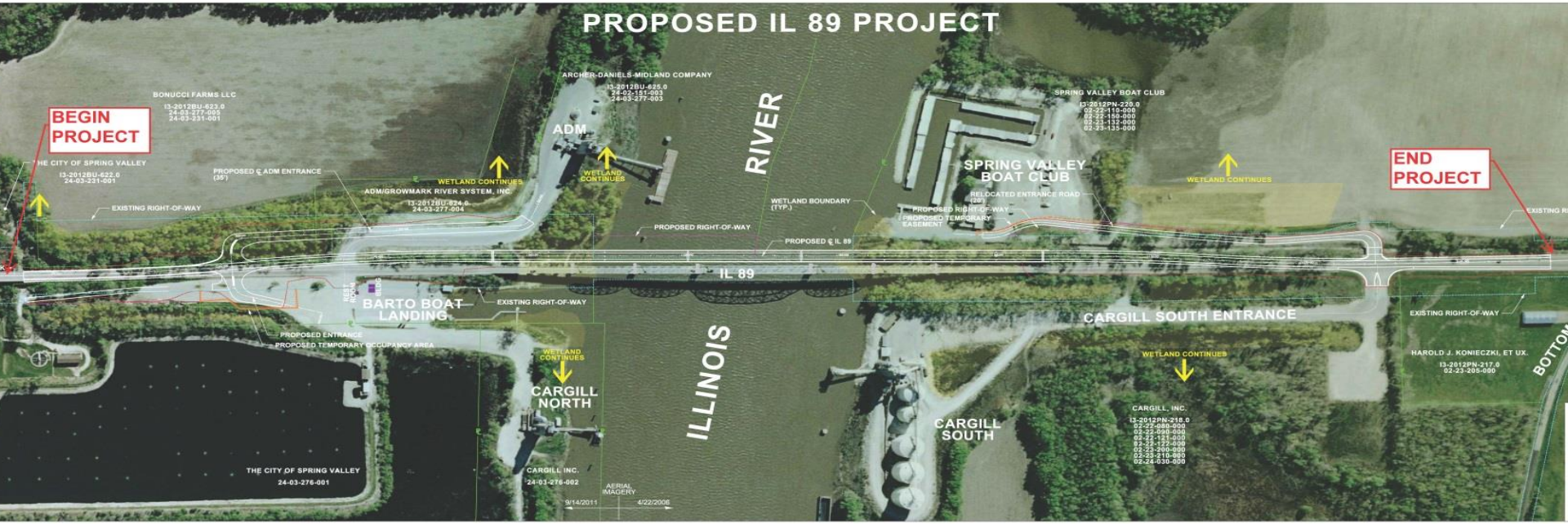
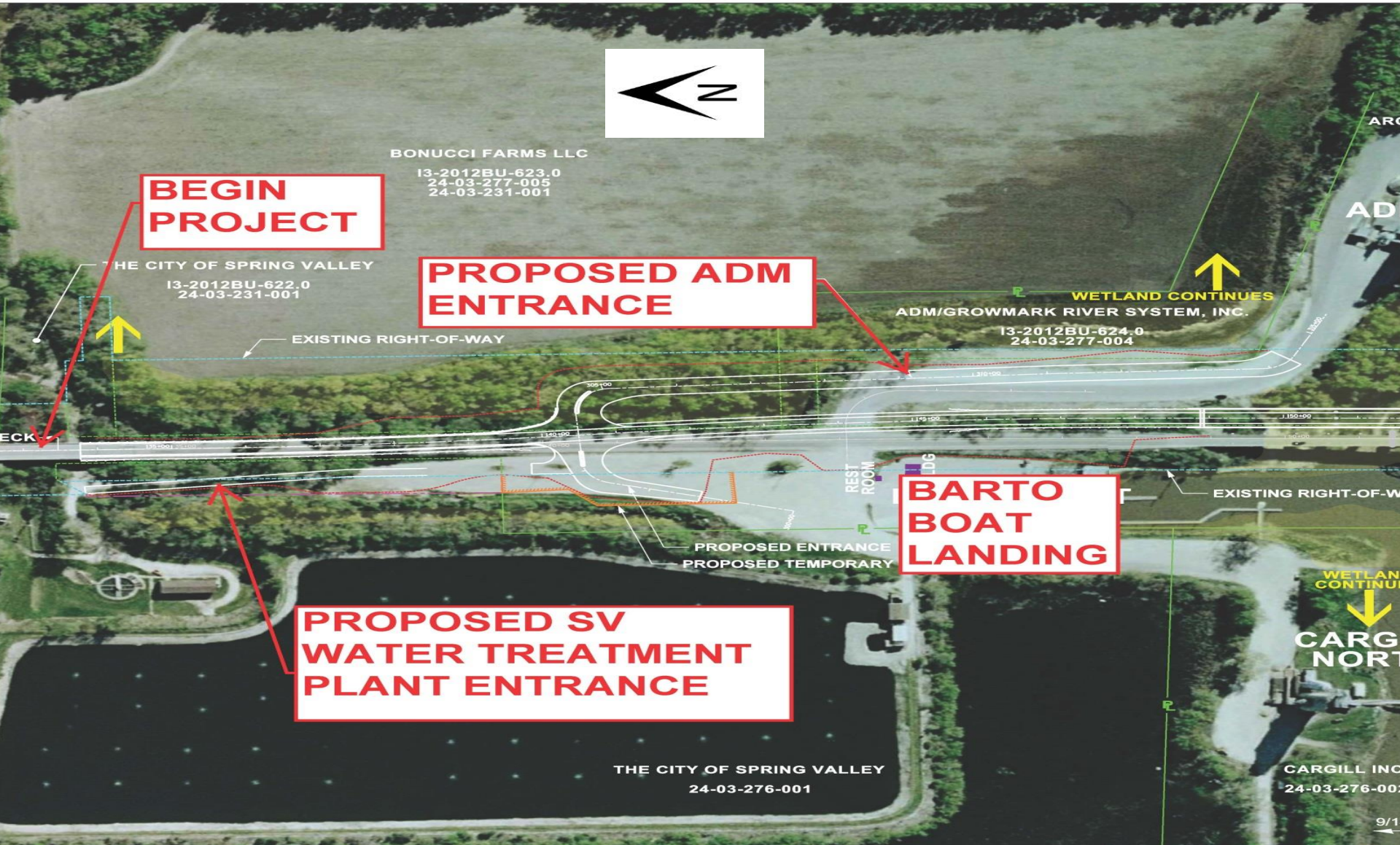
PRE BID MEETING
FOR INFORMATION ONLY
FAP 698 (IL 89),SECTION (1)BR
BUREAU & PUTNAM COUNTY



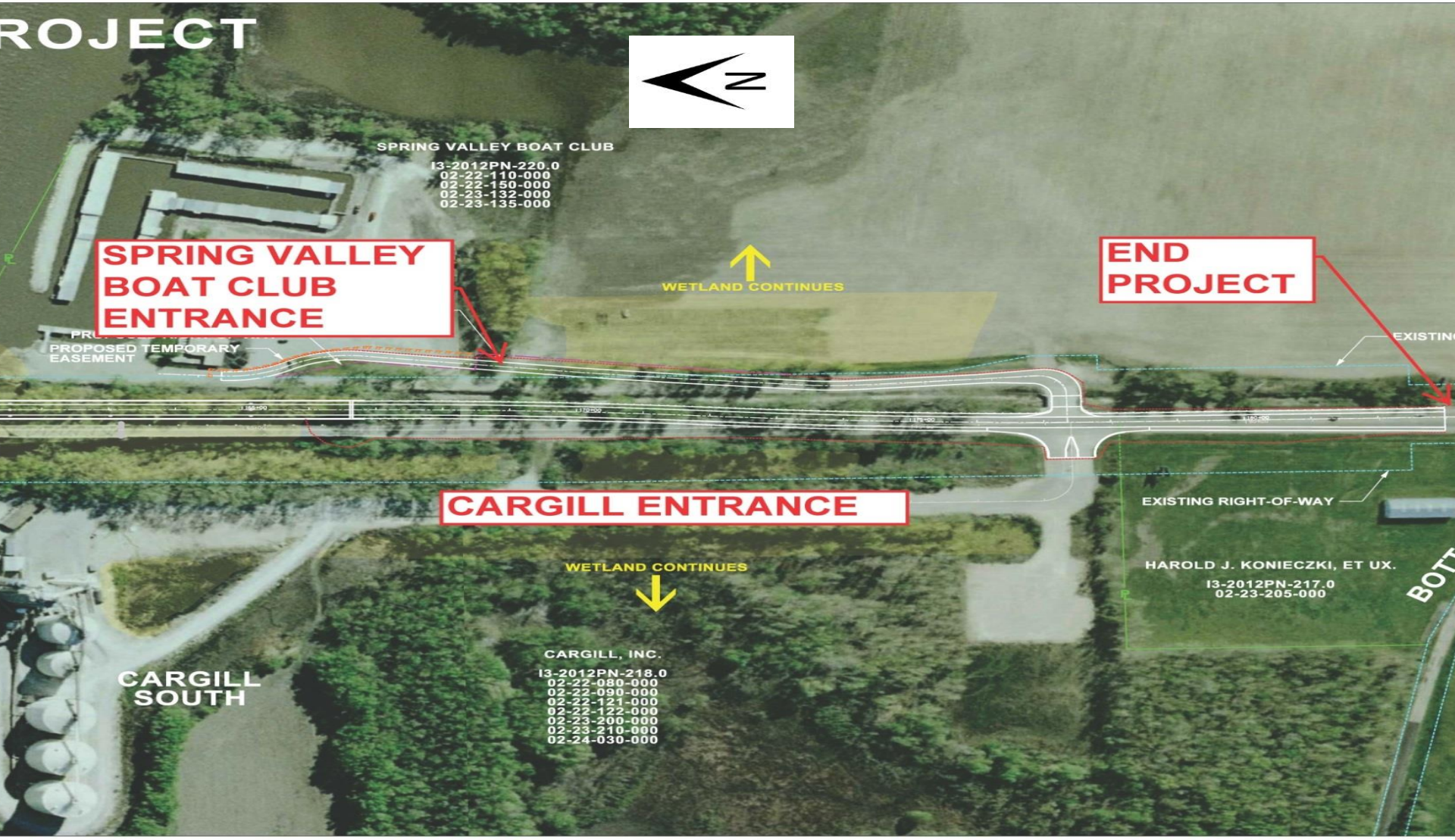
Illinois River Bridge at Spring Valley
Contract 66A69

October 29, 2015

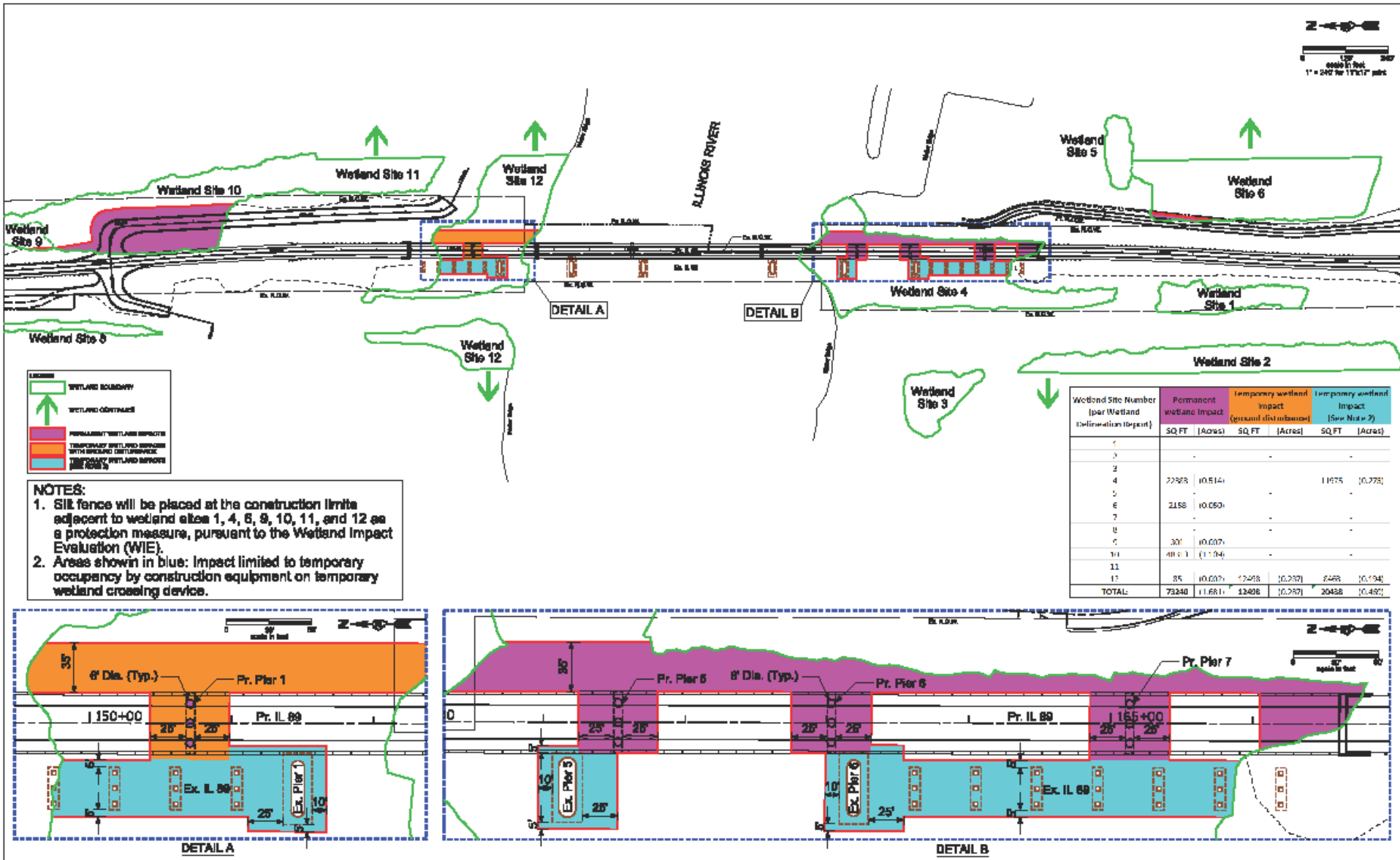
GENERAL PROJECT OVERVIEW NORTH SIDE OF RIVER



GENERAL PROJECT OVERVIEW SOUTH SIDE OF RIVER



WETLANDS



Wetland Site Number (per Wetland Delineation Report)	Permanent wetland impact		Temporary wetland impact (ground disturbance)		Temporary wetland impact (See Note 2)	
	SQ FT	(Acres)	SQ FT	(Acres)	SQ FT	(Acres)
1						
2	-		-		-	
3						
4	22363	(0.514)			11975	(0.275)
5	-		-		-	
6	2158	(0.050)				
7	-		-		-	
8	-		-		-	
9	301	(0.007)				
10	4813	(0.110)	-		-	
11						
12	85	(0.002)	12408	(0.285)	8488	(0.194)
TOTAL:	73240	(1.681)	12408	(0.285)	20488	(0.470)

Illinois Department of Transportation / benesch	IL 89 (Spalding Street) Illinois River Bridge Replacement	02/26/2014	Wetland Impacts due to Proposed IL 89 Construction

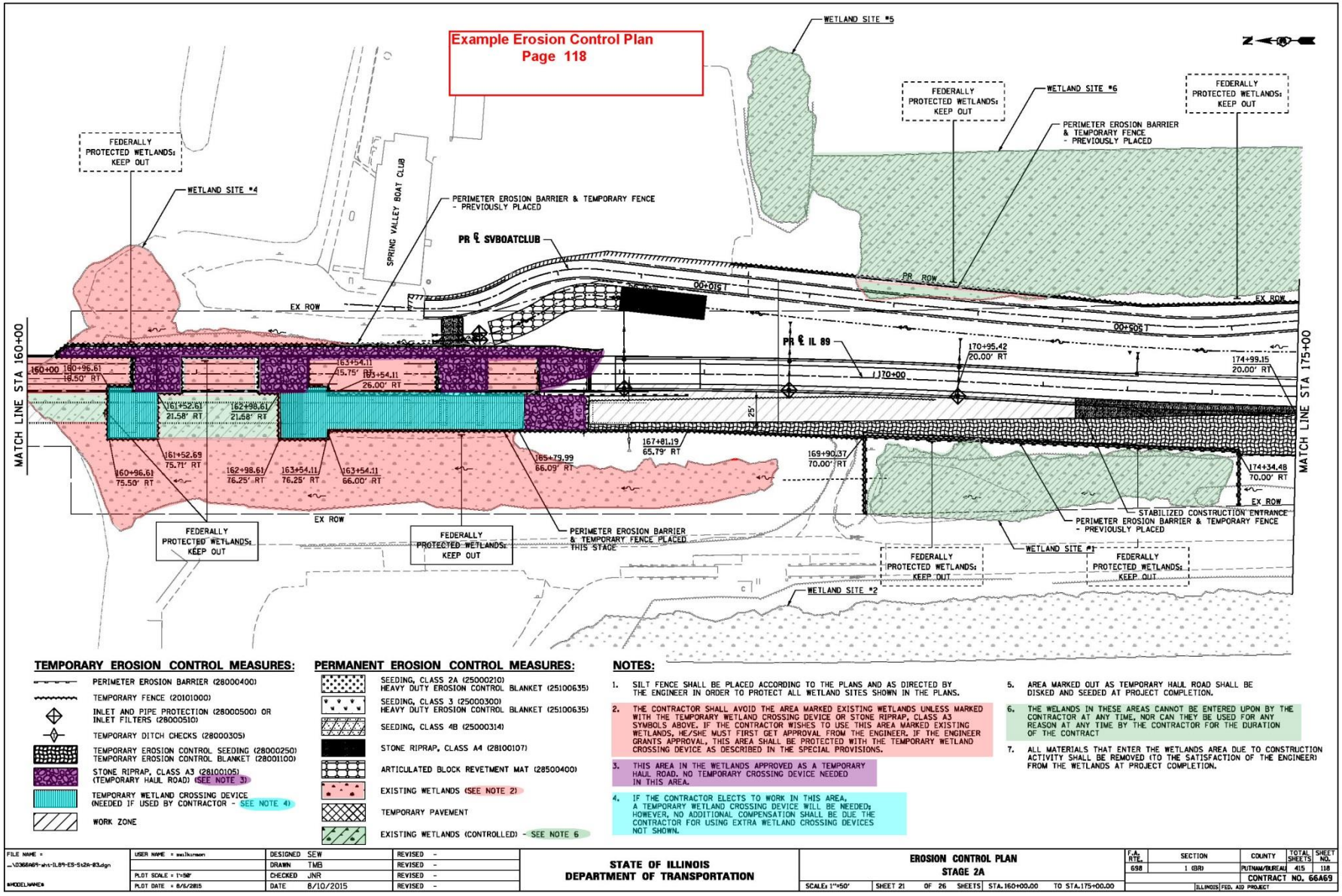
WETLANDS

- **11 Jurisdictional Wetlands Identified in WIE Study**
  - **0.8 of an Acre of Temporary Wetland Impacts**
  - **1.7 Acres of Permanent Wetlands Impacted which have been mitigated**

- **Wetlands are Located in the Northeast, Southwest, and Southeast Quadrants**

  - **Contractor required to install 4’ high orange snow fence with silt fence around protected areas.**

TEMPORARY WETLAND CROSSING DEVICES



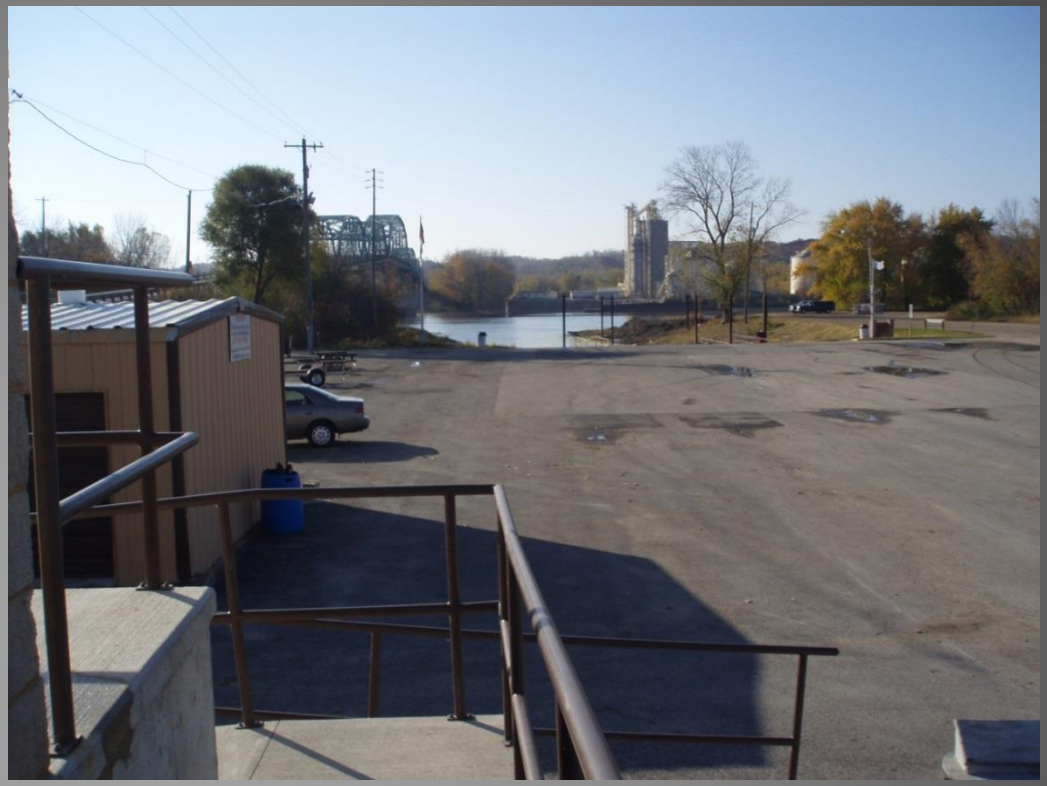
ENDANGERED PLANT SPECIES

Boltonia Decurrens

FEDERALLY PROTECTED PLANT

- Located South Side of Illinois River
  - East Side by Spring Valley Boat Club
  - West Side by Grain Elevator
    - Small Colonies are protected by fencing
- Areas to be protected are delineated with fence on Erosion Control Plan Sheets 99 to 123.
- Commitment:
  - Areas will be disked to de-compact soil and seeded with non-permanent cover to allow seeds within soil to re-establish (Class 4B)
  - Contractor cannot disturb or store equipment in colony areas

BARTO'S BOAT LANDING



- IDNR Funds were used to construct Boat Ramp
  - Asphalt area cannot be used by contractor for material or equipment storage
  - Boat Landing must be open to public at all times including Spring Valley Waste Water Treatment Plant

SPRING VALLEY BOAT CLUB

- **Access will be maintained along the SVBC entrance from IL 89 to boat docks and retail gas pumps.**
- **Access maintained at all times**
- **Dust Abatement measures**

HISTORIC BRIDGE

- **Historic American Engineering Record Documentation approved July 29, 2015**
- **Commitment to provide Bridge Plaque to Resident Engineer**

TREE REMOVAL RESTRICTION

- **Trees Cannot be Cleared from <u>April 1st through November 15th</u>**
  - **Indiana Bat**
  - **Northern Long Eared Bat**

Migratory Bird Treaty Act

- **Nests attached to bridge should be removed outside breeding season**
  - **Breeding Season: Mid April through Mid-August**
- **Efforts should be made to prevent birds from re-nesting during breeding season**

KEEPING ROADS OPEN TO TRAFFIC

- **One Lane Closure using temporary traffic signals (MOT stages 1B, 1C and 2A)**
  - **Not allowed from September 15th to October 31st due to Fall Harvest**

- **No Work during the Spring Valley Walleye Fishing Tournament**

  - **(Typically fall on 2nd or 3rd weekend of March) unless no effect to traffic.**
  - **The Duration of the tournament: 5 PM on the Friday before the tournament to 8 PM Sunday the tournament ends (51 consecutive hours).**

GEOTECHNICAL ITEMS

GEOTECHNICAL ITEMS

- General
  - Geotechnical Reports Special Provision
- Roadway
  - Settlement Amount
  - Settlement Time
  - Wick Drains & Sand Drainage Blanket
  - Surcharge
  - Sheet Piling
  - Settlement of Existing Pavement
  - Piezometer
  - Slope Inclinometer
  - Settlement Platform
  - Embankment
- Bridge
  - Drilled Shaft Special Provision
  - Thermal Integrity Profile Sensors for Drilled Shafts Special Provision
  - Osterberg Load Cell
  - Rock Cores

GEOTECHNICAL REPORTS SPECIAL PROVISION

- Roadway Geotechnical Report
- Structure Geotechnical Report
- Posted on the web site under the link titled "Additional Information"
- Contact Mike Short, District Geotechnical Engineer, at 1-815-433-7085 or Michael.Short@Illinois.gov"

ROADWAY ITEMS

SETTLEMENT AMOUNT – NORTH ABUTMENT

Table 1. Settlement Analysis Summary for Station 148+50, 10 ft. LT
Route FAP 698 (IL 89), Section (1)BR, Bureau County
Job No. P-93-013-11
Borings 5 (2013) and 5-ST (2013), Station 148+87 (PR)

Location of Analyses and Assumptions	Top Elev. of Consolidating Layers (feet)	Bottom Elev. of Consolidating Layers (feet)	Total Est. Primary Settlement (inches)	Est. Time to 50% Settlement (t_{50}) (months)	Est. Time to 90% Settlement (t_{90}) (months)	Drainage Condition
Stage 1a: 17.5 ft of fill to match height of existing embankment	455.0	396.2	13.6	27.7	119.2	Double (1)/ Single (3-7)
Stage 1b: Additional 11.5 ft. of fill over Stage 1a fill with assumed temp. MSE wall at 24 ft. RT stage line.	455.0	396.2	5.6	30.3	130.5	Double (1)/ Single (3-7)
Stage 2: 11.5 ft. tall triangle-shaped wedge fill to complete RT side slope (if no surcharge in Stage 1b).	455.0	396.2	0.4	31.7	136.3	Double (1)/ Single (3-7)
Total for Stage 1a, 1b, and 2:			19.6			
Stage 1b (surcharge option): 550 psf surcharge with the Stage 1b fill.	455.0	396.2	1.5	29.1	125.2	Double (1)/ Single (3-7)
Total for Stage 1a, 1b, and 1b (surcharge):			20.7			

Notes: The existing ground line was assumed to be 455.0 ft. There were 6 consolidating layers in the analyses. All consolidation test e vs. log p curves were correctible. The t_{50} and t_{90} times were based on log of time curves for layer 3 (Sample 4-3) and square root of time curves for the other layers. Settlement of the existing embankment fill is also assumed to be negligible.

