown on the plans.

Attenuator bases, when required by the manufacturer, shall be constructed on a prepared subgrade according to the manufacturer's specifications. The surface of the base shall be slightly sloped or crowned to facilitate drainage.

Impact attenuators shall be installed according to the manufacturer's specifications and include all necessary transitions between the impact attenuator and the item to which it is attached.

When water filled attenuators are used between November 1 and April 15, they shall contain anti-freeze according to the manufacturer's recommendations.

Markings. Sand module impact attenuators shall be striped with alternating reflectorized Type AA or Type AP fluorescent orange and reflectorized white horizontal, circumferential stripes. There shall be at least two of each stripe on each module.

Other types of impact attenuators shall have a terminal marker applied to their nose and reflectors along their sides.

Maintenance. All maintenance of the impact attenuators shall be the responsibility of the Contractor until removal is directed by the Engineer.

Relocate. When relocation of temporary impact attenuators is specified, they shall be removed, relocated and reinstalled at the new location. The reinstallation requirements shall be the same as those for a new installation.

Removal. When the Engineer determines the temporary impact attenuators are no longer required, the installation shall be dismantled with all hardware becoming the property of the Contractor.

Surplus material shall be disposed of according to Article 202.03. Anti-freeze, when present, shall be disposed of/recycled according to local ordinances.

When impact attenuators have been anchored to the pavement, the anchor holes shall be repaired with rapid set mortar Only enough water to permit placement and consolidation by rodding shall be used and the material shall be struck-off flush.

Method of Measurement. This work will be measured for payment as each, where each is defined as one complete installation.

Basis of Payment. This work will be paid for at the contract unit price per each for IMPACT ATTENUATORS, TEMPORARY (FULLY REDIRECTIVE, NARROW); IMPACT ATTENUATORS, TEMPORARY (FULLY REDIRECTIVE, WIDE); IMPACT ATTENUATORS, TEMPORARY (FULLY REDIRECTIVE, RESETTABLE); IMPACT ATTENUATORS, TEMPORARY (SEVERE USE, NARROW); IMPACT ATTENUATORS, TEMPORARY (SEVERE USE, WIDE); or IMPACT ATTENUATORS, TEMPORARY (NON-REDIRECTIVE) of the test level specified.

Relocation of the devices will be paid for at the contract unit price per each for IMPACT ATTENUATORS, RELOCATE (FULLY REDIRECTIVE); IMPACT ATTENUATORS, RELOCATE (SEVERE USE); or IMPACT ATTENUATORS, RELOCATE (NON-REDIRECTIVE); of the test level specified.

Regrading of slopes or approaches will be paid for according to Section 202 and/or Section 204 of the Standard Specifications.

MULTILANE PAVEMENT PATCHING (BDE)
Effective: November 1, 2002

Pavement broken and holes opened for patching shall be completed prior to weekend or holiday periods. Should delays of any type or for any reason prevent the completion of the work, temporary patches shall be constructed. Material able to support the average daily traffic and meeting the approval of the Engineer shall be used for the temporary patches. The cost of furnishing, placing, maintaining, removing and disposing of the temporary work, including traffic control, shall be the responsibility of the Contractor.

ORGANIC ZINC-RICH PAINT SYSTEM (BDE)
Effective: November 1, 2001 Revised: January 1, 2008

Add the following to Section 1008 of the Standard Specifications:

"**1008.05 Organic Zinc-Rich Paint System.** The organic zinc-rich paint system shall consist of an organic zinc-rich primer, an epoxy or urethane intermediate coat, and aliphatic urethane finish coats. It is intended for use over blast-cleaned steel when three-coat shop applications are specified. The system is also suitable for field painting blast-cleaned existing structures.

The coating system shall be evaluated for performance through the National Transportation Product Evaluation Program (NTPEP) for Structural Steel Coatings following the requirements of AASHTO R 31, and shall meet the performance criteria listed herein. After successful NTPEP testing, the coatings shall be submitted to the Illinois Department of Transportation, Bureau of Materials and Physical Research, for qualification and acceptance testing.

(a) General Requirements.

(1) Compatibility. Each coating in the system shall be supplied by the same paint manufacturer.

(2) Toxicity. Each coating shall contain less than 0.01 percent lead in the dry film and no more than trace amounts of hexavalent chromium, cadmium, mercury or other toxic heavy metals.

(3) Volatile Organics. The volatile organic compounds of each coating shall not exceed 3.5 lb/gal (420 g/L) as applied.

(b) Panel Preparation for NTPEP testing. The test panels shall be prepared according to AASHTO R 31, except for the following: Test panels shall be scribed according to ASTM D 1654 with a single "X" mark centered on the panel. The rectangular dimensions of the scribe shall have a top width of 2 in. (50 mm) and a height of 4 in. (100 mm). The scribe cut shall expose the steel substrate as verified with a microscope.

(c) Zinc-Rich Primer Requirements.

(1) Generic Type. This material shall be an organic zinc-rich epoxy or urethane primer. It shall be suitable for topcoating with epoxies, urethanes, and acrylics.

(2) Zinc Dust. The zinc dust pigment shall comply with ASTM D 520, Type II.

(3) Slip Coefficient. The organic zinc coating shall meet a Class B AASHTO slip coefficient (0.50 or greater) for structural steel joints using ASTM A 325 (A 325M) or A 490 (A 490M) bolts.

(4) Adhesion. The adhesion to an abrasively blasted steel substrate shall not be less than 900 psi (6.2 MPa) when tested according to ASTM D 4541 Annex A4.

(5) Unit Weight. The unit weight of the mixed material shall be within 0.4 lb/gal (48 kg/cu m) of the original qualification sample unit weight when tested according to ASTM D 1475.

(6) Percent Solids by Weight of Mixed Primer. The percent solids by weight for the mixed material shall be a minimum of 70 percent and shall not vary more than ±2 percentage points from the percent solids by weight of the original qualification samples when tested according to ASTM D 2369.

(7) Percent Solids by Weight of Vehicle Component. The percent solids by weight of the vehicle component shall not vary more than ±2 percentage points from the percent solids by weight of the original qualification samples when tested according to ASTM D 2369.

(8) Viscosity. The viscosity of the mixed material shall not vary more than ±10 Krebs Units from the original qualification sample viscosity when tested according to ASTM D 562 at 77 ºF (25 ºC).

(9) Dry Set to Touch. The mixed material when applied at 6 mils (150 microns) wet film thickness shall have a dry set to touch of 30 minutes or less when tested according to ASTM D 1640 at 77°ºF (25 ºC).

(10) Pot Life. After sitting eight hours at 77°ºF (25 ºC), the mixed material shall not show curdling, gelling, gassing, or hard caking.

(d) Intermediate Coat Requirements.

(1) Generic Type. This material shall be an epoxy or urethane. It shall be suitable as an intermediate coat over inorganic and organic zinc primers and compatible with acrylic, epoxy, and polyurethane topcoats.

(2) Color. The color of the intermediate coat shall be white, off-white, or beige.

(3) Unit Weight. The unit weight of the mixed material and the unit weight of the individual components shall be within 0.20 lb/gal (24 kg/cu m) of the original qualification sample unit weights when tested according to ASTM D 1475.

(4) Percent Solids by Weight. The percent solids by weight for the mixed material shall not vary more than ±2 percentage points from the percent solids by weight of the original qualification samples when tested according to ASTM D 2369.

(5) Dry Time. The mixed material shall be dry to touch in two hours and dry hard in eight hours when applied at 10 mils (255 microns) wet film thickness and tested according to ASTM D 1640.

(6) Viscosity. The viscosity of the mixed material shall not vary more than ±10 Krebs Units from the original qualification samples when tested according to ASTM D 562 at 77 ºF (25 ºC).

(7) Pot Life. After sitting two hours at 77°ºF (25 ºC), the mixed material shall not show curdling, gelling, gassing, or hard caking.

(e) Urethane Finish Coat Requirements.

(1) Generic Type. This material shall be an aliphatic urethane. It shall be suitable as a topcoat over epoxies and urethanes.

(2) Color and Hiding Power. The finish coat shall match Munsell Glossy Color 7.5G 4/8 Interstate Green, 2.5YR 3/4 Reddish Brown, 10B 3/6 Blue, or 5B 7/1 Gray. The color difference shall not exceed 3.0 Hunter Delta E Units. Color difference shall be measured by instrumental comparison of the designated Munsell standard to a minimum dry film thickness of 3 mils (75 microns) of sample coating produced on a test panel according to ASTM D 823, Practice E, Hand–Held, Blade Film Application. Color measurements shall be determined on a spectrophotometer with 45 degrees circumferential/zero degrees geometry, illuminant C, and two degrees observer angle. The spectrophotometer shall measure the visible spectrum from 380-720 nanometers with a wavelength interval and spectral bandpass of 10 nanometers.

(3) Contrast Ratio. The contrast ratio of the finish coat applied at 3 mils (75 microns) dry film thickness shall not be less than 0.99 when tested according to ASTM D 2805.

(4) Weathering Resistance. Test panels shall be aluminum alloy measuring 12 x 4 in. (300 x 100 mm) prepared according to ASTM D 1730 Type A, Method 1 Solvent Cleaning. A minimum dry film thickness of 3 mils (75 microns) of finish coat shall be applied to three test panels according to ASTM D 823, Practice E, Hand Held Blade Film Application. The coated panels shall be cured at least 14 days at 75 °F ± 2 °F (24 °C ± 1 °C) and 50 ± 5 percent relative humidity. The panels shall be subjected to 300 hours of accelerated weathering using the light and water exposure apparatus (fluorescent UV - condensation type) as specified in ASTM G 53-96 and ASTM G 154 (equipped with UVB-313 lamps). The cycle shall consist of eight hours UV exposure at 140 °F (60 °C) followed by four hours of condensation at 104 °F (40 °C). After exposure, rinse the panel with clean water; allow to dry at room temperature for one hour. The exposed panels shall not show a color change of more than 3 Hunter Delta E Units.

(5) Dry Time. The mixed material shall be dry to touch in two hours and dry hard in six hours when applied at 6 mils (150 microns) wet film thickness and tested according to ASTM D 1640.

(f) Three Coat System Requirements.

(1) Finish Coat Color. For NTPEP testing purposes, the color of the finish coat shall match the latest applicable AASHTO R 31 specified color.

(2) Salt Fog. When tested according to ASTM B 117 and evaluated according to AASHTO R 31, the paint system shall exhibit no spontaneous delamination and not exceed the following acceptance levels after scraping after 5,000 hours of salt fog exposure:

Salt Fog Acceptance Criteria		
Blister Criteria	Rust Criteria	
Conversion Value	Maximum Creep	Average Creep
9	4 mm	2 mm

(3) Cyclic Exposure. When tested according to ASTM D 5894 and evaluated according to AASHTO R 31, the paint system shall exhibit no spontaneous delamination and not exceed the following acceptance levels after 5,000 hours of cyclic exposure:

Cyclic Exposure Acceptance Criteria		
Blister Criteria	Rust Criteria	
Conversion Value	Maximum Creep	Average Creep
9	7 mm	4 mm

(4) Abrasion. The abrasion resistance shall be evaluated according to ASTM D 4060 using a Taber Abrader with a 2.20 lb (1000 gram) load and CS 17 wheels. The duration of the test shall be 1,000 cycles. The loss shall be calculated by difference and be less than 0.00049 lb (220 mgs).

(5) Adhesion. The adhesion to an abrasively blasted steel substrate shall not be less than 900 psi (6.2 MPa) when tested according to ASTM D 4541 Annex A4.

(6) Freeze Thaw Stability. There shall be no reduction of adhesion, which exceeds the test precision, after 30 days of freeze/thaw/immersion testing. One 24 hour cycle shall consist of 16 hours of approximately -22 °F (-30 °C) followed by four hours of thawing at 122 °F (50 °C) and four hours tap water immersion at 77 °F (25 °C). The test panels shall remain in the freezer mode on weekends and holidays.

(g) Sampling, Testing, Acceptance, and Certification. Sampling, testing, acceptance, and certification of the coating system shall be according to Article 1008.01."

PAYMENTS TO SUBCONTRACTORS (BDE)
Effective: June 1, 2000 Revised: January 1, 2006

Federal regulations found at 49 CFR §26.29 mandate the Department to establish a contract clause to require Contractors to pay subcontractors for satisfactory performance of their subcontracts and to set the time for such payments.

State law also addresses the timing of payments to be made to subcontractors and material suppliers. Section 7 of the Prompt Payment Act, 30 ILCS 540/7, requires that when a Contractor receives any payment from the Department, the Contractor shall make corresponding, proportional payments to each subcontractor and material supplier performing work or supplying material within 15 calendar days after receipt of the Department payment. Section 7 of the Act further provides that interest in the amount of two percent per month, in addition to the payment due, shall be paid to any subcontractor or material supplier by the Contractor if the payment required by the Act is withheld or delayed without reasonable cause. The Act also provides that the time for payment required and the calculation of any interest due applies to transactions between subcontractors and lower-tier subcontractors and material suppliers throughout the contracting chain.

This Special Provision establishes the required federal contract clause, and adopts the 15 calendar day requirement of the State Prompt Payment Act for purposes of compliance with the federal regulation regarding payments to subcontractors. This contract is subject to the following payment obligations.

When progress payments are made to the Contractor according to Article 109.07 of the Standard Specifications, the Contractor shall make a corresponding payment to each subcontractor and material supplier in proportion to the work satisfactorily completed by each subcontractor and for the material supplied to perform any work of the contract. The proportionate amount of partial payment due to each subcontractor and material supplier throughout the contracting chain shall be determined by the quantities measured or otherwise determined as eligible for payment by the Department and included in the progress payment to the Contractor. Subcontractors and material suppliers shall be paid by the Contractor within 15 calendar days after the receipt of payment from the Department. The Contractor shall not hold retainage from the subcontractors. These obligations shall also apply to any payments made by subcontractors and material suppliers to their subcontractors and material suppliers; and to all payments made to lower tier subcontractors and material suppliers throughout the contracting chain. Any payment or portion of a payment subject to this provision may only be withheld from the subcontractor or material supplier to whom it is due for reasonable cause.

This Special Provision does not create any rights in favor of any subcontractor or material supplier against the State or authorize any cause of action against the State on account of any payment, nonpayment, delayed payment, or interest claimed by application of the State Prompt Payment Act. The Department will not approve any delay or postponement of the 15 day requirement except for reasonable cause shown after notice and hearing pursuant to Section 7(b) of the State Prompt Payment Act. State law creates other and additional remedies available to any subcontractor or material supplier, regardless of tier, who has not been paid for work properly performed or material furnished. These remedies are a lien against public funds set forth in Section 23(c) of the Mechanics Lien Act, 770 ILCS 60/23(c), and a recovery on the Contractor's payment bond according to the Public Construction Bond Act, 30 ILCS 550.

PORTLAND CEMENT CONCRETE PLANTS (BDE)
Effective: January 1, 2007

Add the following to Article 1020.11(a) of the Standard Specifications.

"(9) Use of Multiple Plants in the Same Construction Item. The Contractor may simultaneously use central-mixed, truck-mixed, and shrink-mixed concrete from more than one plant, for the same construction item, on the same day, and in the same pour. However, the following criteria shall be met.

a. Each plant shall use the same cement, finely divided minerals, aggregates, admixtures, and fibers.

b. Each plant shall use the same mix design. However, material proportions may be altered slightly in the field to meet slump and air content criteria. Field water adjustments shall not result in a difference that exceeds 0.02 between plants for water/cement ratio. The required cement factor for central-mixed concrete shall be increased to match truck-mixed or shrink-mixed concrete, if the latter two types of mixed concrete are used in the same pour.

c. The maximum slump difference between deliveries of concrete shall be 3/4 in. (19 mm) when tested at the jobsite. If the difference is exceeded, but test results are within specification limits, the concrete may be used. The Contractor shall take immediate corrective action and shall test subsequent deliveries of concrete until the slump difference is corrected. For each day, the first three truck loads of delivered concrete from each plant shall be tested for slump by the Contractor. Thereafter, when a specified test frequency for slump is to be performed, it shall be conducted for each plant at the same time.

d. The maximum air content difference between deliveries of concrete shall be 1.5 percent when tested at the jobsite. If the difference is exceeded, but test results are within specification limits, the concrete may be used. The Contractor shall take immediate corrective action and shall test subsequent deliveries of concrete until the air content difference is corrected. For each day, the first three truck loads of delivered concrete from each plant shall be tested for air content by the Contractor. Thereafter, when a specified test frequency for air content is to be performed, it shall be conducted for each plant at the same time.

e. Strength tests shall be performed and taken at the jobsite for each plant. When a specified strength test is to be performed, it shall be conducted for each plant at the same time. The difference between plants for their mean strength shall not exceed 450 psi (3100 kPa) compressive and 80 psi (550 kPa) flexural. The strength standard deviation for each plant shall not exceed 650 psi (4480 kPa) compressive and 110 psi (760 kPa) flexural. The mean and standard deviation requirements shall apply to the test of record. If the strength difference requirements are exceeded, the Contractor shall take corrective action.

f. The maximum haul time difference between deliveries of concrete shall be 15 minutes. If the difference is exceeded, but haul time is within specification limits, the concrete may be used. The Contractor shall take immediate corrective action and check subsequent deliveries of concrete until the haul time difference is corrected."

POLYUREA PAVEMENT MARKING (BDE)
Effective: April 1, 2004 Revised: January 1, 2007

Description. This work shall consist of furnishing and applying pavement marking lines.

The type of polyurea pavement marking applied will be determined by the type of reflective media used. Polyurea Pavement Marking Type I shall use glass beads as a reflective media. Polyurea Pavement Marking Type II shall use a combination of composite reflective elements and glass beads as a reflective media.

