

SOUTH AVENUE E
RECONSTRUCTION
WASHINGTON, IOWA
2020



Materials and construction shall be in accordance with the SUDAS Standard Specifications, 2020 Edition, plus current Supplemental Specifications and Special Provisions.

LICENSED PROFESSIONAL ENGINEER
JACK POPE
11715
IOWA

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Jack Pope, P.E.
License number: 11715
My license renewal date is December 31, 2021
Pages or sheets covered by this seal: A.01 - W.07

11-26-2019

Date

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SHEET TITLE
TITLE SHEET

DATE:
JUL 22, 2019

PROJECT NO.:
5018069

SHEET NO.:
A.01

Call Before You Dig!
1.800.292.8989
Call the toll-free number at least
48 hours
prior to ALL excavations in Iowa.

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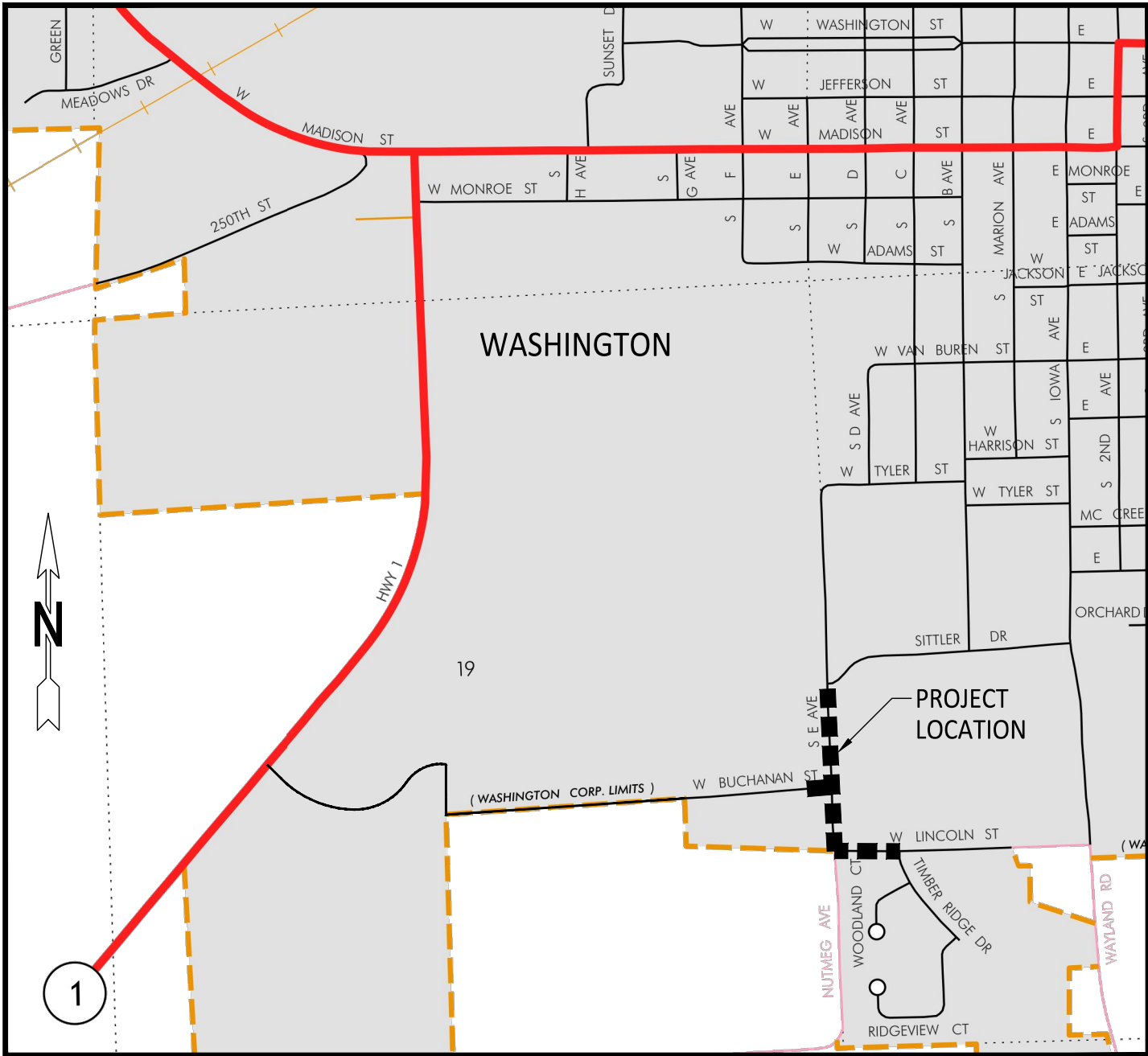
GENERAL SYMBOLS LEGEND

● = PROPERTY CORNER FOUND	— = SIGN
▲ = SECTION CORNER FOUND	⊙ = BOLLARD
—800— = EXISTING GROUND CONTOUR LINE	✕ _{RIR} = RAILROAD GATE OR SIGNAL
—W— = EXISTING WATER LINE (SIZE VARIES)	□ _{MB} = MAILBOX
⊗ = EXISTING FIRE HYDRANT	⊗ = FLAGPOLE
⊗ _W = EXISTING WATER VALVE	□ _{DS} = DOWNSPOUT
⊗ _S = EXISTING WATER SERVICE SHUTOFF	☼ = TREE OR SHRUB
⊗ _M = EXISTING WATER METER PIT	⌒ = STUMP
⊗ _W = EXISTING WATER WELL	—x— = FIELD FENCELINE
□ _{WM} = WATER METER	—o— = CHAIN LINK FENCELINE
==ST== = EXISTING STORM SEWER LINE (SIZE VARIES)	—•— = WOOD FENCELINE
⊙ = EXISTING STORM SEWER ACCESS	—■— = SILT FENCE
⊙ _S = EXISTING SEPTIC TANK	⊕ = BENCHMARK OR ELEVATION MARKER
⊙ _S = EXISTING SANITARY SEWER ACCESS	○ = PROPERTY CORNER SET
—SS— = EXISTING SANITARY SEWER MAIN (SIZE VARIES)	△ = SECTION CORNER SET
⊙ = CLEANOUT	—W— = PROPOSED WATER MAIN (SIZE VARIES)
⊕ = ELECTRIC MANHOLE	⊗ = PROPOSED FIRE HYDRANT
—OE— = OVERHEAD ELECTRIC LINE	⊗ _W = PROPOSED WATER VALVE
—UE— = UNDERGROUND ELECTRIC LINE	⊗ _S = PROPOSED WATER SHUTOFF
□ _{EM} = ELECTRIC METER	⊙ _S = PROPOSED SANITARY SEWER MANHOLE
—FO— = FIBEROPTIC LINE	⊙ _S = PROPOSED SANITARY SEWER END LINE CLEANOUT
⊙ = TELEPHONE MANHOLE	⊙ _S = PROPOSED SANITARY SEWER DOUBLE CLEANOUT
□ _{TELE PED} = TELEPHONE PEDESTAL	—■— = PROPOSED SANITARY SEWER MAIN (SIZE VARIES)
—UT— = TELEPHONE LINE	⊙ _S = PROPOSED LIFT STATION
□ _{TV PED} = TELEVISION PEDESTAL	—FM— = PROPOSED SANITARY SEWER FORCE MAIN
—TV— = TELEVISION LINE	⊙ _S = PROPOSED STORM SEWER ACCESS
□ _{GM} = GAS METER	== = PROPOSED STORM SEWER MAIN
⊗ _W = GAS VALVE	—SST— = PROPOSED SECONDARY STORM SEWER
—G— = EXISTING GAS LINE	—800— = PROPOSED GROUND CONTOUR LINE
⊙ = UTILITY POLE	▨ = SURFACING REMOVAL
⊙ = GUY WIRE	□ or ▨ = CONCRETE SURFACING REPLACEMENT
☆ = LUMINAIRE	⇒ = FLOW DIRECTION ARROW
⊕ = TRANSFORMER	1000.00 —● = FINISH GRADE ELEVATION MARKER