SETTLEMENT TIME – NORTH ABUTMENT

BMPR Lab No.: 13004 (North Approach)

TABLE 6(B) WAS ADDED TO THIS REPORT ON 8-24-2015.

Table 6(b). Treatment Option Summary for Estimated Time of Primary Settlement for Station 148+50, 10 ft. LT Route FAP 698 (IL 89), Section (1)BR, Bureau County Job No. P-93-013-11 Borings 5 (2013) and 5-ST (2013), Station 148+87 (PR)

Location of Analyses and Assumptions	Total Est. Primary Settlement [3] (inches)	Estimated Primary Settlement Time [1,3]							
		No Wick Drains		Wick Drains [2] (5 ft Triangular)		Wick Drains [2] (7.5 ft Triangular)		Wick Drains [2] (10 ft Triangular)	
		t_{95} (days)	t_{98} (days)	t_{95} (days)	t_{98} (days)	t_{95} (days)	t_{98} (days)	t_{95} (days)	t_{98} (days)
Stage 1a + 1b:	19.2	5335	7144	32	42	80	105	150	198
Total for Stage 1a, 1b, and 1b (550 psf surcharge):	20.7	5518	7391	33	43	81	107	152	201

Note 1: t_{95} and t_{98} are the estimated times to complete 95% and 98% of the settlement, respectively.

Note 2: The radial coefficient of consolidation, c_r, is assumed the same as the vertical coefficient, c_v, with no smear for the wick drain calculations.

Note 3: The existing ground line is assumed to be 455.0 ft. There were 6 consolidating layers in the analyses. All consolidation test e vs. log p curves were correctible. The t_{95} and t_{98} times are based on log of time curves for layer 3 (Sample 4-3) and square root of time curves for the other layers.

SETTLEMENT AMOUNT – SOUTH ABUTMENT

Table 1. Settlement Analysis Summary for Station 167+50, 12 ft. LT
Route FAP 698 (IL 89), Section (1)BR, Putnam County
Job No. P-93-013-11
Borings 4 (2013) and 4-ST (2013), Station 166+63 (PR)

Location of Analyses and Assumptions	Top Elev. of Consolidating Layers (feet)	Bottom Elev. of Consolidating Layers (feet)	Total Est. Primary Settlement (inches)	Est. Time to 50% Settlement (t_{50}) (months)	Est. Time to 90% Settlement (t_{90}) (months)	Drainage Condition
Stage 1a: 14 ft of fill to match height of existing embankment	443.0	408.3	3.8	1.0	4.4	Double
Stage 1b: Additional 11.3 ft. of fill over Stage 1a fill with assumed temp. MSE wall at 20 ft. RT stage line.	443.0	408.3	5.9	1.2	5.1	Double
Stage 2: 11.3 ft. tall triangle-shaped wedge fill to complete RT side slope (if no surcharge in Stage 1b).	443.0	408.3	0.2	0.7	2.9	Double
Total for Stage 1a, 1b, and 2:			9.9			
Stage 1a + 1b (Partial): Additional 5.3 ft. of fill over Stage 1a fill with assumed temp. MSE wall at 20 ft. RT stage line.	443.0	408.3	2.9	1.1	4.9	Double
Total for Stage 1a + 1b (Partial):			6.7			
Stage 1b (surcharge option): 800 psf surcharge with the Stage 1b fill.	443.0	408.3	2.4	1.3	5.4	Double
Total for Stage 1a, 1b, and 1b (surcharge):			12.1			

Notes: The existing ground line was assumed to be 451.0 ft. There were 5 consolidating layers in the analyses. All consolidation test e vs. log p curves were correctible. The t_{50} and t_{90} times were based on log of time curves for layer 1 (Sample 1-4) and square root of time curves for the other layers. Settlement of the existing embankment fill is also assumed to be negligible.

RGR Sheet 263

SETTLEMENT TIME – SOUTH ABUTMENT

BMPR Lab No.: 13003 (South Approach)

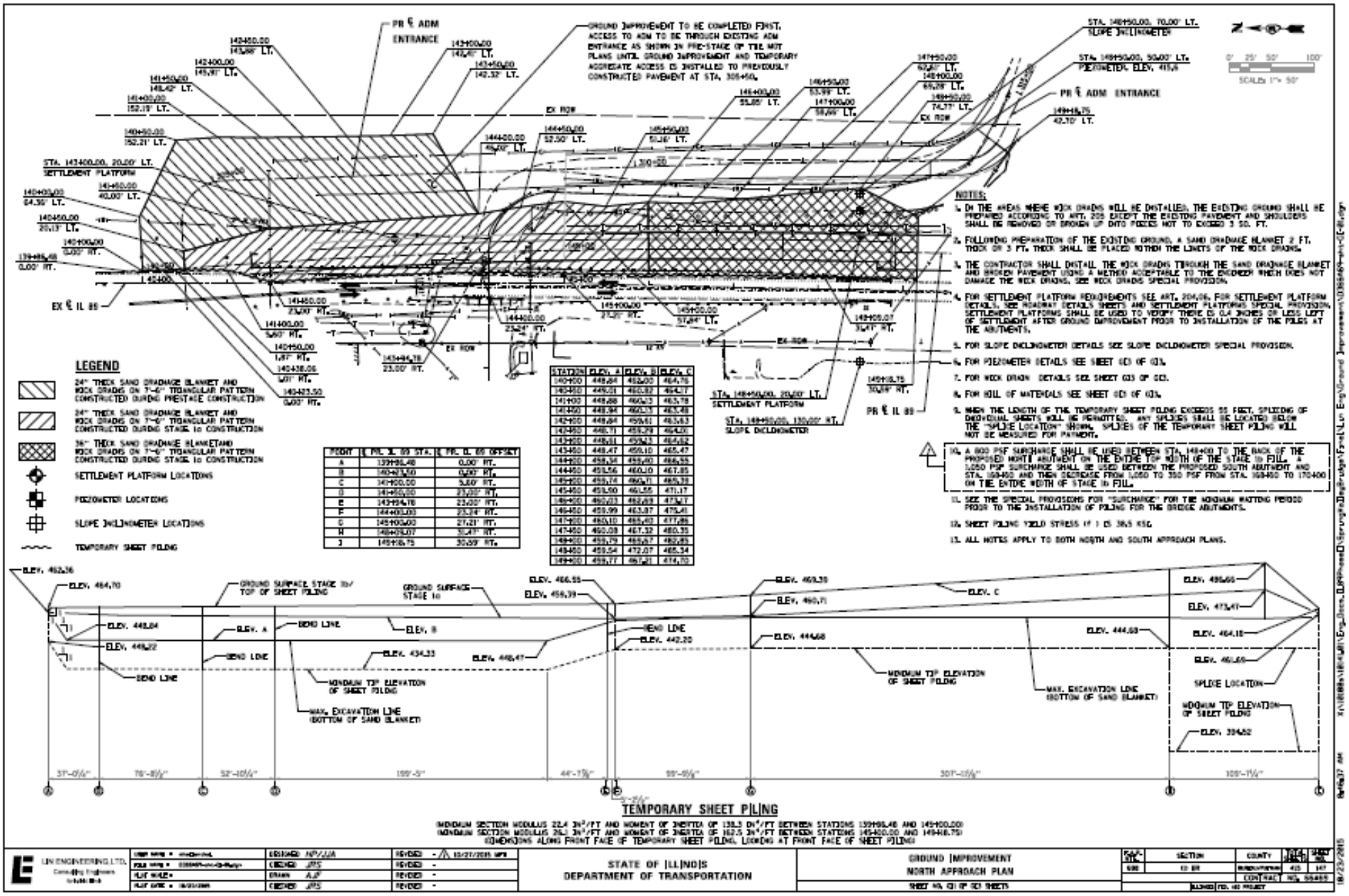
TABLE 6(B) WAS ADDED TO THIS REPORT ON 8-24-2015.

Table 6(b). Treatment Option Summary for Estimated Time of Primary Settlement for Station 167+50, 12 ft. LT
Route FAP 698 (IL 89), Section (1)BR, Putnam County
Job No. P-93-013-11
Borings 4 (2013) and 4-ST (2013), Station 166+63 (PR)

Location of Analyses and Assumptions	Total Est. Primary Settlement [3] (inches)	Estimated Primary Settlement Time [1,3]							
		No Wick Drains		Wick Drains [2] (5 ft Triangular)		Wick Drains [2] (7.5 ft Triangular)		Wick Drains [2] (10 ft Triangular)	
		t_{96} (days)	t_{99} (days)	t_{96} (days)	t_{99} (days)	t_{96} (days)	t_{99} (days)	t_{96} (days)	t_{99} (days)
Stage 1a + 1b:	9.7	245	367	46	69	92	138	132	199
Total for Stage 1a, 1b, and 1b (800 psf surcharge):	12.1	260	390	52	78	103	154	145	219

Note 1: t_{96} and t_{99} are the estimated times to complete 96% and 99% of the settlement, respectively.
Note 2: The radial coefficient of consolidation, c_r, is assumed the same as the vertical coefficient, c_v, with no smear for the wick drain calculations.
Note 3: The existing ground line is assumed to be 451.0 ft. There were 5 consolidating layers in the analyses. All consolidation test e vs. log p curves were correctible. The t_{96} and t_{99} times are based on log of time curves for layer 1 (Sample 1-4) and square root of time curves for the other layers.

PLAN DETAILS



STATION	ELEV. A	ELEV. B	ELEV. C
140+00	448.84	462.00	464.70
140+50	449.01	460.82	464.17
141+00	448.88	460.13	463.78
141+50	448.94	460.15	463.48
142+00	448.84	459.61	463.63
142+50	448.71	459.29	464.00
143+00	448.51	459.13	464.62
143+50	448.47	459.10	465.47
144+00	448.54	459.40	466.55
144+50	451.56	460.10	467.85
145+00	459.74	460.71	469.39
145+50	459.00	461.55	471.17
146+00	460.03	462.69	473.17
146+50	459.99	463.97	475.41
147+00	460.10	465.40	477.86
147+50	460.09	467.32	480.35
148+00	459.79	469.67	482.85
148+50	459.54	472.07	485.34
149+00	459.77	474.21	487.70

POINT	℄ PIL. E. 89 STA.	℄ PIL. EL 89 OFFSET
A	139+98.48	0.00' RT.
B	140+43.50	0.00' RT.
C	141+00.00	5.60' RT.
D	141+50.00	27.00' RT.
E	142+94.76	23.00' RT.
F	144+00.00	23.24' RT.
G	145+00.00	27.27' RT.
H	146+16.07	30.47' RT.
J	149+16.75	30.99' RT.

TEMPORARY SHEET PILING

MINIMUM SECTION MODULUS 22.4 IN^3/FT AND MOMENT OF INERTIA OF 138.3 IN^4/FT BETWEEN STATIONS 139+98.48 AND 145+00.00
MINIMUM SECTION MODULUS 26.1 IN^3/FT AND MOMENT OF INERTIA OF 162.5 IN^4/FT BETWEEN STATIONS 145+00.00 AND 149+16.75)
(DIMENSIONS ALONG FRONT FACE OF TEMPORARY SHEET PILING, LOOKING AT FRONT FACE OF SHEET PILING)

LIN ENGINEERING, LTD. Consulting Engineers

DESIGNED - MPJ/JA
CHECKED - JRS
DRAWN - AJP
CHECKED - JRS
REVISED - 10/27/2015 MPJ
REVISED -
REVISED -
REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

GROUND IMPROVEMENT
NORTH APPROACH PLAN
SHEET NO. 6(I) OF 6(I) SHEETS

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
606	10 BR	MADISON/ST. CLAIR	403	147
		CONTRACT NO. 66469		
		ILLINOIS FED. AID PROJECT		

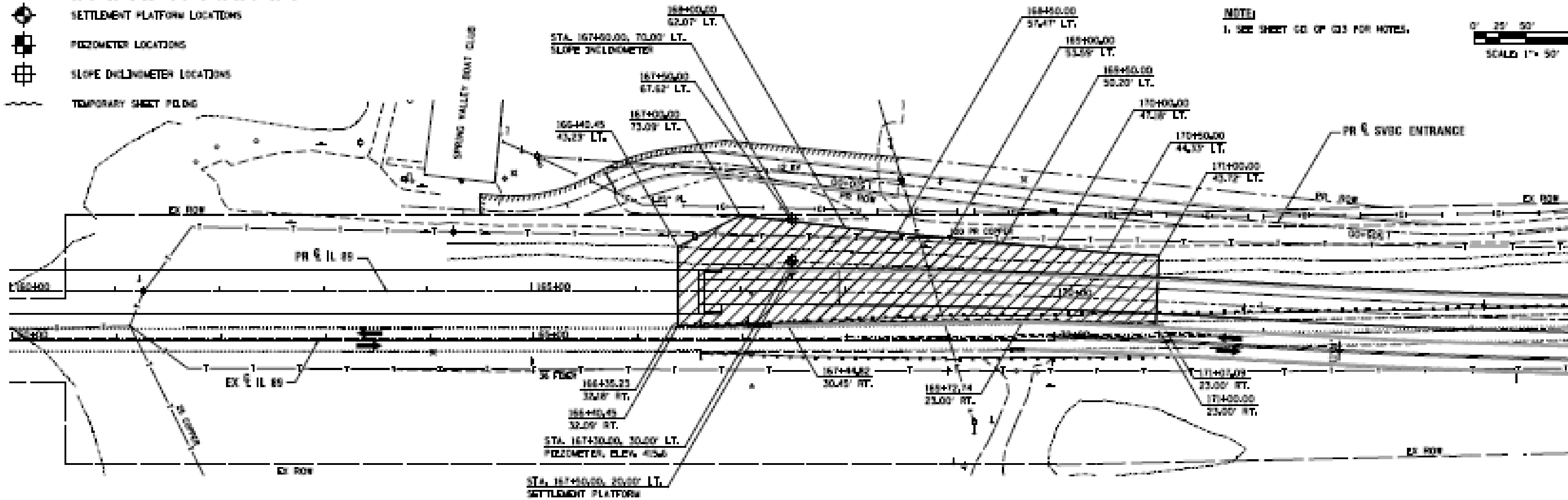
10/23/2015

LEGEND

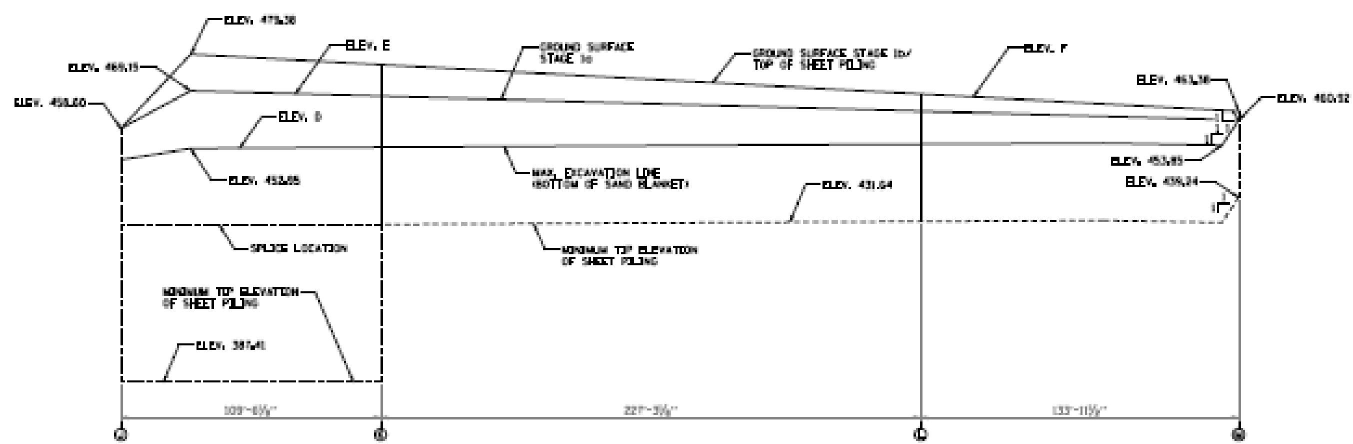
- 24" THICK SAND DRAINAGE BLANKET AND WICK DRAINS ON 7'-6" TRIANGULAR PATTERN CONSTRUCTED DURING STAGE 1a CONSTRUCTION
- SETTLEMENT PLATFORM LOCATIONS
- PIEZOMETER LOCATIONS
- SLOPE INCLINOMETER LOCATIONS
- TEMPORARY SHEET PILING

NOTE:
1. SEE SHEET 121 OF 123 FOR NOTES.

SCALE: 1" = 50'



POINT	℄ PR. IL 89 STA.	℄ PR. IL 89 OFFSET
J	166+35.23	32.18' RT.
K	167+44.82	30.45' RT.
L	169+72.74	23.00' RT.
M	171+07.09	23.00' RT.



STATION	ELEV. D	ELEV. E	ELEV. F
166+50	451.42	454.07	480.38
167+00	453.12	467.88	478.08
167+50	453.37	466.10	475.60
168+00	453.83	464.31	473.28
168+50	454.04	462.82	471.10
169+00	454.22	461.66	469.33
169+50	454.16	461.05	467.69
170+00	454.26	460.29	466.28
170+50	454.51	460.84	465.09
171+00	453.85	460.91	463.64

TEMPORARY SHEET PILING

(MINIMUM SECTION MODULUS 30.7 IN³/FT AND MOMENT OF INERTIA OF 265.3 IN⁴/FT)
(DIMENSIONS ALONG FACE OF TEMPORARY SHEET PILING, LOOKING AT FRONT FACE OF SHEET PILING)

LIN ENGINEERING LTD. Consulting Engineers

DESIGNED NPV/JJA	REVISED -	
CHECKED JMS	REVISED -	
DRAWN AJF	REVISED -	
CHECKED JMS	REVISED -	

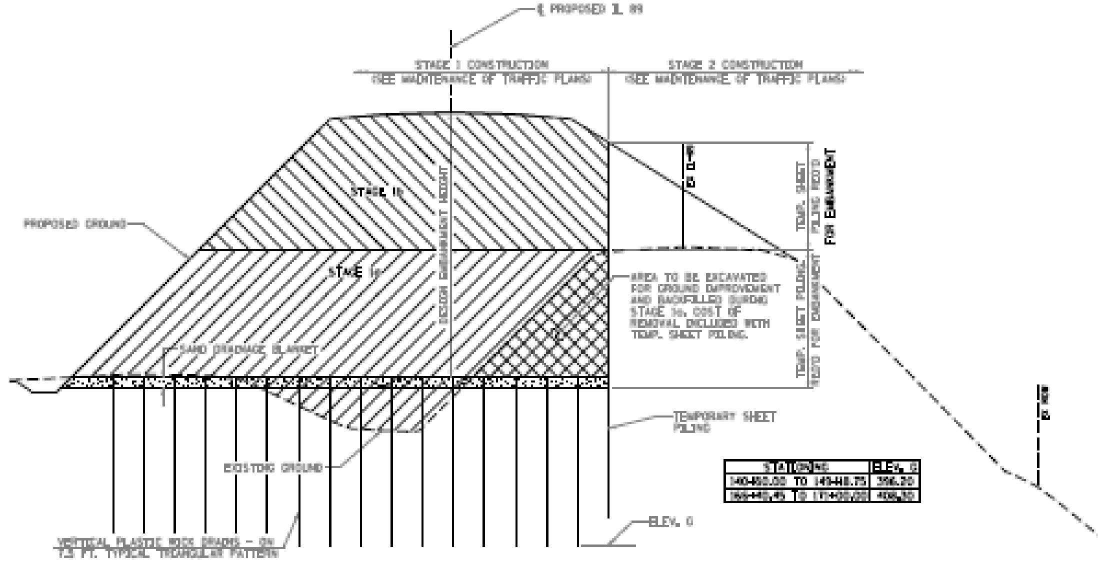
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

GROUND IMPROVEMENT
SOUTH APPROACH PLAN
SHEET NO. 122 OF 123 SHEETS

CONTRACT NO. 66469

BILL OF MATERIAL

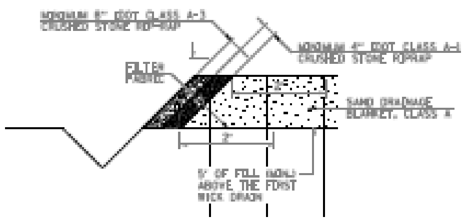
ITEM	UNIT	TOTAL
WICK DRAINS	FEET	152,394
SAND DRAINAGE BLANKET	CU. YD.	11,808
PIEZOMETERS	EACH	2
SLOPE INCLINOMETER	EACH	3
TEMPORARY SHEET PILING	SQ. FT.	57,502
FILTER FABRIC	SQ. YD.	1,790
SURCHARGE	SQ. YD.	2,097



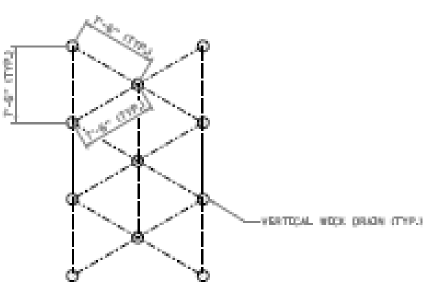
STATIONING	ELEV. 0
140+60.00 TO 149+18.75	396.20
166+40.45 TO 171+00.00	408.30

GROUND IMPROVEMENT TYPICAL CROSS SECTION

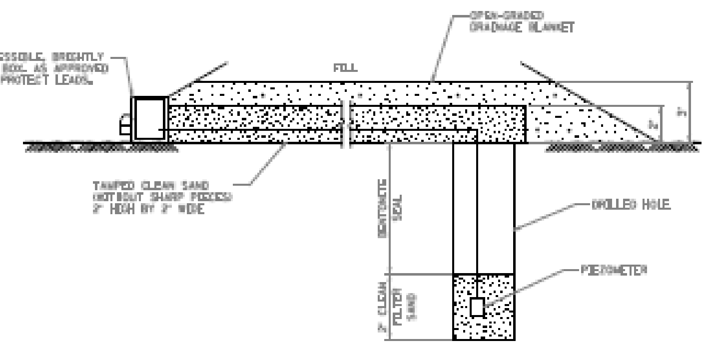
(LOOKING SOUTH)



DRAINAGE BLANKET PROTECTION



WICK DRAIN PATTERN



TYPICAL PIEZOMETER INSTALLATION DETAIL

(NOT TO SCALE)

NOTES:

ANY WORKING PLATFORM NEEDED TO CONSTRUCT THE SAND DRAINAGE BLANKET OR THE WICK DRAINS WILL NOT BE MEASURED FOR PAYMENT.