Polyurea-based liquid pavement markings shall only be applied by Contractors on the list of Approved Polyurea Contractors maintained by the Engineer of Operations and in effect on the date of advertisement for bids.

Materials. Materials shall meet the following requirements:

(a) Polyurea Pavement Marking. The polyurea pavement marking material shall consist of 100 percent solid two part system formulated and designed to provide a simple volumetric mixing ratio of two components (must be two or three volumes of Part A to one volume of Part B). No volatile or polluting solvents or fillers will be allowed.

(b) Pigmentation. The pigment content by weight (mass) of component A shall be determined by low temperature ashing according to ASTM D 3723. The pigment content shall not vary more than ± two percent from the pigment content of the original qualified paint.

White Pigment shall be Titanium Dioxide meeting ASTM D 476 Type II, Rutile.

Yellow Pigment shall be an Organic Yellow and contain no heavy metals.

(c) Environmental. Upon heating to application temperature, the material shall not exude fumes which are toxic or injurious to persons or property.

(d) Daylight Reflectance. The daylight directional reflectance of the cured polyurea material (without reflective media) shall be a minimum of 80 percent (white) and 50 percent (yellow) relative to magnesium oxide when tested using a color spectrophotometer with a 45 degrees circumferential /zero degrees geometry, illuminant C, and two degrees observer angle. The color instrument shall measure the visible spectrum from 380 to 720 nm with a wavelength measurement interval and spectral bandpass of 10 nm. In addition, the color of the yellow polyurea shall visually match Color Number 33538 of Federal Standard 595a with chromaticity limits as follows:

X	0.490	0.475	0.485	0.539
Y	0.470	0.438	0.425	0.456

(e) Weathering Resistance. The polyurea marking material, when mixed in the proper ratio and applied at 14 to 16 mils (0.35 to 0.41 mm) wet film thickness to an aluminum alloy panel (Federal Test Std. No. 141, Method 2013) and allowed to cure for 72 hours at room temperature, shall be subjected to accelerated weathering for 75 hours. The accelerated weathering shall be completed by using the light and water exposure apparatus (fluorescent UV - condensation type) and tested according to ASTM G 53.

The cycle shall consist of four hours UV exposure at 122 °F (50 °C) and four hours of condensation at 104 °F (40 °C). UVB 313 bulbs shall be used. At the end of the exposure period, the material shall show no substantial change in color or gloss.

(f) Dry Time. The polyurea pavement marking material, when mixed in the proper ratio and applied at 14 to 16 mils (0.35 to 0.41 mm) wet film thickness and with the proper saturation of reflective media, shall exhibit a no-tracking time of ten minutes or less when tested according to ASTM D 711.

(g) Adhesion. The catalyzed polyurea pavement marking materials when applied to a 4 x 4 x 2 in. (100 x 100 x 50 mm) concrete block, shall have a degree of adhesion which results in a 100 percent concrete failure in the performance of this test.

The concrete block shall be brushed on one side and have a minimum strength of 3500 psi (24,100 kPa). A 2 in. (50 mm) square film of the mixed polyurea shall be applied to the brushed surface and allowed to cure for 72 hours at room temperature. A 2 in. (50 mm) square cube shall be affixed to the surface of the polyurea by means of an epoxy glue. After the glue has cured for 24 hours, the polyurea specimen shall be placed on a dynamic testing machine in such a fashion so that the specimen block is in a fixed position and the 2 in. (50 mm) cube (glued to the polyurea surface) is attached to the dynamometer head. Direct upward pressure shall be slowly applied until the polyurea system fails. The location of the break and the amount of concrete failure shall be recorded.

(h) Hardness. The polyurea pavement marking materials when tested according to ASTM D 2240, shall have a shore D hardness of between 70 and 100. Films shall be cast on a rigid substrate at 14 to 16 mils (0.35 to 0.41 mm) in thickness and allowed to cure at room temperature for 72 hours before testing.

(i) Abrasion. The abrasion resistance shall be evaluated according to ASTM D 4060 using a Taber Abrader with a 1,000 gram load and CS 17 wheels. The duration of the test shall be 1,000 cycles. The loss shall be calculated by difference and be less than 120 mgs. The tests shall be run on cured samples of polyurea material which have been applied at a film thickness of 14 to 16 mils (0.35 to 0.41 mm) to code S-16 stainless steel plates. The films shall be allowed to cure at room temperature for at least 72 hours and not more than 96 hours before testing.

(j) Reflective Media. The reflective media shall meet the following requirements:

(1) Type I - The glass beads shall meet the requirements of Article 1095.07 of the Standard Specifications and the following requirements:

a. First Drop Glass Beads. The first drop glass beads shall be tested by the standard visual method of large glass spheres adopted by the Department. The beads shall have a silane coating and meet the following sieve requirements:

U.S. Standard Sieve Number	Sieve Size	% Passing By Weight (mass)
12	1.70 mm	95-100
14	1.40 mm	75-95
16	1.18 mm	10-47
18	1.00 mm	0-7
20	850 µm	0-5

b. Second Drop Glass Beads. The second drop glass beads shall meet the requirements of Article 1095.07 of the Standard Specifications for Type B.

(2) Type II - The combination of microcrystalline ceramic elements and glass beads shall meet the following requirements:

a. First Drop Glass Beads. The first drop glass beads shall meet the following requirements:

1. Composition. The elements shall be composed of a titania opacified ceramic core having clear and or yellow tinted microcrystalline ceramic beads embedded to the outer surface.

2. Index of Refraction. All microcrystalline reflective elements embedded to the outer surface shall have an index of refraction of 1.8 when tested by the immersion method.

3. Acid Resistance. A sample of microcrystalline ceramic beads supplied by the manufacturer, shall show resistance to corrosion of their surface after exposure to a one percent solution (by weight (mass)) of sulfuric acid. Adding 0.2 oz (5.7 ml) of concentrated acid into the water shall make the one percent acid solution. This test shall be performed by taking a 1 x 2 in. (25 x 50 mm) sample and adhering it to the bottom of a glass tray and placing just enough acid solution to completely immerse the sample. The tray shall be covered with a piece of glass to prevent evaporation and allow the sample to be exposed for 24 hours under these conditions. The acid solution shall be decanted (do not rinse, touch, or otherwise disturb the bead surfaces) and the sample dried while adhered to the glass tray in a 150 °F (66 °C) oven for approximately 15 minutes. Microscope examination (20X) shall show no white (corroded) layer on the entire surface.

b. Second Drop Glass Beads. The second drop glass beads shall meet the requirements of Article 1095.07 of the Standard Specifications for Type B or the following manufacturer's specification:

1. Sieve Analysis. The glass beads shall meet the following sieve requirements:

U.S. Standard Sieve Number	Sieve Size	% Passing By Weight (mass)
20	850 μm	100
30	600 μm	75-95
50	300 μm	15-35
100	150 μm	0-5

The manufacturer of the glass beads shall certify that the treatment of the glass beads meets the requirements of the polyurea manufacturer.

2. Imperfections. The surface of the glass beads shall be free of pits and scratches. The glass beads shall be spherical in shape and shall contain a maximum of 20 percent by weight (mass) of irregular shapes when tested by the standard method using a vibratile inclined glass plate as adopted by the Department.

3. Index of Refraction. The index of refraction of the glass beads shall be a minimum of 1.50 when tested by the immersion method at 77 °F (25 °C).

(k) Packaging. Microcrystalline ceramic reflective elements and glass beads shall be delivered in approved moisture proof bags or weather resistant bulk boxes. Each carton shall be legibly marked with the manufacturer, specifications and type, lot number, and the month and year the microcrystalline ceramic reflective elements and/or glass beads were packaged. The letters and numbers used in the stencils shall be a minimum of 1/2 in. (12.7 mm) in height.

(1) Moisture Proof Bags. Moisture proof bags shall consist of at least five ply paper construction unless otherwise specified. Each bag shall contain 50 lb (22.7 kg) net.

(2) Bulk Weather Resistance Boxes. Bulk weather resistance boxes shall conform to Federal Specification PPP-8-640D Class II or latest revision. Boxes are to be weather resistant, triple wall, fluted, corrugated-fiber board. Cartons shall be strapped with two metal straps. Straps shall surround the outside perimeter of the carton. The first strap shall be located approximately 2 in. (50 mm) from the bottom of the carton and the second strap shall be placed approximately in the middle of the carton. All cartons shall be shrink wrapped for protection from moisture. Cartons shall be lined with a minimum 4 mil polyester bag and meet Interstate Commerce Commission requirements. Cartons shall be approximately 38 x 38 in. (1 x 1 m), contain 2000 lb (910 kg) of microcrystalline ceramic reflective elements and/or glass beads and be supported on a wooden pallet with fiber straps.

(l) Packaging. The material shall be shipped to the job site in substantial containers and shall be plainly marked with the manufacturer's name and address, the name and color of the material, date of manufacture, and batch number.

(m) Verification. Prior to approval and use of the polyurea pavement marking materials, the manufacturer shall submit a notarized certification of an independent laboratory, together with the results of all tests, stating these materials meet the requirements as set forth herein. The certification test report shall state the lot tested, manufacturer's name, brand name of polyurea and date of manufacture. The certification shall be accompanied by one 1 pt (1/2 L) samples each of Part A and Part B. Samples shall be sent in the appropriate volumes for complete mixing of Part A and Part B.

After approval by the Department, certification by the polyurea manufacturer shall be submitted for each batch used. New independent laboratory certified test results and samples for testing by the Department shall be submitted any time the manufacturing process or paint formulation is changed. All costs of testing (other than tests conducted by the Department) shall be borne by the manufacturer.

(n) Acceptance samples. Acceptance samples shall consist of one 1 pt (1/2 L) samples of Part A and Part B, of each lot of paint. Samples shall be sent in the appropriate volumes for complete mixing of Part A and Part B. The samples shall be submitted to the Department for testing, together with a manufacturer's certification. The certification shall state the formulation for the lot represented is essentially identical to that used for qualification testing. All, acceptance samples will be taken by a representative of the Department. The polyurea pavement marking materials shall not be used until tests are completed and they have met the requirements as set forth herein.

(o) Material Retainage. The manufacturer shall retain the test sample for a minimum of 18 months.

Equipment. The polyurea pavement marking compounds shall be applied through equipment specifically designed to apply two component liquid materials, glass beads and/or reflective elements in a continuous and skip-line pattern. The two-component liquid materials shall be applied after being accurately metered and then mixed with a static mix tube or airless impingement mixing guns. The static mixing tube or impingement mixing guns shall accommodate plural component material systems that have a volumetric ratio of 2 to 1 or 3 to 1. This equipment shall produce the required amount of heat at the mixing head and gun tip and maintain those temperatures within the tolerances specified. The guns shall have the capacity

to deliver materials from approximately 1.5 to 3 gal/min (5.7 to 11.4 L/min) to compensate for a typical range of application speeds of 6 to 8 mph (10 to 13 km/h). The accessories such as spray tip, mix chamber, and rod diameter shall be selected according to the manufacturer's specifications to achieve proper mixing and an acceptable spray pattern. The application equipment shall be maneuverable to the extent that straight lines can be followed and normal curves can be made in a true arc. This equipment shall also have as an integral part of the gun carriage, a high pressure air spray capable of cleaning the pavement immediately prior to making application.

The equipment shall be capable of spraying both yellow and white polyurea, according to the manufacturer's recommended proportions and be mounted on a truck of sufficient size and stability with an adequate power source to produce lines of uniform dimensions and prevent application failure. The truck shall have at least two polyurea tanks each of 110 gal (415 L) minimum capacity and be equipped with hydraulic systems and agitators. It shall be capable of placing stripes on the left and right sides and placing two lines on a three-line system simultaneously with either line in a solid or intermittent pattern, in yellow or white, and applying the appropriate reflective media according to manufacturer's recommendations. All guns shall be in full view of operations at all times. The equipment shall have a metering device to register the accumulated installed quantities for each gun, each day. Each vehicle shall include at least one operator who shall be a technical expert in equipment operations and polyurea application techniques. Certification of equipment shall be provided at the pre-construction conference.

The mobile applicator shall include the following features:

(a) Material Reservoirs. The applicator shall provide individual material reservoirs, or space for the storage of Part A and Part B of the resin composition.

(b) Heating Equipment. The applicator shall be equipped with heating equipment of sufficient capacity to maintain the individual resin components at the manufacturer's recommended temperature of ±5 ºF (±2.8 °C) for spray application.

(c) Dispensing Equipment. The applicator shall be equipped with glass bead and/or reflective element dispensing equipment. The applicator shall be capable of applying the glass beads and/or reflective elements at a rate and combination indicated by the manufacturer.

(d) Volumetric Usage. The applicator shall be equipped with metering devices or pressure gauges on the proportioning pumps as well as stroke counters to monitor volumetric usage. Metering devices or pressure gauges and stroke counters shall be visible to the Engineer.

(e) Pavement Marking Placement. The applicator shall be equipped with all the necessary spray equipment, mixers, compressors and other appurtenances to allow for the placement of reflectorized pavement markings in a simultaneous sequence of operations.

The Contractor shall provide an accurate temperature-measuring device(s) that shall be capable of measuring the pavement temperature prior to application of the material, the material temperature at the gun tip and the material temperature prior to mixing.

CONSTRUCTION REQUIREMENTS

General. The pavement shall be cleaned by a method approved by the Engineer to remove all dirt, grease, glaze, or any other material that would reduce the adhesion of the markings with minimum or no damage to the pavement surface. New portland cement concrete pavements shall be air-blast-cleaned to remove all latents.

Widths, lengths, and shapes of the cleaned surface shall be of sufficient size to include the full area of the specified pavement marking to be placed.

The cleaning operation shall be a continuous moving operation process with minimum interruption to traffic.

Markings shall be applied to the cleaned surfaces on the same calendar day. If this cannot be accomplished, the surface shall be re-cleaned prior to applying the markings. No markings shall be applied until the Engineer approves the cleaning.

The pavement markings shall be applied to the cleaned road surface, during conditions of dry weather and subsequently dry pavement surfaces at a minimum uniform wet thickness of 15 mils (0.4 mm) according to the manufacturer's installation instructions. On new hot-mix asphalt (HMA) surfaces the pavement markings shall be applied at a minimum uniform wet thickness of 20 mils (0.5 mm). The application of and combination of reflective media (glass beads and/or reflective elements) shall be applied at a rate specified by the manufacturer. At the time of installation the pavement surface temperature and the ambient temperature shall be above 40 ºF (4 ºC) and rising. The pavement markings shall not be applied if the pavement shows any visible signs of moisture or it is anticipated that damage causing moisture, such as rain showers, may occur during the installation and set periods. The Engineer will determine the atmospheric conditions and pavement surface conditions that produce satisfactory results.

Using the application equipment, the pavement markings shall be applied in the following manner, as a simultaneous operation:

(a) The surface shall be air-blasted to remove any dirt and residue.

(b) The resin shall be mixed and heated according to manufacturer's recommendations and sprayed onto the pavement surface.

The edge of the center line or lane line shall be offset a minimum distance of 2 in. (50 mm) from a longitudinal crack or joint. Edge lines shall be approximately 2 in. (50 mm) from the edge of pavement. The finished center and lane lines shall be straight, with the lateral deviation of any 10 ft (3 m) line not to exceed 1 in. (25 mm).

Notification. The Contractor shall notify the Engineer 72 hours prior to the placement of the markings in order that he/she can be present during the operation. At the time of notification, the Contractor shall provide the Engineer the manufacturer and lot numbers of polyurea and reflective media that will be used.

Inspection. The polyurea pavement markings will be inspected following installation according to Article 780.10 of the Standard Specifications, except, no later than December 15, and inspected following a winter performance period that extends 180 days from December 15.

Method of Measurement. This work will be measured for payment in place, in feet (meters). Double yellow lines will be measured as two separate lines.

Basis of Payment. This work will be paid for at the contract unit price per foot (meter) for POLYUREA PAVEMENT MARKING TYPE I – LINE of the line width specified or for POLYUREA PAVEMENT MARKING TYPE II – LINE of the line width specified.

PRECAST CONCRETE HANDLING HOLES (BDE)
Effective: January 1, 2007

Add the following to Article 540.02 of the Standard Specifications:

"(g) Handling Hole Plugs 1042.16"

Add the following paragraph after the sixth paragraph of Article 540.06 of the Standard Specifications:

"Handling holes shall be filled with a precast concrete plug and sealed with mastic or mortar, or filled with a polyethylene plug. The plug shall not project beyond the inside surface after installation. When metal lifting inserts are used, their sockets shall be filled with mastic or mortar."

Add the following to Article 542.02 of the Standard Specifications:

"(ee) Handling Hole Plugs 1042.16"

Revise the fifth paragraph of Article 542.04(d) of the Standard Specifications to read:

"Handling holes in concrete pipe shall be filled with a precast concrete plug and sealed with mastic or mortar; or filled with a polyethylene plug. The plug shall not project beyond the inside surface after installation."

Add the following to Article 550.02 of the Standard Specifications:

"(o) Handling Hole Plugs 1042.16"

Replace the fourth sentence of the fifth paragraph of Article 550.06 of the Standard Specifications with the following:

"Handling holes in concrete pipe shall be filled with a precast concrete plug and sealed with mastic or mortar; or filled with a polyethylene plug. The plug shall not project beyond the inside surface after installation."

Add the following to Article 602.02 of the Standard Specifications:

"(p) Handling Hole Plugs 1042.16(a)"

Replace the fifth sentence of the first paragraph of Article 602.07 of the Standard Specifications with the following:

"Handling holes shall be filled with a precast concrete plug and sealed with mastic or mortar. The plug shall not project beyond the inside surface after installation. When metal lifting inserts are used, their sockets shall be filled with mastic or mortar."