GENERAL ABBREVIATIONS LEGEND

R/W = RIGHT OF WAY	SY = SQUARE YARD
R.O.W. = RIGHT OF WAY	CY = CUBIC YARD
P.C. = POINT OF CURVATURE	MJ = MECHANICAL JOINT
P.I. = POINT OF INTERSECTION	PE = PLAIN END JOINT
P.T. = POINT OF TANGENCY	FE = FLANGED JOINT
℄ = CENTERLINE	UT = UNION TITE JOINT
TC = TOP OF CURB	S.S. = STAINLESS STEEL
GU = GUTTER	O.C. = ON CENTER
FL = FLOW LINE	I.D. = INSIDE DIAMETER
SB = SOIL BORING	O.D. = OUTSIDE DIAMETER
R = RADIUS	∅ = DIAMETER
BTM = BOTTOM	DIA. = DIAMETER
HWL = HIGH WATER LEVEL	# = NUMBER
LWL = LOW WATER LEVEL	TYP = TYPICAL
EA = EACH	INV = INVERT
GPM = GALLONS PER MINUTE	PVC = POLYVINYL CHLORIDE PIPE
IN. = INCHES	DIP = DUCTILE IRON PIPE
FT = FOOT OR FEET	CIP = CAST IRON PIPE
SF = SQUARE FEET	CMP = CORRUGATED METAL PIPE
LF = LINEAR FOOT	RCP = REINFORCED CONCRETE PIPE

SCALE:	AS NOTED	FIELD BOOK:	DRAWN BY: KJR	APPROVED: JP
REVISIONS:				



LOCATION MAP
SCALE: 1" = 1,000'±

UTILITY CONTACT INFORMATION		
UTILITY	ORGANIZATION/REPRESENTATIVE	PHONE
CITY INFRASTRUCTURE	CITY OF WASHINGTON - JJ BELL	319-653-6584
NATURAL GAS (DISTRIBUTION)	ALLIANT ENERGY	800-255-4268
ELECTRIC	ALLIANT ENERGY	800-255-4268
COMMUNICATIONS	KALONA COOPERATIVE TELEPHONE	319-656-3668
COMMUNICATIONS	MEDIACOM	855-633-4226
COMMUNICATIONS	WINDSTREAM	888-941-2619

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SHEET TITLE
**LEGEND AND
LOCATION MAP**