INSTALLATION PER PIEZOMETER MANUFACTURER RECOMMENDATIONS AND AS APPROVED BY ENGINEER.

CONTRACTOR SHALL RECORD GROUNDWATER LEVEL DURING INSTALLATION AND SUBMIT TO ENGINEER.

THE CONTRACTOR SHALL TAKE CARE TO ENSURE THE PIEZOMETER INSTALLATIONS ARE PROTECTED FROM DAMAGE. SHOULD ANY DAMAGE OR MALFUNCTION OCCUR TO ANY PORTION OF THE INSTALLATION, THE CONTRACTOR SHALL IMMEDIATELY CEASE ALL WORK ON THE SUBJECT EMBANKMENT AND IMMEDIATELY MAKE THE NECESSARY REPAIRS AT NO ADDITIONAL COST TO THE CONTRACT. WORK ON THE SUBJECT EMBANKMENT SHALL NOT RESUME UNTIL ALL REPAIRS HAVE BEEN COMPLETED TO THE SATISFACTION OF THE ENGINEER.

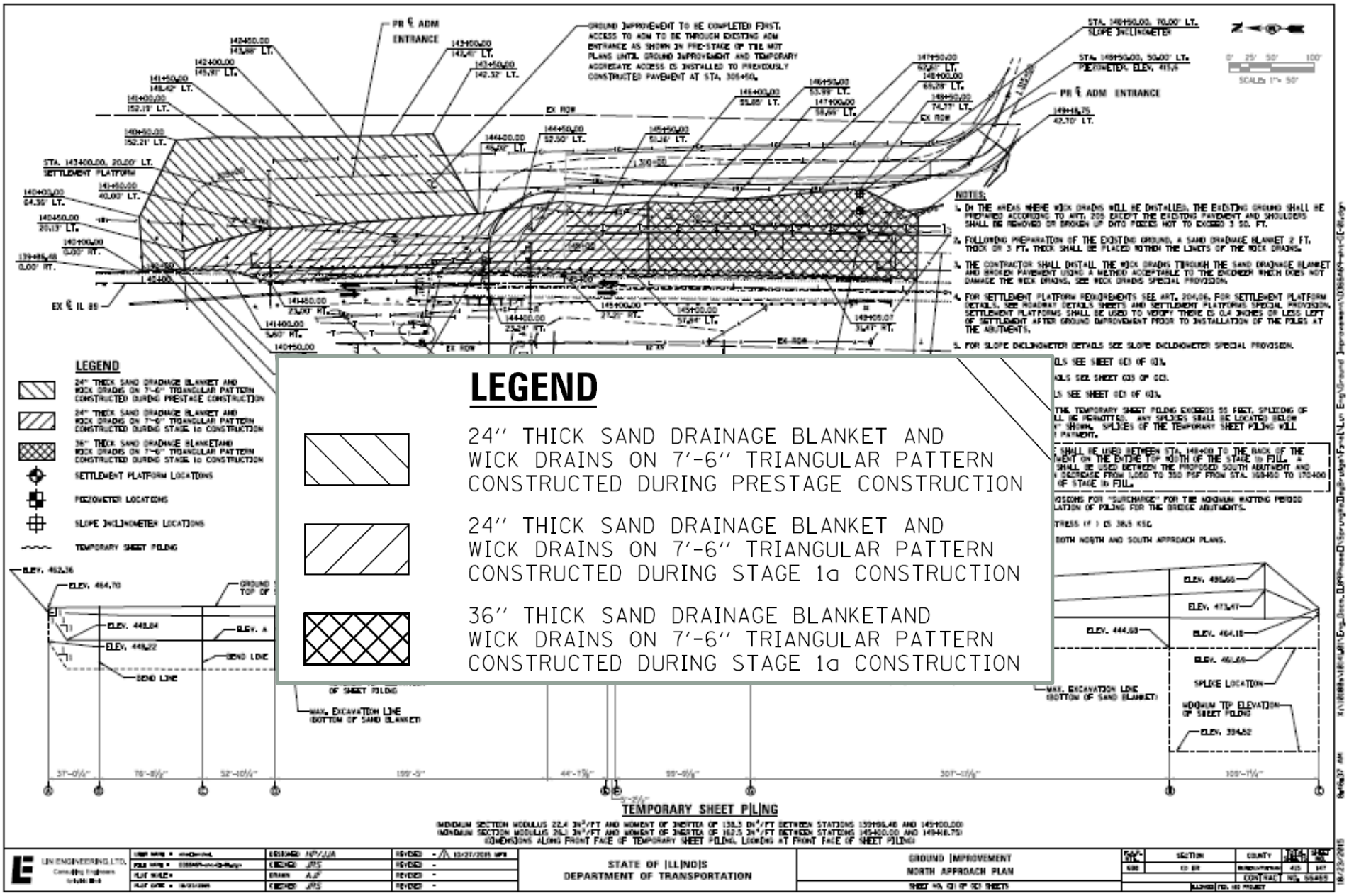
PIEZOMETER ELEVATIONS AND ESTIMATED MAXIMUM PIEZOMETER WATER LEVEL READINGS ALLOWABLE TO MAINTAIN AN ADEQUATE FACTOR OF SAFETY AGAINST SLOPE FAILURE (DATA PROVIDED BY IDOT)

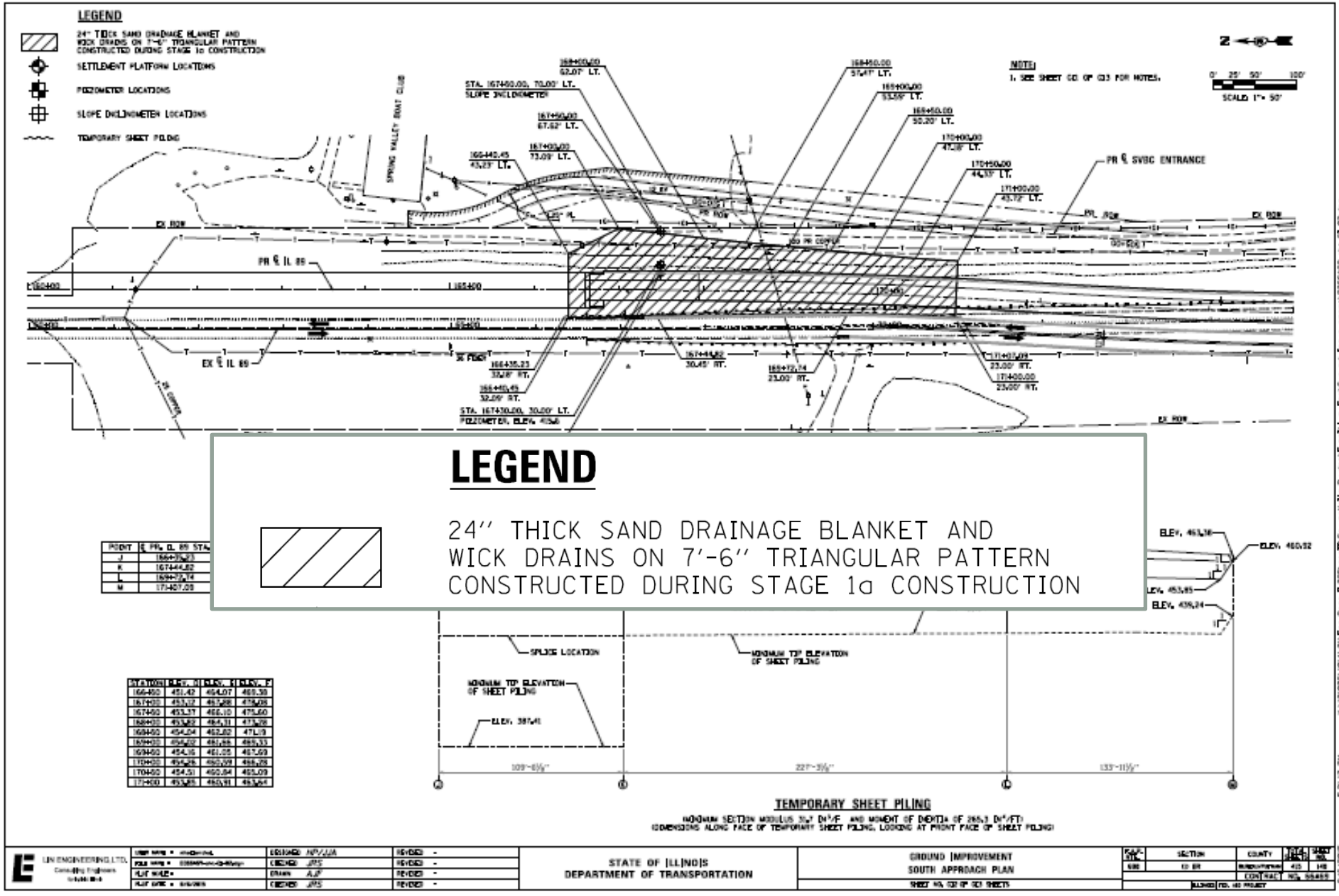
RECOMMENDED PIEZOMETER LOCATIONS

LOCATION NUMBER	STATION	OFFSET	NEAREST BORING	APPROXIMATE ELEVATION (FT.)	EST. INITIAL READING (psf)	EST. MAX ALLOWABLE READING (psf): 17.6 FT (FILL HT)	19.1 FT (FILL HT)	22.5 FT (FILL HT)	26.3 FT (FILL HT)	26.3 FT (FILL HT + 800 psf SURCHARGE)	29.3 FT (FILL HT)	29.3 FT (FILL HT + 550 psf SURCHARGE)
1	149+60	50' LT.	B-05(2013)	415.6	1660	2392		2350			2320	2310
2	167+00	30' LT.	B-04(2013)	430.6	792		1925		1802	1762		

LIN ENGINEERING LTD. Consulting Engineers	USER NAME =	DESIGNED - MPV/JJA	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION
	PLOT SCALE =	CHECKED - JMS	REVISED -	GROUND IMPROVEMENT DETAILS
	PLOT DATE =	DRAWN - AJF	REVISED -	SHEET NO. OF SHEETS
		CHECKED - JMS	REVISED -	CONTRACT NO.

WICK DRAINS


LEGEND
24" THICK SAND DRAINAGE BLANKET AND WICK DRAINS ON 7'-6" TRIANGULAR PATTERN CONSTRUCTED DURING PRESTAGE CONSTRUCTION
24" THICK SAND DRAINAGE BLANKET AND WICK DRAINS ON 7'-6" TRIANGULAR PATTERN CONSTRUCTED DURING STAGE 1a CONSTRUCTION
36" THICK SAND DRAINAGE BLANKETAND WICK DRAINS ON 7'-6" TRIANGULAR PATTERN CONSTRUCTED DURING STAGE 1a CONSTRUCTION
SETTLEMENT PLATFORM LOCATIONS
PIEZOMETER LOCATIONS
SLOPE INCLINOMETER LOCATIONS
TEMPORARY SHEET PILING
PR & ADM ENTRANCE
EX ROW
EX ℄ IL 89
NOTES:
1. IN THE AREAS WHERE WICK DRAINS WILL BE INSTALLED, THE EXISTING GROUND SHALL BE PREPARED ACCORDING TO ART. 205 EXCEPT THE EXISTING PAVEMENT AND SHOULDERS SHALL BE REMOVED OR BROKEN UP INTO PIECES NOT TO EXCEED 3 SQ. FT.
2. FOLLOWING PREPARATION OF THE EXISTING GROUND, A SAND DRAINAGE BLANKET 2 FT. THICK OR 3 FT. THICK SHALL BE PLACED WITHIN THE LIMITS OF THE WICK DRAINS.
3. THE CONTRACTOR SHALL INSTALL THE WICK DRAINS THROUGH THE SAND DRAINAGE BLANKET AND BROKEN PAVEMENT USING A METHOD ACCEPTABLE TO THE ENGINEER WHICH DOES NOT DAMAGE THE WICK DRAINS. SEE WICK DRAINS SPECIAL PROVISION.
4. FOR SETTLEMENT PLATFORM REQUIREMENTS SEE ART. 204.06. FOR SETTLEMENT PLATFORM DETAILS, SEE ROADWAY DETAILS SHEETS AND SETTLEMENT PLATFORMS SPECIAL PROVISION. SETTLEMENT PLATFORMS SHALL BE USED TO VERIFY THERE IS 0.4 INCHES OR LESS LEFT OF SETTLEMENT AFTER GROUND IMPROVEMENT PRIOR TO INSTALLATION OF THE PILES AT THE ABUTMENTS.
5. FOR SLOPE INCLINOMETER DETAILS SEE SLOPE INCLINOMETER SPECIAL PROVISION.
TEMPORARY SHEET PILING
MINIMUM SECTION MODULUS 22.4 IN³/FT AND MOMENT OF INERTIA OF 138.3 IN⁴/FT BETWEEN STATIONS 139+98.48 AND 145+00.00
MINIMUM SECTION MODULUS 26.1 IN³/FT AND MOMENT OF INERTIA OF 162.5 IN⁴/FT BETWEEN STATIONS 145+00.00 AND 149+18.75
DIMENSIONS ALONG FRONT FACE OF TEMPORARY SHEET PILING, LOOKING AT FRONT FACE OF SHEET PILING
MAX. EXCAVATION LINE (BOTTOM OF SAND BLANKET)
SPLICE LOCATION
MINIMUM TIP ELEVATION OF SHEET PILING
ELEV. 394.52
LIN ENGINEERING, LTD.
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION
GROUND IMPROVEMENT
NORTH APPROACH PLAN
SECTION
COUNTY
CONTRACT NO. 65469
ILLINOIS FED. AID PROJECT

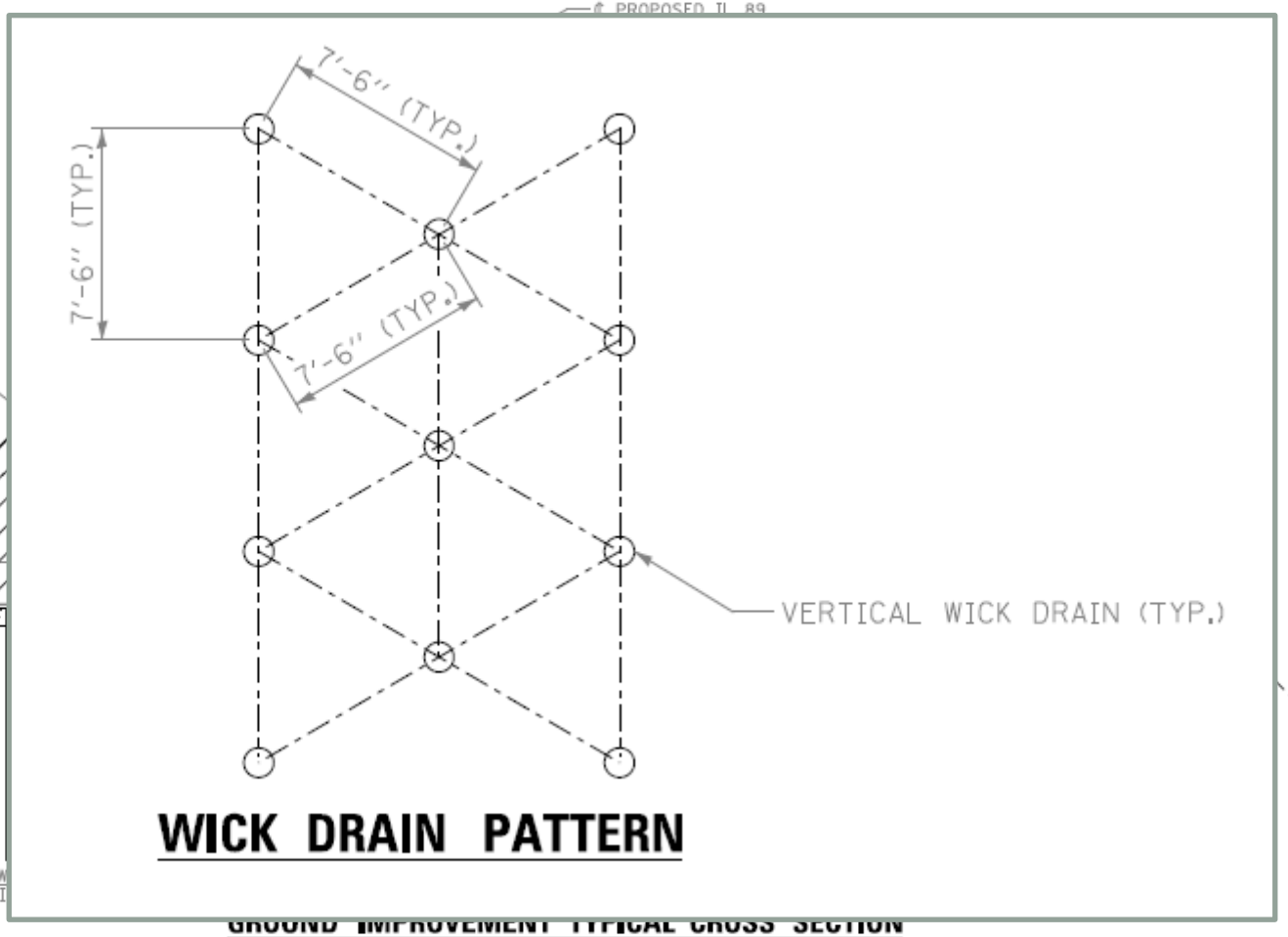


POINT	℄ PR. D. 89 STA.
J	166+35.23
K	167+44.82
L	169+72.74
M	171+07.09

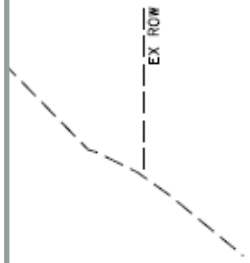
STATION	ELEV. J	ELEV. K	ELEV. L
166+00	451.47	454.07	460.38
167+00	453.12	457.28	474.08
168+00	453.37	456.10	475.60
169+00	453.82	454.11	473.28
170+00	454.04	452.82	471.19
171+00	454.22	451.86	469.33
172+00	454.16	451.05	467.69
173+00	454.26	450.39	466.28
174+00	454.31	450.84	465.09
175+00	453.85	450.91	463.64

BILL OF MATERIAL

ITEM	UNIT	TOTAL



WICK DRAIN PATTERN



GROUND IMPROVEMENT TYPICAL CROSS SECTION
(LOOKING SOUTH)

1	48+60	50' LT.	R-05(013)1	41K6	1660	2392		2350			2320	2310
2	61+60	50' LT.	R-04(013)1	42K8	150'		1325		1852	1762		

LIN ENGINEERING, LTD.
Consulting Engineers

USER NAME =	DESIGNED - MPV/JA	REVISED -	
PLOT SCALE =	CHECKED - JMS	REVISED -	
PLOT DATE =	DRAWN - AJF	REVISED -	
	CHECKED - JMS	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

GROUND IMPROVEMENT DETAILS

SHEET NO. 53 OF 90 SHEETS

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEET NO.	SHEET NO.
606	10 BR	RANDOLPH	40	149
		CONTRACT NO. 66466		
		ILLINOIS FED. AID PROJECT		

6/6/2005

WICK DRAIN

- Submittals (Specific requirements are in the special provision)
  - Two weeks after preconstruction conference
  - Four weeks prior to installation
  - Two weeks prior to installation
  - At the end of each work day

WICK DRAINS

- Quality Assurance (Specific requirements are in the special provision)
  - Install six trial wick drains (production wick drains)
  - Provide method to measure the quantity of wick drain installed at each location

WICK DRAINS

- Measurement and Payment
  - Length is from tip of wick drain to middle of sand drainage blanket
  - Unit price per foot
  - Work platforms will not be measured for payment

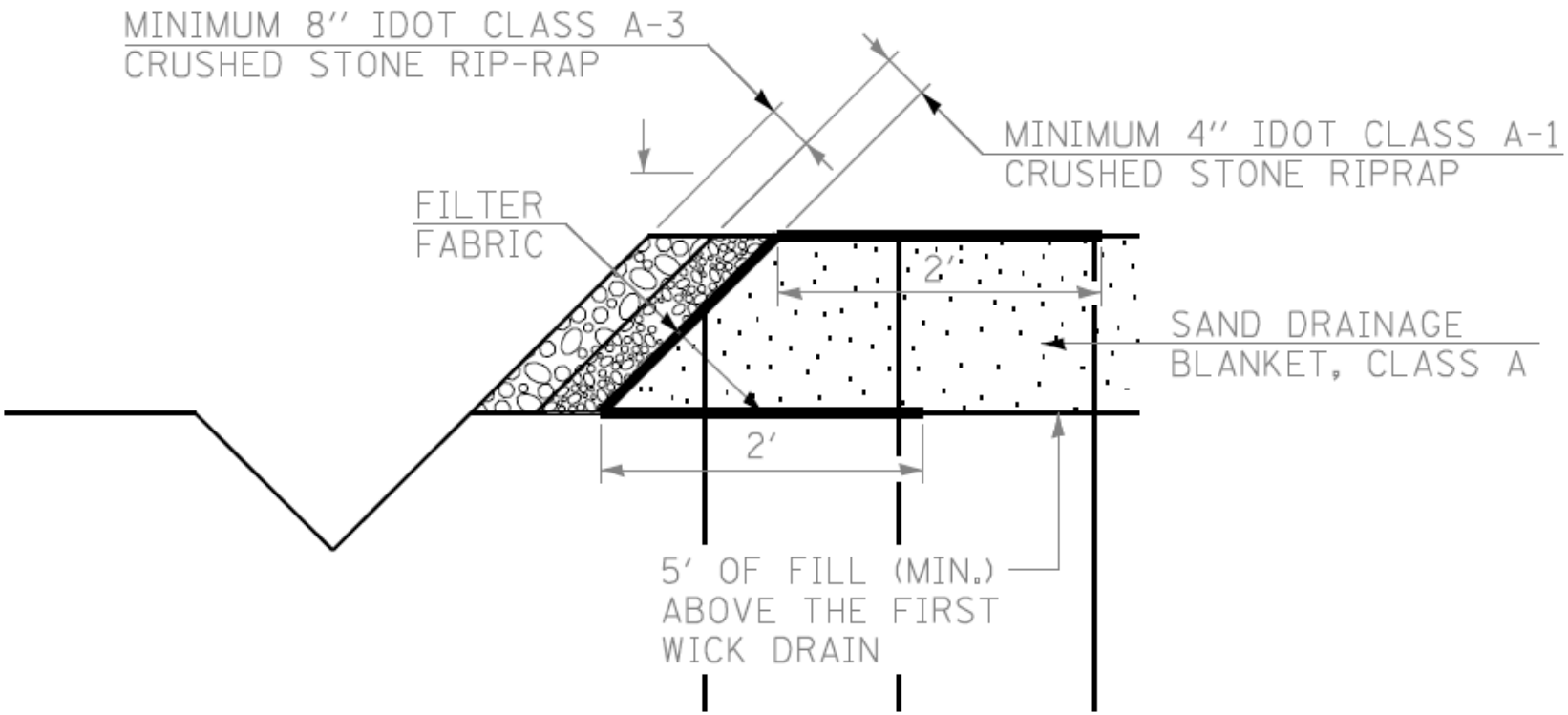
SAND DRAINAGE BLANKET

BILL OF MATERIAL

ITEM	UNIT	TOTAL

PROPOSED 1.89

STAGE 1 CONSTRUCTION (SEE MAINTENANCE OF TRAFFIC PLANS) | STAGE 2 CONSTRUCTION (SEE MAINTENANCE OF TRAFFIC PLANS)