Add the following to Section 1042 of the Standard Specifications:

"**1042.16 Handling Hole Plugs.** Plugs for handling holes in precast concrete products shall be as follows.

(a) Precast Concrete Plug. The precast concrete plug shall have a tapered shape and shall have a minimum compressive strength of 3000 psi (20,700 kPa) at 28 days.

(b) Polyethylene Plug. The polyethylene plug shall have a "mushroom" shape with a flat round top and a stem with three different size ribs. The plug shall fit snuggly and cover the handling hole.

The plug shall be according to the following.

Mechanical Properties	Test Method	Value (min.)
Flexural Modulus	ASTM D 790	3300 psi (22,750 kPa)
Tensile Strength (Break)	ASTM D 638	1600 psi (11,030 kPa)
Tensile Strength (Yield)	ASTM D 638	1200 psi (8270 kPa)

Thermal Properties	Test Method	Value (min.)
Brittle Temperature	ASTM D 746	-49 ºF (-45 ºC)
Vicat Softening Point	ASTM D 1525	194 ºF (90 ºC)"

PUBLIC CONVENIENCE AND SAFETY (BDE)
Effective: January 1, 2000

Add the following paragraph after the fourth paragraph of Article 107.09 of the Standard Specifications.

"On weekends, excluding holidays, roadways with Average Daily Traffic of 25,000 or greater, all lanes shall be open to traffic from 3:00 P.M. Friday to midnight Sunday except where structure construction or major rehabilitation makes it impractical."

MENTOR-PROTÉGÉ PROGRAM (BDE)
Effective: June 1, 2007

Eligibility. This contract is eligible for the Department's Mentor-Protégé Program for those bidders with an approved Mentor-Protégé Development Plan.

In order for a Mentor-Protégé relationship to be recognized as part of this contract, the Protégé shall be used as a subcontractor and a Mentor-Protégé Agreement for Contract Assistance and Training shall be fully executed and approved. The Mentor-Protégé Agreement for Contract Assistance and Training shall be completed on the form provided by the Department and submitted with the DBE Utilization Plan for approval by the Department. If approved, the Mentor-Protégé Agreement for Contract Assistance and Training shall become part of the contract. In the event the Mentor-Protégé Agreement for Contract Assistance and Training is not approved, the contract shall be performed in accordance with the DBE Utilization Plan exclusive of the Agreement.

DBE Goal Reduction. The DBE participation goal set for this contract may, at the discretion of the Department, be reduced according to the Mentor-Protégé Program Guidelines when the Protégé is used as a subcontractor. When submitting the DBE Utilization Plan, the bidder shall indicate whether the Protégé will be used as a subcontractor and to what extent.

Reimbursement of Mentor Expenses. The direct and indirect expenses of the Mentor, as detailed in the approved Mentor-Protégé Agreement for Contract Assistance and Training will be reimbursed by the Department.

RAILROAD PROTECTIVE LIABILITY INSURANCE (5 AND 10) (BDE)
Effective: January 1, 2006

Description. Railroad Protective Liability and Property Damage Liability Insurance shall be carried according to Article 107.11 of the Standard Specifications, except the limits shall be a minimum of $5,000,000 combined single limit per occurrence for bodily injury liability and property damage liability with an aggregate limit of $10,000,000 over the life of the policy. A separate policy is required for each railroad unless otherwise noted.

Special CN/IC Requirements as follows:

1. **Exclusion Asbestos (CG T4 78 02 90) must be removed.**
2. **War Liability Exclusion (CG 00 64 12 02) must be removed.**
3. **Cap on Losses from Certified Acts of Terrorism (CG 21 70 11 02) must be removed.**
4. **Bridge attachment shop drawings and proposed method of access for installation shall also be submitted to Mr. John Henriksen at the address below for RR concurrence prior to installation.**

NAMED INSURED & ADDRESS	NUMBER & SPEED OF PASSENGER TRAINS	NUMBER & SPEED OF FREIGHT TRAINS
IllinoisCentral Railroad Company 17641 S. Ashland Ave. Homewood, IL 60430-1345	4 Amtraks/day@79mph	18 /day @70mph

DOT/AAR No.: 289 647Y RR Mile Post: 20.6
RR Division: Northern RR Sub-Division: Richton

For Freight/Passenger Information Contact: Mr. John Henriksen Phone: 708/332-3557

METRA** 79/day@60mph
547 W. Jackson Boulevard
Chicago IL 60661-5717

DOT/AAR No.: 289 646S RR Mile Post: 20.6
RR Division: METRA Electric RR Sub-Division: University Park Sub.

For Freight/Passenger Information Contact: Anthony F. Ognibene Phone: 312/322-8006
For Insurance Information Contact Kerry Brunette Phone: 312/322-6991

Approval of Insurance. The original and one certified copy of each required policy shall be submitted to the following address for approval:

Illinois Department of Transportation
Bureau of Design and Environment
2300 South Dirksen Parkway, Room 326
Springfield, Illinois 62764

The Contractor will be advised when the Department has received approval of the insurance from the railroad(s). Before any work begins on railroad right-of-way, the Contractor shall submit to the Engineer evidence that the required insurance has been approved by the railroad(s). The Contractor shall also provide the Engineer with the expiration date of each required policy.

Basis of Payment. Providing Railroad Protective Liability and Property Damage Liability Insurance will be paid for at the contract unit price per Lump Sum for RAILROAD PROTECTIVE LIABILITY INSURANCE.

** *"The commuter Rail Division of the Regional Transportation Authority and its affiliated separate public corporation known as the Northeast Illinois Regional Transportation Authority, both operating under the service mark METRA, as now exists or may thereafter be constituted or acquired including their interest in partnership."*

REFLECTIVE SHEETING ON CHANNELIZING DEVICES (BDE)
Effective: April 1, 2007

Revise the seventh paragraph of Article 1106.02 of the Standard Specifications to read:

"At the time of manufacturing, the retroreflective prismatic sheeting used on channelizing devices shall meet or exceed the initial minimum coefficient of retroreflection as specified in the following table. Measurements shall be conducted according to ASTM E 810, without

averaging. Sheeting used on cones, drums and flexible delineators shall be reboundable as tested according to ASTM D 4956. Prestriped sheeting for rigid substrates on barricades shall be white and orange.

Initial Minimum Coefficient of Retroreflection candelas/foot candle/sq ft (candelas/lux/sq m) of material				
Observation Angle (deg.)	Entrance Angle (deg.)	White	Orange	Fluorescent Orange
0.2	-4	365	160	150
0.2	+30	175	80	70
0.5	-4	245	100	95
0.5	+30	100	50	40”

Revise the first sentence of the first paragraph of Article 1106.02(c) of the Standard Specifications to read:

“Barricades and vertical panels shall have alternating white and orange stripes sloping downward at 45 degrees toward the side on which traffic will pass.”

Revise the third sentence of the first paragraph of Article 1106.02(d) of the Standard Specifications to read:

“The bottom panels shall be 8 x 24 in. (200 x 600 mm) with alternating white and orange stripes sloping downward at 45 degrees toward the side on which traffic will pass.”

REINFORCEMENT BARS (BDE)
Effective: November 1, 2005 Revised: January 2, 2008

Revise Article 1006.10(a) of the Standard Specifications to read:

“ (a) Reinforcement Bars. Reinforcement bars will be accepted according to the current Bureau of Materials and Physical Research Policy Memorandum, “Reinforcement Bar and/or Dowel Bar Plant Certification Procedure”. The Department will maintain an approved list of producers.

(1) Reinforcement Bars (Non-Coated). Reinforcement bars shall be according to ASTM A 706 (A 706M), Grade 60 (420) for deformed bars and the following.

a. For straight bars furnished in cut lengths and with a well-defined yield point, the yield point shall be determined as the elastic peak load, identified by a halt or arrest of the load indicator before plastic flow is sustained by the bar and dividing it by the nominal cross-sectional area of the bar.

b. For bars without a well-defined yield point, including bars straightened from coils, the yield strength shall be determined by taking the corresponding load at 0.005 strain as measured by an extensometer (0.5% elongation under load) and dividing it by the nominal cross-sectional area of the bar.

c. For bars straightened from coils or bars bent from fabrication, there shall be no upper limit on yield strength; and for bar designation Nos. 3 - 6 (10 - 19), the elongation after rupture shall be at least 9%.

d. Heat Numbers. Bundles or bars at the construction site shall be marked or tagged with heat identification numbers of the bar producer.

e. Guided Bend Test. Bars may be subject to a guided bend test across two pins which are free to rotate, where the bending force shall be centrally applied with a fixed or rotating pin of a certain diameter as specified in Table 3 of ASTM A 706 (A 706M). The dimensions and clearances of this guided bend test shall be according to ASTM E 190.

f. Spiral Reinforcement. Spiral reinforcement shall be deformed or plain bars conforming to the above requirements or cold-drawn steel wire conforming to AASHTO M 32.

(2) Epoxy Coated Reinforcement Bars. Epoxy coated reinforcement bars shall be according to Article 1006.10(a)(1) and shall be epoxy coated according to AASHTO M 284 (M 284M) and the following.

a. Certification. The epoxy coating applicator shall be certified according to the current Bureau of Materials and Physical Research Policy Memorandum, "Epoxy Coating Plant Certification Procedure". The Department will maintain an approved list.

b. Coating Thickness. The thickness of the epoxy coating shall be 7 to 12 mils (0.18 to 0.30 mm). When spiral reinforcement is coated after fabrication, the thickness of the epoxy coating shall be 7 to 20 mils (0.18 to 0.50 mm).

c. Cutting Reinforcement. Reinforcement bars may be sheared or sawn to length after coating, providing the end damage to the coating does not extend more than 0.5 in. (13 mm) back and the cut is patched before any visible rusting appears. Flame cutting will not be permitted."

REMOVAL AND DISPOSAL OF REGULATED SUBSTANCES (BDE)
Effective: August 1, 2006 Revised: January 1, 2007

Revise Article 669.01 of the Standard Specifications to read:

"**669.01 Description.** This work shall consist of the excavation, removal, and proper disposal of contaminated soil, water, and underground storage tanks (UST), their content and associated underground piping to the point where the piping is above the ground, including determining the content types and estimated quantities."

Revise the first paragraph of Article 669.15 of the Standard Specifications to read:

"**669.15 Method of Measurement.** Non-special waste, special waste, and hazardous waste soil will be measured for payment according to Article 202.07(b) when performing earth excavation, Article 502.12(b) when excavating for structures, or by computing the volume of the trench using the maximum trench width permitted and the actual depth of the trench."

Revise the second paragraph of Article 669.16 of the Standard Specifications to read:

"The excavation, transportation, and disposal of soil and other materials from an excavation determined to be contaminated will be paid for at the contract unit price per cubic yard (cubic meter) for NON-SPECIAL WASTE DISPOSAL, SPECIAL WASTE DISPOSAL, or HAZARDOUS WASTE DISPOSAL."

RETROREFLECTIVE SHEETING, NONREFLECTIVE SHEETING, AND TRANSLUCENT OVERLAY FILM FOR HIGHWAY SIGNS (BDE)
Effective: April 1, 2007

General. This special provision covers retroreflective sheeting and translucent overlay films intended for application on new or refurbished aluminum. The sheeting serves as the reflectorized background for sign messages and as cutout legends and symbols applied to the reflectorized background. Messages may be applied in opaque black or transparent colors.

This special provision also covers nonreflective sheeting for application on new or refurbished aluminum, and as material for cutout legends and symbols applied to the reflectorized background.

All material furnished under this specification shall have been manufactured within 18 months of the delivery date. All material shall be supplied by the same manufacturer.

Retroreflective Sheeting Properties. Retroreflective sheeting shall consist of a flexible, colored, prismatic, or glass lens elements adhered to a synthetic resin, encapsulated by a flexible, transparent plastic having a smooth outer surface and shall meet the following requirements.

Only suppliers whose products have been tested and approved in the Department's periodic Sheeting Study will be eligible to supply material. All individual batches and or lots of material shall be tested and approved by the Department. The Department reserves the right to sample and test delivered materials according to Federal Specification LS-300.

(a) Adhesive. The sheeting shall have a Class 1, pre-coated, pressure sensitive adhesive according to ASTM D 4956. The adhesive shall have a protective liner that is easily removed when tested according to ASTM D 4956. The adhesive shall be capable of being applied to new or refurbished aluminum and reflectorized backgrounds without additional adhesive.

(b) Color. The sheeting shall be uniform in color and devoid of streaks throughout the length of each roll. The color shall conform to the latest appropriate standard color tolerance chart issued by the U.S. Department of Transportation, Federal Highway Administration and to the daytime and nighttime color requirements of ASTM D 4956. Sheeting used for side by side overlay applications shall have a Hunter Lab Delta E of less than 3.

(c) Coefficient of Retroreflection. When tested according to ASTM E 810, without averaging, the sheeting shall have a minimum coefficient of retroreflection as shown in the following tables. The brightness of the sheeting when totally wet shall be a minimum of 90 percent of the values shown when tested according to the standard rainfall test specified in Section 7.10.1 of AASHTO M 268-84.

Type A Sheeting
Minimum Coefficient of Retroreflection
candelas/foot candle/sq ft (candelas/lux/sq m) of material

Type A

Observation Angle (deg.)	Entrance Angle (deg.)	White	Yellow	Orange	Red	Green	Blue	Brown
0.2	-4	250	170	100	45	45	20	12
0.2	+30	150	100	60	25	25	12	8.5
0.5	-4	95	65	30	15	15	8	5
0.5	+30	75	50	25	10	10	5	3.5

Type AA Sheeting
Minimum Coefficient of Retroreflection
candelas/foot candle/sq ft (candelas/lux/sq m) of material

Type AA (0 and 90 degree rotation)

Observation Angle (deg.)	Entrance Angle (deg.)	White	Yellow	Red	Green	Blue	FO
0.2	-4	800	660	215	80	43	200
0.2	+30	400	340	100	35	20	120
0.5	-4	200	160	45	20	9.8	80
0.5	+30	100	85	26	10	5.0	50

Type AA (45 degree rotation)

Observation Angle (deg.)	Entrance Angle (deg.)	Yellow	FO
0.2	-4	550	165
0.2	+30	130	45
0.5	-4	145	70
0.5	+30	70	40

Type AP Sheeting
Minimum Coefficient of Retroreflection
candelas/foot candle/sq ft (candelas/lux/sq m) of material

Type AP

Observation Angle (deg.)	Entrance Angle (deg.)	White	Yellow	Red	Green	Blue	Brown	FO
0.2	-4	550	425	100	75	50	30	275
0.2	+30	200	150	40	35	25	15	90
0.5	-4	300	250	60	35	25	20	150
0.5	+30	100	70	20	20	10	5	50

Type AZ Sheeting
Minimum Coefficient of Retroreflection
candelas/foot candle/sq ft (candelas/lux/sq m) of material

Type AZ (0 degree rotation)

Observation Angle (deg.)	Entrance Angle (deg.)	White	Yellow	Red	Green	Blue	FYG	FY
0.2	-4	430	350	110	45	20	325	240
0.2	+30	235	140	60	24	11	200	150
0.5	-4	250	200	60	25	10	235	165
0.5	+30	170	135	40	19	7	105	75
1.0	-4	70	45	10	10	4	70	30
1.0	+30	30	20	7	5	2.5	45	15

Type AZ (90 degree rotation)

Observation Angle (deg.)	Entrance Angle (deg.)	White	Yellow	Red	Green	Blue	FYG	FY
0.2	-4	320	250	100	45	20	300	220
0.2	+30	235	140	40	24	11	200	150
0.5	-4	240	200	60	25	10	235	165
0.5	+30	100	85	20	10	7	80	75
1.0	-4	30	30	7	5	4	65	20
1.0	+30	15	15	5	2	2	30	10

(d) Gloss. The sheeting surface shall exhibit a minimum 85 degree gloss-meter rating of 50 when tested according to ASTM D 523.

(e) Durability. When processed and applied, the sheeting shall be weather resistant.

Accelerated weathering testing will be performed for 1000 hours (300 hours for orange/FO) according to ASTM G 151. The testing cycle will consist of 8 hours of light at 140 °F (60 °C), followed by 4 hours of condensation at 104 °F (40 °C). Following accelerated weathering, the sheeting shall exhibit a minimum of 80 percent of its initial minimum coefficient of retroreflection as listed in the previous tables.

Outdoor weathering will entail an annual evaluation of material placed in an outdoor rack with a 45 degree angle and a southern sun exposure. The sheeting will be evaluated for five years. Following weathering, the test specimens will be cleaned by immersing them in a five percent hydrochloric acid solution for 45 seconds, then rinsed with water and blotted dry with a soft clean cloth. Following cleaning, the applied sheeting shall show no appreciable discoloration, cracking, streaking, crazing, blistering, or dimensional change. The sheeting shall exhibit a Hunter Lab Delta E of 5 or less when compared to the original.

(f) Shrinkage. When tested according to ASTM D 4956, the sheeting shall not shrink in any dimension more than 1/32 in. (0.8 mm) in ten minutes and not more than 1/8 in. (3 mm) in 24 hours.

(g) Workability. The sheeting shall show no cracking, scaling, pitting, blistering, edge lifting, inter-film splitting, curling, or discoloration when processed and applied using mutually acceptable processing and application procedures.

(h) Splices. A single roll of sheeting shall contain a maximum of four splices per 50 yd (45 m) length. The sheeting shall be overlapped a minimum of 3/16 in. (5 mm) at each splice.