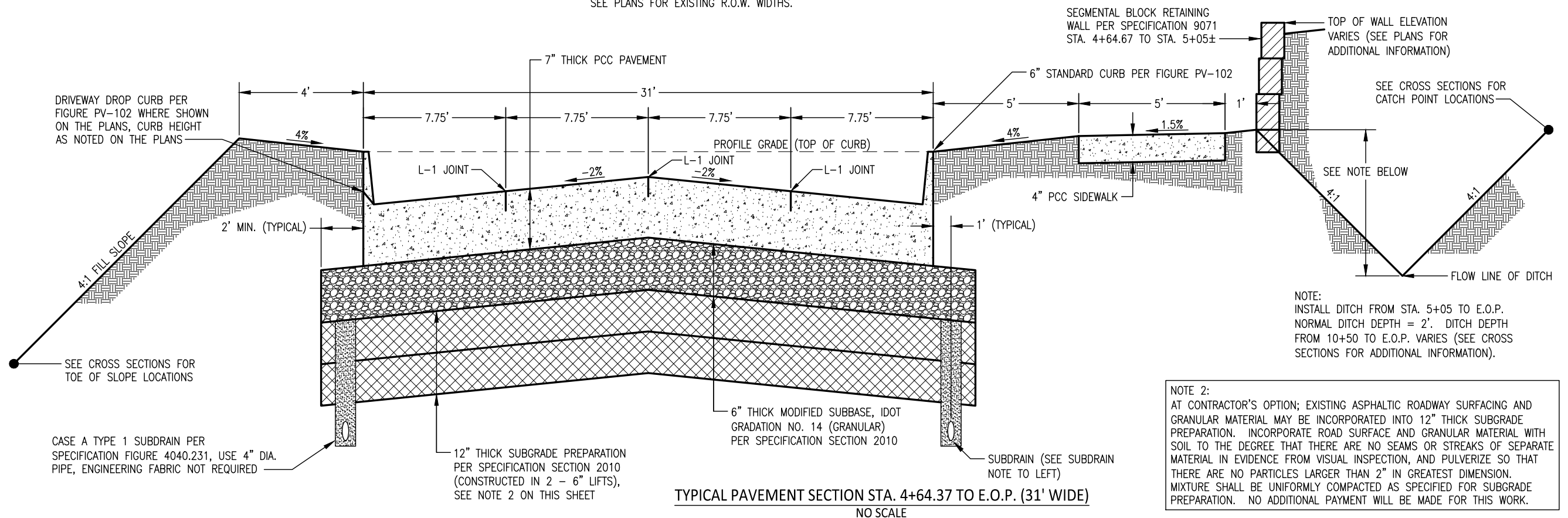
DATE:
JUL. 22, 2019

PROJECT NO.:
5018069

SHEET NO.:
A.02

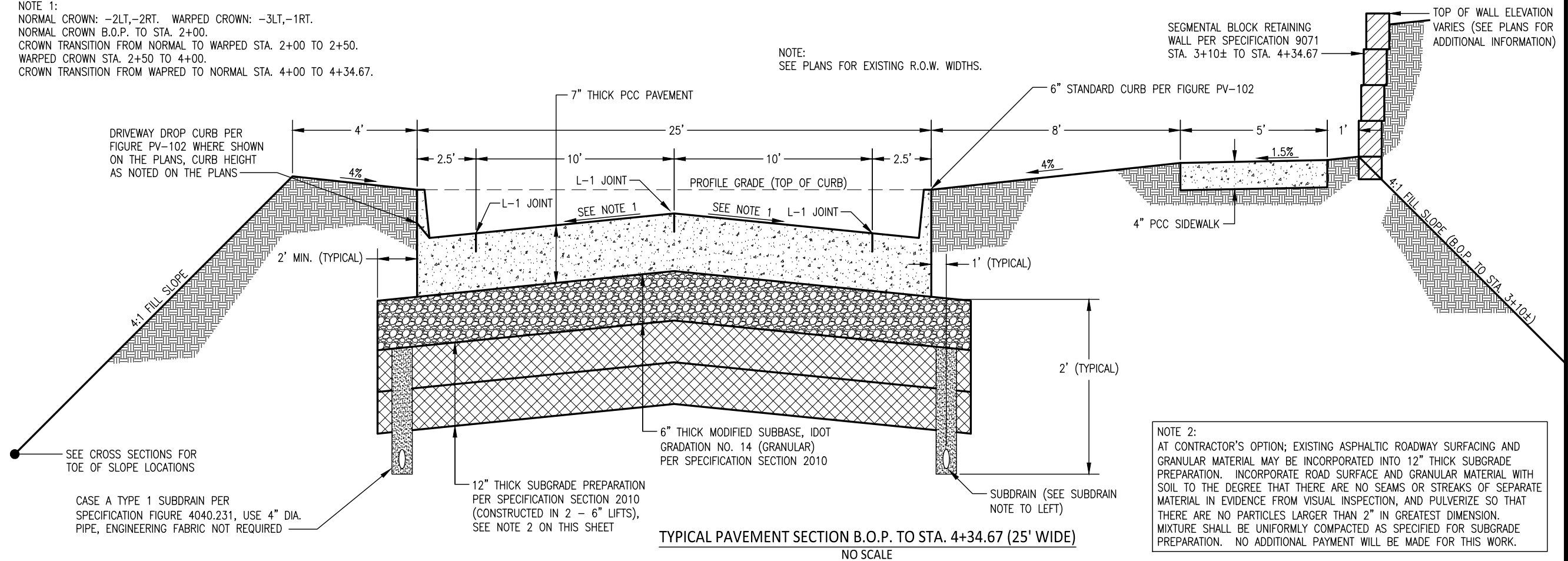
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REVISIONS: 01/20: SUBDRAIN NOTE				

NOTE:
SEE PLANS FOR EXISTING R.O.W. WIDTHS.



NOTE 1:
NORMAL CROWN: -2LT,-2RT. WARPED CROWN: -3LT,-1RT.
NORMAL CROWN B.O.P. TO STA. 2+00.
CROWN TRANSITION FROM NORMAL TO WARPED STA. 2+00 TO 2+50.
WARPED CROWN STA. 2+50 TO 4+00.
CROWN TRANSITION FROM WAPRED TO NORMAL STA. 4+00 TO 4+34.67.

NOTE:
SEE PLANS FOR EXISTING R.O.W. WIDTHS.



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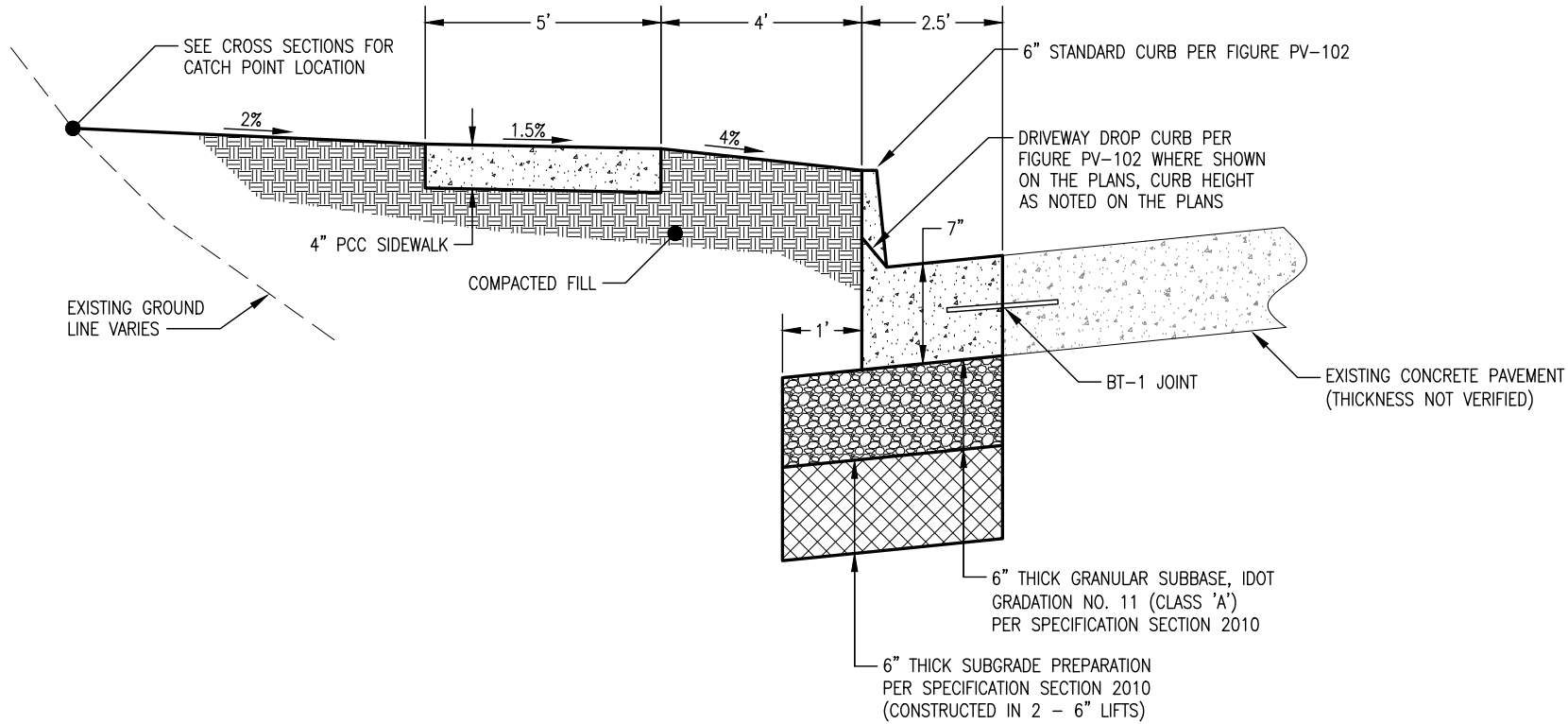
SHEET TITLE
TYPICAL SECTIONS
AND DETAILS