DRAINAGE BLANKET PROTECTION

1	148+00	50'	LT.	R-05(201)H	41.5	1660	2392		2350			2320	2310
2	151+00	50'	LT.	R-04(201)H	44.8	792		1325		1852	1792		

LIN ENGINEERING, LTD. Consulting Engineers

USER NAME =	DESIGNED - MPV/JA	REVISED -	
PLOT SCALE =	CHECKED - JMS	REVISED -	
PLOT DATE =	DRAWN - AJF	REVISED -	
	CHECKED - JMS	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

GROUND IMPROVEMENT DETAILS

SHEET NO. 13 OF 20 SHEETS

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEET NO.	SHEET NO.
606	13 BR	MADISON	420	149
		CONTRACT NO. 66466		
		ILLINOIS FED. AID PROJECT		

6/6/2005

SAND DRAINAGE BLANKET

- Materials - Sand Drainage Blanket
  - Must be "sand" according to Article 1003.01
  - Gradation FA 1, FA 2, FA 6, FA 20
  - Maximum 4% passing No. 200 sieve
  - Class A quality
  - Submit source and gradation 60 days prior to placement

SAND DRAINAGE BLANKET

- Materials – Drainage Blanket Protection
  - RR1 and RR3
    - Class A quality
    - Crushed stone

SAND DRAINAGE BLANKET

- Materials – Filter Fabric
  - Article 1080.03 of Standard Specifications
    - Meet requirements of Gradation 4 & 5

SAND DRAINAGE BLANKET

- Measurement and Payment
  - Volume calculated by length, width, and depth
    - Drainage blanket protection included in volume
  - Unit price per cubic yard
  - Filter fabric measured and paid for by square yards

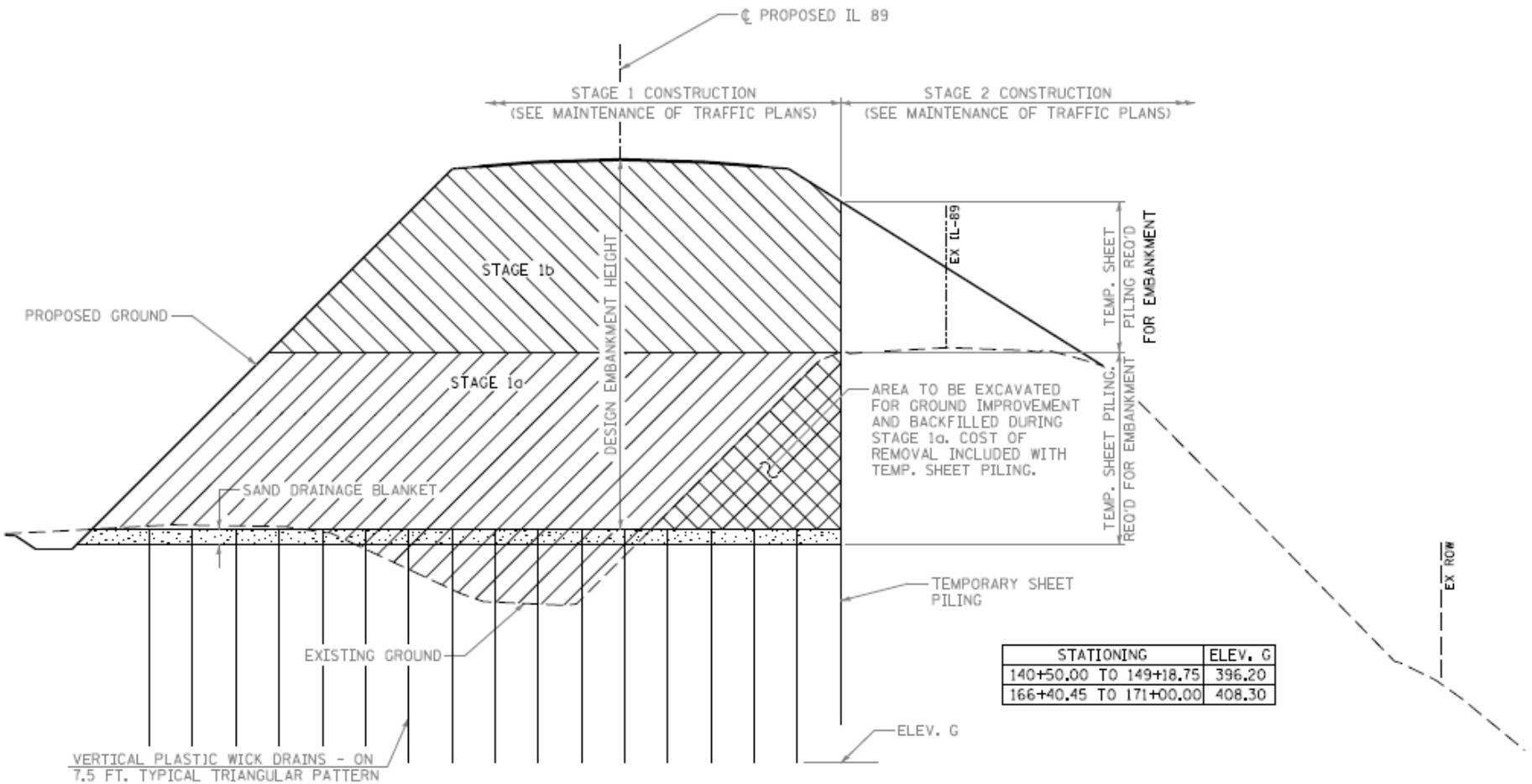
QUESTIONS

WICK DRAINS
SAND DRAINAGE BLANKET

SURCHARGE

BILL OF MATERIAL

ITEM	UNIT	TOTAL



STATIONING	ELEV. G
140+50.00 TO 149+18.75	396.20
166+40.45 TO 171+00.00	408.30

GROUND IMPROVEMENT TYPICAL CROSS SECTION

(LOOKING SOUTH)

LIN ENGINEERING, LTD.
Consulting Engineers

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

GROUND IMPROVEMENT DETAILS

DIFFERENTIAL SETTLEMENT - NORTH ABUTMENT

Table 2. Differential Settlement Summary for Station 148+50
Route FAP 698 (IL 89), Section (1)BR, Bureau County
Job No. P-93-013-11
Borings 5 (2013) and 5-ST (2013), Station 148+87 (PR)

		Offset from Proposed Center Line				
Location of Analyses and Assumptions		**10 ft. LT**	**20 ft. RT (PR RT SHLD)**	**30 ft. RT (EX LT SHLD)**	**46 ft. RT (EX Centerline)**	**62 ft. RT (EX RT SHLD)**
Stage 1a: 17.5 ft of fill to match height of existing embankment	(inches)	13.6	5.8	3.1	1.3	0.7
Stage 1b: Additional 11.5 ft. of fill over Stage 1a fill with assumed temp. MSE wall at 24 ft. RT stage line.	(inches)	5.6	4.3	3.3	1.8	1.1
Stage 2: 11.5 ft. tall triangle-shaped wedge fill to complete RT side slope (if no surcharge in Stage 1b).	(inches)	0.4	1.1	1.3	1.1	0.6
Total for Stage 1a, 1b, and 2:	**(inches)**	**19.6**	**11.2**	**7.7**	**4.2**	**2.4**
Total for Stage 1a and 1b:	(inches)	19.2	10.1	6.4	3.1	1.8
Stage 1b (surcharge option): 550 psf surcharge with the Stage 1b fill.	(inches)	1.5	1.3	1.1	0.7	0.5
Total for Stage 1a, 1b, and 1b (surcharge):	(inches)	20.7	11.4	7.5	3.8	2.3

RGR Sheet 210

DIFFERENTIAL SETTLEMENT – SOUTH ABUTMENT

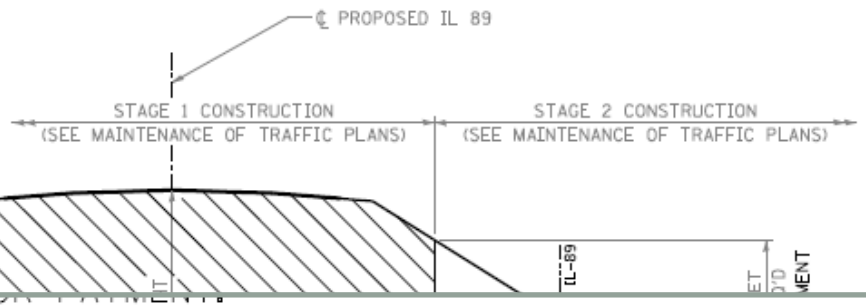
Table 2. Differential Settlement Summary for Station 167+50
Route FAP 698 (IL 89), Section (1)BR, Putnam County
Job No. P-93-013-11
Borings 4 (2013) and 4-ST (2013), Station 166+63 (PR)

		Offset from Proposed Center Line				
Location of Analyses and Assumptions		**12 ft. LT**	**20 ft. RT (PR RT SHLD)**	**30 ft. RT (EX LT SHLD)**	**46 ft. RT (EX Centerline)**	**62 ft. RT (EX RT SHLD)**
Stage 1a: 14 ft of fill to match height of existing embankment	(inches)	3.8	1.8	1.1	0.4	0.1
Stage 1b: Additional 11.3 ft. of fill over Stage 1a fill with assumed temp. MSE wall at 20 ft. RT stage line.	(inches)	5.9	3.5	1.6	0.5	0.2
Stage 2: 11.3 ft. tall triangle-shaped wedge fill to complete RT side slope (if no surcharge in Stage 1b).	(inches)	0.2	2.1	2.9	2.5	0.7
Total for Stage 1a, 1b, and 2:	(inches)	9.9	7.4	5.6	3.4	1.0
Total for Stage 1a and 1b:	(inches)	9.7	5.3	2.7	0.9	0.3
Stage 1b (surcharge option): 800 psf surcharge with the Stage 1b fill.	(inches)	2.4	1.7	0.8	0.3	0.1
Total for Stage 1a, 1b, and 1b (surcharge):	(inches)	12.1	7.0	3.5	1.2	0.4

RGR Sheet 264

BILL OF MATERIAL

ITEM	UNIT	TOTAL

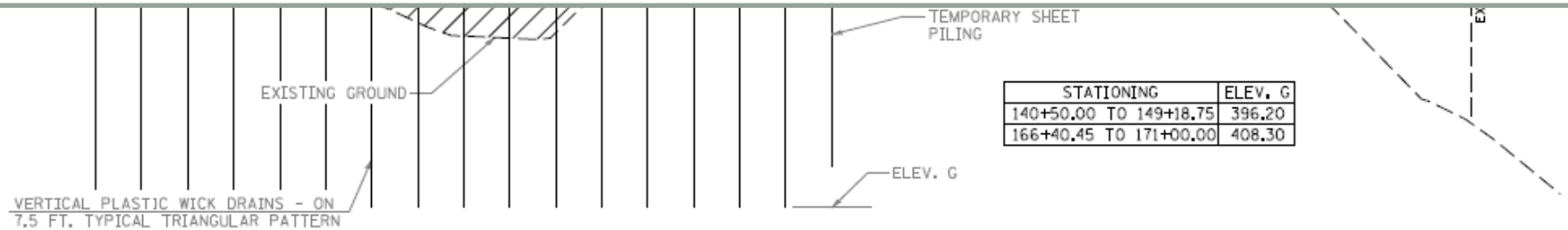


NOT BE MEASURED FOR PAYMENT.

1

10. A 800 PSF SURCHARGE SHALL BE USED BETWEEN STA. 148+00 TO THE BACK OF THE PROPOSED NORTH ABUTMENT ON THE ENTIRE TOP WIDTH OF THE STAGE 1b FILL. A 1,050 PSF SURCHARGE SHALL BE USED BETWEEN THE PROPOSED SOUTH ABUTMENT AND STA. 168+50 AND THEN DECREASE FROM 1,050 TO 350 PSF FROM STA. 168+50 TO 170+00 ON THE ENTIRE WIDTH OF STAGE 1b FILL.

11. SEE THE SPECIAL PROVISIOHS FOR "SURCHARGE" FOR THE MINIMUM WAITING PERIOD PRIOR TO THE INSTALLATION OF PILING FOR THE BRIDGE ABUTMENTS.



STATIONING	ELEV. G
140+50.00 TO 149+18.75	396.20
166+40.45 TO 171+00.00	408.30

GROUND IMPROVEMENT TYPICAL CROSS SECTION

(LOOKING SOUTH)

1	148+50	50'	LT.	R=5620.13'	4.1%	1660	2392		2350			2320	2310
2	167+00	50'	LT.	R=5620.13'	4.1%	792		1325		1812	1762		

LIN ENGINEERING, LTD.
Consulting Engineers

DESIGNED	MPV/JA	REVISED	-
CHECKED	JMS	REVISED	-
DRAWN	AJF	REVISED	-
CHECKED	JMS	REVISED	-

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

GROUND IMPROVEMENT DETAILS

SHEET NO. 13 OF 20 SHEETS

DIST.	SECTION	COUNTY	TOTAL SHEET NO.	SHEET NO.
6	13 BR	RANDOLPH	20	149
		CONTRACT NO. 66A65		
		ILLINOIS FED. AID PROJECT		

6/6/2013

SURCHARGE

- Submittals (30 days prior to construction)
  - Material
  - Unit Weight
    - Compaction criteria
  - Drawings showing plan, profile, and typical section
  - Method of placement
  - Quality control (if necessary)
  - Removal and disposal

SURCHARGE

- Materials
  - "Materials shall be any material approved by the Engineer that uniformly applies the required surcharge pressure over the surcharge area shown on the plans."

SURCHARGE

Location (length)	Treatment Width	Surcharge Pressure (1)	Minimum Surcharge Duration(2) (days)
Sta. 148+00 to Back of Proposed North Bridge Abutment	Entire top width of the Stage 1b fill.	800 psf	107
Back of Proposed South Bridge Abutment to Sta. 168+50	Entire top width of the Stage 1b fill.	1050 psf	154
Sta. 168+50 to Sta. 170+00	Entire top width of the Stage 1b fill.	Decrease uniformly from 1050 psf at Sta. 168+50 to 350 psf at Sta. 170+00	154

Note 1: Surcharge shall be placed prior to construction of subgrade, subbase, and pavement.

Note 2: Surcharge duration is based on wick drains with a 7.5 foot triangular spacing pattern. The duration will be adjusted by the Engineer in the event that a different wick drain configuration is used.

Location of Analyses and Assumptions	Sta. 148+50, 10 ft. LT (inches)	Sta. 167+50, 12 ft. LT (inches)
Stage 1a: Fill to match height of existing embankment	13.6	3.8
Stage 1b: Additional fill over Stage 1a fill with assumed temporary MSE wall at 20 ft. RT.	5.6	5.9
Stage 1b (surcharge): surcharge.	1.5	2.4
Total for Stage 1a, 1b, and 1b (surcharge):	20.7	12.1

SURCHARGE

- Construction Requirements
  - Rate of placement based on settlement plate, slope inclinometer, and piezometer
  - Construction shall stop if slope stability problems are encountered

SURCHARGE

- Construction Requirements
  - "The surcharge shall at no time exceed the specified pressure without prior approval of the Engineer. The Contractor shall not stockpile material or place excess load on top of the embankment."
  - "The surcharge shall remain in place until the Minimum Surcharge Duration has elapsed and the estimated remaining settlement is a maximum of 0.4 inch."
  - "Piling for the bridge abutments and the pavement subgrade shall not be constructed until after the surcharge is removed."

SURCHARGE

- Measurement and Payment
  - Measured by square yards of surface area covered by surcharge
  - Unit price per square yard

QUESTIONS

SURCHARGE

SHEET PILING

DIFFERENTIAL SETTLEMENT - NORTH ABUTMENT

Table 2. Differential Settlement Summary for Station 148+50
Route FAP 698 (IL 89), Section (1)BR, Bureau County
Job No. P-93-013-11
Borings 5 (2013) and 5-ST (2013), Station 148+87 (PR)

		Offset from Proposed Center Line				
Location of Analyses and Assumptions		**10 ft. LT**	**20 ft. RT (PR RT SHLD)**	**30 ft. RT (EX LT SHLD)**	**46 ft. RT (EX Centerline)**	**62 ft. RT (EX RT SHLD)**
Stage 1a: 17.5 ft of fill to match height of existing embankment	(inches)	13.6	5.8	3.1	1.3	0.7
Stage 1b: Additional 11.5 ft. of fill over Stage 1a fill with assumed temp. MSE wall at 24 ft. RT stage line.	(inches)	5.6	4.3	3.3	1.8	1.1
Stage 2: 11.5 ft. tall triangle-shaped wedge fill to complete RT side slope (if no surcharge in Stage 1b).	(inches)	0.4	1.1	1.3	1.1	0.6
Total for Stage 1a, 1b, and 2:	**(inches)**	**19.6**	**11.2**	**7.7**	**4.2**	**2.4**
Total for Stage 1a and 1b:	(inches)	19.2	10.1	6.4	3.1	1.8
Stage 1b (surcharge option): 550 psf surcharge with the Stage 1b fill.	(inches)	1.5	1.3	1.1	0.7	0.5
Total for Stage 1a, 1b, and 1b (surcharge):	(inches)	20.7	11.4	7.5	3.8	2.3

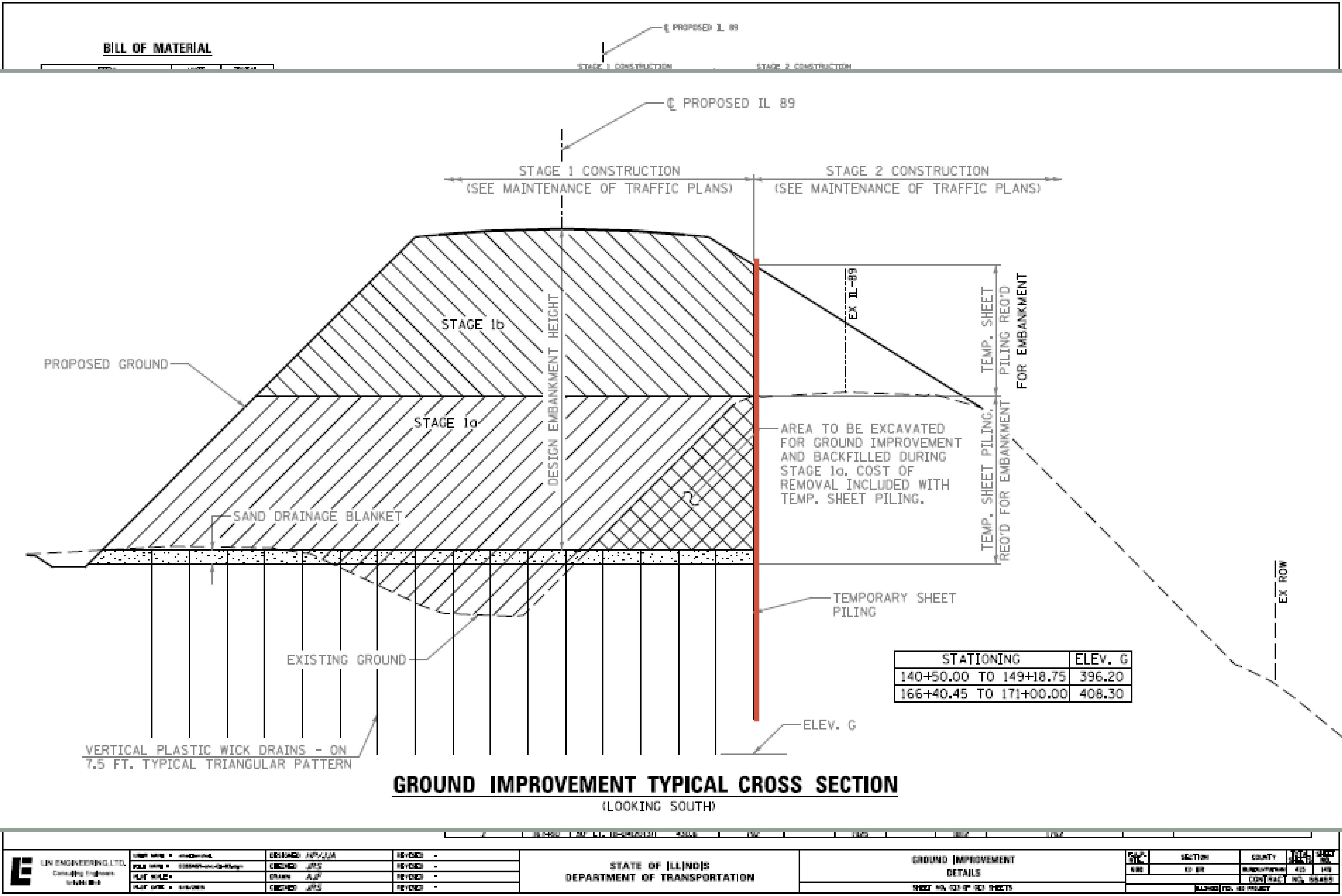
RGR Sheet 210

DIFFERENTIAL SETTLEMENT – SOUTH ABUTMENT

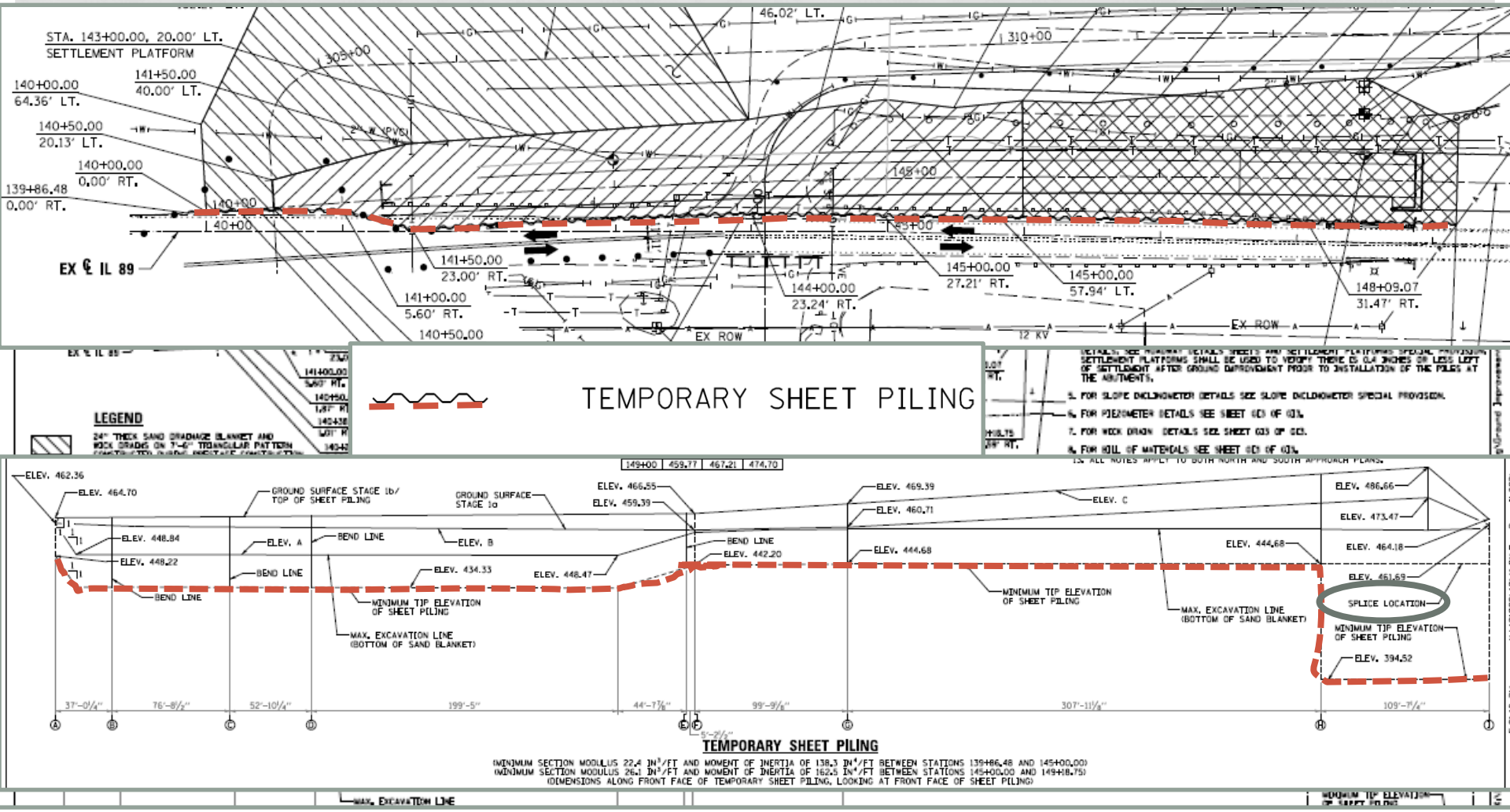
Table 2. Differential Settlement Summary for Station 167+50
Route FAP 698 (IL 89), Section (1)BR, Putnam County
Job No. P-93-013-11
Borings 4 (2013) and 4-ST (2013), Station 166+63 (PR)