(i) Adhesive Bond. The sheeting shall form a durable bond to smooth, corrosion and weather-resistant surfaces and adhere securely when tested according to ASTM D 4956.

(j) Positionability. Sheeting, with ASTM D 4956 Class 3 adhesive, used for manufacturing cutout legends and borders shall provide sufficient positionability during the fabrication process to permit removal and reapplication without damage to either the legend or sign background and shall have a plastic liner suitable for use on bed cutting machines. Thereafter, all other adhesive and bond requirements contained in the specification shall apply.

Positionablility shall be verified by cutting 4 in. (100 mm) letters E, I, K, M, S, W, and Y out of the positionable material. The letters shall then be applied to a sheeted aluminum blank using a single pass of a two pound roller. The letters shall sit for five minutes and then a putty knife shall be used to lift a corner. The thumb and fore finger shall be used to slowly pull the lifted corner to lift letters away from the sheeted aluminum. The letters shall not tear or distort when removed.

(k) Thickness. The thickness of the sheeting without the protective liner shall be less than or equal to 0.015 in. (0.4 mm), or 0.025 in. (0.6 mm) for prismatic material.

(l) Processing. The sheeting shall permit cutting and color processing according to the sheeting manufacturer's specifications at temperatures of 60 to 100 °F (15 to 38 °C) and within a relative humidity range of 20 to 80 percent. The sheeting shall be heat resistant and permit forced curing without staining the applied or unapplied sheeting at temperatures recommended by the manufacturer. The sheeting shall be solvent resistant and capable of being cleaned with VM&P naptha, mineral spirits, and turpentine.

Transparent color and opaque black inks shall be single component and low odor. The inks shall dry within eight hours and not require clear coating. After color processing on white sheeting, the sheeting shall show no appreciable discoloration, cracking, streaking, crazing, blistering, or dimensional change when tested for durability (e). The ink on the weathered, prepared panel shall exhibit a Hunter Lab Delta E of 5 or less when compared to the original.

Transparent color electronic cutting films shall be acrylic. After application to white sheeting, the films shall show no appreciable discoloration, cracking, streaking, crazing, blistering, or dimensional change when tested for durability (e). The films on the weathered, prepared panel shall exhibit a Hunter Lab Delta E of 5 or less when compared to the original.

Transparent colors screened, or transparent acrylic electronic cutting films, on white sheeting, shall have a minimum initial coefficient of retroreflection values of 50 percent for yellow and red, and a minimum 70 percent for green, blue, and brown of the 0.2 degree observation angle/-4.0 degree entrance angle values as listed in the previous tables for the color being applied. After durability testing, the colors shall retain a minimum 80 percent of the initial coefficient of retroreflection.

(m) Identification. The sheeting shall have a distinctive overall pattern in the sheeting unique to the manufacturer. If material orientation is required for optimum retroreflectivity, permanent orientation marks shall be incorporated into the face of the sheeting. Neither the overall pattern nor the orientation marks shall interfere with the reflectivity of the sheeting.

(n) Packaging. Both ends of each box shall be clearly labeled with the sheeting type, color, adhesive type, manufacturer's lot number, date of manufacture, and supplier's name. Material Safety Data Sheets and technical bulletins for all materials shall be furnished to the Department with each shipment.

Nonreflective Sheeting Properties. Nonreflective sheeting shall consist of a flexible, pigmented cast vinyl film having a smooth, flat outer surface and shall meet the following requirements.

The Department reserves the right to sample and test delivered materials according to Federal Specification LS-300.

(a) Adhesive. The sheeting shall have a Class 1, pre-coated, pressure sensitive adhesive according to ASTM D 4956. The adhesive shall have a protective liner that is easily removed when tested according to ASTM D 4956. The adhesive shall be capable of being applied to new or refurbished aluminum and reflectorized backgrounds without additional adhesive.

(b) Color. The sheeting shall be uniform in color and devoid of streaks throughout the length of each roll.

(c) Gloss. The sheeting shall exhibit a minimum 85 degree gloss-meter rating of 40 when tested according to ASTM D 523.

(d) Durability. Applied sheeting that has been vertically exposed to the elements for seven years shall show no appreciable discoloration, cracking, crazing, blistering, delamination, or loss of adhesion. A slight amount of chalking is permitted but the sheeting shall not support fungus growth.

(e) Testing. Test panels shall be prepared by applying the sheeting to 6 1/2 x 6 1/2 in. (165 x 165 mm) pieces of aluminum according to the manufacturer's specifications. The edges of the panel shall be trimmed evenly and aged 48 hours at 70 to 90 °F (21 to 32 °C). Shrinkage and immersion testing shall be as follows.

(1) Shrinkage. The sheeting shall not shrink more then 1/64 in. (0.4 mm) from any panel edge when subjected to a temperature of 150 °F (66 °C) for 48 hours and shall be sufficiently heat resistant to retain adhesion after one week at 150 °F (66 °C).

(2) Immersion Testing. The sheeting shall show no appreciable decrease in adhesion, color, or general appearance when examined one hour after being immersed to a depth of 2 or 3 in. (50 or 75 mm) in the following solutions at 70 to 90 °F (21 to 32 °C) for specified times.

Solution	Immersion Time (hours)
Reference Fuel (M I L-F-8799A) (15 parts xylol and 85 parts mineral spirits by weight)	1
Distilled Water	24
SAE No. 20 Motor Oil	24
Antifreeze (1/2 ethylene glycol, 1/2 distilled water)	24

(f) Adhesive Bond: The sheeting shall form a durable bond to smooth, corrosion and weather-resistant surfaces and adhere securely when tested according to ASTM D 4956.

(g) Thickness. The thickness of the sheeting without the protective liner shall be a maximum of 0.005 in. (0.13 mm).

(h) Cutting. Material used on bed cutting machines shall have a smooth plastic liner.

(i) Identification. The sheeting shall have a distinctive overall pattern in the sheeting unique to the manufacturer. If material orientation is required for optimum retroreflectivity, permanent orientation marks shall be incorporated into the face of the sheeting. Neither the overall pattern nor the orientation marks shall interfere with the reflectivity of the sheeting.

(j) Packaging. Both ends of each box shall be clearly labeled with the sheeting type, color, adhesive type, manufacturer's lot number, date of manufacture, and supplier's name. Material Safety Data Sheets and technical bulletins for all materials shall be furnished to the Department with each shipment.

SEEDING (BDE)
Effective: July 1, 2004 Revised: August 1, 2007

Revise the following seeding mixtures shown in Table 1 of Article 250.07 of the Standard Specifications to read:

"Table 1 - SEEDING MIXTURES		
Class – Type	Seeds	lb/acre (kg/hectare)
2 Roadside Mixture 7/	Tall Fescue (Inferno, Tarheel II, Quest, Blade Runner, or Falcon IV)	100 (110)
	Perennial Ryegrass	50 (55)
	Creeping Red Fescue	40 (50)
	Red Top	10 (10)

2A	Salt Tolerant Roadside Mixture 7/	Tall Fescue (Inferno, Tarheel II, Quest, Blade Runner, or Falcon IV)	60 (70)
		Perennial Ryegrass	20 (20)
		Red Fescue (Audubon, Sea Link, or Epic)	30 (20)
		Hard Fescue (Rescue 911, Spartan II, or Reliant IV)	30 (20)
		Fults Salt Grass 1/	60 (70)"

Revise Table II of Article 1081.04(c)(6) of the Standard Specifications to read:

TABLE II

Variety of Seeds	Hard Seed % Max.	Purity % Min.	Pure Live Seed % Min.	Weed % Max.	Secondary * Noxious Weeds No. per oz (kg) Max. Permitted	Notes
Alfalfa	20	92	89	0.50	6 (211)	1/
Clover, Alsike	15	92	87	0.30	6 (211)	2/
Red Fescue, Audubon	0	97	82	0.10	3 (105)	-
Red Fescue, Creeping	-	97	82	1.00	6 (211)	-
Red Fescue, Epic	-	98	83	0.05	1 (35)	-
Red Fescue, Sea Link	-	98	83	0.10	3 (105)	-
Tall Fescue, Blade Runner	-	98	83	0.10	2 (70)	-
Tall Fescue, Falcon IV	-	98	83	0.05	1 (35)	-
Tall Fescue, Inferno	0	98	83	0.10	2 (70)	-
Tall Fescue, Tarheel II	-	97	82	1.00	6 (211)	-
Tall Fescue, Quest	0	98	83	0.10	2 (70)	
Fults Salt Grass	0	98	85	0.10	2 (70)	-
Kentucky Bluegrass	-	97	80	0.30	7 (247)	4/
Oats	-	92	88	0.50	2 (70)	3/
Redtop	-	90	78	1.80	5 (175)	3/
Ryegrass, Perennial, Annual	-	97	85	0.30	5 (175)	3/
Rye, Grain, Winter	-	92	83	0.50	2 (70)	3/
Hard Fescue, Reliant IV	-	98	83	0.05	1 (35)	-
Hard Fescue, Rescue 911	0	97	82	0.10	3 (105)	-
Hard Fescue, Spartan II	-	98	83	0.10	3 (105)	-
Timothy	-	92	84	0.50	5 (175)	3/
Wheat, hard Red Winter	-	92	89	0.50	2 (70)	3/"

Revise the first sentence of the first paragraph of Article 1081.04(c)(7) of the Standard Specifications to read:

"The seed quantities indicated per acre (hectare) for Prairie Grass Seed in Classes 3, 3A, 4, 4A, 6, and 6A in Article 250.07 shall be the amounts of pure, live seed per acre (hectare) for each species listed."

SELF-CONSOLIDATING CONCRETE FOR CAST-IN-PLACE CONSTRUCTION (BDE)
Effective: November 1, 2005 Revised: January 1, 2007

Definition. Self-consolidating concrete is a flowable mixture that does not require mechanical vibration for consolidation.

Usage. Self-consolidating concrete may be used for cast-in-place concrete construction items involving Class MS, DS, and SI concrete.

Materials. Materials shall be according to Section 1021 of the Standard Specifications.

Mix Design Criteria. Article 1020.04 of the Standard Specifications shall apply, except as follows:

(a) The cement factor shall be according to Article 1020.04 of the Standard Specifications. If the maximum cement factor is not specified, it shall not exceed 7.05 cwt/cu yd (418 kg/cu m). The cement factor shall not be reduced if a water-reducing, retarding, or high range water-reducing admixture is used.

(b) The maximum allowable water/cement ratio shall be according to Article 1020.04 of the Standard Specifications or 0.44, whichever is lower.

(c) The slump requirements shall not apply.

(d) The coarse aggregate gradations shall be CA 13, CA 14, CA 16, or a blend of these gradations. CA 11 may be used when the Contractor provides satisfactory evidence to the Engineer that the mix will not segregate. The fine aggregate proportion shall be a maximum 50 percent by weight (mass) of the total aggregate used.

(e) The slump flow range shall be ± 2 in. (± 50 mm) of the Contractor target value, and within the overall Department range of 20 in. (510 mm) minimum to 28 in. (710 mm) maximum.

(f) The visual stability index shall be a maximum of 1.

(g) The J-ring value shall be a maximum of 4 in. (100 mm). The Contractor may specify a lower maximum in the mix design.

(h) The L-box blocking ratio shall be a minimum of 60 percent. The Contractor may specify a higher minimum in the mix design.

(i) The column segregation index shall be a maximum 15 percent.

(j) The hardened visual stability index shall be a maximum of 1.

Test Methods. Illinois Test Procedures SCC-1, SCC-2, SCC-3, SCC-4, SCC-5, SCC-6, and Illinois Modified AASHTO T 22, 23, 121, 126, 141, 152, 177, 196, and 309 shall be used for testing of self-consolidating concrete mixtures.

Mix Design Submittal. The Contractor's Level III PCC Technician shall submit a mix design according to the "Portland Cement Concrete Level III Technician" course manual, except target slump information is not applicable and will not be required. However, a slump flow target range shall be submitted. In addition, the design mortar factor may exceed 1.10 and durability test data will be waived.

A J-ring value shall be submitted if a lower mix design maximum will apply. An L-box blocking ratio shall be submitted if a higher mix design minimum will apply. The Contractor shall also indicate applicable construction items for the mix design.

Trial mixture information will be required by the Engineer. A trial mixture is a batch of concrete tested by the Contractor to verify the Contractor's mix design will meet specification requirements. Trial mixture information shall include test results as specified in the "Portland Cement Concrete Level III Technician" course manual. Test results shall also include slump flow, visual stability index, J-ring value, L-box blocking ratio, column segregation index, and hardened visual stability index. For the trial mixture, the slump flow shall be near the midpoint of the proposed slump flow target range.

Trial Batch. A minimum 2 cu yd (1.5 cu m) trial batch shall be produced, and the self-consolidating concrete admixture dosage proposed by the Contractor shall be used. The slump flow shall be within 1.0 in. (25 mm) of the maximum slump flow range specified by the Contractor, and the air content shall be within the top half of the allowable specification range.

The trial batch shall be scheduled a minimum of 21 calendar days prior to anticipated use and shall be performed in the presence of the Engineer.

The Contractor shall provide the labor, equipment, and materials to test the concrete. The mixture will be evaluated by the Engineer for strength, air content, slump flow, visual stability index, J-ring value, L-box blocking ratio, column segregation index, and hardened visual stability index.

Upon review of the test data from the trial batch, the Engineer will verify or deny the use of the mix design and notify the Contractor. Verification by the Engineer will include the Contractor's target slump flow range. If applicable, the Engineer will verify the Contractor's maximum J-ring value and minimum L-box blocking ratio.

A new trial batch will be required whenever there is a change in the source of any component material, proportions beyond normal field adjustments, dosage of the self-consolidating concrete admixture, batch sequence, mixing speed, mixing time, or as determined by the Engineer. The testing criteria for the new trial batch will be determined by the Engineer.

When necessary, the trial batches shall be disposed of according to Article 202.03 of the Standard Specifications.

Mixing Portland Cement Concrete. In addition to Article 1020.11 of the Standard Specifications, the mixing time for central-mixed concrete shall not be reduced as a result of a mixer performance test. Truck-mixed or shrink-mixed concrete shall be mixed in a truck mixer for a minimum of 100 revolutions.

Wash water, if used, shall be completely discharged from the drum or container before the succeeding batch is introduced.

The batch sequence, mixing speed, and mixing time shall be appropriate to prevent cement balls and mix foaming for central-mixed, truck-mixed, and shrink-mixed concrete.

Falsework and Forms. In addition to Articles 503.05 and 503.06 of the Standard Specifications, the Contractor shall consider the fluid nature of the concrete for designing the falsework and forms. Forms shall be tight to prevent leakage of fluid concrete.

Placing and Consolidating. Concrete placement and consolidation shall be according to Article 503.07 of the Standard Specifications, except as follows:

Revise the third paragraph of Article 503.07 of the Standard Specifications to read:

"Open troughs and chutes shall extend as nearly as practicable to the point of deposit. The drop distance of concrete shall not exceed 5 ft (1.5 m). If necessary, a tremie shall be used to meet this requirement. The maximum distance of horizontal flow from the point of deposit shall be 25 ft (7.6 m), unless approved otherwise by the Engineer. For drilled shafts, free fall placement will not be permitted."

Delete the seventh, eighth, ninth, and tenth paragraphs of Article 503.07 of the Standard Specifications.

Add to the end of the eleventh paragraph of Article 503.07 of the Standard Specifications the following:

"Concrete shall be rodded with a piece of lumber, conduit, or vibrator if the material has lost its fluidity prior to placement of additional concrete. The vibrator shall be the pencil head type with a maximum diameter or width of 1 in. (25 mm). Any other method for restoring the fluidity of the concrete shall be approved by the Engineer."

Quality Control by Contractor at Plant. The specified test frequencies for aggregate gradation, aggregate moisture, air content, unit weight/yield, and temperature shall be performed as indicated in the contract plans.

Slump flow, visual stability index, and J-ring or L-box tests shall be performed as needed to control production. The column segregation index test and hardened visual stability index test will not be required to be performed at the plant.

Quality Control by Contractor at Jobsite. The specified test frequencies for air content, strength, and temperature shall be performed as indicated in the contract plans.

Slump flow, visual stability index, and J-ring or L-box tests shall be performed on the first two truck deliveries of the day, and every 50 cu yd (40 cu m) thereafter. The Contractor shall select either the J-ring or L-box test for jobsite testing.

The column segregation index test will not be required to be performed at the jobsite. The hardened visual stability index test shall be performed on the first truck delivery of the day, and every 300 cu yd (230 cu m) thereafter. Slump flow, visual stability index, J-ring value or L-box blocking ratio, air content, and concrete temperature shall be recorded for each hardened visual stability index test.

The Contractor shall retain all hardened visual stability index cut cylinder specimens until the Engineer notifies the Contractor that the specimens may be discarded.

If mix foaming or other potential detrimental material is observed during placement or at the completion of the pour, the material shall be removed while the concrete is still plastic.

Quality Assurance by Engineer at Plant. For air content and aggregate gradation, quality assurance independent sample testing and split sample testing will be performed as indicated in the contract plans.

For slump flow, visual stability index, and J-ring or L-box tests, quality assurance independent sample testing and split sample testing will be performed as determined by the Engineer.

Quality Assurance by Engineer at Jobsite. For air content and strength, quality assurance independent sample testing and split sample testing will be performed as indicated in the contract plans.

For slump flow, visual stability index, J-ring or L-box, and hardened visual stability index tests, quality assurance independent sample testing will be performed as determined by the Engineer.