DATE: JUL. 22, 2019

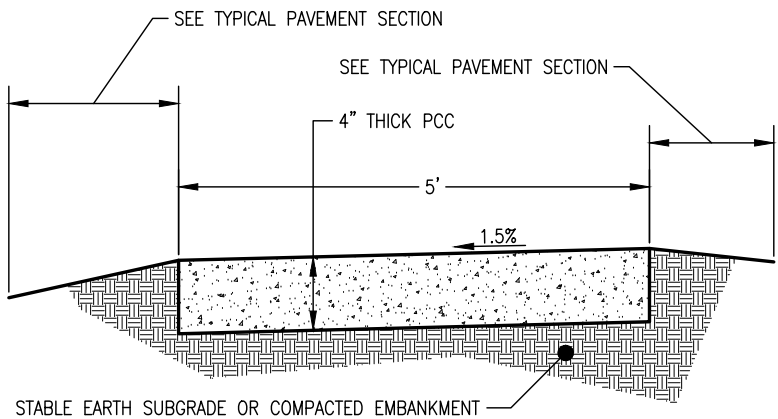
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SHEET NO.: **B.01**

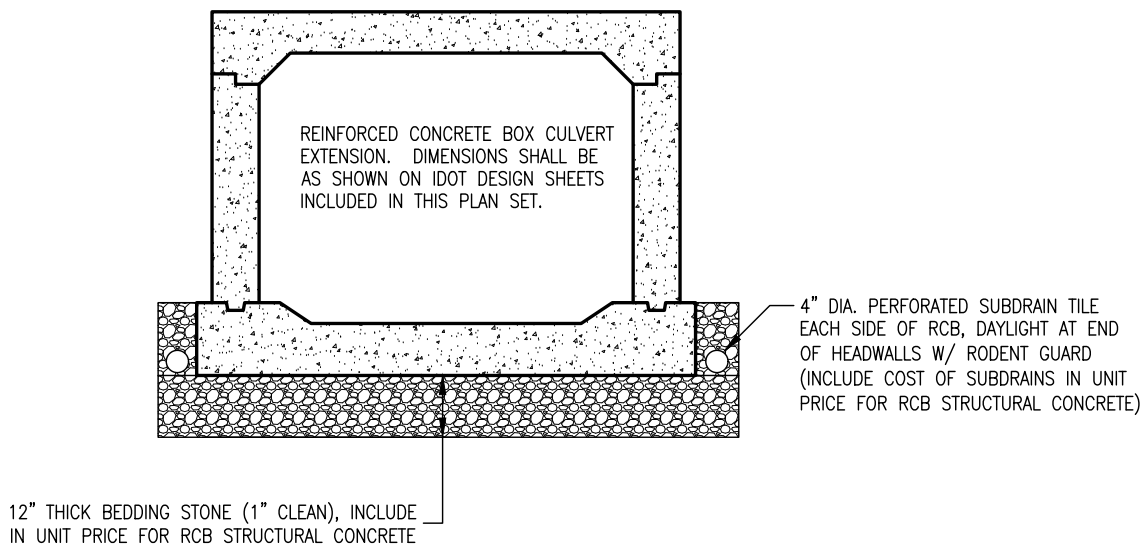
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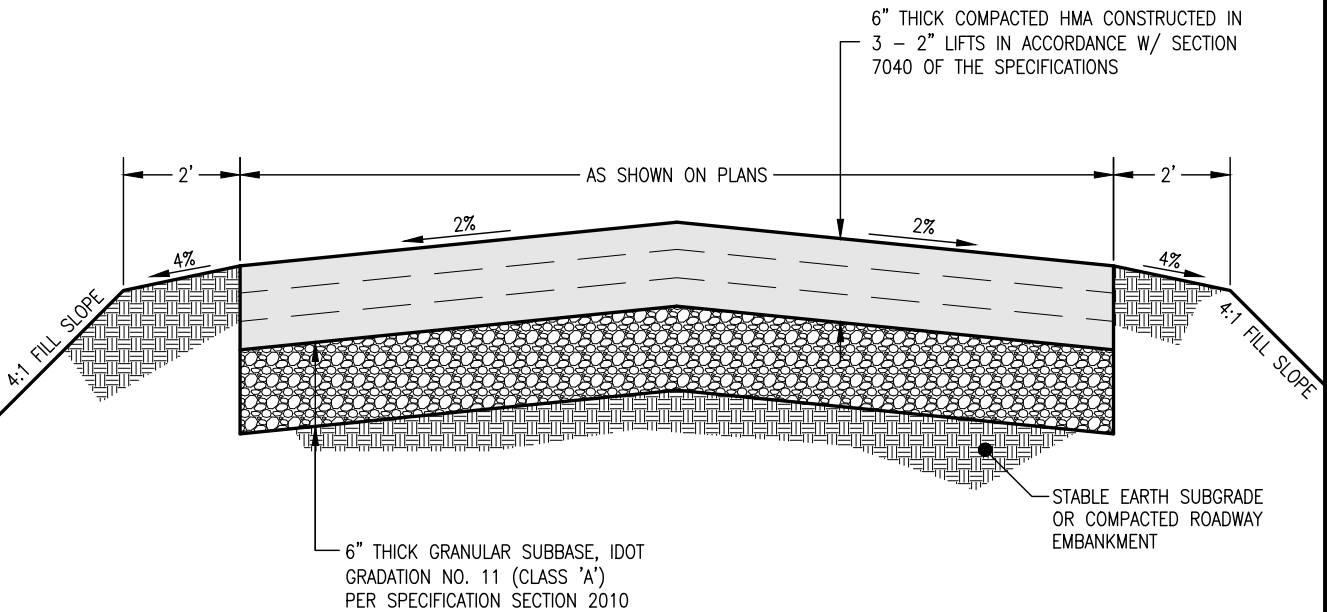
TYPICAL SECTION - WEST LINCOLN STREET PCC CURB AND GUTTER WIDENING
NO SCALE



TYPICAL SECTION - PCC SIDEWALK (SOUTH AVENUE E)
NO SCALE



TYPICAL SECTION - REINFORCED CONCRETE BOX CULVERT (RCB) EXTENSION
NO SCALE



TYPICAL SECTION - WEST BUCHANAN STREET HMA PAVEMENT SURFACING
NO SCALE

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SHEET TITLE
**TYPICAL SECTIONS
AND DETAILS**

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SHEET NO.:
B.02

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SCALE:	NO SCALE	FIELD BOOK:	DRAWN BY: KJR	APPROVED: JP
REVISIONS: 01/20: NOTE REVISIONS				

GENERAL CONSTRUCTION NOTES

1.