		Offset from Proposed Center Line				
Location of Analyses and Assumptions		**12 ft. LT**	**20 ft. RT (PR RT SHLD)**	**30 ft. RT (EX LT SHLD)**	**46 ft. RT (EX Centerline)**	**62 ft. RT (EX RT SHLD)**
Stage 1a: 14 ft of fill to match height of existing embankment	(inches)	3.8	1.8	1.1	0.4	0.1
Stage 1b: Additional 11.3 ft. of fill over Stage 1a fill with assumed temp. MSE wall at 20 ft. RT stage line.	(inches)	5.9	3.5	1.6	0.5	0.2
Stage 2: 11.3 ft. tall triangle-shaped wedge fill to complete RT side slope (if no surcharge in Stage 1b).	(inches)	0.2	2.1	2.9	2.5	0.7
Total for Stage 1a, 1b, and 2:	(inches)	9.9	7.4	5.6	3.4	1.0
Total for Stage 1a and 1b:	(inches)	9.7	5.3	2.7	0.9	0.3
Stage 1b (surcharge option): 800 psf surcharge with the Stage 1b fill.	(inches)	2.4	1.7	0.8	0.3	0.1
Total for Stage 1a, 1b, and 1b (surcharge):	(inches)	12.1	7.0	3.5	1.2	0.4

RGR Sheet 264

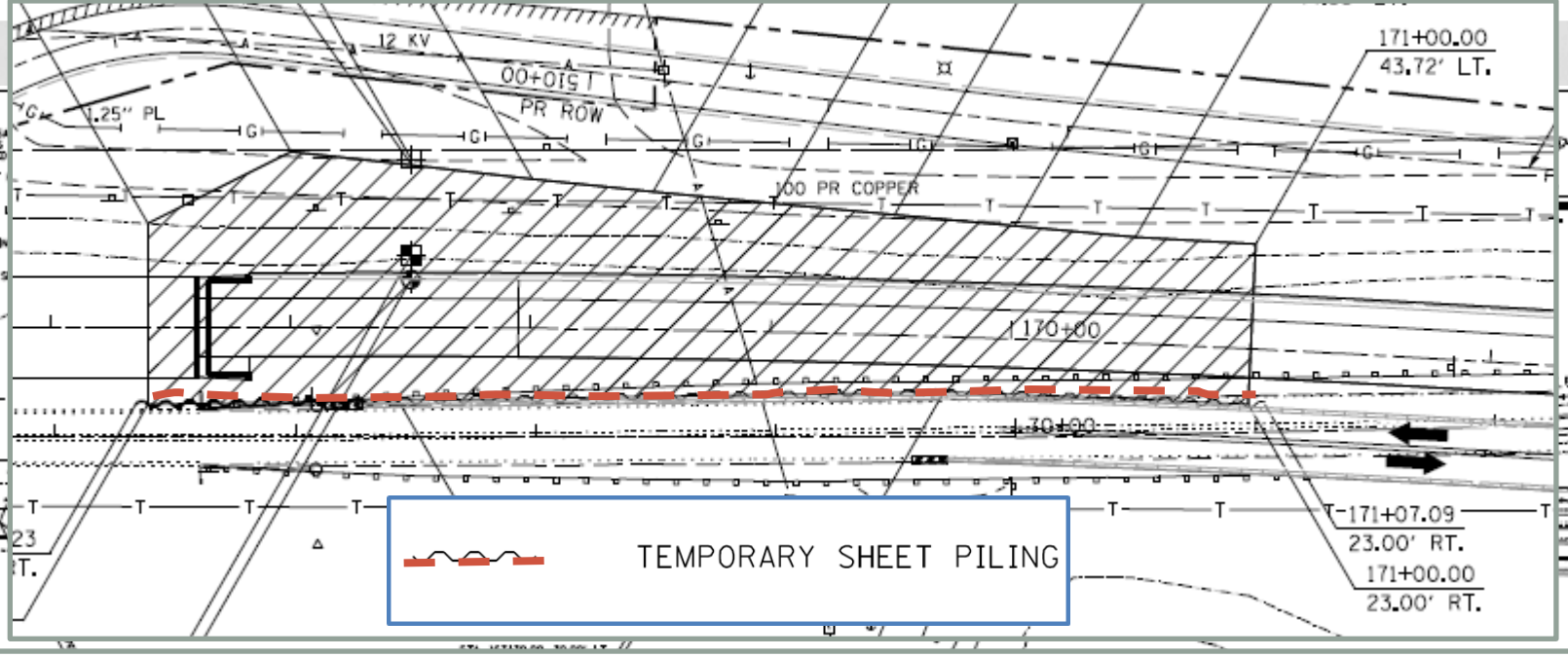


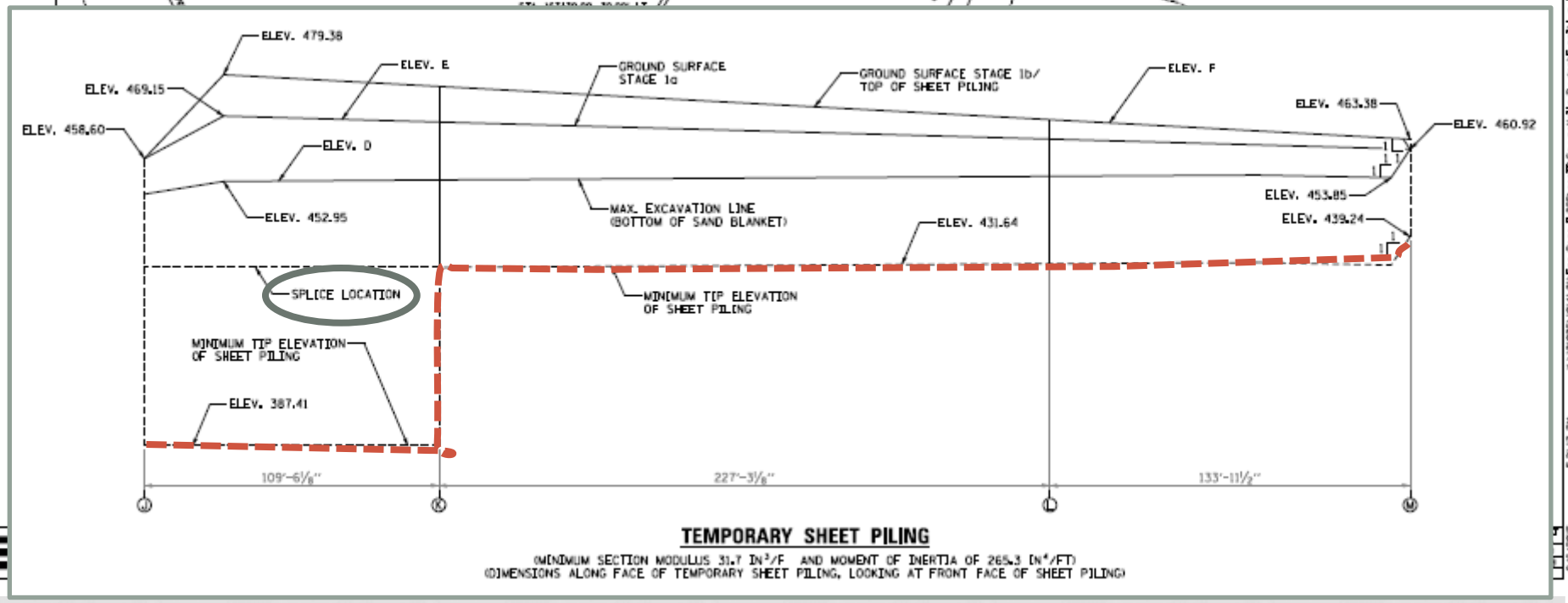
STATIONING	ELEV. G
140+50.00 TO 149+18.75	396.20
166+40.45 TO 171+00.00	408.30



9. WHEN THE LENGTH OF THE TEMPORARY SHEET PILING EXCEEDS 55 FEET, SPLICING OF INDIVIDUAL SHEETS WILL BE PERMITTED. ANY SPLICES SHALL BE LOCATED BELOW THE "SPLICE LOCATION" SHOWN. SPLICES OF THE TEMPORARY SHEET PILING WILL NOT BE MEASURED FOR PAYMENT.

12. SHEET PILING YIELD STRESS (f_y) IS 38.5 KSI.





TEMPORARY SHEET PILING

(MINIMUM SECTION MODULUS 31.7 IN^3/F AND MOMENT OF INERTIA OF 265.3 (IN^4/FT)
(DIMENSIONS ALONG FACE OF TEMPORARY SHEET PILING, LOOKING AT FRONT FACE OF SHEET PILING)

SETTLEMENT OF EXISTING PAVEMENT

SETTLEMENT OF EXISTING PAVEMENT

- North approach settlement: 7.5 to 2.3 inches
- South approach settlement: 3.5 to 0.4 inches

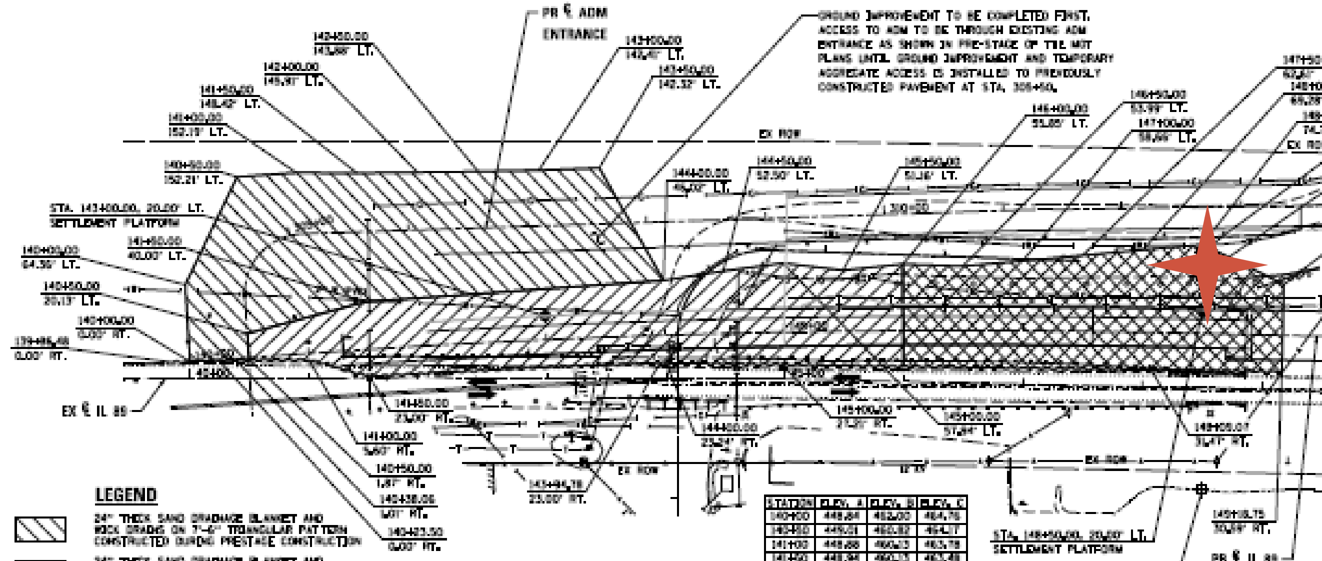
SETTLEMENT OF EXISTING PAVEMENT

- Special Provision
  - Roadway needs to be maintained
  - Work may include
    - HMA Surface Removal, Variable Depth
    - HMA Mixture “D”, N50
    - Tack coat
    - Pavement striping
    - Traffic control

QUESTIONS

SHEET PILING
SETTLEMENT OF EXISTING PAVEMENT

PIEZOMETER



LEGEND

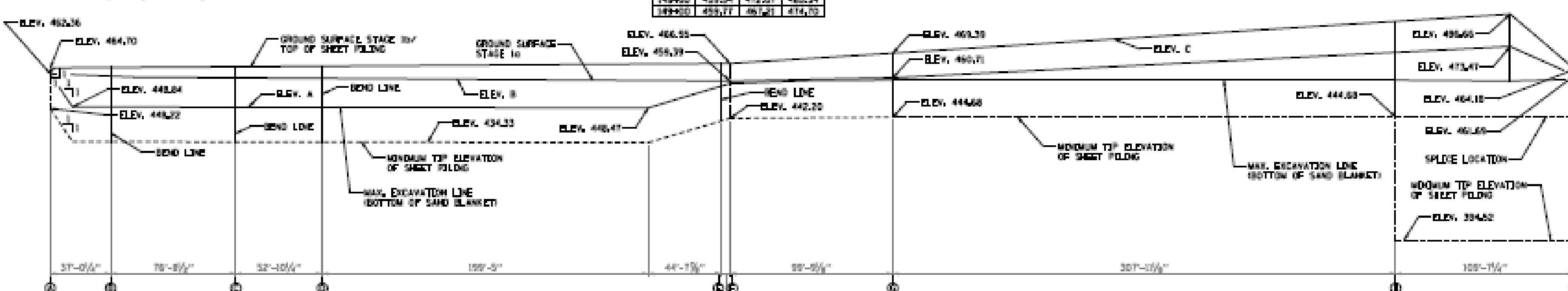
- 24" THICK SAND DRAINAGE BLANKET AND WICK DRAINS ON 7'-6" TRIANGULAR PATTERN CONSTRUCTED DURING PRESTAGE CONSTRUCTION
- 24" THICK SAND DRAINAGE BLANKET AND WICK DRAINS ON 7'-6" TRIANGULAR PATTERN CONSTRUCTED DURING STAGE 1a CONSTRUCTION
- 36" THICK SAND DRAINAGE BLANKETAND WICK DRAINS ON 7'-6" TRIANGULAR PATTERN CONSTRUCTED DURING STAGE 1a CONSTRUCTION
- SETTLEMENT PLATFORM LOCATIONS
- PIEZOMETER LOCATIONS
- SLOPE INCLINOMETER LOCATIONS
- TEMPORARY SHEET PILING

POINT	℄ PR. IL 89 STA.	℄ PR. IL 89 OFFSET
A	139+86.48	0.00' RT.
B	140+23.50	0.00' RT.
C	141+00.00	5.60' RT.
D	141+50.00	23.00' RT.
E	143+34.78	23.00' RT.
F	144+00.00	23.24' RT.
G	145+00.00	27.21' RT.
H	148+05.07	31.47' RT.
I	149+18.75	30.59' RT.

STATION	ELEV. A	ELEV. B	ELEV. C
140+00	448.84	462.00	464.76
140+50	449.01	460.82	464.17
141+00	448.88	460.13	463.78
141+50	448.94	460.13	463.48
142+00	448.84	459.61	463.63
142+50	448.71	459.29	464.01
143+00	448.61	459.13	464.62
143+50	448.47	459.10	465.47
144+00	458.34	459.40	466.55
144+50	451.56	460.10	467.85
145+00	455.74	460.71	469.39
145+50	451.90	461.55	471.17
146+00	460.03	462.69	473.17
146+50	459.99	463.87	475.41
147+00	460.10	465.40	477.86
147+50	460.08	467.32	480.35
148+00	459.79	469.67	482.85
148+50	459.54	472.07	485.34
149+00	459.77	467.21	474.70

NOTES:

1. IN THE AREAS WHERE WICK DRAINS WILL BE INSTALLED, THE EXISTING GROUND SHALL BE PREPARED ACCORDING TO ART. 205 EXCEPT THE EXISTING PAVEMENT AND SHOULDERS SHALL BE REMOVED OR BROKEN UP INTO PIECES NOT TO EXCEED 3 SQ. FT.
2. FOLLOWING PREPARATION OF THE EXISTING GROUND, A SAND DRAINAGE BLANKET 2 FT. THICK OR 3 FT. THICK SHALL BE PLACED WITHIN THE LIMITS OF THE WICK DRAINS.
3. THE CONTRACTOR SHALL INSTALL THE WICK DRAINS THROUGH THE SAND DRAINAGE BLANKET AND BROKEN PAVEMENT USING A METHOD ACCEPTABLE TO THE ENGINEER WHICH DOES NOT DAMAGE THE WICK DRAINS. SEE WICK DRAINS SPECIAL PROVISION.
4. FOR SETTLEMENT PLATFORM REQUIREMENTS SEE ART. 204.06. FOR SETTLEMENT PLATFORM DETAILS, SEE ROADWAY DETAILS SHEETS AND SETTLEMENT PLATFORMS SPECIAL PROVISION. SETTLEMENT PLATFORMS SHALL BE USED TO VERIFY THERE IS 0.4 INCHES OR LESS LEFT OF SETTLEMENT AFTER GROUND IMPROVEMENT PRIOR TO INSTALLATION OF THE PILES AT THE ABUTMENTS.
5. FOR SLOPE INCLINOMETER DETAILS SEE SLOPE INCLINOMETER SPECIAL PROVISION.
6. FOR PIEZOMETER DETAILS SEE SHEET 613 OF 613.
7. FOR WICK DRAIN DETAILS SEE SHEET 613 OF 613.
8. FOR BILL OF MATERIALS SEE SHEET 613 OF 613.
9. WHEN THE LENGTH OF THE TEMPORARY SHEET PILING EXCEEDS 55 FEET, SPLICING OF INDIVIDUAL SHEETS WILL BE PERMITTED. ANY SPLICES SHALL BE LOCATED BELOW THE "SPLICE LOCATION" SHOWN. SPLICES OF THE TEMPORARY SHEET PILING WILL NOT BE MEASURED FOR PAYMENT.
10. A 800 PSF SURCHARGE SHALL BE USED BETWEEN STA. 148+00 TO THE BACK OF THE PROPOSED NORTH ABUTMENT ON THE ENTIRE TOP WIDTH OF THE STAGE 1b FILL. A 1,050 PSF SURCHARGE SHALL BE USED BETWEEN THE PROPOSED SOUTH ABUTMENT AND STA. 168+00 AND THEN DECREASE FROM 1,050 TO 350 PSF FROM STA. 168+00 TO 170+00 ON THE ENTIRE WIDTH OF STAGE 1b FILL.
11. SEE THE SPECIAL PROVISIONS FOR "SURCHARGE" FOR THE MINIMUM WAITING PERIOD PRIOR TO THE INSTALLATION OF PILING FOR THE BRIDGE ABUTMENTS.
12. SHEET PILING YIELD STRESS (F y) IS 38.5 KSI.
13. ALL NOTES APPLY TO BOTH NORTH AND SOUTH APPROACH PLANS.



TEMPORARY SHEET PILING

(MINIMUM SECTION MODULUS 22.4 IN³/FT AND MOMENT OF INERTIA OF 138.3 IN⁴/FT BETWEEN STATIONS 139+86.48 AND 145+00.00)
(MINIMUM SECTION MODULUS 26.1 IN³/FT AND MOMENT OF INERTIA OF 162.5 IN⁴/FT BETWEEN STATIONS 145+00.00 AND 149+18.75)
(DIMENSIONS ALONG FRONT FACE OF TEMPORARY SHEET PILING, LOOKING AT FRONT FACE OF SHEET PILING)

LIN ENGINEERING LTD. Consulting Engineers

DESIGNED - AFV/JJA	REVISED - 10/27/2015 MPB
CHECKED - JMS	REVISED -
DRAWN - AJF	REVISED -
CHECKED - JMS	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

GROUND IMPROVEMENT
NORTH APPROACH PLAN

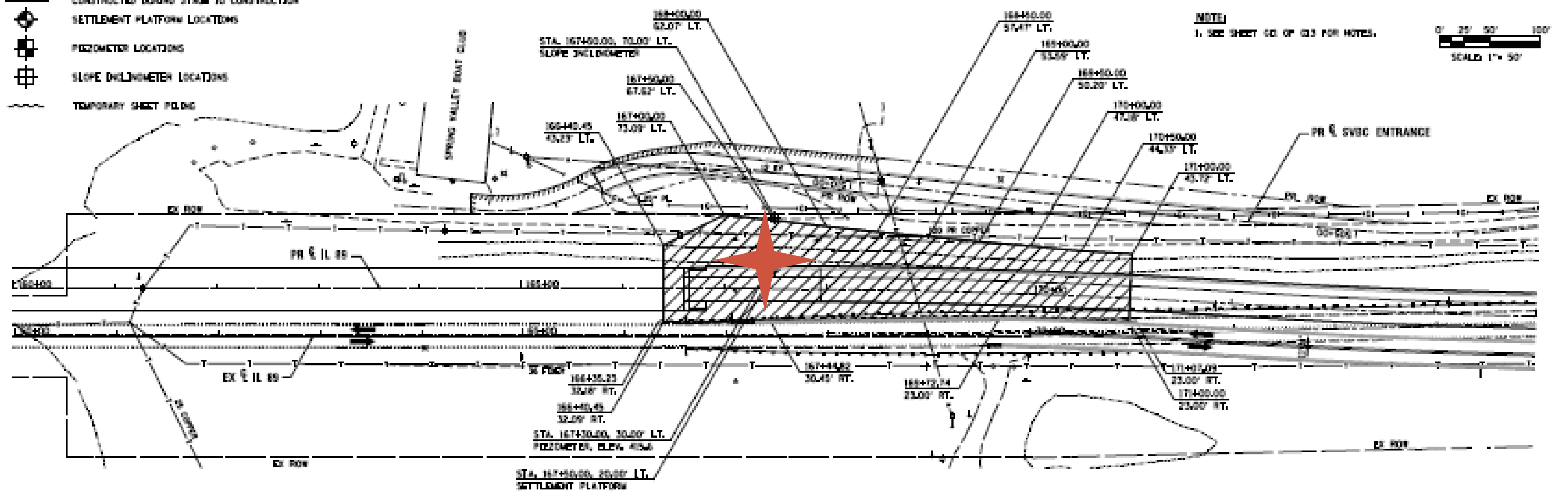
SHEET NO. 63 OF 63 SHEETS

CONTRACT NO. 66455

LEGEND

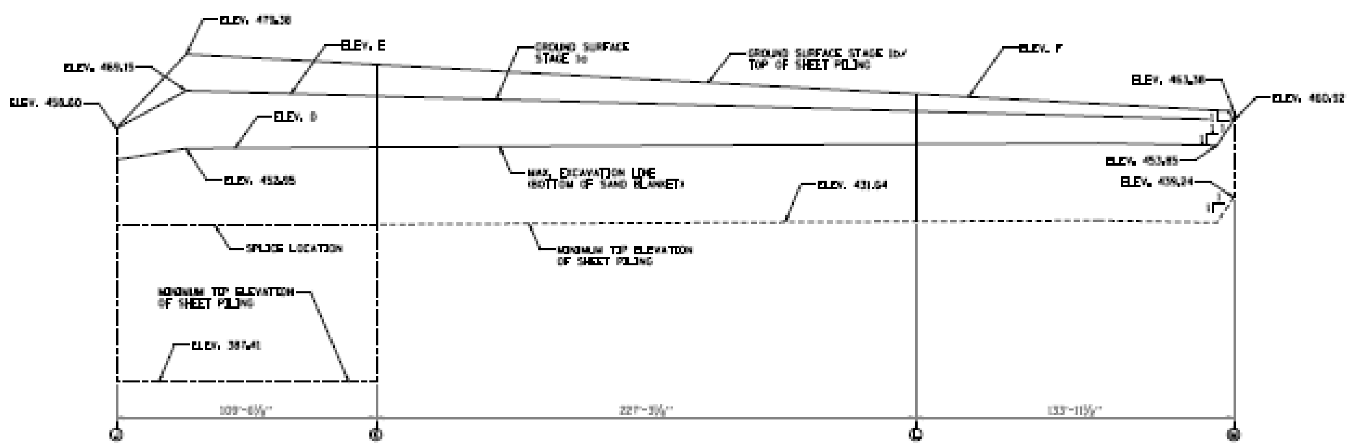
- 24" THICK SAND DRAINAGE BLANKET AND WICK DRAINS ON 7'-6" TRIANGULAR PATTERN CONSTRUCTED DURING STAGE 1a CONSTRUCTION
- SETTLEMENT PLATFORM LOCATIONS
- PIEZOMETER LOCATIONS
- SLOPE INCLINOMETER LOCATIONS
- TEMPORARY SHEET PILING

NOTE:
1. SEE SHEET 130 OF 133 FOR NOTES.