For slump flow and visual stability index quality assurance split sample testing, the Engineer will perform tests at the beginning of the project on the first three tests performed by the Contractor. Thereafter, a minimum of ten percent of total tests required of the Contractor will be performed per plant, which will include a minimum of one test per mix design. The acceptable limit of precision will be 1.5 in. (40 mm) for slump flow and a limit of precision will not apply to the visual stability index.

For the J-ring or the L-box quality assurance split sample testing, a minimum of 80 percent of the total tests required of the Contractor will be witnessed by the Engineer per plant, which will include a minimum of one witnessed test per mix design. The Engineer reserves the right to conduct quality assurance split sample testing. The acceptable limit of precision will be 1.5 in. (40 mm) for the J-ring value and ten percent for the L-box blocking ratio.

For each hardened visual stability index test performed by the Contractor, the cut cylinders shall be presented to the Engineer for determination of the rating. The Engineer reserves the right to conduct quality assurance split sample testing. A limit of precision will not apply to the hardened visual stability index.

SELF-CONSOLIDATING CONCRETE FOR PRECAST PRODUCTS (BDE)
Effective: July 1, 2004 Revised: January 1, 2007

Definition. Self-consolidating concrete is a flowable mixture that does not require mechanical vibration for consolidation.

Usage. Self-consolidating concrete may be used for precast concrete products.

Materials. Materials shall be according to Section 1021 of the Standard Specifications.

Mix Design Criteria. The mix design criteria shall be as follows:

(a) The minimum cement factor shall be according to Article 1020.04 of the Standard Specifications. If the maximum cement factor is not specified, it shall not exceed 7.05 cwt/cu yd (418 kg/cu m).

(b) The maximum allowable water/cement ratio shall be according to Article 1020.04 of the Standard Specifications or 0.44, whichever is lower.

(c) The slump requirements of Article 1020.04 of the Standard Specifications shall not apply.

(d) The coarse aggregate gradations shall be CA 13, CA 14, CA 16, or a blend of these gradations. CA 11 may be used when the Contractor provides satisfactory evidence to the Engineer that the mix will not segregate. The fine aggregate proportion shall be a maximum 50 percent by weight (mass) of the total aggregate used.

(e) The slump flow range shall be ± 2 in. (± 50 mm) of the Contractor target value, and within the overall Department range of 20 in. (510 mm) minimum to 28 in. (710 mm) maximum.

(f) The visual stability index shall be a maximum of 1.

(g) The J-ring value shall be a maximum of 4 in. (100 mm). The Contractor may specify a lower maximum in the mix design.

(h) The L-box blocking ratio shall be a minimum of 60 percent. The Contractor may specify a higher minimum in the mix design.

(i) The column segregation index shall be a maximum 15 percent.

(j) The hardened visual stability index shall be a maximum of 1.

Placing and Consolidating. The maximum distance of horizontal flow from the point of deposit shall be 25 ft (7.6 m), unless approved otherwise by the Engineer.

Concrete shall be rodded with a piece of lumber, conduit, or vibrator if the material has lost its fluidity prior to placement of additional concrete. The vibrator shall be the pencil head type with a maximum diameter or width of 1 in. (25 mm). Any other method for restoring the fluidity of the concrete shall be approved by the Engineer.

Mix Design Approval. The Contractor shall obtain mix design approval according to the Department's Policy Memorandum "Quality Control/Quality Assurance Program for Precast Concrete Products".

SILT FILTER FENCE (BDE)
Effective: January 1, 2008

For silt filter fence fabric only, revise Article 1080.02 of the Standard Specifications to read:

"**1080.02 Geotextile Fabric.** The fabric for silt filter fence shall be a woven fabric meeting the requirements of AASHTO M 288 for unsupported silt fence with less than 50 percent geotextile elongation."

Replace the last sentence of Article 1081.15(b) of the Standard Specifications with the following:

"Silt filter fence stakes shall be a minimum of 4 ft (1.2 m) long and made of either wood or metal. Wood stakes shall be 2 in. x 2 in. (50 mm x 50 mm). Metal stakes shall be a standard T or U shape having a minimum weight (mass) of 1.32 lb/ft (600 g/300 mm)."

STEEL INSERTS AND BRACKETS CAST INTO CONCRETE (BDE)
Effective: April 1, 2008

Add the following to Article 503.02 of the Standard Specifications:

"(g) Steel Inserts and Brackets Cast Into Concrete ..... 1006.13"

Add the following to Article 504.02 of the Standard Specifications:

"(j) Steel Inserts and Brackets Cast Into Concrete ..... 1006.13"

Revise Article 1006.13 of the Standard Specifications to read:

"**1006.13 Steel Inserts and Brackets Cast Into Concrete.** Steel inserts and brackets cast into concrete shall be galvanized according to AASHTO M 232 or AASHTO M 111.

The inserts shall be ferrules with loop or strut type anchorages having the following minimum certified proof load.

Insert Diameter	Proof Load
5/8 in. (16 mm)	6600 lb (29.4 kN)
3/4 in. (19 mm)	6600 lb (29.4 kN)
1 in. (25 mm)	9240 lb (41.1 kN)"

SUBCONTRACTOR MOBILIZATION PAYMENTS (BDE)
Effective: April 2, 2005

To account for the preparatory work and operations necessary for the movement of subcontractor personnel, equipment, supplies, and incidentals to the project site and for all other work or operations that must be performed or costs incurred when beginning work approved for subcontracting in accordance with Article 108.01 of the Standard Specifications, the Contractor shall make a mobilization payment to each subcontractor.

This mobilization payment shall be made at least 14 days prior to the subcontractor starting work. The amount paid shall be equal to 3 percent of the amount of the subcontract reported on form BC 260A submitted for the approval of the subcontractor's work.

This provision shall be incorporated directly or by reference into each subcontract approved by the Department.

TEMPORARY EROSION CONTROL (BDE)
Effective: November 1, 2002 Revised: January 1, 2008

Revise the third paragraph of Article 280.03 of the Standard Specifications to read:

"Erosion control systems shall be installed prior to beginning any activities which will potentially create erodible conditions. Erosion control systems for areas outside the limits of construction such as storage sites, plant sites, waste sites, haul roads, and Contractor furnished borrow sites shall be installed prior to beginning soil disturbing activities at each area. These offsite systems shall be designed by the Contractor and be subject to the approval of the Engineer."

Add the following paragraph after the third paragraph of Article 280.03 of the Standard Specifications:

"The temporary erosion and sediment control systems shown on the plans represent the minimum systems anticipated for the project. Conditions created by the Contractor's operations, or for the Contractor's convenience, which are not covered by the plans, shall be protected as directed by the Engineer at no additional cost to the Department. Revisions or modifications of the erosion and sediment control systems shall have the Engineer's written approval."

Add the following paragraph after the ninth paragraph of Article 280.07 of the Standard Specifications:

"Temporary or permanent erosion control systems required for areas outside the limits of construction will not be measured for payment."

Delete the tenth (last) paragraph of Article 280.08 of the Standard Specifications.

VARIABLY SPACED TINING (BDE)
Effective: August 1, 2005 Revised: January 1, 2007

Revise the first sentence of the third paragraph of Article 420.09(e)(1) of the Standard Specifications to read:

"The metal comb shall consist of a single line of tempered spring steel tines variably spaced as shown in the table below and securely mounted in a suitable head."

Revise the fifth sentence of the third paragraph of Article 420.09(e)(1) of the Standard Specifications to read:

"The tining device shall be operated so as to a produce a pattern of grooves, 1/8 to 3/16 in. (3 to 5 mm) deep and 1/10 to 1/8 in. (2.5 to 3.2 mm) wide across the pavement. The tining device shall be operated at a 1:6 skew across the pavement for facilities with a posted speed limit of 55 mph or greater. The tining pattern shall not overlap or leave gaps between successive passes."

Add the following table after the third paragraph of Article 420.09(e)(1) of the Standard Specifications:

"Center to Center Spacings of Metal Comb Tines in. (mm) (read spacings left to right)				
1 5/16 (34)	1 7/16 (36)	1 7/8 (47)	2 1/8 (54)	1 7/8 (48)
1 11/16 (43)	1 1/4 (32)	1 1/4 (31)	1 1/16 (27)	1 7/16 (36)
1 1/8 (29)	1 13/16 (46)	13/16 (21)	1 11/16 (43)	7/8 (23)
1 5/8 (42)	2 1/16 (52)	15/16 (24)	11/16 (18)	1 1/8 (28)
1 9/16 (40)	1 5/16 (34)	1 1/16 (27)	1 (26)	1 (25)
1 1/16 (27)	13/16 (20)	1 7/16 (37)	1 1/2 (38)	2 1/16 (52)
2 (51)	1 3/4 (45)	1 7/16 (37)	1 11/16 (43)	2 1/16 (53)
1 1/16 (27)	1 7/16 (37)	1 5/8 (42)	1 5/8 (41)	1 1/8 (29)
1 11/16 (43)	1 3/4 (45)	1 3/4 (44)	1 3/16 (30)	1 7/16 (37)
1 5/16 (33)	1 9/16 (40)	1 1/8 (28)	1 1/4 (31)	1 15/16 (50)
1 5/16 (34)	1 3/4 (45)	13/16 (20)	1 3/4 (45)	1 15/16 (50)
2 1/16 (53)	2 (51)	1 1/8 (29)	1 (25)	11/16 (18)
2 1/16 (53)	11/16 (18)	1 1/2 (38)	2 (51)	1 9/16 (40)
11/16 (17)	1 15/16 (49)	1 15/16 (50)	1 9/16 (39)	2 (51)
1 7/16 (36)	1 7/16 (36)	1 1/2 (38)	1 13/16 (46)	1 1/8 (29)
1 1/2 (38)	1 15/16 (50)	15/16 (24)	1 5/16 (33)"	

WATER BLASTER WITH VACUUM RECOVERY (BDE)
Effective: April 1, 2006 Revised: January 1, 2007

Add the following to Article 783.02 of the Standard Specifications.

"(c) Water Blaster with Vacuum Recovery 1101.12"

Revise Article 1101.12 of the Standard Specifications to read.

"**1101.12 Water Blaster with Vacuum Recovery.** The water blaster shall remove the stripe from the pavement using a high pressurized water spray with a vacuum recovery system to provide a clean, almost dry surface, without the use of a secondary cleanup process. The removal shall be to the satisfaction of the Engineer. The equipment shall contain a storage system that allows for the storage of the wastewater while retaining the debris. The operator shall be in immediate control of the blast head."

TRAINING SPECIAL PROVISIONS (BDE)

Effective: October 15, 1975

This Training Special Provision supersedes Section 7b of the Special Provision entitled "Specific Equal Employment Opportunity Responsibilities," and is in implementation of 23 U.S.C. 140(a).

As part of the Contractor's equal employment opportunity affirmative action program, training shall be provided as follows:

The Contractor shall provide on-the-job training aimed at developing full journeyman in the type of trade or job classification involved. The number of trainees to be trained under this contract will be **15**. In the event the Contractor subcontracts a portion of the contract work, he shall determine how many, if any, of the trainees are to be trained by the subcontractor, provided however, that the Contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The Contractor shall also insure that this Training Special Provision is made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

The number of trainees shall be distributed among the work classifications on the basis of the Contractor's needs and the availability of journeymen in the various classifications within the reasonable area of recruitment. Prior to commencing construction, the Contractor shall submit to the Illinois Department of Transportation for approval the number of trainees to be trained in each selected classification and training program to be used. Furthermore, the Contractor shall specify the starting time for training in each of the classifications. The Contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such trainees as provided hereinafter.

Training and upgrading of minorities and women toward journeyman status is a primary objective of this Training Special Provision. Accordingly, the Contractor shall make every effort to enroll minority trainees and women (e.g. by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees) to the extent such persons are available within a reasonable area of recruitment. The Contractor will be responsible for demonstrating the steps that he has taken in pursuance thereof, prior to a determination as to whether the Contractor is in compliance with this Training Special Provision. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

No employee shall be employed as a trainee in any classification in which he has successfully completed a training course leading to journeyman status or in which he has been employed as a journeyman. The Contractor should satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used, the Contractor's records should document the findings in each case.

The minimum length and type of training for each classification will be as established in the training program selected by the Contractor and approved by the Illinois Department of Transportation and the Federal Highway Administration. The Illinois Department of Transportation and the Federal Highway Administration shall approve a program, if it is reasonably calculated to meet the equal employment opportunity obligations of the Contractor and to qualify the average trainee for journeyman status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau and training programs approved by not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the State prior to commencing work on the classification covered by the program. It is the intention of these provisions that training is to be provided in the construction crafts rather then clerk-typists or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the Illinois Department of Transportation and the Federal Highway Administration. Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Except as otherwise noted below, the Contractor will be reimbursed 80 cents per hour of training given an employee on this contract in accordance with an approved training program. As approved by the Engineer, reimbursement will be made for training of persons in excess of the number specified herein. This reimbursement will be made even though the Contractor receives additional training program funds from other sources, provided such other source does not specifically prohibit the Contractor from receiving other reimbursement. Reimbursement for offsite training indicated above may only be made to the Contractor where he does one or more of the following and the trainees are concurrently employed on a Federal-aid project; contributes to the cost of the training, provides the instruction to the trainee or pays the trainee's wages during the offsite training period.

No payment shall be made to the Contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyman, is caused by the Contractor and evidences a lack of good faith on the part of the Contractor in meeting the requirement of this Training Special Provision. It is normally expected that a trainee will begin his training on the project as soon as feasible after start of work utilizing the skill involved and remain on the project as long as training opportunities exist in his work classification or until he has completed his training program.

It is not required that all trainees be on board for the entire length of the contract. A Contractor will have fulfilled his responsibilities under this Training Special Provision if he has provided acceptable training to the number of trainees specified. The number trained shall be determined on the basis of the total number enrolled on the contract for a significant period.

Trainees will be paid at least 60 percent of the appropriate minimum journeyman's rate specified in the contract for the first half of the training period, 75 percent for the third quarter of the training period, and 90 percent for the last quarter of the training period, unless apprentices or trainees in an approved existing program are enrolled as trainees on this project. In that case, the appropriate rates approved by the Departments of Labor or Transportation in connection with the existing program shall apply to all trainees being trained for the same classification who are covered by this Training Special Provision.

The Contractor shall furnish the trainee a copy of the program he will follow in providing the training. The Contractor shall provide each trainee with a certification showing the type and length of training satisfactorily complete.

The Contractor shall provide for the maintenance of records and furnish periodic reports documenting his performance under this Training Special Provision.

Method of Measurement. The unit of measurement is in hours.

Basis of Payment. This work will be paid for at the contract unit price of 80 cents per hour for TRAINEES. The estimated total number of hours, unit price, and total price have been included in the schedule of prices.

20338

BITUMINOUS MATERIALS COST ADJUSTMENTS (BDE) (RETURN FORM WITH BID)
Effective: November 2, 2006 Revised: January 2, 2007

Description. For projects with at least 1200 tons (1100 metric tons) of work involving applicable bituminous materials, cost adjustments will be made to provide additional compensation to the Contractor, or credit to the Department, for fluctuations in the cost of bituminous materials when optioned by the Contractor. The adjustments shall apply to permanent and temporary hot-mix asphalt (HMA) mixtures, bituminous surface treatments (cover and seal coats), and pavement preservation type surface treatments. The adjustments shall not apply to bituminous prime coats, tack coats, crack filling/sealing, or joint filling/sealing.

The bidder shall indicate on the attached form whether or not this special provision will be part of the contract and submit the completed form with his/her bid. Failure to submit the form, or failure to fill out the form completely, shall make this contract exempt of bituminous materials cost adjustments.

Method of Adjustment. Bituminous materials cost adjustments will be computed as follows.

$CA = (BPI_P - BPI_L) \times (\%AC_V / 100) \times Q$

Where: CA = Cost Adjustment, $.
BPI_P = Bituminous Price Index, as published by the Department for the month the work is performed, $/ton ($/metric ton).
BPI_L = Bituminous Price Index, as published by the Department for the month prior to the letting, $/ton ($/metric ton).
$\%AC_V$ = Percent of virgin Asphalt Cement in the Quantity being adjusted. For HMA mixtures, the % AC_V will be determined from the adjusted job mix formula. For bituminous materials applied, a performance graded or cutback asphalt will be considered to be 100% AC_V and undiluted emulsified asphalt will be considered to be 65% AC_V.
Q = Authorized construction Quantity, tons (metric tons) (see below).

For HMA mixtures measured in square yards: Q, tons = A x D x (G_{mb} x 46.8) / 2000. For HMA mixtures measured in square meters: Q, metric tons = A x D x (G_{mb} x 24.99) / 1000. When computing adjustments for full-depth HMA pavement, separate calculations will be made for the binder and surface courses to account for their different G_{mb} and % AC_V.

For bituminous materials measured in gallons: Q, tons = V x 8.33 lb/gal x SG / 2000
For bituminous materials measured in liters: Q, metric tons = V x 1.0 kg/L x SG / 1000

Where: A = Area of the HMA mixture, sq yd (sq m).
D = Depth of the HMA mixture, in. (mm).
G_{mb} = Average bulk specific gravity of the mixture, from the approved mix design.
V = Volume of the bituminous material, gal (L).
SG = Specific Gravity of bituminous material as shown on the bill of lading.

Basis of Payment. Bituminous materials cost adjustments may be positive or negative but will only be made when there is a difference between the BPI_L and BPI_P in excess of five percent, as calculated by:

Percent Difference = $\{(BPI_L - BPI_P) \div BPI_L\} \times 100$

Bituminous materials cost adjustments will be calculated for each calendar month in which applicable bituminous material is placed; and will be paid or deducted when all other contract requirements for the items of work are satisfied. The adjustments shall not apply during contract time subject to liquidated damages for completion of the entire contract.