ALL WORK SHALL BE IN ACCORDANCE WITH THE SUDAS STANDARD SPECIFICATIONS, 2019 EDITION AND CURRENT SUPPLEMENTAL SPECIFICATIONS AND THE DETAILED SPECIFICATION REQUIREMENTS. SPECIFICATION MANUALS CAN BE ORDERED FROM THE INSTITUTE FOR TRANSPORTATION (FORMERLY CTRE) - ATTENTION: BETH RICHARDS, 2711 SOUTH LOOP DRIVE, SUITE 4700, AMES, IOWA 50010-8664, PHONE: 515-294-2869. SPECIFICATIONS CAN ALSO BE VIEWED AT THE SUDAS WEB SITE (WWW.IOWASUDAS.ORG). CONTRACTOR SHALL HAVE A MINIMUM OF ONE SET OF PLANS AND SPECIFICATIONS ON THE JOB SITE AT ALL TIMES DURING CONSTRUCTION.
2.

NOTIFY JJ BELL, MAINTENANCE/CONSTRUCTION SUPERINTENDENT, CITY OF WASHINGTON AT 319-653-6584 TWO WEEKS PRIOR TO COMMENCING WORK ON THE PROJECT.
3.

COORDINATE WORK AND COOPERATE WITH CITY PERSONNEL AND ENGINEER.
4.

LOCATION OF EXISTING UTILITIES IS APPROXIMATE. VERIFY LOCATION OF EXISTING UTILITIES IN LINE OF CONSTRUCTION PRIOR TO BEGINNING CONSTRUCTION BY EXCAVATING AHEAD OF WORK. CONTRACTOR IS RESPONSIBLE FOR NOTIFYING ALL UTILITY COMPANIES LOCATED IN THE WORK ZONE DURING CONSTRUCTION AT LEAST 48 HOURS PRIOR TO EXCAVATION.
5.

PROTECT ALL UTILITIES FROM DAMAGE DURING CONSTRUCTION UNLESS OTHERWISE SHOWN ON PLANS. ANY UTILITIES DAMAGED DUE TO CONTRACTOR'S NEGLIGENCE WILL BE REPAIRED AT CONTRACTOR'S EXPENSE.
6.

THERE MAY BE BURIED UTILITIES NOT SHOWN ON PLANS THAT ARE IN LINE OF CONSTRUCTION.
7.

NOTIFY PROPERTY OWNERS 48 HOURS IN ADVANCE IF ACCESS TO PROPERTY WILL BE INTERRUPTED. ACCESS TO PRIVATE PROPERTY SHALL BE MAINTAINED AT ALL TIMES FOR EMERGENCY VEHICLES. PROVIDE PEDESTRIAN ACCESS TO RESIDENCES DURING THE CONSTRUCTION PERIOD.
8.

CONTRACTOR SHALL PROVIDE TEMPORARY TRAFFIC CONTROL AS SHOWN ON THE TEMPORARY TRAFFIC CONTROL PLAN AND IN ACCORDANCE WITH SECTION 8030 OF THE SPECIFICATIONS AND THE CITY OF WASHINGTON REQUIREMENTS. TEMPORARY TRAFFIC CONTROL SHALL CONSIST OF BARRICADES, SIGNAGE AND LIGHTS AS NECESSARY TO PROTECT VEHICLES AND PEDESTRIAN TRAFFIC. CONTRACTOR SHALL MAINTAIN, CLEAN AS NECESSARY AND REPLACE DAMAGED TEMPORARY TRAFFIC CONTROL DEVICES THROUGHOUT DURATION OF THE PROJECT.
9.

CONSTRUCTION SURVEY SHALL BE PROVIDED BY THE JURISDICTION. CONTRACTOR SHALL PROTECT AND PRESERVE ALL STAKES, POINTS AND MARKS SET BY THE JURISDICTION. WHERE SAID STAKES, POINTS AND MARKS ARE ALTERED OR DESTROYED BY CONTRACTOR, COST OF REPLACEMENT SHALL BE IN ACCORDANCE WITH SECTION 1050 1.10, C. OF THE SPECIFICATIONS.
10.

CONTRACTOR SHALL MAINTAIN POSTAL SERVICE IN ACCORDANCE WITH SECTIONS 1070 2.14 AND 11,030 OF THE SPECIFICATIONS. CONTRACTOR SHALL MAINTAIN SOLID WASTE COLLECTION IN ACCORDANCE WITH SECTION 11,030 OF THE SPECIFICATIONS. ALL OF THIS WORK IS INCIDENTAL TO CONSTRUCTION.
11.

MAIL BOXES IN LINE OF CONSTRUCTION SHALL BE REMOVED, SALVAGED, AND STORED BY THE CONTRACTOR. TEMPORARY MAIL SERVICE SHALL BE AS DESCRIBED IN NOTE ABOVE. UPON COMPLETION OF PAVING AND GRADING OPERATIONS, REPLACE MAIL BOXES AT THEIR PREVIOUS LOCATIONS AS APPROVED BY THE LOCAL POSTMASTER. MAIL BOX POSTS SHALL BE RESET IN A MINIMUM 4' FOOT DEEP BY 12 INCH DIAMETER GRAVEL PACKED HOLE UNLESS OTHERWISE APPROVED BY THE JURISDICTION. REMOVAL AND RESETTING OF MAIL BOXES IS INCIDENTAL TO CONSTRUCTION.
12.

REMOVE AND DISPOSE OF EXISTING PIPES WHERE SHOWN ON THE PLANS. REMOVE ENTIRE RUNS OF PIPE WHERE IN DIRECT CONFLICT WITH NEW CONSTRUCTION AND WHERE NOTED ON THE PLANS. PLUG END OF PIPES TO BE ABANDONED WITH CONCRETE.
13.

SIGNS AND SIGN POSTS IN LINE OF CONSTRUCTION SHALL BE REMOVED, SALVAGED, AND RESET WHERE INSTRUCTED BY THE JURISDICTION. SIGNS SHALL BE RESET IN A 4 FOOT DEEP BY 12 INCH DIAMETER GRAVEL PACKED HOLE UNLESS APPROVED OTHERWISE BY THE JURISDICTION. ANY SIGNS NOT TO BE RESET SHALL BE REMOVED BY THE CONTRACTOR AND SALVAGED BY THE JURISDICTION. WORK WITH SIGNS IS CONSIDERED INCIDENTAL TO CONSTRUCTION.
14.

CONTRACTOR SHALL PREVENT ENTRY OF MUD, DIRT, DEBRIS AND OTHER MATERIAL INTO NEW SEWER AND EXISTING SEWERS. SHOULD MUD, DIRT, DEBRIS, OR OTHER MATERIAL ENTER THE NEW SEWER CONSTRUCTION OR EXISTING SEWERS, CONTRACTOR SHALL CLEAN AT NO COST TO OWNER.
15.