POINT	℄ PR. IL 89 STA.	℄ PR. IL 89 OFFSET
J	166+35.23	32.18' RT.
K	167+44.82	30.45' RT.
L	169+72.74	23.00' RT.
M	171+07.09	23.00' RT.

STATION	ELEV. D	ELEV. E	ELEV. F
166+50	451.42	464.07	469.38
167+00	453.12	467.88	478.08
167+50	453.37	466.10	475.60
168+00	453.82	464.31	473.78
168+50	454.04	462.82	471.19
169+00	454.02	461.66	469.33
169+50	454.16	461.05	467.69
170+00	454.26	460.59	466.28
170+50	454.51	460.84	465.09
171+00	453.85	460.91	463.64



TEMPORARY SHEET PILING

(MINIMUM SECTION MODULUS 30.7 IN³/F AND MOMENT OF INERTIA OF 265.3 IN⁴/FT)
(DIMENSIONS ALONG FACE OF TEMPORARY SHEET PILING, LOOKING AT FRONT FACE OF SHEET PILING)

LIN ENGINEERING LTD.
Consulting Engineers

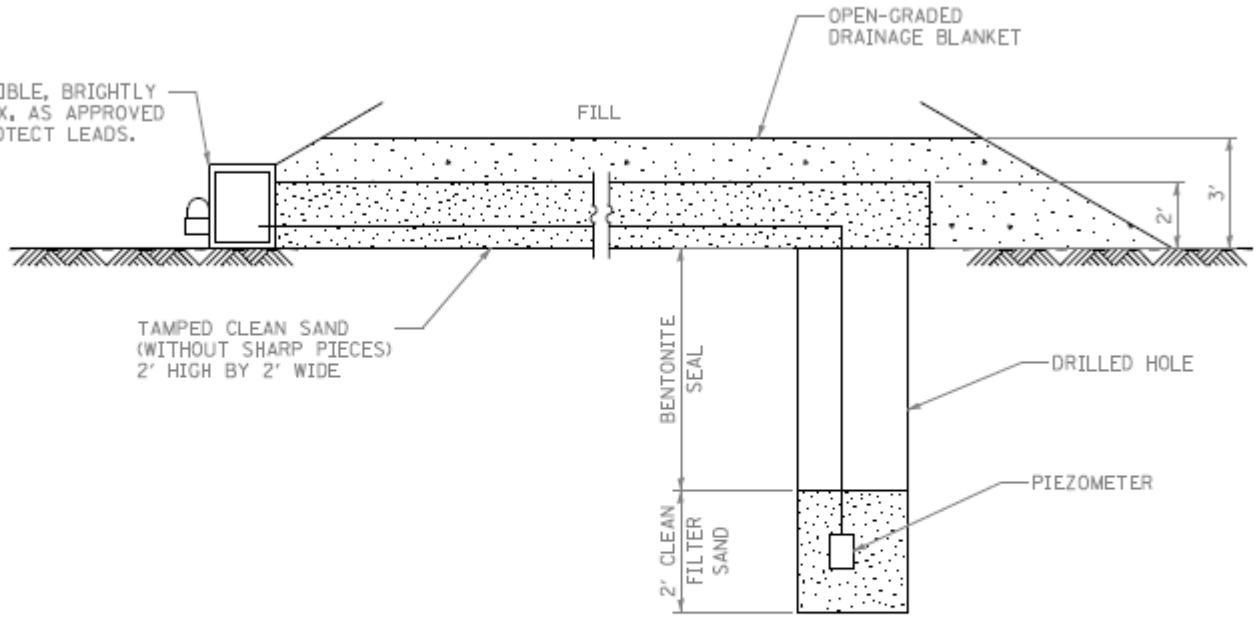
DESIGNED - MPV/JJA | REVISED -
CHECKED - JMS | REVISED -
DRAWN - AJP | REVISED -
CHECKED - JMS | REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

GROUND IMPROVEMENT
SOUTH APPROACH PLAN
SHEET NO. 132 OF 133 SHEETS

CONTRACT NO. 66469

SS SECTION



ICAL WICK DRAIN (TYP.)

TYPICAL PIEZOMETER INSTALLATION DETAIL

(NOT TO SCALE)

PIEZOMETER ELEVATIONS AND ESTIMATED MAXIMUM PIEZOMETER WATER LEVEL READINGS ALLOWABLE TO MAINTAIN AN ADEQUATE FACTOR OF SAFETY AGAINST SLOPE FAILURE (DATA PROVIDED BY IDOT)

ART WORKING PLATFORM NEEDED TO CONSTRUCT THE SAND DRAINAGE BLANKET OR THE WICK DRAINS WILL NOT BE MEASURED FOR PAYMENT.

INSTALLATION PER PIEZOMETER MANUFACTURER RECOMMENDATIONS AND AS APPROVED BY ENGINEER.

WICK DRAIN PATTERN

TYPICAL PIEZOMETER INSTALLATION DETAIL

NOT TO SCALE

RECOMMENDED PIEZOMETER LOCATIONS

LOCATION NUMBER	STATION	OFFSET	NEAREST BORING	APPROXIMATE ELEVATION (FT.)	EST. INITIAL READING (psf)	EST. MAX ALLOWABLE READING (psf)						
						17.5 FT (FILL HT)	19.3 FT (FILL HT)	22.5 FT (FILL HT)	25.3 FT (FILL HT)	25.3 FT (FILL HT + 800 psf SURCHARGE)	29.3 FT (FILL HT)	29.3 FT (FILL HT + 550 psf SURCHARGE)
1	148+50	50' LT.	B-05(2013)	415.6	1660	2392		2350			2320	2310
2	167+50	30' LT.	B-04(2013)	430.6	792		1925		1812	1762		

LIN ENGINEERING, LTD.
Consulting Engineers

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

GROUND IMPROVEMENT DETAILS

DIST.	SECTION	COUNTY	TOTAL SHEET NO.	SHEET NO.
6	13 BR		415	149
		CONTRACT NO. 66A65		

PIEZOMETER

- Materials
  - Vibrating wire
  - Automatic data collection & storage

PIEZOMETER

- Submittal
  - 45 Days prior to installation: Technical data and catalog cuts

PIEZOMETER

- Qualifications
  - Installer must be prequalified by IDOT in the category "Geotechnical Services – Subsurface Explorations"
  - http://eplan.dot.il.gov/desenv/epas/ConsultantsPrequalificationR080.pdf

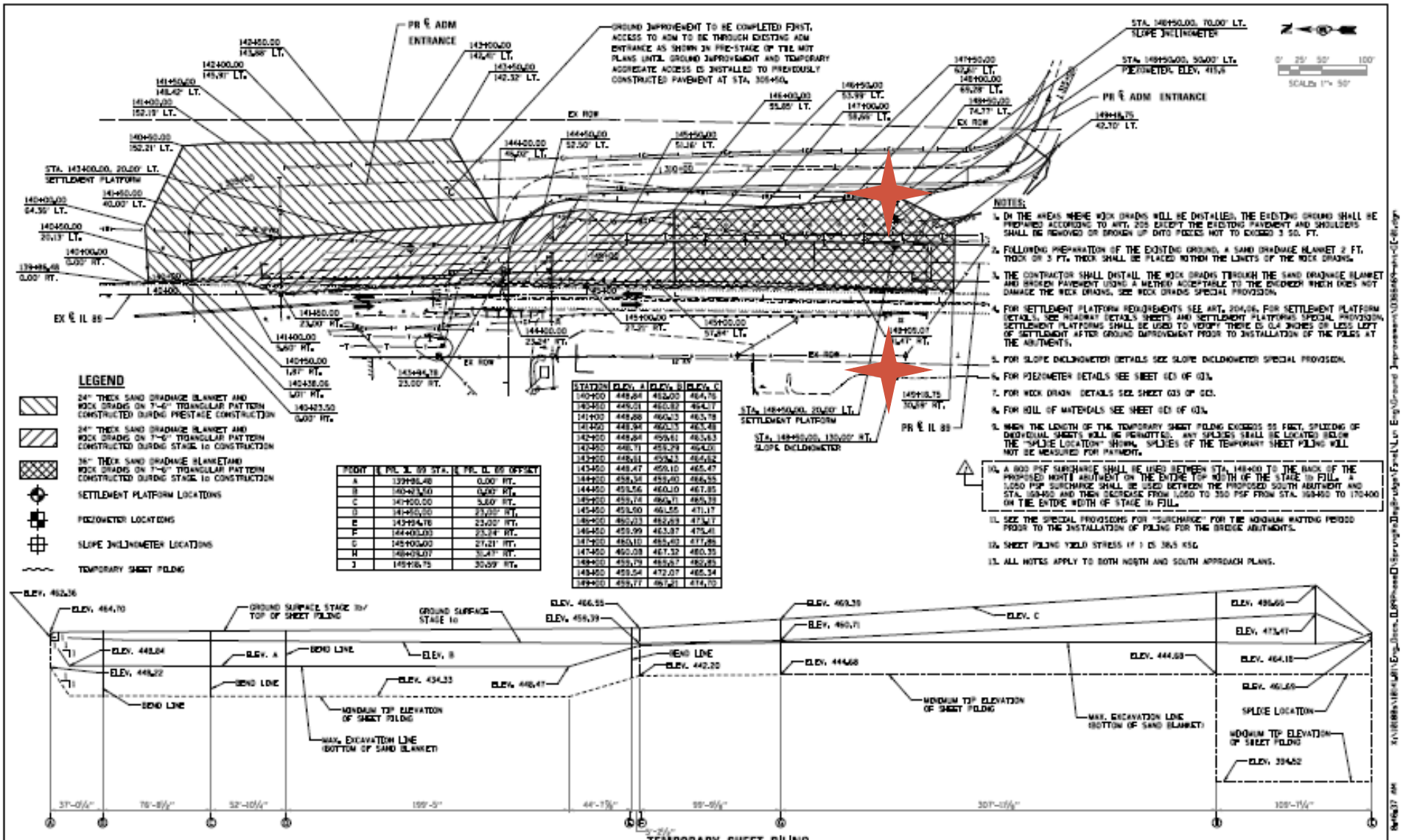
PIEZOMETER

- Construction
  - Functional 14 days prior to embankment construction
  - Training on use provided to Engineer
  - The Engineer will perform the data collection and analysis
  - Protect and maintain the piezometers throughout construction
  - If pore pressures exceed those in the plans, embankment construction shall stop until pore pressures dissipate
  - Final grading and shaping shall occur after pore pressures reach their initial (pre-construction) values

PIEZOMETER

- Measurement and Payment
  - Measured in units of each

SLOPE INCLINOMETER



LEGEND

- 24" THICK SAND DRAINAGE BLANKET AND ROCK DRAINS ON 7'-6" TRIANGULAR PATTERN CONSTRUCTED DURING PRESTAGE CONSTRUCTION
- 24" THICK SAND DRAINAGE BLANKET AND ROCK DRAINS ON 7'-6" TRIANGULAR PATTERN CONSTRUCTED DURING STAGE 1a CONSTRUCTION
- 36" THICK SAND DRAINAGE BLANKETAND ROCK DRAINS ON 7'-6" TRIANGULAR PATTERN CONSTRUCTED DURING STAGE 1a CONSTRUCTION
- SETTLEMENT PLATFORM LOCATIONS
- PIEZOMETER LOCATIONS
- SLOPE INCLINOMETER LOCATIONS
- TEMPORARY SHEET PILING

POINT	℄ PIL. EL. 89 STA.	℄ PIL. EL. 89 OFFSET
A	139+86.48	0.00' RT.
B	140+47.50	0.00' RT.
C	141+00.00	5.00' RT.
D	141+60.00	23.00' RT.
E	143+98.78	23.00' RT.
F	144+60.00	25.24' RT.
G	145+00.00	27.21' RT.
H	148+05.07	30.41' RT.
J	149+18.75	30.59' RT.

STATION	ELEV. A	ELEV. B	ELEV. C
140+00	448.84	458.00	464.70
140+50	448.01	460.82	464.17
141+00	448.68	460.43	465.78
141+50	448.94	460.15	467.48
142+00	448.84	459.61	465.63
142+50	448.11	459.78	464.20
143+00	448.11	459.13	464.62
143+50	448.47	459.10	465.47
144+00	448.34	459.40	466.35
144+50	451.56	460.10	467.85
145+00	455.74	464.11	469.38
145+50	459.60	461.55	471.17
146+00	460.23	462.69	473.31
146+50	459.99	463.87	475.41
147+00	460.10	464.40	477.86
147+50	460.08	467.32	480.35
148+00	459.79	469.67	482.85
148+50	459.54	472.07	485.34
149+00	459.77	467.21	474.70

NOTES:

1. IN THE AREAS WHERE WICK DRAINS WILL BE INSTALLED, THE EXISTING GROUND SHALL BE PREPARED ACCORDING TO ART. 205 EXCEPT THE EXISTING PAVEMENT AND SHOULDERS SHALL BE REMOVED OR BROKEN UP INTO PIECES NOT TO EXCEED 3 SQ. FT.
2. FOLLOWING PREPARATION OF THE EXISTING GROUND, A SAND DRAINAGE BLANKET 2 FT. THICK OR 3 FT. THICK SHALL BE PLACED WITHIN THE LIMITS OF THE WICK DRAINS.
3. THE CONTRACTOR SHALL INSTALL THE WICK DRAINS THROUGH THE SAND DRAINAGE BLANKET AND BROKEN PAVEMENT USING A METHOD ACCEPTABLE TO THE ENGINEER WHICH DOES NOT DAMAGE THE WICK DRAINS. SEE WICK DRAINS SPECIAL PROVISION.
4. FOR SETTLEMENT PLATFORM REQUIREMENTS SEE ART. 204.06. FOR SETTLEMENT PLATFORM DETAILS, SEE ROADWAY DETAILS SHEETS AND SETTLEMENT PLATFORMS SPECIAL PROVISION. SETTLEMENT PLATFORMS SHALL BE USED TO VERIFY THERE IS 0.4 INCHES OR LESS LEFT OF SETTLEMENT AFTER GROUND IMPROVEMENT PRIOR TO INSTALLATION OF THE PILES AT THE ABUTMENTS.
5. FOR SLOPE INCLINOMETER DETAILS SEE SLOPE INCLINOMETER SPECIAL PROVISION.
6. FOR PIEZOMETER DETAILS SEE SHEET 6D OF 6D.
7. FOR WICK DRAIN DETAILS SEE SHEET 6D3 OF 6D.
8. FOR ROLL OF MATERIALS SEE SHEET 6D OF 6D.
9. WHEN THE LENGTH OF THE TEMPORARY SHEET PILING EXCEEDS 55 FEET, SPLICING OF INDIVIDUAL SHEETS WILL BE PERMITTED. ANY SPLICES SHALL BE LOCATED BELOW THE "SPLICE LOCATION" SHOWN. SPLICES OF THE TEMPORARY SHEET PILING WILL NOT BE MEASURED FOR PAYMENT.
10. A 800 PSF SURCHARGE SHALL BE USED BETWEEN STA. 148+00 TO THE BACK OF THE PROPOSED NORTH ABUTMENT ON THE ENTIRE TOP WIDTH OF THE STAGE 1b FILL. A 1,050 PSF SURCHARGE SHALL BE USED BETWEEN THE PROPOSED SOUTH ABUTMENT AND STA. 139+60 AND THEN DECREASE FROM 1,050 TO 350 PSF FROM STA. 139+60 TO 170+00 ON THE ENTIRE WIDTH OF STAGE 1b FILL.
11. SEE THE SPECIAL PROVISIONS FOR "SURCHARGE" FOR THE MINIMUM WAITING PERIOD PRIOR TO THE INSTALLATION OF PILING FOR THE BRIDGE ABUTMENTS.
12. SHEET PILING YIELD STRESS IF ≥ 35.5 KSI.
13. ALL NOTES APPLY TO BOTH NORTH AND SOUTH APPROACH PLANS.

TEMPORARY SHEET PILING

MINIMUM SECTION MODULUS 22.4 IN³/FT AND MOMENT OF INERTIA OF 138.3 IN⁴/FT BETWEEN STATIONS 139+86.48 AND 145+00.00)
MINIMUM SECTION MODULUS 26.1 IN³/FT AND MOMENT OF INERTIA OF 162.5 IN⁴/FT BETWEEN STATIONS 145+00.00 AND 149+18.75)
DIMENSIONS ALONG FRONT FACE OF TEMPORARY SHEET PILING, LOOKING AT FRONT FACE OF SHEET PILING

LIN ENGINEERING LTD.
Consulting Engineers
Schaumburg, Illinois

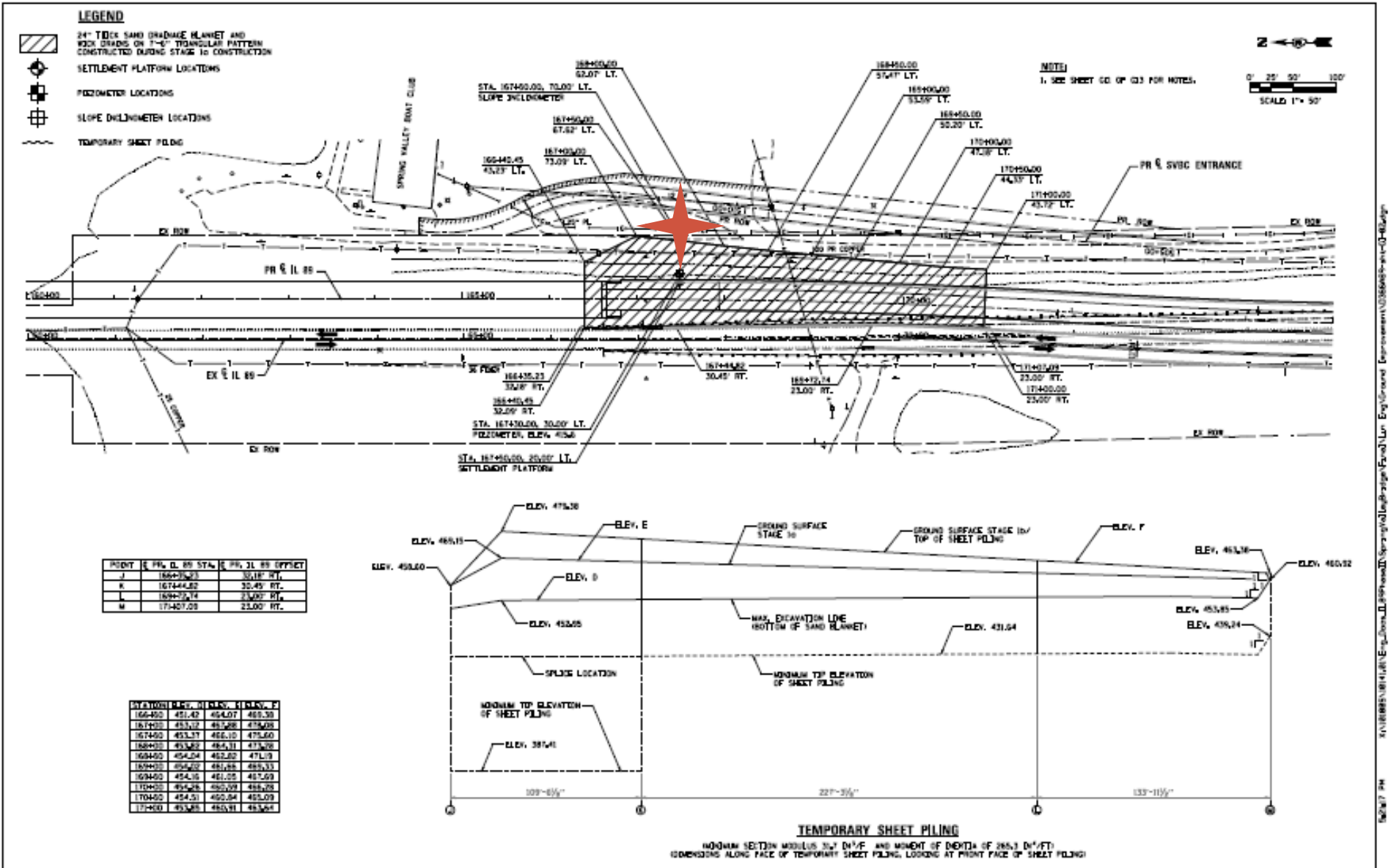
USER NAME = <Default>	DESIGNED - NP/JJA	REVISED - ⚠ 10/27/2015 MPS	
PLOT SCALE =	CHECKED - JPS	REVISED -	
PLOT DATE =	DRAWN - AJF	REVISED -	
	CHECKED - JPS	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

GROUND IMPROVEMENT
NORTH APPROACH PLAN
SHEET NO. 6D OF 6D SHEETS

F.A.P. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
606	10 BR	MADISON	413	147
		CONTRACT NO. 60H85		
		ILLINOIS FED. AID PROJECT		

10/29/2015



POINT	℄ PR. IL 89 STA.	℄ PR. IL 89 OFFSET
J	166+35.23	32.18' RT.
K	167+44.82	30.45' RT.
L	169+72.74	23.00' RT.
M	171+07.09	23.00' RT.