Return With Bid

ILLINOIS DEPARTMENT OF TRANSPORTATION

OPTION FOR BITUMINOUS MATERIALS COST ADJUSTMENTS

The bidder shall submit this completed form with his/her bid. Failure to submit the form, or failure to fill out the form completely, shall make this contract exempt of bituminous materials cost adjustments. After award, this form, when submitted, shall become part of the contract.

Contract No.: _____

Company Name:_____

Contractor's Option:

Is your company opting to include this special provision as part of the contract?

Yes ☐ No ☐

Signature: _____ **Date:** _____

STEEL COST ADJUSTMENT (BDE) (RETURN FORM WITH BID)
Effective: April 2, 2004 Revised: April 1, 2007

Description. Steel cost adjustments will be made to provide additional compensation to the Contractor, or a credit to the Department, for fluctuations in steel prices when optioned by the Contractor. The bidder shall indicate on the attached form whether or not this special provision will be part of the contract and submit the completed form with his/her bid. Failure to submit the form, or failure to fill out the form completely, shall make this contract exempt of steel cost adjustments.

Types of Steel Products. An adjustment will be made for fluctuations in the cost of steel used in the manufacture of the following items:

Metal Piling (excluding temporary sheet piling)
Structural Steel
Reinforcing Steel

Other steel materials such as dowel bars, tie bars, mesh reinforcement, guardrail, steel traffic signal and light poles, towers and mast arms, metal railings (excluding wire fence), frames and grates, and other miscellaneous items will be subject to a steel cost adjustment when the pay item they are used in has a contract value of $10,000 or greater.

Documentation. Sufficient documentation shall be furnished to the Engineer to verify the following:

(a) Evidence that increased or decreased steel costs have been passed on to the Contractor.

(b) The dates and quantity of steel, in lb (kg), shipped from the mill to the fabricator.

(c) The quantity of steel, in lb (kg), incorporated into the various items of work covered by this special provision. The Department reserves the right to verify submitted quantities.

Method of Adjustment. Steel cost adjustments will be computed as follows:

$SCA = Q \times D$

Where: SCA = steel cost adjustment, in dollars
Q = quantity of steel incorporated into the work, in lb (kg)
D = price factor, in dollars per lb (kg)

$D = CBP_M - CBP_L$

Where: CBP_M = The average of the Consumer Buying Price indices for Shredded Auto Scrap (Chicago) and No. 1 Heavy Melt (Chicago) as published by the American Metal Market (AMM) for the day the steel is shipped from the mill. The indices will be converted from dollars per ton to dollars per lb (kg).

CBP_L = The average of the Consumer Buying Price indices for Shredded Auto Scrap (Chicago) and No. 1 Heavy Melt (Chicago) as published by the AMM for the day the contract is let. The indices will be converted from dollars per ton to dollars per lb (kg).

The unit weights (masses) of steel that will be used to calculate the steel cost adjustment for the various items are shown in the attached table.

No steel cost adjustment will be made for any products manufactured from steel having a mill shipping date prior to the letting date.

If the Contractor fails to provide the required documentation, the method of adjustment will be calculated as described above; however, the CBP_M will be based on the date the steel arrives at the job site. In this case, an adjustment will only be made when there is a decrease in steel costs.

Basis of Payment. Steel cost adjustments may be positive or negative but will only be made when there is a difference between the CBP_L and CBP_M in excess of five percent, as calculated by:

$$\text{Percent Difference} = \{(CBP_L - CBP_M) \div CBP_L\} \times 100$$

Steel cost adjustments will be calculated by the Engineer and will be paid or deducted when all other contract requirements for the items of work are satisfied. Adjustments will only be made for fluctuations in the cost of the steel as described herein. No adjustment will be made for changes in the cost of manufacturing, fabrication, shipping, storage, etc.

The adjustments shall not apply during contract time subject to liquidated damages for completion of the entire contract.

Attachment

Item	Unit Mass (Weight)
Metal Piling (excluding temporary sheet piling)	
Furnishing Metal Pile Shells 12 in. (305 mm), 0.179 in. (3.80 mm) wall thickness)	23 lb/ft (34 kg/m)
Furnishing Metal Pile Shells 12 in. (305 mm), 0.250 in. (6.35 mm) wall thickness)	32 lb/ft (48 kg/m)
Furnishing Metal Pile Shells 14 in. (356 mm), 0.250 in. (6.35 mm) wall thickness)	37 lb/ft (55 kg/m)
Other piling	See plans
Structural Steel	See plans for weights (masses)
Reinforcing Steel	See plans for weights (masses)
Dowel Bars and Tie Bars	6 lb (3 kg) each
Mesh Reinforcement	63 lb/100 sq ft (310 kg/sq m)
Guardrail	
Steel Plate Beam Guardrail, Type A w/steel posts	20 lb/ft (30 kg/m)
Steel Plate Beam Guardrail, Type B w/steel posts	30 lb/ft (45 kg/m)
Steel Plate Beam Guardrail, Types A and B w/wood posts	8 lb/ft (12 kg/m)
Steel Plate Beam Guardrail, Type 2	305 lb (140 kg) each
Steel Plate Beam Guardrail, Type 6	1260 lb (570 kg) each
Traffic Barrier Terminal, Type 1 Special (Tangent)	730 lb (330 kg) each
Traffic Barrier Terminal, Type 1 Special (Flared)	410 lb (185 kg) each
Steel Traffic Signal and Light Poles, Towers and Mast Arms	
Traffic Signal Post	11 lb/ft (16 kg/m)
Light Pole, Tenon Mount and Twin Mount, 30 - 40 ft (9 – 12 m)	14 lb/ft (21 kg/m)
Light Pole, Tenon Mount and Twin Mount, 45 - 55 ft (13.5 – 16.5 m)	21 lb/ft (31 kg/m)
Light Pole w/Mast Arm, 30 - 50 ft (9 – 15.2 m)	13 lb/ft (19 kg/m)
Light Pole w/Mast Arm, 55 - 60 ft (16.5 – 18 m)	19 lb/ft (28 kg/m)
Light Tower w/Luminaire Mount, 80 - 110 ft (24 – 33.5 m)	31 lb/ft (46 kg/m)
Light Tower w/Luminaire Mount, 120 - 140 ft (36.5 – 42.5 m)	65 lb/ft (97 kg/m)
Light Tower w/Luminaire Mount, 150 - 160 ft (45.5 – 48.5 m)	80 lb/ft (119 kg/m)
Metal Railings (excluding wire fence)	
Steel Railing, Type SM	64 lb/ft (95 kg/m)
Steel Railing, Type S-1	39 lb/ft (58 kg/m)
Steel Railing, Type T-1	53 lb/ft (79 kg/m)
Steel Bridge Rail	52 lb/ft (77 kg/m)
Frames and Grates	
Frame	250 lb (115 kg)
Lids and Grates	150 lb (70 kg)

Return With Bid

ILLINOIS DEPARTMENT OF TRANSPORTATION

OPTION FOR STEEL COST ADJUSTMENT

The bidder shall submit this completed form with his/her bid. Failure to submit the form, or failure to fill out the form completely, shall make this contract exempt of steel cost adjustments. After award, this form, when submitted shall become part of the contract.

Contract No.: _____

Company Name:_____

Contractor's Option:

Is your company opting to include this special provision as part of the contract plans?

Yes ☐ No ☐

Signature: _____ **Date:** _____

STORM WATER POLLUTION PREVENTION PLAN

Illinois Department of Transportation

Storm Water Pollution Prevention Plan

Route	F.A.P. Route 351	Marked Rt.	(US Rte. 6 - 159th Street)
Section	3277R (60774), and 2008-001VB (60E10)	Project No.	C-91-249-99 and C-91-171-08
County	Cook	Contract No.	60774 and 60E10

This plan has been prepared to comply with the provisions of the NPDES Permit Number ILR10, issued by the Illinois Environmental Protection Agency on May 30, 2003 for storm water discharges from Construction Site Activities. This plan has also been prepared to comply with the provisions of NPDES Permit Number ILR40 for discharges from small municipal separate storm sewer systems if checked below.

NPDES permits associated with this project:

- ☐ ILR10 Permit No. (if applicable):
- ☒ ILR40 Permit No. (if applicable): ILR400493

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Diane M. O'Keefe, P.E.
Print Name

Deputy Director of Highways, Region One Engineer
Title

IDOT Region One
Agency

Signature

3-20-01
Date

I. Site Description:

A. The following is a description of the project location:

The project is located in the Cities of Harvey and Markham, Cook County, Illinois. The western improvement limit of FAP Route 351 (US Route 6 - 159th Street) The western improvement limit of FAP Route 351 (US Route 6) begins approximately 23.6 meters west of Western Avenue and 463.5 meters east of Interstate 294 (the Tri-State Tollway) and extends east to a point approximately 10.7 meters west of Carol Avenue and 248.5 meters east of State Route 1 (Halsted Street), a total distance of approximately 3.51 kilometers. Work will include improvements along Dixie Highway from approximately 100 meters north to 214 meters south of US Route 6; along Halsted Street from US Route 6 to 194 meters north.

This work will be completed by two separate construction contracts that will be completed simultaneously. The first contract will include all work between Lexington Avenue, station 2+682.05, to Fisk Avenue station 3+100, and will include work along the existing railroad lines and work along Park Avenue and Center Street and West Avenue.

B. The following is a description of the construction activity which is the subject of this plan:

The proposed improvement consists of reconstruction and widening of existing roadway to provide a continuous cross section of five lanes throughout the project corridor, including the viaduct section. This will provide left turn channelization at all major intersections, and a two-way left turn lane for refuge for vehicles making left turn into the numerous side streets and driveways. The existing roadway profiles will be modified by up to 2 feet to provide positive drainage. The proposed improvement is also including construction of new enclosed drainage systems, roadway lighting, and traffic signal modernization, combination concrete curb and gutter, pavement marking, landscaping and all incidental and collateral work necessary to complete the project as shown on the plans.

C. The following is a description of the intended sequence of major activities which will disturb soils for major portions of the construction site, such as grubbing, excavation and grading:

This work will consist of grading including removal and replacement of the traffic lanes, new sidewalks, and a new storm sewer system. Construction will take place in two general stages along US Route 6 - 159th Street and the project sidestreets. The first stage will include the construction of the new Storm Sewer main drain and half of the roadway and sidewalk pavements, split approximately down the roadway centerline. The first side to be constructed is the side of the main sewer drain. The second stage will consist of the reconstruction of the opposing half of the roadway and sidewalk pavements.

D. The total area of the construction site is estimated to be 41.1 acres.

The total area of the site that is estimated will be disturbed by excavation, grading or other activities is 41.1 acres.

E. The following is a weighted average of the runoff coefficient for this project after construction activities are completed:
The weighted average runoff coefficient prior to construction is 0.81, and the weighted average runoff coefficient for the project site after construction is 0.84.

F. The following is a description of the soil types found at the project site followed by information regarding their erosivity:

Map unit symbol	Map unit name	Rating	Percent of AOI
49	Watseka loamy fine sand	0.17	4.40%
69	Milford silty clay loam	0.28	11.10%
125	Selma loam	0.28	7.90%
392	Urban land-Orthents, loamy complex	0.43	0.50%
533	Urban land	--	46.70%
534	Urban land-Orthents, clayey complex	0.32	1.50%
536	Dumps	--	3.50%
924	Urban land-Milford-Martinton complex	0.28	24.40%
Totals for Area of Interest (AOI)			100.00%

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

G. The following is a description of potentially erosive areas associated with this project:

The predominant potentially erosive areas within the project area are all located within the urban areas. The proposed and existing slopes around the project site are generally very flat with overland slopes typically less than 2%. Typical construction activities will expose the soils by removing the vegetative cover during construction but will not generate long term adverse erosive conditions. Construction activities will be staged to minimize erosive conditions during the work activities.

H. The following is a description of soil disturbing activities, their locations, and their erosive factors (e.g. steepness of slopes, length of slopes, etc):

The nature and purpose of land disturbing activities on this project is to remove and replace the roadway and sidewalks along US Route 6 - 159th Street, and to construct a new enclosed storm sewer system throughout the limits of the project site.

Approximately 50% of the disturbed areas within the project has been classified with erosive characteristics. The majority of the project has soil classified as 533 Urban Land or 536 Dumps. (or fill). The remainder of the existing soil within the project area is moderately susceptible to water erosion.

I. See the erosion control plans and/or drainage plans for this contract for information regarding drainage patterns, approximate slopes anticipated before and after major grading activities, locations where vehicles enter or exit the site and controls to prevent offsite sediment tracking (to be added after contractor identifies locations), areas of soil

disturbance, the location of major structural and non-structural controls identified in the plan, the location of areas where stabilization practices are expected to occur, surface waters (including wetlands) and locations where storm water is discharged to surface water including wetlands.

J. The following is a list of receiving water(s) and the ultimate receiving water(s), and areal extent of wetland acreage at the site. The location of the receiving waters can be found on the erosion and sediment control plans:

All drainage water within the project site eventually is received in the municipal storm sewer system and is eventually collected within storm systems controlled by the MWRDGC. Following is a summary of the receiving storm water outfalls:

- From the western termini of the project to the western side of Wood Street, the storm water discharges directly to a 72" MWRDGC Storm Sewer interceptor flowing to the north to the Calumet Wastewater Reclamation Plant, which then discharges into the Calumet River.
- From Wood Street to Gauger Avenue, the storm flow is discharged into the Calumet Union Drainage Ditch at Wood Street.
- Between Gauger Avenue and Fisk Avenue, the storm flow is collected by local combined City of Harvey sewers that flow northward and eventually into an MWRDGC interceptor pipe that flows to the Calumet Wastewater Reclamation Plant, which then discharges into the Calumet River.
- From Fisk Avenue to Halsted Street, the storm water is collected by local catch basins and flows directly into the Calumet Union Drainage Ditch located on Halsted Street south of 159th street.
- From Halsted Street to the eastern termini of the project, the storm water is collected by local catch basins and flows in pipes to Vincennes Avenue, then southward and into the Calument Union Drainage Ditch.

K. The following pollutants of concern will be associated with this construction project:

☒	Soil Sediment	☐	Petroleum (gas, diesel, oil, kerosene, hydraulic oil / fluids)
☒	Concrete	☐	Antifreeze / Coolants
☒	Concrete Truck Waste	☐	Waste water from cleaning construction equipment
☒	Concrete Curing Compounds	☐	Other (specify)
☐	Solid Waste Debris	☐	Other (specify)
☐	Paints	☐	Other (specify)
☐	Solvents	☐	Other (specify)
☒	Fertilizers / Pesticides	☐	Other (specify)

II. Controls:

This section of the plan addresses the controls that will be implemented for each of the major construction activities described in I.C. above and for all use areas, borrow sites, and waste sites. For each measure discussed, the contractor will be responsible for its implementation as indicated. The contractor shall provide to the resident engineer a plan for the implementation of the measures indicated. The contractor, and subcontractors, will notify the resident engineer of any proposed changes, maintenance, or modifications to keep construction activities

compliant with the permit. Each such contractor has signed the required certification on forms which are attached to, and are a part of, this plan:

A. Erosion and Sediment Controls

1. **Stabilized Practices:** Provided below is a description of interim and permanent stabilization practices, including site specific scheduling of the implementation of the practices. Site plans will ensure that existing vegetation is preserved where attainable and disturbed portions of the site will be stabilized. Stabilization practices may include but are not limited to: temporary seeding, permanent seeding, mulching, geotextiles, sodding, vegetative buffer strips, protection of trees, preservation of mature vegetation, and other appropriate measures. Except as provided below in II(A)(1)(a) and II(A)(3), stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceases on all disturbed portions of the site where construction will not occur for a period of 21 or more calendar days.

   a. Where the initiation of stabilization measures by the 14th day after construction activity temporarily or permanently ceases is precluded by snow cover, stabilization measures shall be initiated as soon as practicable thereafter.

   The following Stabilization Practices will be used for this project:

☒	Preservation of Mature Vegetation	☒	Erosion Control Blanket / Mulching
☐	Vegetated Buffer Strips	☒	Sodding
☒	Protection of Trees	☐	Geotextiles
☒	Temporary Erosion Control Seeding	☐	Other (specify)
☐	Temporary Turf (Seeding, Class 7)	☐	Other (specify)
☐	Temporary Mulching	☐	Other (specify)
☐	Permanent Seeding	☐	Other (specify)

   Describe how the Stabilization Practices listed above will be utilized:

   All sediment and erosion control measures will be installed per IDOT standard section 280 as specified in the IDOT's standard specifications, Adopted January 1, 2007. All construction activities will be in accordance with the national pollution discharge elimination system storm water permit ILR40.
   Erosion control will be provided in accordance with the sequence of construction stage. Sediment and erosion control devices will be functional before the project site is disturbed. All disturbed areas will be seeded or sodded as soon as practical after construction activities in that area have concluded. Temporary erosion control measures consist of perimeter erosion barriers, inlet protections, inlet filters and temporary seeding. The limits of sodding, salt tolerant will be 3.0 meters behind the back of curb or to edge of sidewalk as shown on the plans unless otherwise noted. All control measures will be kept operational and maintained continuously throughout the period of land disturbance until permanent sediment and erosion control measures are operational.

Erosion control measures will be inspected by the engineer periodically and within 24 hours of any storm exceeding ½ inch precipitation. Damaged and ineffective erosion control measures will be repaired or replaced within 72 hours.