CONTRACTOR SHALL DISPOSE OF ALL CONSTRUCTION DEBRIS, UNSUITABLE MATERIAL FOR TRENCH BACKFILL AND SURFACE RESTORATION AND EXCESS EXCAVATED MATERIAL. DISPOSAL SHALL MEET FEDERAL, STATE AND LOCAL SAFETY, HEALTH AND ENVIRONMENTAL REQUIREMENTS. WORK IS INCIDENTAL TO CONSTRUCTION.
16.

WATER VALVES SHALL BE KENNEDY RESILIENT WEDGE GATE VALVES; C509 OR C515.
17.

FIRE HYDRANT SHALL BE MUELLER SUPER CENTURION OR WATEROUS PACER, AS SPECIFIED. COLOR: YELLOW.
18.

CONTRACTOR RESPONSIBLE FOR MAINTAINING THE AS-BUILT LOCATION OF ALL UTILITIES.
19.

STORM SEWER PIPE MATERIAL MAY BE ANY OF THE FOLLOWING OPTIONS, UNLESS NOTED OTHERWISE ON THE PLANS;

19.1.

REINFORCED CONCRETE PIPE (RCP) MEETING THE REQUIREMENTS OF SUDAS STANDARD SPECIFICATION 4020 2.01, A. USE OF RUBBER O-RING OR PROFILE GASKETS WILL BE REQUIRED.

19.2.

POLYVINYL CHLORIDE PIPE (PVC) MEETING THE REQUIREMENTS OF SUDAS STANDARD SPECIFICATION 4020 2.01, E.1.a.1, CORRUGATED EXTERIOR, SMOOTH INTERIOR, ASTM F 949.

19.3.

POLYPROPYLENE PIPE MEETING THE REQUIREMENTS OF SUDAS STANDARD SPECIFICATION SECTION 4020 2.01, L.
20.

CONCRETE MIX SHALL BE IDOT C-3WR-C OR C-4WR-C FOR ALL PAVEMENT AND DRIVEWAYS. COARSE AGGREGATE SHALL BE CLASS 3 DURABILITY. USE OF FLY ASH AND GROUND GRANULATED BLAST FURNACE SLAG (GGBFS) SHALL BE IN ACCORDANCE WITH SECTION 7010 2.02 C OF THE SPECIFICATIONS.
21.

COARSE AND FINE AGGREGATES SHALL BE FURNISHED FROM AN APPROVED SOURCE IN ACCORDANCE WITH THE SPECIFICATIONS. METHOD OF ACCEPTANCE FOR COARSE AND FINE AGGREGATES SHALL BE BY QUALITY CERTIFICATION FURNISHED BY THE CONTRACTOR. CERTIFIED PLANT INSPECTION IS NOT REQUIRED.
22.

CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING CONCRETE WASHOUT IN ACCORDANCE WITH SECTION 11,050 OF THE SPECIFICATIONS. WORK FOR CONCRETE WASHOUT IS INCIDENTAL TO CONSTRUCTION.
23.

CONTRACTOR SHALL BE RESPONSIBLE PARTY FOR ALL TESTING AND RE-TESTING OF P.C. CONCRETE REQUIRED BY THE SPECIFICATIONS INCLUDING; AIR CONTENT AND SLUMP (CYLINDERS WILL NOT BE REQUIRED). TIME FOR OPENING PAVEMENT SHALL BE DETERMINED BY MATURITY METHOD IN ACCORDANCE WITH SPECIFICATION SECTION 7010 3.05. CONTRACTOR SHALL PROVIDE DEVELOPMENT AND MAINTENANCE OF MATURITY CURVE. COORDINATE MATURITY CURVE DEVELOPMENT, MAINTENANCE, AND USE WITH JURISDICTION. NO TESTING OF HARDENED CONCRETE WILL BE REQUIRED UNLESS TESTS ON PLASTIC CONCRETE ARE DEEMED INSUFFICIENT.
24.

USE TYPE 'C' JOINTS FOR ALL TRANSVERSE PAVEMENT JOINTS UNLESS SHOWN OR NOTED OTHERWISE ON THE PLANS. ALL PAVEMENT SAW JOINTS SHALL BE SEALED. DO NOT SEAL SIDEWALK OR DRIVEWAY JOINTS.
25.

PAVEMENT SMOOTHNESS SHALL BE MEASURED WITH A PROFILOGRAPH IN ACCORDANCE WITH IOWA D.O.T. SECTION 2316. SURFACE CORRECTIONS AND PRICE ADJUSTMENTS SHALL BE IN ACCORDANCE WITH SUDAS SECTION 7010 3.08 C.2 AND TABLE 7010.04. NO INCENTIVE FOR PAVEMENT SMOOTHNESS WILL BE MADE.
26.

FERTILIZE, SEED AND MULCH ALL AREAS DISTURBED BY CONSTRUCTION.
27.

THE JURISDICTION WILL PROVIDE CONSTRUCTION STAKING ONE TIME ONLY FOR THE FOLLOWING OPERATIONS:

1)

WATER MAIN LINE AND APPURTENANCES

2)

STORM SEWER STRUCTURES AND PIPING

3)

ROUGH GRADING

4)

STREET PAVING - MAINLINE AND INTERSECTIONS

ADDITIONAL STAKING AND REPLACEMENT OF STAKES DAMAGED AS A RESULT OF CONTRACTOR'S NEGLIGENCE SHALL BE AT CONTRACTOR'S EXPENSE.
24.

ELEVATIONS SHOWN FOR MANHOLE TOPS ARE APPROXIMATE. MAKE FINAL ADJUSTMENTS IN FIELD AS DIRECTED BY JURISDICTION.

G

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SHEET TITLE

GENERAL
CONSTRUCTION
NOTES

DATE:

JUL. 22, 2019

PROJECT NO.:

5018069

SHEET NO.:

C.01

G:\Projects\5018069 - Washington - South E Ave Street Reconstruction\Drafting\Civil 3D Plan Drawings\A-B-C-J Sheets 5018069.dwg