STATION	ELEV. H	ELEV. I	ELEV. F
166+00	451.42	454.07	465.38
167+00	453.12	457.28	474.98
167+60	453.31	466.10	475.60
168+00	453.82	464.31	471.78
169+00	454.04	462.82	471.19
169+00	454.32	461.88	469.33
169+60	454.16	461.05	467.69
170+00	454.26	460.28	466.28
170+60	454.31	460.84	465.09
171+00	453.85	460.91	463.64

LIN ENGINEERING LTD. Consulting Engineers	USER NAME =	DESIGNED - MPV/JJA	REVISED -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	GROUND IMPROVEMENT SOUTH APPROACH PLAN	F.A.P. RTE. 636	SECTION 10 BR	COUNTY Madison	TOTAL SHEET NO. 148
	PLOT SCALE =	DRAWN AJP	REVISED -						
	PLOT DATE =	CHECKED JMS	REVISED -		SHEET NO. 132 OF 161 SHEETS			ILLINOIS FED. AID PROJECT	

SLOPE INCLINOMETER

- Materials
  - Approved sources of instrument
    - Indicated in special provision
  - Carrying case
  - Computer software
  - Guide casing
  - Covers / protective devices

SLOPE INCLINOMETER

- Submittal
  - 45 Days prior to installation: Technical data and catalog cuts

SLOPE INCLINOMETER

- Qualifications
  - Installer must be prequalified by IDOT in the category "Geotechnical Services – Subsurface Explorations"
  - http://eplan.dot.il.gov/desenv/epas/ConsultantsPrequalificationR080.pdf

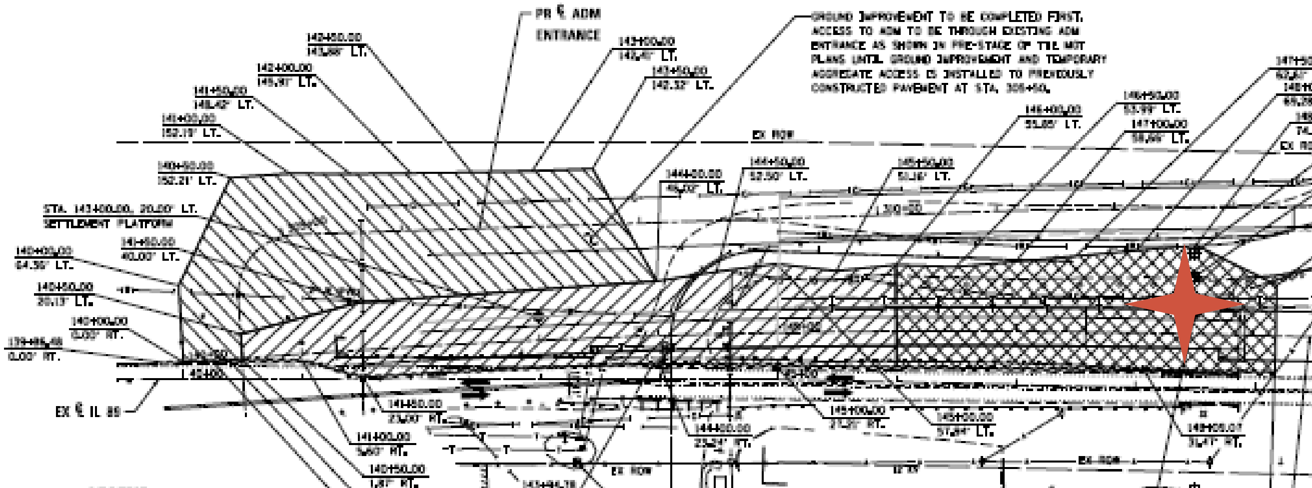
SLOPE INCLINOMETER

- Construction
  - Functional 14 days prior to embankment construction
  - Training on use provided to Engineer
  - The Engineer will perform measurements with the inclinometer equipment
  - Protect and maintain the slope inclinometers throughout construction
  - If slope movement is detected, embankment construction shall stop
  - Slope inclinometers shall be preserved for long term use
  - All equipment and software becomes property of IDOT

SLOPE INCLINOMETER

- Measurement and Payment
  - Measured in units of each
  - Price includes measuring equipment and computer software

SETTLEMENT PLATFORMS



LEGEND

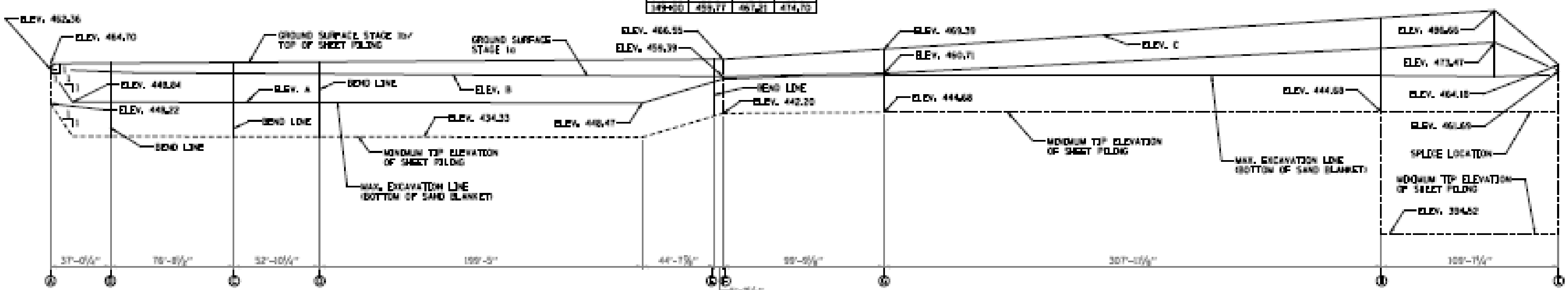
- 24" THICK SAND DRAINAGE BLANKET AND WICK DRAINS ON 7'-6" TRIANGULAR PATTERN CONSTRUCTED DURING PRESTAGE CONSTRUCTION
- 24" THICK SAND DRAINAGE BLANKET AND WICK DRAINS ON 7'-6" TRIANGULAR PATTERN CONSTRUCTED DURING STAGE 1a CONSTRUCTION
- 36" THICK SAND DRAINAGE BLANKET AND WICK DRAINS ON 7'-6" TRIANGULAR PATTERN CONSTRUCTED DURING STAGE 1b CONSTRUCTION
- SETTLEMENT PLATFORM LOCATIONS
- PIEZOMETER LOCATIONS
- SLOPE INCLINOMETER LOCATIONS
- TEMPORARY SHEET PILING

POINT	℄ PR. IL 89 STA.	℄ PR. IL 89 OFFSET
A	139+86.40	0.00' RT.
B	140+23.50	0.00' RT.
C	141+00.00	5.60' RT.
D	141+50.00	23.00' RT.
E	143+94.78	23.00' RT.
F	144+00.00	23.24' RT.
G	145+00.00	27.21' RT.
H	148+05.07	31.47' RT.
I	149+18.75	30.59' RT.

STATION	ELEV. A	ELEV. B	ELEV. C
140+00	448.84	462.00	464.76
140+50	449.01	460.82	464.17
141+00	448.88	460.13	463.78
141+50	448.94	460.13	463.48
142+00	448.84	459.61	463.63
142+50	448.71	459.29	464.00
143+00	448.61	459.13	464.62
143+50	448.47	459.10	465.47
144+00	458.34	459.40	466.55
144+50	459.56	460.10	467.85
145+00	459.74	460.71	469.39
145+50	459.80	461.55	471.17
146+00	460.03	462.69	473.17
146+50	459.99	463.87	475.41
147+00	460.10	465.40	477.86
147+50	460.08	467.32	480.35
148+00	459.79	469.67	482.85
148+50	459.54	472.07	485.34
149+00	459.77	467.21	474.70

NOTES:

1. IN THE AREAS WHERE WICK DRAINS WILL BE INSTALLED, THE EXISTING GROUND SHALL BE PREPARED ACCORDING TO ART. 205 EXCEPT THE EXISTING PAVEMENT AND SHOULDERS SHALL BE REMOVED OR BROKEN UP INTO PIECES NOT TO EXCEED 3 SQ. FT.
2. FOLLOWING PREPARATION OF THE EXISTING GROUND, A SAND DRAINAGE BLANKET 2 FT. THICK OR 3 FT. THICK SHALL BE PLACED WITHIN THE LIMITS OF THE WICK DRAINS.
3. THE CONTRACTOR SHALL INSTALL THE WICK DRAINS THROUGH THE SAND DRAINAGE BLANKET AND BROKEN PAVEMENT USING A METHOD ACCEPTABLE TO THE ENGINEER WHICH DOES NOT DAMAGE THE WICK DRAINS. SEE WICK DRAINS SPECIAL PROVISION.
4. FOR SETTLEMENT PLATFORM REQUIREMENTS SEE ART. 204.06. FOR SETTLEMENT PLATFORM DETAILS, SEE ROADWAY DETAILS SHEETS AND SETTLEMENT PLATFORMS SPECIAL PROVISION. SETTLEMENT PLATFORMS SHALL BE USED TO VERIFY THERE IS 0.4 INCHES OR LESS LEFT OF SETTLEMENT AFTER GROUND IMPROVEMENT PRIOR TO INSTALLATION OF THE PILES AT THE ABUTMENTS.
5. FOR SLOPE INCLINOMETER DETAILS SEE SLOPE INCLINOMETER SPECIAL PROVISION.
6. FOR PIEZOMETER DETAILS SEE SHEET GI3 OF GI3.
7. FOR WICK DRAIN DETAILS SEE SHEET GI3 OF GI3.
8. FOR BILL OF MATERIALS SEE SHEET GI3 OF GI3.
9. WHEN THE LENGTH OF THE TEMPORARY SHEET PILING EXCEEDS 55 FEET, SPLICING OF INDIVIDUAL SHEETS WILL BE PERMITTED. ANY SPLICES SHALL BE LOCATED BELOW THE "SPLICE LOCATION" SHOWN. SPLICES OF THE TEMPORARY SHEET PILING WILL NOT BE MEASURED FOR PAYMENT.
10. A 800 PSF SURCHARGE SHALL BE USED BETWEEN STA. 148+00 TO THE BACK OF THE PROPOSED NORTH ABUTMENT ON THE ENTIRE TOP WIDTH OF THE STAGE 1b FILL. A 1,050 PSF SURCHARGE SHALL BE USED BETWEEN THE PROPOSED SOUTH ABUTMENT AND STA. 168+50 AND THEN DECREASE FROM 1,050 TO 350 PSF FROM STA. 168+50 TO 170+00 ON THE ENTIRE WIDTH OF STAGE 1b FILL.
11. SEE THE SPECIAL PROVISIONS FOR "SURCHARGE" FOR THE MINIMUM WAITING PERIOD PRIOR TO THE INSTALLATION OF PILING FOR THE BRIDGE ABUTMENTS.
12. SHEET PILING YIELD STRESS (F y) IS 38.5 KSI.
13. ALL NOTES APPLY TO BOTH NORTH AND SOUTH APPROACH PLANS.



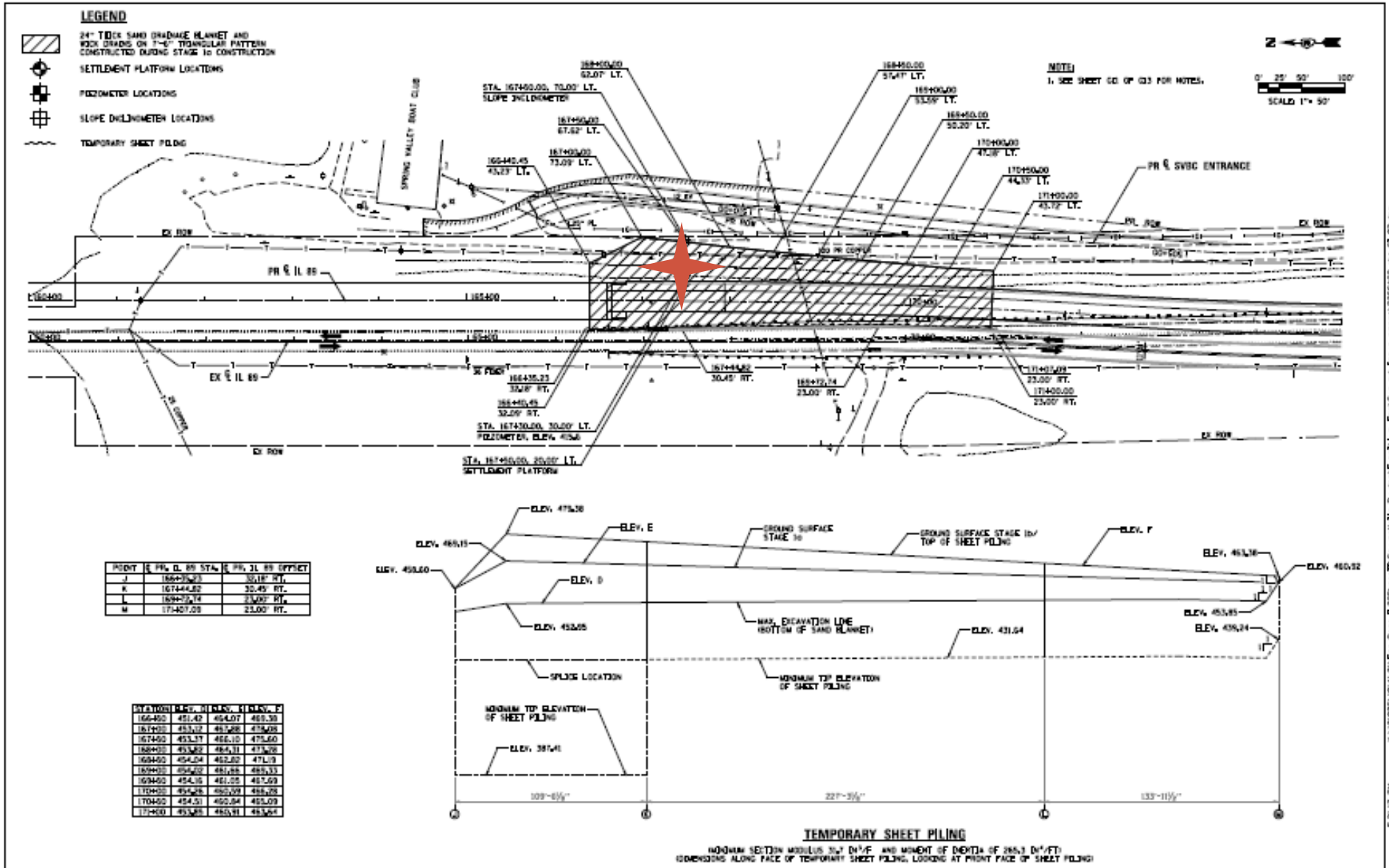
TEMPORARY SHEET PILING

(MINIMUM SECTION MODULUS 22.4 IN³/FT AND MOMENT OF INERTIA OF 130.3 IN⁴/FT BETWEEN STATIONS 139+86.40 AND 145+00.00)
(MINIMUM SECTION MODULUS 26.1 IN³/FT AND MOMENT OF INERTIA OF 162.5 IN⁴/FT BETWEEN STATIONS 145+00.00 AND 149+18.75)
(DIMENSIONS ALONG FRONT FACE OF TEMPORARY SHEET PILING, LOOKING AT FRONT FACE OF SHEET PILING)

LIN ENGINEERING LTD.

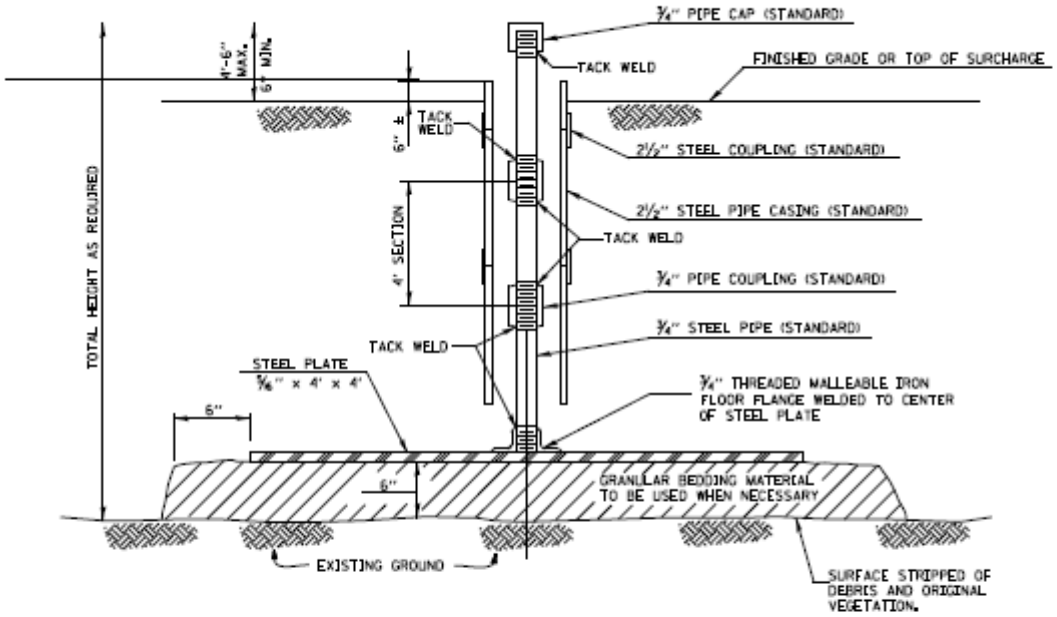
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

GROUND IMPROVEMENT
NORTH APPROACH PLAN



POINT	℄ PR. IL 89 STA.	℄ PR. IL 89 OFFSET
J	166+35.23	32.18' RT.
K	167+44.82	30.45' RT.
L	169+72.74	23.00' RT.
M	171+07.09	23.00' RT.

STATION	ELEV. D	ELEV. E	ELEV. F
166+50	451.47	454.07	460.38
167+00	453.12	457.28	474.08
167+50	453.37	466.10	475.60
168+00	453.82	464.11	473.28
168+50	454.04	462.82	471.19
169+00	454.22	461.86	469.33
169+50	454.16	461.05	467.69
170+00	454.26	460.39	466.28
170+50	454.51	460.84	465.09
171+00	453.85	460.91	463.64



SETTLEMENT PLATFORM DETAIL

NOTES:

1. SEE SECTION 204.06 OF THE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION
2. SETTLEMENT PLATFORMS WILL NOT BE MEASURED FOR PAYMENT.

TWO SETTLEMENT PLATFORMS SHALL BE CONSTRUCTED ON THIS PROJECT-ONE NORTH OF THE ILLINOIS RIVER AND ONE SOUTH OF THE ILLINOIS RIVER. THE COST IS INCLUDED IN THE COST OF FURNISHED EXCAVATION

SETTLEMENT PLATFORMS

- Measurement and Payment
  - Note 2: "Settlement platforms will not be measured for payment."

Plan Sheet 336

QUESTIONS

PIEZOMETER
SLOPE INCLINOMETER
SETTLEMENT PLATFORM

EMBANKMENT

EMBANKMENT

- Bench into existing slope
- Materials Prohibited
  - Liquid Limit > 60
- Materials Restricted to Interior of Embankment
  - < 35% passing #200 sieve
  - 50 < Liquid Limit < 60
  - Plasticity Index < 12
- Geotechnical Instrumentation installed prior to embankment construction

EMBANKMENT

- Moisture content
  - Shall not exceed 110% of AASHTO T99
  - May be reduced to achieve stability
- Stability
  - IBV of 4.0
- Placement
  - Based on geotechnical instrumentation
  - Stop placement if signs of slope instability are observed
  - It may be necessary to remove previously placed material to achieve slope stability

EMBANKMENT

- Measurement and Payment
  - This work will not be measured for payment
  - It is included in the standard pay items for furnished excavation

QUESTIONS

EMBANKMENT

QUESTIONS

ROADWAY ITEMS

DRILLED SHAFT SPECIAL PROVISION

DRILLED SHAFTS SPECIAL PROVISION

- Section 516 of the Standard Specifications has been replaced with the special provision in this contract.
- Significant changes were made.
  - Modified requirements for shaft cleaning.
  - Modified the definition of top of rock.
  - Modified the definition of an obstruction.
  - Modified the requirements for concrete placement including the requirement of a trial batch to demonstrate the control of slump for the temporary casing method.
  - Added requirement for a minimum concrete head pressure during concrete placement and removal of temporary casing.
  - Added a maximum infiltration rate allowed for the free fall placement of concrete.
  - Modified the requirements for placing concrete underwater in 503.08.
  - Modified the requirements for seal coats in cofferdams in 503.14.
  - Added some equipment requirements for concrete tremies to Section 1100.
  - **Many other items were changed as well.**

QUESTIONS

DRILLED SHAFT SPECIAL PROVISION

THERMAL INTEGRITY PROFILE SENSORS FOR DRILLED SHAFTS SPECIAL PROVISION

THERMAL INTEGRITY PROFILE SENSORS FOR DRILLED SHAFTS SPECIAL PROVISION

- Description
  - Contractor
    - Furnish and install embedded thermal sensors to perform Thermal Integrity Profile (TIP) testing
  - Engineer
    - Supply data recording device
    - Download data
    - Interpret data
  - Contractor
    - Investigate anomalies
    - Design repairs

THERMAL INTEGRITY PROFILE SENSORS FOR DRILLED SHAFTS SPECIAL PROVISION

- Equipment
  - Must be purchased from GRL Engineers

THERMAL INTEGRITY PROFILE SENSORS FOR DRILLED SHAFTS SPECIAL PROVISION

- Construction
  - Number of wires

Reinforcing Cage Diameter (feet)	Number of access locations for embedded thermal sensors
≤ 5.0	4
5.1 to 7.0	6
7.1 to 9.0	8
9.1 to 11.0	10
11.1 to 13.0	12
> 13.0	14

  - Enough lead in wire to for wire to terminate above river surface water elevation at time of concrete placement
  - Sensors will be checked after cage is set

THERMAL INTEGRITY PROFILE SENSORS FOR DRILLED SHAFTS SPECIAL PROVISION

- Anomalies
  - Verification by coring or other method
  - Defects require the contractor's SE to submit a repair proposal
    - Calculations
    - Drawings
    - Procedure
      - Equipment
      - Materials
      - Quality Control

THERMAL INTEGRITY PROFILE SENSORS FOR DRILLED SHAFTS SPECIAL PROVISION

- Measurement and Payment
  - Measured by the linear foot of drilled shaft foundation tested
    - Extra wire needed for access at the top of the shaft will not be measured for payment
    - Example: A shaft 60 feet long with 6 wires (each 75 feet) has a payment length of 60 feet
  - TIP data collector and analysis of the TIP data will be paid for according to Article 109.05
    - Fees for the data recording device and interpretation of the data shall be paid by the Contractor
    - The Contractor will be reimbursed for the bill plus an administrative fee

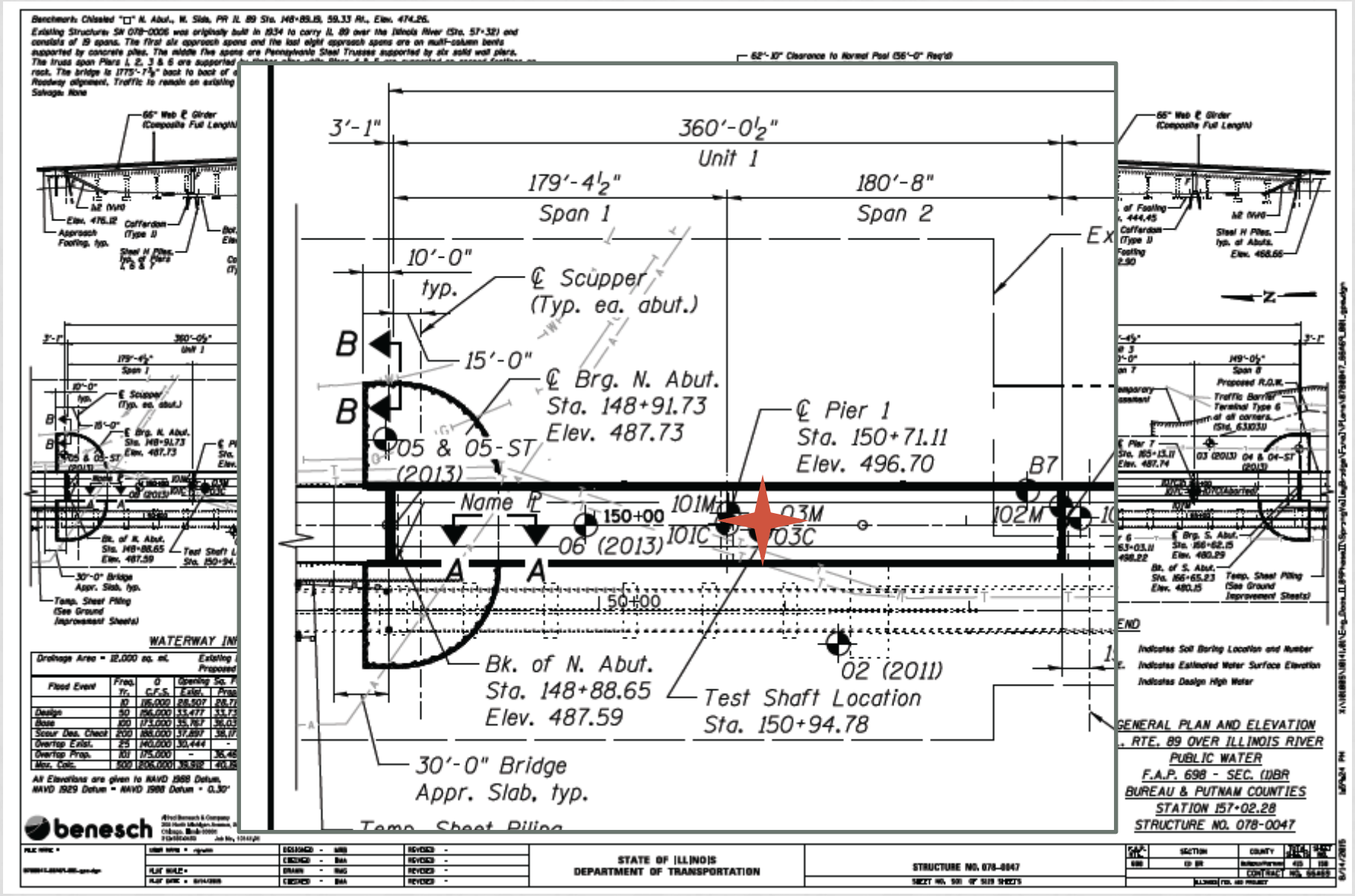
THERMAL INTEGRITY PROFILE SENSORS FOR DRILLED SHAFTS SPECIAL PROVISION

- Measurement and Payment
  - Confirmation of anomalies according to Article 105.12
    - Shaft is unacceptable = confirmation is not measured for payment
    - Shaft is acceptable = confirmation is measured for payment (Article 109.04)
  - Designing and implementing repairs is not measured for payment

QUESTIONS

THERMAL INTEGRITY PROFILE SENSORS

OSTERBERG LOAD CELL



Plan Sheet 158

OSTERBERG LOAD CELL

- The Osterberg Load Cell is a design tool, not a construction tool
- The complete Osterberg Load Cell report is included within the Structure Geotechnical Report
- Be aware that the shaft is buried in the ground at the location shown on the plans

QUESTIONS

OSTERBERG LOAD CELL

ROCK CORES

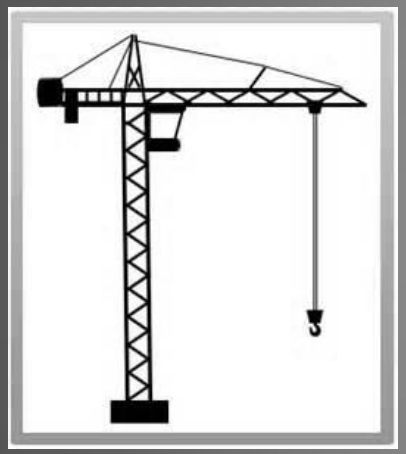
ROCK CORES

- All of the rock cores are available for inspection

QUESTIONS

BRIDGE ITEMS

ERECTION OF COMPLEX STEEL STRUCTURES



Description. In addition to the requirements of Article 505.08(e), the following shall apply.