2. **Structural Practices:** Provided below is a description of structural practices that will be implemented, to the degree attainable, to divert flows from exposed soils, store flows or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Such practices may include but are not limited to: perimeter erosion barrier, earth dikes, drainage swales, sediment traps, ditch checks, subsurface drains, pipe slope drains, level spreaders, storm drain inlet protection, rock outlet protection, reinforced soil retaining systems, gabions, and temporary or permanent sediment basins. The installation of these devices may be subject to Section 404 of the Clean Water Act.

The following Structural Practices will be used for this project:

☒ Perimeter Erosion Barrier	☐ Rock Outlet Protection
☐ Temporary Ditch Check	☒ Riprap
☒ Storm Drain Inlet Protection	☐ Gabions
☐ Sediment Trap	☐ Slope Mattress
☐ Temporary Pipe Slope Drain	☐ Retaining Walls
☐ Temporary Sediment Basin	☐ Slope Walls
☐ Temporary Stream Crossing	☐ Concrete Revetment Mats
☐ Stabilized Construction Exits	☐ Level Spreaders
☐ Turf Reinforcement Mats	☐ Other (specify)
☐ Permanent Check Dams	☐ Other (specify)
☐ Permanent Sediment Basin	☐ Other (specify)
☐ Aggregate Ditch	☐ Other (specify)
☐ Paved Ditch	☐ Other (specify)

Describe how the Structural Practices listed above will be utilized:

1. Temporary Perimeter Erosion Barrier - will be placed at all locations where runoff exits the project site in an effort to prevent or control the erosion and sedimentation from leaving the site.

2. Inlet and Pipe Protection - will be placed on all drainage structures and pipes exiting the project site. This will be used to protect the existing and proposed catch basins, inlets and manholes with open lids in the unpaved area until final grading operations are ready.

3. Inlet Filters - These devices are to be provided at all existing and proposed inlets. The filter assembly, consisting of a frame and filter bag, will collect sediment in surface water runoff at locations shown on the drainage plans.

4. Riprap - Riprap will be placed in the Calumet Union Drainage Ditch (CUDD) at the storm sewer outfalls at Wood Street and at Halsted Street in order to minimize the potential for soil erosion along the bottom of the drainage ditch at the storm sewer outfalls.

3. **Storm Water Management:** Provided below is a description of measures that will be installed during the construction process to control pollutants in storm water discharges that will occur after construction operations have been completed. The installation of these devices may be subject to Section 404 of the Clean Water Act.

   a. Such practices may include but are not limited to: storm water detention structures (including wet ponds), storm water retention structures, flow attenuation by use of open vegetated swales and natural depressions, infiltration of runoff on site, and sequential systems (which combine several practices).

      The practices selected for implementation were determined on the basis of the technical guidance in Section 59-8 (Erosion and Sediment Control) in Chapter 59 (Landscape Design and Erosion Control) of the Illinois Department of Transportation Bureau of Design and Environment Manual. If practices other than those discussed in Section 59-8 are selected for implementation or if practices are applied to situations different from those covered in Section 59-8, the technical basis for such decisions will be explained below.

   b. Velocity dissipation devices will be placed at discharge locations and along the length of any outfall channel as necessary to provide a non-erosive velocity flow from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected (e.g. maintenance of hydrologic conditions such as the hydroperiod and hydrodynamics present prior to the initiation of construction activities).

Description of Storm Water Management Controls.

The proposed storm sewer design along US Route 6 between Western Avenue and Page Avenue. is to remove and replace the existing storm sewer. Portions of the existing storm sewer date back to the 1940's. Throughout the improvement, all non-paved areas will be constructed to provide permanent turf which will facilitate cleaner runoff to the storm water receiving areas. Also, throughout the improvement, new catch basins are being constructed at storm water collection points that will aide in the collection of larger sediments and debris prior to entering the storm water conveyance system. A portion of the project, as described below, is providing storm sewer separation for the existing combined sanitary system with storm water runoff flowing directly to the Calumet Union Drainage Ditch which runs parallel and south of the improvement area.

The proposed storm sewer along US Route 6 from Page Avenue to west of Myrtle Avenue is to provide stormwater separation from the existing combined sewer system. Stormwater within these limits is to be conveyed along US Route 6 and outlet via a new storm sewer to be constructed along Wood Street running south from US Route 6 to the Calumet Union Drainage Ditch (CUDD) at Wood Street.

The proposed storm sewer systems along US Route 6 from east of Myrtle Avenue to west of Park Avenue are to be conveyed to the existing City of Harvey combined sewer systems. Drainage of US Route 6 through this area are to be conveyed to existing combined sewers running north along Myrtle Avenue, Loomis Street and Lexington Avenue, with eventual outfalls at 157th Street.

The proposed storm sewer systsem along US Route 6 from west of Park Avenue to Fisk Avenue including the Metra and CN viaducts is to be conveyed to the existing City of Harvey combined sewer system. Drainage of US Route 6 between Park Avenue and West Avenue are to be comveyed to the exisign combined sewer running north along west side of West Avenue with eventual outfall at 157th Street. Drainage of US Route 6 between West Avenue and Fisk Avenue are to be conveyed to a new storm sewer running north along east side of West Avenue with eventual outfall at 157th Street.

The proposed storm sewer along US Route 6 between Fisk Avenue and Halsted Street is to drain to Calumet Union Drainage Ditch (CUDD) along Halsted Street. Approximately 6.7 acres of US Rte. 6 that once drained north through the combined sewer system is being diverted to the CUDD at Halsted Street in orger to provide better comveyance and alleviate the overtaxed local combined system. The proposed storm sewer system has been designed and sized to provide stormwater detention, and utilizes the control structure with restrictor prior to release to the CUDD.

The control manhole is designed so that stormwater will overflow the orifice plate once the storage capacity is realized. The manhole control structure outlet pipe is oversized to convey both discharge through the restrictor orifice and storage system overflow. During a 100-year event, the water level would rise in the oversized storm sewer and begin overflowing the orifice plate. If the water elevation continued to rise and exceed the rim elevation of the control manhole, stormwater would then pond in the swale at outlet location. Overflow from the swale would then flow overland to the CUDD.

4. Other Controls:

a. Vehicle Entrances and Exits – Stabilized construction entrances and exits must be constructed to prevent tracking of sediments onto roadways.

   The contractor will provide the resident engineer with a written plan identifying the location of stabilized entrances and exits and the procedures (s)he will use to construct and maintain them.

b. Material Delivery, Storage, and Use – The following BMPs shall be implemented to help prevent discharges of construction materials during delivery, storage, and use:
   - All products delivered to the project site must be properly labeled.
   - Water tight shipping containers and/or semi trailers shall be used to store hand tools, small parts, and most construction materials that can be carried by hand, such as paint cans, solvents, and grease.
   - A storage/containment facility should be chosen for larger items such as drums and items shipped or stored on pallets. Such material is to be covered by a tin roof or large sheets of plastic to prevent precipitation from coming in contact with the products being stored.
   - Large items such as light stands, framing materials and lumber shall be stored in the open in a general storage area. Such material shall be elevated with wood blocks to minimize contact with storm water runoff.
   - Spill clean-up materials, material safety data sheets, an inventory of materials, and emergency contact numbers shall be maintained and stored in one designated area and each Contractor is to inform his/her employees and the resident engineer of this location.

c. Stockpile Management – BMPs shall be implemented to reduce or eliminate pollution of storm water from stockpiles of soil and paving materials such as but not limited to portland cement concrete rubble, asphalt concrete, asphalt concrete rubble, aggregate base, aggregate sub base, and pre-mixed aggregate. The following BMPs may be considered:
   - Perimeter Erosion Barrier
   - Temporary Seeding
   - Temporary Mulch
   - Plastic Covers
   - Soil Binders
   - Storm Drain Inlet Protection

   The contractor will provide the resident engineer with a written plan of the procedures (s)he will use on the project and how they will be maintained.

d. Waste Disposal. No materials, including building materials, shall be discharged into Waters of the State, except as authorized by a Section 404 permit.

e. The provisions of this plan shall ensure and demonstrate compliance with applicable State and/or local waste disposal, sanitary sewer or septic system regulations.

f. The contractor shall provide a written and graphic plan to the resident engineer identifying where each of the above areas will be located and how they are to be managed.

5. Approved State or Local Laws

The management practices, controls and provisions contained in this plan will be in accordance with IDOT specifications, which are at least as protective as the requirements contained in the Illinois Environmental Protection Agency's Illinois Urban Manual, 1995. Procedures and requirements specified in applicable sediment and erosion site plans or storm water management plans approved by local officials shall be described or incorporated by reference in the space provided below. Requirements specified in sediment and erosion site plans, site permits, storm water management site plans or site permits approved by local officials that are applicable to protecting surface water resources are, upon submittal of an NOI, to be authorized to discharge under permit ILR10 incorporated by reference and are enforceable under this permit even if they are not specifically included in the plan.

Description of procedures and requirements specified in applicable sediment and erosion site plans or storm water management plans approved by local officials:

All management practices, controls, and other provisions provided in this project are in accordance with IDOT Standard Specifications for Road and Bridge Construction adopted January 1, 2007

III. Maintenance:

The following is a description of procedures that will be used to maintain, in good and effective operating conditions, the vegetation, erosion and sediment control measures and other

protective measures identified in this plan. The resident engineer will provide maintenance guides to the contractor for the practices associated with this project.

All sediment and erosion control measures will be installed per IDOT standards and in accordance with section 280 of the standard specifications.

All construction activities will be in accordance with the national pollution discharge elimination system storm water permit ILR10.

Erosion control will be provided in accordance with the sequence of stage construction.

Sedimentation and erosion control devices will be in place and functional before the project site is disturbed.

All disturbed areas will be seeded or sodded as soon as practical after construction activities in that area have concluded. Areas that have been stripped and will not receive permanent landscaping before the end of the fall seeding restrictions will receive "temporary erosion control seeding".

The contractor will take all precautions to protect wetlands from damage by sediment, construction equipment or by his work crews. The contractor will assure that debris or any construction material is not disposed of in wetlands.

Water pumped or otherwise discharged from the site during construction dewatering will be filtered.

Gravel roads, access drives, parking areas of sufficient width and length, and vehicle wash down facilities if necessary, will be provided to prevent the deposit of soil from being tracked onto public or private roadways. Any soil reaching a public or private roadway will be removed before the end of each workday or sooner as needed.

Erosion control measures will be inspected by the engineer periodically and within 24 hours of any storm exceeding 1/2-inch precipitation. Damaged and ineffective erosion control measures will be repaired or replaced within 72 hours.

All control measures will be kept operational and maintained continuously throughout the period of land disturbance until permanent sediment and erosion control measures are operational.

Perimeter Erosion Barriers will be routinely cleaned of debris and any worn or inefficient segments will be replaced throughout the project duration.

Inlet and Pipe Protections will be routinely cleaned of debris and any worn or inefficient areas will be replaced throughout the project duration.

Sediment control and drainage structure inlet filters will be routinely cleaned of debris and any worn or inefficient filters will be replaced throughout the project duration.

IV. Inspections:

Qualified personnel shall inspect disturbed areas of the construction site which have not yet been finally stabilized, structural control measures, and locations where vehicles and equipment enter and exit the site. Such inspections shall be conducted at least once every seven (7) calendar days and within 24 hours of the end of a storm that is 0.5 inches or greater or equivalent snowfall.

A. Disturbed areas, use areas (storage of materials, stockpiles, machine maintenance, fueling, etc.), borrow sites, and waste sites shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the plan shall be observed to ensure that they are operating correctly. Discharge locations or points that are accessible, shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles enter or exit the site shall be inspected for evidence of off site sediment tracking.

B. Based on the results of the inspection, the description of potential pollutant sources identified in section I above and pollution prevention measures identified in section II above shall be revised as appropriate as soon as practicable after such inspection. Any changes to this plan resulting from the required inspections shall be implemented within ½ hour to 1 week based on the urgency of the situation. The resident engineer will notify the contractor of the time required to implement such actions through the weekly inspection report.

C. A report summarizing the scope of the inspection, name(s) and qualifications of personnel making the inspection, the date(s) of the inspection, major observations relating to the implementation of this storm water pollution prevention plan, and actions taken in accordance with section IV(B) shall be made and retained as part of the plan for at least three (3) years after the date of the inspection. The report shall be signed in accordance with Part VI. G of the general permit.

D. If any violation of the provisions of this plan is identified during the conduct of the construction work covered by this plan, the resident engineer shall complete and file an "Incidence of Noncompliance" (ION) report for the identified violation. The resident engineer shall use forms provided by the Illinois Environmental Protection Agency and shall include specific information on the cause of noncompliance, actions which were taken to prevent any further causes of noncompliance, and a statement detailing any environmental impact which may have resulted from the noncompliance. All reports of noncompliance shall be signed by a responsible authority in accordance with Part VI. G of the general permit.

The Incidence of Non-Compliance shall be mailed to the following address:

Illinois Environmental Protection Agency
Division of Water Pollution Control
Attn: Compliance Assurance Section
1021 North Grand East
Post Office Box 19276
Springfield, Illinois 62794-9276

V. Non-Storm Water Discharges:

Except for flows from fire fighting activities, sources of non-storm water that is combined with storm water discharges associated with the industrial activity addressed in this plan must be described below. Appropriate pollution prevention measures, as described below, will be implemented for the non-storm water component(s) of the discharge.

A. Spill Prevention and Control – BMPs shall be implemented to contain and clean-up spills and prevent material discharges to the storm drain system. The contractor shall produce a written plan stating how his/her company will prevent, report, and clean up spills and provide a copy to all of his/her employees and the resident engineer. The contractor shall notify all of his/her employees on the proper protocol for reporting spills. The contractor shall notify the resident engineer of any spills immediately.

B. Concrete Residuals and Washout Wastes – The following BMPs shall be implemented to control residual concrete, concrete sediments, and rinse water:
   - Temporary Concrete Washout Facilities shall be constructed for rinsing out concrete trucks. Signs shall be installed directing concrete truck drivers where designated washout facilities are located.
   - The contractor shall have the location of temporary concrete washout facilities approved by the resident engineer.
   - All temporary concrete washout facilities are to be inspected by the contractor after each use and all spills must be reported to the resident engineer and cleaned up immediately.
   - Concrete waste solids/liquids shall be disposed of properly.

C. Litter Management – A proper number of dumpsters shall be provided on site to handle debris and litter associated with the project. The Contractor is responsible for ensuring his/her employees place all litter including marking paint cans, soda cans, food wrappers, wood lathe, marking ribbon, construction string, and all other construction related litter in the proper dumpsters.

D. Vehicle and Equipment Cleaning – Vehicles and equipment are to be cleaned in designated areas only, preferably off site.

E. Vehicle and Equipment Fueling – A variety of BMPs can be implemented during fueling of vehicles and equipment to prevent pollution. The contractor shall inform the resident engineer as to which BMPs will be used on the project. The contractor shall inform the resident engineer how (s)he will be informing his/her employees of these BMPs (i.e. signs, training, etc.). Below are a few examples of these BMPs:
   - Containment
   - Spill Prevention and Control
   - Use of Drip Pans and Absorbents
   - Automatic Shut-Off Nozzles
   - Topping Off Restrictions
   - Leak Inspection and Repair

F. Vehicle and Equipment Maintenance – On site maintenance must be performed in accordance with all environmental laws such as proper storage and no dumping of old engine oil or other fluids on site.

VI. Failure to Comply:

Failure to comply with any provisions of this Storm Water Pollution Prevention Plan will result in the implementation of an Erosion and Sediment Control Deficiency Deduction against the contractor and/or penalties under the NPDES permit which could be passed onto the contractor.

Illinois Department of Transportation

Contractor Certification Statement

This certification statement is part of the Storm Water Pollution Prevention Plan for the project described below, in accordance with NPDES Permit No. ILR10 issued by the Illinois Environmental Protection Agency on May 30, 2003.

Route	FAP Route 351	Marked Rt.	(US Rte. 6 - 159th Street)
Section	3277R (60774), and 2008-001VB	Project No.	C-91-249-99 and C-91-171-08
County	Cook	Contract No.	60774 and 60E10

I certify under penalty of law that I understand the terms of the general National Pollutant Discharge Elimination System (NPDES) permit (ILR 10) that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification. I have read and understand all of the information and requirements stated in the Storm Water Pollution Prevention Plan for the above mentioned project. I have provided all documentation required to be in compliance with the ILR10 and Storm Water Pollution Prevention Plan and will provide timely updates to these documents as necessary.

☐ Contractor

☐ Sub-Contractor

Print Name	Signature
Title	Date
Name of Firm	Telephone
Street Address	City/State/ZIP

REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS

I. GENERAL

1. These contract provisions shall apply to all word performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

2. Except as otherwise provided for in each section, the contractor shall insert in each subcontract all of the stipulations contained in these Required Contract Provisions, and further require their inclusion in any lower tier subcontract or purchase order that may in turn be made. The Required Contract Provisions shall not be incorporated by reference in any case. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with these Required Contract Provisions.

3. A breach of any of the stipulations contained in these Required Contract Provisions shall be sufficient grounds for termination of the contract.

4. A breach of the following clauses of the Required Contract Provisions may also be grounds for debarment as provided in 29 CFR 5.12:

Section I, paragraph 2;
Section IV, paragraphs 1, 2, 3, 4 and 7;
Section V, paragraphs 1 and 2a through 2g.

5. Disputes arising out of the labor standards provisions of Section IV (except paragraph 5) and Section V of these Required Contract Provisions shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the U.S. Department of Labor (DOL) as set forth in 29 CFR 5, 6 and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the DOL, or the contractor's employees or their representatives.

6. Selection of Labor: During the performance of this contract, the contractor shall not:

a. Discriminate against labor from any other State, possession, or territory of the United States (except for employment preference for Appalachian contracts, when applicable, as specified in Attachment A), or

b. Employ convict labor for any purpose within the limits of the project unless it is labor performed by convicts who are on parole, supervised release, or probation.

II. NONDISCRIMINATION

(Applicable to all Federal-aid construction contracts and to all related subcontracts of $10,000 or more.)

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630 and 41 CFR 60 (and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The Equal Opportunity Construction Contract Specifications set forth under 41 CFR 60-4.3 and the provisions of the American Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the State highway agency (SHA) and the Federal Government in carrying out EEO obligations and in their review of his/her activities under the contract.

b. The contractor will accept as his operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, preapprenticeship, and/or on-the-job-training."

2. EEO Officer: The contractor will designate and make known to the SHA contracting officers an EEO Officer who will have the responsibility for an must be capable of effectively administering and promoting an active contractor program of EEO and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above

agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minority group employees.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minority groups in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employees referral sources likely to yield qualified minority group applicants. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish which such identified sources procedures whereby minority group applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, he is expected to observe the provisions of that agreement to the extent that the system permits the contractor's compliance with EEO contract provisions. (The DOL has held that where implementation of such agreements have the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Executive Order 11246, as amended.)

c. The contractor will encourage his present employees to refer minority group applicants for employment. Information and procedures with regard to referring minority group applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with his obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of his avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision.

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of minority group and women employees and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women within the unions, and to effect referrals by such unions of minority and female employees. Actions by the contractor either directly or through a contractor's association acting as agent will include the procedures set forth below:

a. The contractor will use best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group employees and women so that they may qualify for higher paying employment.

b. The contractor will use best efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to

the SHA and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of minority and women referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or quailifiable minority group persons and women. (The DOL has held that it shall be no excuse that the union with which the contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the SHA.

8. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment.

a. The contractor shall notify all potential subcontractors and suppliers of his/her EEO obligations under this contract.

b. Disadvantaged business enterprises (DBE), as defined in 49 CFR 23, shall have equal opportunity to compete for and perform subcontracts which the contractor enters into pursuant to this contract. The contractor will use his best efforts to solicit bids from and to utilize DBE subcontractors or subcontractors with meaningful minority group and female representation among their employees. Contractors shall obtain lists of DBE construction firms from SHA personnel.

c. The contractor will use his best efforts to ensure subcontractor compliance with their EEO obligations.

9. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the SHA and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women;

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees; and

(4) The progress and efforts being made in securing the services of DBE subcontractors or subcontractors with meaningful minority and female representation among their employees.

b. The contractors will submit an annual report to the SHA each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data.

III. NONSEGREGATED FACILITIES

(Applicable to all Federal-aid construction contracts and to all related subcontracts of $10,000 or more.)

a. By submission of this bid, the execution of this contract or subcontract, or the consummation of this material supply agreement or purchase order, as appropriate, the bidder, Federal-aid construction contractor, subcontractor, material supplier, or vendor, as appropriate, certifies that the firm does not maintain or provide for its employees any segregated facilities at any of its establishments, and that the firm does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The firm agrees that a breach of this certification is a violation of the EEO provisions of this contract. The firm further certifies that no employee will be denied access to adequate facilities on the basis of sex or disability.

b. As used in this certification, the term “segregated facilities” means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, timeclocks, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive, or are, in fact, segregated on the basis of race, color, religion, national origin, age or disability, because of habit, local custom, or otherwise. The only exception will be for the disabled when the demands for accessibility override (e.g. disabled parking).

c. The contractor agrees that it has obtained or will obtain identical certification from proposed subcontractors or material suppliers prior to award of subcontracts or consummation of material supply agreements of $10,000 or more and that it will retain such certifications in its files.

IV. PAYMENT OF PREDETERMINED MINIMUM WAGE

(Applicable to all Federal-aid construction contracts exceeding $2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural minor collectors, which are exempt.)

1. General:

a. All mechanics and laborers employed or working upon the site of the work will be paid unconditionally and not less often than once a week and without subsequent deduction or rebate on any account [except such payroll deductions as are permitted by regulations (29 CFR 3) issued by the Secretary of Labor under the Copeland Act (40 U.S.C. 276c)] the full amounts of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment. The payment shall be computed at wage rates not less than those contained in the wage determination of the Secretary of Labor (hereinafter “the wage determination”) which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the

contractor or its subcontractors and such laborers and mechanics. The wage determination (including any additional classifications and wage rates conformed under paragraph 2 of this Section IV and the DOL poster (WH-1321) or Form FHWA-1495) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers. For the purpose of this Section, contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act (40 U.S.C. 276a) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of Section IV, paragraph 3b, hereof. Also, for the purpose of this Section, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in paragraphs 4 and 5 of this Section IV.

b. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein, provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed.

c. All rulings and interpretations of the Davis-Bacon Act and related acts contained in 29 CFR 1, 3, and 5 are herein incorporated by reference in this contract.

2. Classification:

a. The SHA contracting officer shall require that any class of laborers or mechanics employed under the contract, which is not listed in the wage determination, shall be classified in conformance with the wage determination.

b. The contracting officer shall approve an additional classification, wage rate and fringe benefits only when the following criteria have been met:

(1) the work to be performed by the additional classification requested is not performed by a classification in the wage determination;

(2) the additional classification is utilized in the area by the construction industry;

(3) the proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and

(4) with respect to helpers, when such a classification prevails in the area in which the work is performed.

c. If the contractor or subcontractors, as appropriate, the laborers and mechanics (if known) to be employed in the additional classification or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the DOL, Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, D.C. 20210. The Wage and Hour Administrator, or an authorized representative, will approve, modify, or

disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

d. In the event the contractor or subcontractors, as appropriate, the laborers or mechanics to be employed in the additional classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the question, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. Said Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advised the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

e. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 2c or 2d of this Section IV shall be paid to all workers performing work in the additional classification from the first day on which work is performed in the classification.

3. Payment of Fringe Benefits:

a. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor or subcontractors, as appropriate, shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly case equivalent thereof.

b. If the contractor or subcontractor, as appropriate, does not make payments to a trustee or other third person, he/she may consider as a part of the wages of any laborer or mechanic the amount of any cost reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

4. Apprentices and Trainees (Programs of the U.S. DOL) and Helpers:

a. Apprentices:

(1) Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the DOL, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau, or if a person is employed in his/her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State apprenticeship agency (where appropriate) to be eligible for probationary employment as an apprentice.

(2) The allowable ratio of apprentices to journeyman-level employees on the job site in any craft classification shall not

be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate listed in the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor or subcontractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman-level hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

(3) Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator for the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

(4) In the event the Bureau of Apprenticeship and Training, or a State apprenticeship agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor or subcontractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the comparable work performed by regular employees until an acceptable program is approved.

b. Trainees:

(1) Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the DOL, Employment and Training Administration.

(2) The ratio of trainees to journeyman-level employees on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

(3) Every trainee must be paid at not less than the rate specified in the approved program for his/her level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman-level wage rate on the wage determination which provides for less than full fringe benefits for apprentices, in which cases such trainees shall receive the same fringe benefits as apprentices.

(4) In the event the Employment and Training Administration withdraws approval of a training program, the contractor or subcontractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Helpers:
Helpers will be permitted to work on a project if the helper classification is specified and defined on the applicable wage determination or is approved pursuant to the conformance procedure set forth in Section IV. 2. Any worker listed on a payroll at a helper wage rate, who is not a helper under a approved definition, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed.

5. Apprentices and Trainees (Programs of the U.S. DOT):

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

6. Withholding:

The SHA shall upon its own action or upon written request of an authorized representative of the DOL withhold, or cause to be withheld, from the contractor or subcontractor under this contract or any other Federal contract with the same prime contractor or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements which is held by the same prime contractor, as much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainee's and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the SHA contracting officer may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

7. Overtime Requirements:

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers, mechanics, watchmen, or guards (including apprentices, trainees, and helpers described in paragraphs 4 and 5 above) shall require or permit any laborer, mechanic, watchman, or guard in any workweek in which he/she is employed on such work, to work in excess of 40 hours in such workweek unless such laborer, mechanic, watchman, or guard receives compensation at a rate not less than one-and-one-half times his/her basic rate of pay for all hours worked in excess of 40 hours in such workweek.

8. Violation:

Liability for Unpaid Wages; Liquidated Damages: In the event of any violation of the clause set forth in paragraph 7 above, the contractor and any subcontractor responsible thereof shall be liable to the affected employee for his/her unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory) for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer, mechanic, watchman, or guard employed in violation of the clause set forth in paragraph 7, in the sum of $10 for each calendar day on which such employee was required or permitted to work in excess of the standard work week of 40 hours without payment of the overtime wages required by the clause set forth in paragraph 7.

9. Withholding for Unpaid Wages and Liquidated Damages:

The SHA shall; upon its own action or upon written request of any authorized representative of the DOL withhold, or cause to be withheld, from any monies payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 8 above.

V. STATEMENTS AND PAYROLLS

(Applicable to all Federal-aid construction contracts exceeding $2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural collectors, which are exempt.)

1. Compliance with Copeland Regulations (29 CFR 3):

The contractor shall comply with the Copeland Regulations of the Secretary of Labor which are herein incorporated by reference.

2. Payrolls and Payroll Records:

a. Payrolls and basic records relating thereto shall be maintained by the contractor and each subcontractor during the course of the work and preserved for a period of 3 years from the date of completion of the contract for all laborers, mechanics, apprentices, trainees, watchmen, helpers, and guards working at the site of the work.

b. The payroll records shall contain the name, social security number, and address of each such employee; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalent thereof the types described in Section 1(b)(2)(B) of the Davis Bacon Act); daily and weekly number of hours worked; deductions made; and actual wages paid. In addition, for Appalachian contracts, the payroll records shall contain a notation indicating whether the employee does, or does not, normally reside in the labor area as defined in Attachment A, paragraph 1. Whenever the Secretary of Labor, pursuant to Section IV, paragraph 3b, has found that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis Bacon Act, the contractor and each subcontractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, that the plan or program has been communicated in writing to the laborers or mechanics affected, and show the cost anticipated or the actual cost incurred in providing benefits. Contractors or subcontractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprentices and trainees, and ratios and wage rates prescribed in the applicable programs.

c. Each contractor and subcontractor shall furnish, each week in which any contract work is performed, to the SHA resident engineer a payroll of wages paid each of its employees (including apprentices trainees, and helpers, described in Section IV, paragraphs 4 and 5, and watchmen and guards engaged on work during the preceding weekly payroll period).

The payroll submitted shall set out accurately and completely all of the information required to be maintained under paragraph 2b of this Section V.

This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal stock number 029-005-0014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for the submission of copies of payrolls by all suncontractors.

d. Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the Contractor or subcontractor or his/her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) that the payroll for the payroll period contains the information required to be maintained under paragraph 2b of this Section V and that such information is correct and complete;

(2) that such laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in the Regulations, 29 CFR 3;

(3) that each laborer or mechanic has been paid not less that the applicable wage rate and fringe benefits or cash equivalent for the classification of worked performed, as specified in the applicable wage determination incorporated into the contract.

e. The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 2d of this Section V.

f. The falsification of any of the above certifications may subject the contractor to civil or criminal prosecution under 18 U/S. C. 1001 and 31 U.S.C. 231.

g. The contractor or subcontractor shall make the records required under paragraph 2b of this Section V available for

inspection, copying, or transcription by authorized representatives of the SHA, the FHWA, or the DOL, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the SHA, the FHWA, the DOL, or all may, after written notice to the contractor, sponsor, applicant, or owner, take such actions as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

VI. RECORD OF MATERIALS, SUPPLIES, AND LABOR

1. On all federal-aid contracts on the national highway system, except those which provide solely for the installation of protective devices at railroad grade crossings, those which are constructed on a force account or direct labor basis, highway beautification contracts, and contracts for which the total final construction cost for roadway and bridge is less than $1,000,000 (23 CFR 635) the contractor shall:

a. Become familiar with the list of specific materials and supplies contained in Form FHWA-47, "Statement of Materials and Labor Used by Contractor of Highway Construction Involving Federal Funds," prior to the commencement of work under this contract.

b. Maintain a record of the total cost of all materials and supplies purchased for and incorporated in the work, and also of the quantities of those specific materials and supplies listed on Form FHWA-47, and in the units shown on Form FHWA-47.

c. Furnish, upon the completion of the contract, to the SHA resident engineer on /Form FHWA-47 together with the data required in paragraph 1b relative to materials and supplies, a final labor summary of all contract work indicating the total hours worked and the total amount earned.

2. At the prime contractor's option, either a single report covering all contract work or separate reports for the contractor and for each subcontract shall be submitted.

VII. SUBLETTING OR ASSIGNING THE CONTRACT

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the State. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractors' own organization (23 CFR 635).

a. "Its own organization" shall be construed to include only workers employed and paid directly by the prime contractor and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor, assignee, or agent of the prime contractor.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph 1 of Section VII is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the SHA contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the SHA contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract.

Written consent will be given only after the SHA has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

VIII. SAFETY: ACCIDENT PREVENTION

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the SHA contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S. C. 333).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

IX. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification,

distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, the following notice shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

NOTICE TO ALL PERSONNEL ENGAGED ON FEDERAL-AID HIGHWAY PROJECTS

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined not more than $10,000 or imprisoned not more than 5 years or both."

X. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

(Applicable to all Federal-aid construction contracts and to all related subcontracts of $100,000 or more).

By submission of this bid or the execution of this contract, or subcontract, as appropriate, the bidder, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any facility that is or will be utilized in the performance of this contract, unless such contract is exempt under the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Pub.L. 91-604), and under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Pub.L. 92-500), Executive Order 11738, and regulations in implementation thereof (40 CFR 15) is not listed, on the date of contract award, on the U.S. Environmental Protection Agency (EPA) List of Violating Facilities pursuant to 40 CFR 15.20.

2. That the firm agrees to comply and remain in compliance with all the requirements of Section 114 of the Clean Air Act and Section 308 of the Federal Water Pollution Control Act and all regulations and guidelines listed thereunder.

3. That the firm shall promptly notify the SHA of the receipt of any communication from the Director, Office of Federal Activities, EPA indicating that a facility that is or will be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities.

4. That the firm agrees to include or cause to be included the requirements of paragraph 1 through 4 of this Section X in every nonexempt subcontract, and further agrees to take such action as the government may direct as a means of enforcing such requirements.

XI. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

1. Instructions for Certification - Primary Covered Transactions:

(Applicable to all Federal-aid contracts - 49 CFR 29)

a. By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.

d. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible,""lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is submitted for assistance in obtaining a copy of those regulations.

f. The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective primary participant further agrees by submitting this proposal that it will include the clause titled

"Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," provided by the department or agency entering into this covered transaction, without modification in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the nonprocurement portion of the "Lists of Parties Excluded from Federal Procurement or Nonprocurement Programs" (Nonprocurement List) which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph f of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

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Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Primary Covered Transactions

1. The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a 3-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph 1b of this certification; and

d. Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

2. Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

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2. Instructions for Certification - Lower Tier Covered Transactions:

(Applicable to all subcontracts, purchase orders and other lower tier transactions of $25,000 or more - 49 CFR 29)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "primary covered transaction," "participant," "person," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

e. The prospective lower tie participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealing.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily

excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

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Certification Regarding Debarment, Suspension, Ineligibility And Voluntary Exclusion-Lower Tier Covered Transactions:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

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XII. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

(Applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000 - 49 CFR 20)

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, “Disclosure Form to Report Lobbying,” in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

3. The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.

MINIMUM WAGES FOR FEDERAL AND FEDERALLY ASSISTED CONSTRUCTION CONTRACTS

This project is funded, in part, with Federal-aid funds and, as such, is subject to the provisions of the Davis-Bacon Act of March 3, 1931, as amended (46 Sta. 1494, as amended, 40 U.S.C. 276a) and of other Federal statutes referred to in a 29 CFR Part 1, Appendix A, as well as such additional statutes as may from time to time be enacted containing provisions for the payment of wages determined to be prevailing by the Secretary of Labor in accordance with the Davis-Bacon Act and pursuant to the provisions of 29 CFR Part 1. The prevailing rates and fringe benefits shown in the General Wage Determination Decisions issued by the U.S. Department of Labor shall, in accordance with the provisions of the foregoing statutes, constitute the minimum wages payable on Federal and federally assisted construction projects to laborers and mechanics of the specified classes engaged on contract work of the character and in the localities described therein.

General Wage Determination Decisions, modifications and supersedes decisions thereto are to be used in accordance with the provisions of 29 CFR Parts 1 and 5. Accordingly, the applicable decision, together with any modifications issued, must be made a part of every contract for performance of the described work within the geographic area indicated as required by an applicable DBRA Federal prevailing wage law and 29 CFR Part 5. The wage rates and fringe benefits contained in the General Wage Determination Decision shall be the minimum paid by contractors and subcontractors to laborers and mechanics.

NOTICE

The most current **General Wage Determination Decisions** (wage rates) are available on the IDOT web site. They are located on the Letting and Bidding page at http://www.dot.state.il.us/desenv/delett.html.

In addition, ten (10) days prior to the letting, the applicable Federal wage rates will be e-mailed to subscribers. It is recommended that all contractors subscribe to the Federal Wage Rates List or the Contractor's Packet through IDOT's subscription service.

PLEASE NOTE: if you have already subscribed to the Contractor's Packet you will automatically receive the Federal Wage Rates.

The instructions for subscribing are at http://www.dot.state.il.us/desenv/subsc.html.

If you have any questions concerning the wage rates, please contact IDOT's Chief Contract Official at 217-782-7806.