Erector Qualifications. The Erection Contractor shall be certified as an Advanced Certified Steel Erector (ACSE), by the AISC Certification Program. The Erection Contractor shall submit evidence of current ACSE certification to the Engineer with the submittal of the proposed erection plan.

Erection Plan. The Erection Contractor shall retain the services of an Engineering firm, prequalified with the Illinois Department of Transportation in the Complex Structures category, for the completion of a project-specific erection plan. An Illinois Licensed Structural Engineer employed by this pre-qualified Engineering firm, herein referred to as the Erection Engineer, shall sign and seal the erection plan, drawings, and calculations for the proposed erection of the structural steel.

The erection plan shall be complete in detail for all phases, stages, and conditions anticipated during erection. The erection plan shall include structural calculations and supporting documentation necessary to completely describe and document the means, methods, temporary support positions, and loads necessary to safely erect the structural steel in conformance with the contract documents and as outlined herein. The erection plans shall address and account for all items pertinent to the steel erection including such items as sequencing, falsework, temporary shoring and/or bracing, girder stability, crane positioning and movement, means of access, pick points, girder shape, permissible deformations and roll, interim/final plumbness, cross frame/diaphragm placement and connections, bolting and anchor bolt installation sequences and procedures, and blocking and anchoring or bearings. The Erection Contractor shall be responsible for the stability of the partially erected steel structure during all phases of the steel erection.

The erection plan and procedures shall be developed in accordance with the current AASHTO LRFD Bridge Construction Specifications, including interim specifications. Calculations for all items pertinent to the steel erection shall be in accordance with the 2012 AASHTO LRFD Bridge Design Specifications.

The erection plans and procedures shall be submitted to the Engineer for review and acceptance prior to starting the work. Review, acceptance and/or comments by the Department, USACE, and the USCG shall not be construed to guarantee the safety or final acceptability of the work or compliance with all applicable specifications, codes, or contract requirements, and shall neither relieve the Contractor of the responsibility and liability to comply with these requirements, nor create liability for the Department, USACE, nor the USCG. The Contractor is responsible for meeting all IDOT, USACE, and USCG requirements. No additional compensation or time shall be allowed for USACE or USCG restrictions. The erection plans and procedures shall be submitted 90 days prior to beginning work. The Contractor shall not proceed with work until written approval from each of the approval agencies has been received. Approval agencies are IDOT, USACE, and the USCG. Significant changes to the erection plan in the field must be approved by the Erection Engineer and accepted by the Engineer for the Department.

Basis of Payment. This work shall not be paid for separately but shall be included in the applicable pay items according to Art. 505.13 of the Standard Specifications.

404 PERMIT

Nationwide #23

- Approved on February 3, 2015
- Coordinate with Corps of Engineers 45 days prior to commencement of in-stream work.
  - No instream work until notification to Corps of Engineers and coordination with the Resident Engineer
  - The Corps contact is Gene Wassenhove with contact information in the contract
- Causeway and/or instream work pad plan to be submitted to the Resident Engineer 30 days prior to instream notification to ACOE
- Approved temporary causeway at the south bank only
  - If the contractor wishes to deviate, they will need to submit revisions

IDNR PERMIT

- IDNR issued Permit on June 30, 2015

TEMPORARY CAUSEWAY

- **Only** allowed at the south bank for Pier #4 construction. See page 146 of the plans showing the causeway
- Designed to prevent no increase of water surface elevation during construction
  - If contractor wishes to revise the causeway plan, send plan and hydraulic analyses to IDNR for review
  - Hydraulic model is available from District 3 upon request
- Disturbance of streamside vegetation kept to minimum; disturbed areas to be restored
- Warning signs installed upstream and downstream of causeway to notify boaters
- Contractor to maintain adequate river depths for recreational boaters

ILLINOIS EPA PERMIT

- IEPA Permit approved:
  March 13, 2015
- No spoil returned to waterway
- Follow erosion control measures in contract plans and items identified in approved IEPA permit
- Adequate erosion control to prevent transport of sediment and material downstream

US COAST GUARD PERMIT

- US Coast Guard Permit approved June 7, 2015
- Contractor shall submit a PLAN OF OPERATIONS within 4 weeks of award
  - The plan will keep Coast Guard informed of any events affecting navigation
- Plans for cofferdams, causeways and other temporary structures placed into the water must be approved by US Coast Guard
- Work shall be done to not unreasonably interfere with navigation and navigable depths

BRIDGE DECK CONSTRUCTION
Effective: October 22, 2013
Revised: April 18, 2014

Revise the Second Paragraph of Article 503.06(b) to read as follows.

"When the Contractor uses cantilever forming brackets on exterior beams or girders, additional requirements shall be as follows."

Revise Article 503.06(b)(1) to read as follows.

"(1) Bracket Placement. The spacing of brackets shall be per the manufacturer's published design specifications for the size of the overhang and the construction loads anticipated. The resulting force of the leg brace of the cantilever bracket shall bear on the web within 6 inches (150 mm) of the bottom flange of the beam or girder."

Revise Article 503.06(b)(2) to read as follows.

"(2) Beam Ties. The top flange of exterior steel beams or girders supporting the cantilever forming brackets shall be tied to the bottom flange of the next interior beam. The top flange of exterior concrete beams supporting the cantilever forming brackets shall be tied to the top flange of the next interior beam. The ties shall be spaced at 4 ft (1.2 m) centers. Permanent cross frames on steel girders may be considered a tie. Ties shall be a minimum of 1/2 inch (13 mm) diameter threaded rod with an adjusting mechanism for drawing the tie taut. The ties shall utilize hanger brackets or clips which hook onto the flange of steel beams. No welding will be permitted to the structural steel or stud shear connectors, or to reinforcement bars of concrete beams, for the installation of the tie bar system. After installation of the ties and blocking, the tie shall be drawn taut until the tie does not vary from a straight line from beam to beam. The tie system shall be approved by the Engineer."

Revise Article 503.06(b)(3) to read as follows.

"(3) Beam Blocks. Suitable beam blocks of 4 in x 4 in (100 x 100 mm) timbers or metal structural shapes of equivalent strength or better, acceptable to the Engineer, shall be wedged between the webs of the two beams tied together, within 6 inches (150 mm) of the bottom flange at each location where they are tied. When it is not feasible to have the resulting force from the leg brace of the cantilever brackets transmitted to the web within 6 inches (150 mm) of the bottom flange, then additional blocking shall be placed at each bracket to transmit the resulting force to within 6 inches (150 mm) of the bottom flange of the next interior beam or girder."

Delete the last paragraph of Article 503.06(b).

(Continued)

Revise the third paragraph of Article 503.16 to read as follows.

"Fogging equipment shall be in operation unless the evaporation rate is less than 0.1 lb/sq ft/hour (0.5kg/sq m/hour) and the Engineer gives permission to stop. The evaporation rate shall be determined according to the following formula.

$$E = (T_c^{2.5} - rT_a^{2.5})(1 + 0.4V)x10^{-6}\,(English)$$
$$E = 5[(T_c + 18)^{2.5} - r(T_a + 18)^{2.5}](V + 4)x10^{-6}\,(Metric)$$

Where:
E = Evaporation Rate, lb/ft^2/h (kg/sq m/h)
T_c = Concrete Temperature, °F (°C)
T_a = Air Temperature, °F (°C)
r = Relative Humidity in percent/100
V = Wind Velocity, mph (km/h)

The Contractor shall provide temperature, relative humidity, and wind speed measuring equipment. Fogging equipment shall be adequate to reach or cover the entire pour from behind the finishing machine or vibrating screed to the point of curing covering application, and shall be operated in a manner which shall not accumulate water on the deck until the curing covering has been placed."

Revise the third paragraph of Article 503.16(a)(1) to read as follows.

"At the Contractor's option, a vibrating screed may be used in lieu of a finishing machine for superstructures with a pour width less than or equal to 24 ft (7.3 m). After the concrete is placed and consolidated, it shall be struck off with a vibrating screed allowing for camber, if required. The vibrating screed shall be of a type approved by the Engineer. A slight excess of concrete shall be kept in front of the cutting edge at all times during the striking off operation. After screeding, the entire surface shall be finished with hand-operated longitudinal floats having blades not less than 10 ft (3 m) in length and 6 in. (150 mm) in width. Decks so finished need not be straightedge tested as specified in 503.16(a)(2)."

Delete the fifth paragraph of 503.16(a)(1).

Revise Article 503.16(a)(2) to read as follows.

"(2) Straightedge Testing and Surface Correction. After the finishing has been completed and while the concrete is still plastic, the surface shall be tested for trueness with a 10 ft (3 m) straightedge, or a hand-operated longitudinal float having blades not less than 10 ft (3 m) in length and 6 in. (150 mm) in width. The Contractor shall furnish and use an accurate 10 ft (3 m) straightedge or float which has a handle not less than 3 ft (1 m) longer than 1/2 the pour width. The straightedge or float shall be held in contact with the surface and passed gradually from one side of the superstructure to the other. Advance along the surface

(Continued)

shall be in successive stages of not more than 1/2 the length of the straightedge or float. Any depressions found shall be immediately filled with freshly mixed concrete, struck off, consolidated, and refinished. High areas shall be cut down and refinished."

Replace the second sentence of the first paragraph of Article 1020.13(a)(5) with the following sentences.

"Cotton mats in poor condition will not be allowed. The cotton mats shall be placed in a manner which will not create indentations greater than 1/4 inch (6 mm) in the concrete surface. Minor marring of the surface is tolerable and is secondary to the importance of timely curing."

Revise Article 1020.14(b) to read as follows.

"(b) Concrete in Structures. Concrete may be placed when the air temperature is above 40 °F (4 °C) and rising, and concrete placement shall stop when the falling temperature reaches 45 °F (7 °C) or below, unless otherwise approved by the Engineer.

(1) Bridge Deck Concrete. For concrete in bridge decks, slabs, and bridge approach slabs the Contractor shall schedule placing and finishing of the concrete during hours in which the ambient air temperature is forecast to be lower than 85 °F (30 °C). It shall be understood this may require scheduling the deck pour at night in order to utilize the temperature window available. The temperature of the concrete immediately before placement shall be a minimum of 50 °F (10 °C) and a maximum of 85 °F (30 °C).

(2) Non-Bridge Deck Concrete. Except as noted above, the temperature of the concrete immediately before placement shall be a minimum of 50 °F (10 °C) and a maximum of 90 °F (32 °C).

If concrete is pumped, the temperature restrictions above shall be considered at point of placement. When insulated forms are used according to Article 1020.13(d)(1), the maximum temperature of the concrete mixture immediately before placement shall be 80 °F (25 °C).When concrete is placed in contact with previously placed concrete, the temperature of the freshly mixed concrete may be increased by the Contractor to offset anticipated heat loss, but in no case shall the maximum concrete temperature be permitted to exceed the limits stated in this Article."

Revise Article 1103.13(a) to read as follows.

"(a) Bridge Deck. The finishing machine shall be equipped with: (1) a mechanical strike off device; (2) either a rotating cylinder(s) or a longitudinal oscillating screed which transversely finishes the surface of the concrete. The Contractor may attach other equipment to the finishing machine to enhance the final finish when approved by the Engineer. The finishing machine shall produce a deck surface of uniform texture, free from porous areas, and with the required surface smoothness.

BRIDGE DECK CONSTRUCTION
Effective: October 22, 2013
Revised: April 18, 2014

(Continued)

The finishing machine shall be operated on rails or other supports that will not deflect under the applied loads. The maximum length of rail segments supported on top of beams and within the pour shall be 10 ft (3 m). The supports shall be adjustable for elevation and shall be completely in place to allow the finishing machine to be used for the full length of the area to be finished. The supports shall be approved by the Engineer before placing of the concrete is started."

Revise Article 1103.17(k) to read as follows.

"(k) Fogging Equipment. Fogging equipment shall be hand held fogging equipment for humidity control. The equipment shall be capable of atomizing water to produce a fog blanket by the use of pressure 2500 psi minimum (17.24 MPa) and an industrial fire hose fogging nozzle or equivalent. Fogging equipment attached to the finishing machine will not be permitted."

1020.15 Heat of Hydration Control for Concrete Structures. The Contractor shall control the heat of hydration for concrete structures when the least dimension for a drilled shaft, foundation, footing, substructure, or superstructure concrete pour exceeds 5.0 ft (1.5 m).

The work shall be according to the following.
(a) Temperature Restrictions. The maximum temperature of the concrete after placement shall not exceed 150 °F (66 °C). The maximum temperature differential between the internal concrete core and concrete 2 to 3 in. (50 to 75 mm) from the exposed surface shall not exceed 35 °F (19 °C). The Contractor shall perform temperature monitoring to ensure compliance with the temperature restrictions.

(b) Thermal Control Plan. The Contractor shall provide a thermal control plan a minimum of 28 calendar days prior to concrete placement for review by the Engineer. Acceptance of the thermal control plan by the Engineer shall not preclude the Contractor from specification compliance, and from preventing cracks in the concrete. At a minimum, the thermal control plan shall provide detailed information on the following requested items and shall comply with the specific specifications indicated for each item.

(1) Concrete mix design(s) to be used. Grout mix design if post-cooling with embedded pipe.

The mix design requirements in Articles 1020.04 and 1020.05 shall be revised to include the following additional requirements to control the heat of hydration.

a. The concrete mixture should be uniformly graded and preference for larger size aggregate should be used in the mix design. Article 1004.02(d)(2) shall apply and information in the "Portland Cement Concrete Level III Technician Course – Manual of Instructions for Design of Concrete Mixtures" may be used to develop the uniformly graded mixture.

b. The following shall apply to all concrete except Class DS concrete or when self-consolidating concrete is desired. For central-mixed concrete, the Contractor shall have the option to develop a mixture with a minimum of 520 lbs/cu yd (309 kg/cu m) of cement and finely divided minerals summed together. For truck-mixed or shrinkmixed concrete, the Contractor shall have the option to develop a mixture with a minimum of 550 lbs/cu yd (326 kg/cu m) of cement and finely divided minerals summed together. A water-reducing or high range water-reducing admixture shall be used in the central mixed, truck-mixed or shrink-mixed concrete mixture. For any

1020.15 Heat of Hydration Control for Concrete Structures.

(Continued)

mixture to be placed underwater, the minimum cement and finely divided minerals shall be 550 lbs/cu yd (326 kg/cu m) for centralmixed concrete, and 580 lbs/cu yd (344 kg/cu m) for truck-mixed or shrink-mixed concrete.

For Class DS concrete, CA 11 may be used. If CA 11 is used, the Contractor shall have the option to develop a mixture with a minimum cement and finely divided minerals of 605 lbs/cu yd (360 kg/cu m) summed together. If CA 11 is used and either Class DS concrete is placed underwater or a self-consolidating concrete mixture is desired, the Contractor shall have the option to develop a mixture with a minimum cement and finely divided minerals of 635 lbs/cu yd (378 kg/cu m) summed together.

c. The minimum portland cement content in the mixture shall be 375 lbs/cu yd (222 kg/cu m). When the total of organic processing additions, inorganic processing additions, and limestone addition exceed 5.0 percent in the cement, the minimum portland cement content in the mixture shall be 400 lbs/cu yd (237 kg/cu m). For a drilled shaft, foundation, footing, or substructure, the minimum portland cement may be reduced to as low as 330 lbs/cu yd (196 kg/cu m) if the concrete has adequate freeze/thaw durability. The Contractor shall provide freeze/thaw test results according to ITP 161, and the relative dynamic modulus of elasticity of the mix design shall be a minimum of 80 percent. Freeze/thaw testing will not be required for concrete that will not be exposed to freezing and thawing conditions as determined by the Engineer.

d. The maximum cement replacement with fly ash shall be 40.0 percent. The maximum cement replacement with ground granulated blast-furnace slag shall be 65.0 percent. When cement replacement with ground granulated blast-furnace slag exceeds 35.0 percent, only Grade 100 shall be used.

e. The mixture may contain a maximum of two finely divided minerals. The finely divided mineral in portland-pozzolan cement or portland blast-furnace slag cement shall count toward the total number of finely divided minerals allowed. The finely divided minerals shall constitute a maximum of 65.0 percent of the total cement plus finely divided minerals. The fly ash portion shall not exceed 40.0 percent. The ground granulated blast-furnace slag portion shall not exceed 65.0 percent. The microsilica or high reactivity metakaolin portion used together or separately shall not exceed 5.0 percent.

f. The time to obtain the specified strength may be increased to a maximum 56 days, provided the curing period specified in

1020.15 Heat of Hydration Control for Concrete Structures.

(Continued)

The minimum grout strength for filling embedded pipe shall be as specified for the concrete, and testing shall be according to AASHTO T 106.

(2) The selected mathematical method for evaluating heat of hydration thermal effects, which shall include the calculated adiabatic temperature rise, calculated maximum concrete temperature, and calculated maximum temperature differential between the internal concrete core and concrete 2 to 3 in. (50 to 75 mm) from the exposed surface. The time when the maximum concrete temperature and maximum temperature differential will occur is required.

Acceptable mathematical methods include ACI 207.2R "Report on Thermal and Volume Change Effects on Cracking of Mass Concrete" as well as other proprietary methods. The Contractor shall perform heat of hydration testing on the cement and finely divided minerals to be used in the concrete mixture. The test shall be according to ASTM C 186 or other applicable test methods, and the result for heat shall be used in the equation to calculate adiabatic temperature rise. Other required test parameters for the mathematical model may be assumed if appropriate.

The Contractor has the option to propose a higher maximum temperature differential between the internal concrete core and concrete 2 to 3 in. (50 to 75 mm) from the exposed surface, but the proposed temperature differential shall not exceed 50 °F (28 °C). In addition, based on strength gain of the concrete, multiple maximum temperature differentials at different times may be proposed. The proposed value shall be justified through a mathematical method.

(3) Proposed maximum concrete temperature or temperature range prior to placement.

Article 1020.14 shall apply except a minimum 40 °F (4 °C) concrete temperature will be permitted.

(4) Pre-cooling, post-cooling, and surface insulation methods that will be used to ensure the concrete will comply with the specified maximum temperature and specified or proposed temperature differential. For reinforcement that extends beyond the limits of the pour, the Contractor shall indicate if the reinforcement is required to be covered with insulation.

Refer to ACI 207.4R "Cooling and Insulating Systems for Mass Concrete" for acceptable methods that will be permitted. If embedded pipe is used for post-cooling, the material shall be polyvinyl chloride or

(Continued)

polyethylene. The embedded pipe system shall be properly supported, and the Contractor shall subsequently inspect glued joints to ensure they are able to withstand free falling concrete. The embedded pipe system shall be leak tested after inspection of the glued joints, and prior to the concrete placement. The leak test shall be performed at maximum service pressure or higher for a minimum of 15 minutes. All leaks shall be repaired. The embedded pipe cooling water may be from natural sources such as streams and rivers, but shall be filtered to prevent system stoppages. When the embedded pipe is no longer needed, the surface connections to the pipe shall be removed to a depth of 4 in. (100 mm) below the surface of the concrete. The remaining pipe shall be completely filled with grout. The 4 in. (100 mm) deep concrete hole shall be filled with nonshrink grout. Form and insulation removal shall be done in a manner to prevent cracking and ensure the maximum temperature differential is maintained. Insulation shall be in good condition as determined by the Engineer and properly attached.

(5) Dimensions of each concrete pour, location of construction joints, placement operations, pour pattern, lift heights, and time delays between lifts.

Refer to ACI 207.1R "Guide to Mass Concrete" for acceptable placement operations that will be permitted.

(6) Type of temperature monitoring system, the number of temperature sensors, and location of sensors.

A minimum of two independent temperature monitoring systems and corresponding sensors shall be used.

The temperature monitoring system shall have a minimum temperature range of 32 °F (0 °C) to 212 °F (100 °C), an accuracy of ± 2 °F (± 1 °C), and be able to automatically record temperatures without external power. Temperature monitoring shall begin once the sensor is encased in concrete, and with a maximum interval of one hour. Temperature monitoring may be discontinued after the maximum concrete temperature has been reached, post-cooling is no longer required, and the maximum temperature differential between the internal concrete core and the ambient air temperature does not exceed 35 °F (19 °C). The Contractor has the option to select a higher maximum temperature differential, but the proposed value shall not exceed 50 °F (28 °C). The proposed value shall be justified through a mathematical method.

At a minimum, a temperature sensor shall be located at the theoretical hottest portion of the concrete, normally the geometric center, and at

1020.15 Heat of Hydration Control for Concrete Structures.

(Continued)

the exterior face that will provide the maximum temperature differential. At the exterior face, the sensor shall be located 2 to 3 in. (50 to 75 mm) from the surface of the concrete. Sensors shall also be located a minimum of 1 in. (25 mm) away from reinforcement, and equidistant between cooling pipes if either applies. A sensor will also be required to measure ambient air temperature. The entrant/exit cooling water temperature for embedded pipe shall also be monitored.

Temperature monitoring results shall be provided to the Engineer a minimum of once each day and whenever requested by the Engineer. The report may be electronic or hard copy. The report shall indicate the location of each sensor, the temperature recorded, and the time recorded. The report shall be for all sensors and shall include ambient air temperature and entrant/exit cooling water temperatures. The temperature data in the report may be provided in tabular or graphical format, and the report shall indicate any corrective actions during the monitoring period. At the completion of the monitoring period, the Contractor shall provide the Engineer a final report that includes all temperature data and corrective actions.

(7) Indicate contingency operations to be used if the maximum temperature or temperature differential of the concrete is reached after placement.

(c) Temperature Restriction Violations. If the maximum temperature of the concrete after placement exceeds 150 °F (66 °C), but is equal to or less than 158 °F (70 °C), the concrete will be accepted if no cracking or other unacceptable defects are identified. If cracking or unacceptable defects are identified, Article 105.03 shall apply. If the concrete temperature exceeds 158 °F (70 °C), Article 105.03 shall apply.

If a temperature differential between the internal concrete core and concrete 2 to 3 in. (50 to 75 mm) from the exposed surface exceeds the specified or proposed maximum value allowed, the concrete will be accepted if no cracking or other unacceptable defects are identified. If unacceptable defects are identified, Article 105.03 shall apply.

When the maximum 150 °F (66 °C) concrete temperature or the maximum allowed temperature differential is violated, the Contractor shall implement corrective action prior to the next pour. In addition, the Engineer reserves the right to request a new thermal control plan for acceptance before the Contractor is allowed to pour again.

(d) Inspection and Repair of Cracks. The Engineer will inspect the concrete for cracks after the temperature monitoring is discontinued, and the Contractor shall provide access for the Engineer to do the inspection. A crack may require repair by the Contractor as determined by the Engineer. The

1020.15 Heat of Hydration Control for Concrete Structures.

(Continued)

Contractor shall be responsible for the repair of all cracks. Protective coat or a concrete sealer shall be applied to a crack less than 0.007 in. (0.18 mm) in width. A crack that is 0.007 in. (0.18 mm) or greater shall be pressure injected with epoxy according to Section 590."

QUESTIONS