SCALE:	NO SCALE	FIELD BOOK:	DRAWN BY: KJR	APPROVED: JP
REVISIONS: 01/20: DRIVEWAY 6+34				

STORM SEWER STRUCTURE TABLE				
STRUCTURE NO.	NORTHING	EASTING	TOP OF CURB OR RIM ELEV.	STRUCTURE TYPE
ST-1	6776579.17	23560224.34	703.40	SW-401 MANHOLE, 48" DIA. SET OVER END OF EXISTING PIPE
ST-2	6776572.85	23560318.88	702.60	SW-507 INTAKE
ST-3	6776581.21	23560156.72	704.45	SW-508 INTAKE
ST-4	6776575.77	23560120.72	704.90	SW-507 INTAKE
ST-5	6776949.42	23559950.53	707.50	SW-401 MANHOLE, 60" DIA. SET OVER EXISTING PIPE
ST-6	6776952.40	23560077.75	714.05	SW-507 INTAKE
ST-7	6777122.32	23560093.51	710.75	SW-513 5'X5' OPEN ON WEST SIDE, INLET ELEVATION = 709.50
ST-8	6777173.02	23560103.49	712.32	SW-508 INTAKE
ST-9	6777173.65	23560134.49	712.32	SW-508 INTAKE
ST-10	6777174.05	23560153.98	711.75	*SW-513 INTAKE, 3'X3' OPEN ON NORTH AND SOUTH SIDES, INLET ELEVATION = 710.50
ST-11	6777078.80	23560155.43	711.50	SW-512 INTAKE, CASE 1 RISER, 24" DIA. W/ SW-604 TYPE 5 GRATE
ST-12	6777314.05	23560131.61	713.59	SW-508 INTAKE
ST-13	6777314.45	23560151.10	711.75	SW-512 INTAKE, CASE 1 RISER, 24" DIA. W/ SW-604 TYPE 5 GRATE
ST-14	6777474.90	23560128.31	716.42	SW-508 INTAKE
ST-15	6777474.26	23560097.27	716.42	SW-507 INTAKE
ST-16	6777475.38	23560157.70	717.25	SW-401 MANHOLE, 48" DIA. SET OVER END OF EXISTING PIPE
ST-17	6777552.09	23560134.05	720.75	SW-401 MANHOLE, 48" DIA. SET OVER END OF EXISTING PIPE

* LID FOR SW-602 TYPE G CASTING SHALL BE OPEN GRATE LID.

STORM SEWER PIPE TABLE								
PIPE	DIAMETER	MATERIAL	FROM	TO	LENGTH	SLOPE	PIPE Ǝ IN	PIPE Ǝ OUT
P-1	15"				59.8 LF	11.53%	702.00	695.10
P-2	18"		ST-2	ST-1	91.5 LF	0.50%	698.56	698.10
P-3	15"		ST-3	ST-1	64.2 LF	2.00%	700.38	699.10
P-4	15"	RCP	ST-4	ST-3	37.8 LF	0.50%	701.07	700.88
P-5	15"		ST-6	ST-5	125.4 LF	7.50%	708.41	699.00
P-6	30"	RCP	ST-8	ST-7	49.8 LF	1.00%	705.23	704.73
P-7	30"		ST-9	ST-8	31.0 LF	1.00%	705.64	705.33
P-8	18"		ST-10	ST-9	19.5 LF	1.00%	705.93	705.74
P-9	15"		ST-11	ST-10	95.3 LF	1.50%	707.46	706.03
P-10	27"		ST-12	ST-9	137.2 LF	0.75%	706.77	705.74
P-11	15"		ST-13	ST-12	15.8 LF	1.00%	707.03	706.87
P-12	27"		ST-14	ST-12	158.6 LF	1.50%	709.25	706.87
P-13	15"		ST-15	ST-14	31.0 LF	5.00%	710.90	709.35
P-14	15"		ST-16	ST-14	26.9 LF	3.00%	710.16	709.35
P-15	24"		ST-17	ST-14	76.1 LF	6.00%	713.92	709.35

NOTES:
AT CONTRACTOR'S OPTION; PIPES P-10 AND P-12 MAY BE SUBSTITUTED WITH 30" DIA. PIPE AT UNIT PRICE FOR 27" PIPE. PIPES P-4 AND P-6 SHALL BE RCP AS DEFINED IN GENERAL NOTE 19.1 ON SHEET C.01 OR AWWA C900 WATER MAIN WITH EQUIVALENT OR GREATER INSIDE DIAMETER.

DRIVEWAY TABULATION							
STATION	SIDE	STREET	LENGTH OF DROPPED CURB OPENING (LF)/DROP CURB HEIGHT	EXISTING DRIVEWAY SURFACING REMOVAL AREA (SY)	NEW DRIVEWAY SURFACING TYPE 6" PCC (SY)	NEW SIDEWALK SURFACING AT DRIVE CROSSING 6" PCC (SY)	REMARKS
3+00	RT	SOUTH AVENUE E	22'/3"	38	25	10	EXISTING ASPHALT DRIVEWAY
3+16	LT	SOUTH AVENUE E	23'/2"	10	36		EXISTING CONCRETE AND GRANULAR DRIVEWAY
4+17	LT	SOUTH AVENUE E	45'/2"		76		EXISTING GRANULAR DRIVEWAY
6+34	RT	SOUTH AVENUE E	28'/2"		22	13	EXISTING GRANULAR DRIVEWAY
24+20	LT	WEST LINCOLN ST	26'/3"		33	12	EXISTING GRANULAR DRIVEWAY
TOTAL				48	192	35	

SUBDRAIN OUTLET INSTALLATION (FIGURE 4040.233)	
USE 4" OUTLET PIPE AS SPECIFIED WITH RODENT GUARD ON ALL OUTLETS	
LOCATION	NUMBER OF OUTLETS
STORM STRUCTURE ST-3	2
STORM STRUCTURE ST-4	2
STORM STRUCTURE ST-8	2
STORM STRUCTURE ST-9	2
STORM STRUCTURE ST-12	2
STORM STRUCTURE ST-14	2
STORM STRUCTURE ST-15	2
TOTAL	14

EXISTING MANHOLE ADJUSTMENT		
LOCATION	ADJUSTMENT	REMARKS
1+23 30' RT SOUTH AVE E	+1.2±	SANITARY SEWER MANHOLE (SEE NOTE BELOW)

NOTE: ADJUST MANHOLE IN ACCORDANCE W/ SECTION 6010 OF THE SPECIFICATIONS (MAJOR ADJUSTMENT).



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PROJECT
TABULATIONS

DATE:

JUL. 22, 2019

PROJECT NO.:

5018069

SHEET NO.:

C.02

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					SCALE:	NO SCALE	FIELD BOOK:	DRAWN BY: KJR	APPROVED: JP
					REVISIONS: 01/20: VARIOUS QUANTITIES				
ESTIMATED PROJECT QUANTITIES									
Bid Item	Item No.	Bid Item Description	Unit	Estimated Quantity	Remarks				
1	2010-108-C-0	Clearing and Grubbing	LS	1					
2	2010-108-E-0	Excavation, Class 10	CY	3,830	Class 10 Excavation was calculated by the average end area method with cross sections spaced a maximum of 50 feet resulting in a total cut quantity of 2,505 Cubic Yards (CY). Based on a shrinkage factor of 30%, it is estimated there will be approximately 3,830 CY of fill required, resulting in a shortage of approximately 1,325 CY. Contractor will be required to provide shortage of fill material as part of this item, from a contractor secured site. Contractor provided fill material shall meet requirements of Section 2010 2.03 of the Specifications for embankment construction and 2010 2.04 if used for subgrade construction. Payment for excavation will be based on plan quantity unless a change in horizontal or vertical alignment is made and approved by the Jurisdiction. Item also includes stripping (minimum 8" lift), salvaging, stockpiling, and resspreading of topsoil on site. Top 6" of resspread topsoil shall be prepared for seeding per specifications. No separate payment will be made for handling of topsoil. Item also includes removal and disposal of existing seal coat (asphaltic) surfacing.				
3	2010-108-G-0	Subgrade Preparation, 6" Thick	SY	140	See typical sections on B sheets. Provide compaction with moisture and density control in accordance with Section 2010 3.04 D. Contractor shall adjust the moisture content of the soil if required to meet the specification requirements by scarifying, disking, or adding water as directed by the Jurisdiction.				
4	2010-108-G-0	Subgrade Preparation, 12" Thick	SY	4,180	See typical sections on B sheets. Provide compaction with moisture and density control in accordance with Section 2010 3.04 D. Contractor shall adjust the moisture content of the soil if required to meet the specification requirements by scarifying, disking, or adding water as directed by the Jurisdiction.				
5	2010-108-I-0	Subbase, Modified (6" Thick Modified Subbase)	SY	4,180	Material shall be in accordance with specification 2010 2.04 D. 3., compacted in place.				
6	2010-108-I-0	Subbase, Granular (6" Thick Class 'A' Crushed Stone)	SY	695	Material shall be in accordance with Iowa DOT specification 4120, Gradation No. 11, Class 'A' Crushed Stone, compacted in place.				
7	2010-108-J-2-a	Removal of Known Box Culvert, Concrete Wing and Headwalls	LS	1	No measurement for payment will be made. Payment will be based on proper removal of existing concrete RCB wing and headwall as described on the plans.				
8	2001-108-J-2-c	Removal of Known Pipe Culvert, All Types, ≤36"	LF	223	Item is for removal of all types of existing culverts and storm sewer lines where noted on the plans or ordered by the Jurisdiction. All existing culverts and storm sewers not in conflict with new construction, to be abandoned and remain in place, shall be plugged with concrete where approved by the jurisdiction. Plugging of existing pipes to be abandoned in place is incidental to construction.				
9	2010-108-L-0	Compaction Testing	LS	1					
10	3010-108-C-0	Trench Foundation	TON	50	Use only where authorized by the Jurisdiction. The limitation for increase or decrease in work outlined in Specification Section 1040 1.06 does not apply to this bid item. Jurisdiction may authorize use of all, part, or none of the estimated quantity at the unit price as bid.				
11	3010-108-F-0	Trench Compaction Testing (Water Main and Storm Sewer)	LS	1	Item is for testing trench backfill of water main and storm sewer construction.				
12	4020-108-A-1	Storm Sewer, Trenched, 15"	LF	456	See General Construction Notes and plans for allowable pipe material.				
13	4020-108-A-1	Storm Sewer, Trenched, 18"	LF	111	See General Construction Notes and plans for allowable pipe material.				
14	4020-108-A-1	Storm Sewer, Trenched, 24"	LF	76	See General Construction Notes and plans for allowable pipe material.				
15	4020-108-A-1	Storm Sewer, Trenched, 27"	LF	296	See General Construction Notes and plans for allowable pipe material.				
16	4020-108-A-1	Storm Sewer, Trenched, 30"	LF	81	See General Construction Notes and plans for allowable pipe material.				
17	4030-108-B-0	Pipe Apron, 15"	EA	2	Apron type shall be RCP for attachment to RCP pipe and Metal for attachment to Plastic pipes. Item includes installation of Apron Section Footing per figure 4030.221 of the specifications for all apron types.				
18	4040-108-A-0	Subdrain, Longitudinal, Perforated 4"	LF	2,145					
19	4040-108-D-0	Subdrain and Footing Drain Outlets and Connections	EA	14	Item is for installation of subdrain and footing drain (secondary storm sewer) outlets. See table on this sheet.				
20	2403-0100020	Structural Concrete (RCB Culvert Extension), IDOT Specifications	CY	31.5	Item includes cost of reinforcing steel required for culvert construction in accordance with Iowa DOT Specification Section 2404 (See Iowa DOT sheet RCB G1-12 attached to these plans for applicable Specification reference) and the plans. Item also includes granular bedding material for RCB (see typical section on sheet B.02) and excavation required to construct RCB extension. Suitable excess excavated materials may be used on site as fill material, as approved by the Jurisdiction. Coarse aggregate for structural concrete shall be minimum Class 3 durability. Certified Plant Inspection is not required for this item. Method of acceptance for materials incorporated into this item shall be quality certification submittals in accordance with the Iowa DOT Specifications. Use fill dimension of 4-7 per IDOT sheet RCB 6-6-12 for this item.				
21	5010-108-A-1	Water Main, Trenched, C900 PVC DR 18, 6"	LF	20	Include cost for all fittings by weight or count in unit price for water main. No separate payment will be made for fittings.				
22	5010-108-A-1	Water Main, Trenched, C900 PVC DR 18, 12"	LF	675	Include cost for all fittings by weight or count in unit price for water main. No separate payment will be made for fittings.				
23	5020-108-A-0	Valve, Gate, 8"	EA	1					
24	5020-108-A-0	Valve, Gate, 12"	EA	1					
25	5020-108-C-0	Fire Hydrant Assembly	EA	1					
26	5020-108-F-0	Valve Box Extension	EA	1					
27	5020-108-I-0	Fire Hydrant Assembly Removal	EA	1					
28	XXXX-XXX-X-X	Connection to Existing Main, Connection No. 1	LS	1	See Detailed Specifications for description.				
29	XXXX-XXX-X-X	Connection to Existing Main, Connection No. 2	LS	1	See Detailed Specifications for description.				
30	XXXX-XXX-X-X	Connection to Existing Main, Connection No. 3	LS	1	See Detailed Specifications for description.				
31	6010-108-A-0	Manhole, SW-401, 48" Dia.	EA	3					
32	6010-108-A-0	Manhole, SW-401, 60" Dia.	EA	1					
33	6010-108-B-0	Intake, SW-507	EA	4					
34	6010-108-B-0	Intake, SW-508	EA	5					
35	6010-108-B-0	Intake, SW-512, Case 1 Riser, 24" Dia.	EA	2					
36	6010-108-B-0	Intake, SW-513, 3'x3'	EA	1					
37	6010-108-B-0	Intake, SW-513, 5'x5'	EA	1					
38	6010-108-F-0	Manhole Adjustment, Major	EA	1	See table on sheet C.02.				
39	6010-108-H-0	Remove Intake	EA	1					
40	7010-108-A-0	Pavement, PCC, 7" Thick	SY	3,687					
41	7010-108-E-0	Curb and Gutter, 2.5' Width, 7" Thick	LF	367					
42	7010-108-I-0	PCC Pavement Samples and Testing	LS	1					
43	7020-108-B-0	Pavement, HMA, 6" Thick	SY	555					
44	7030-108-A-0	Removal of Driveway	SY	48					
45	7030-108-E-0	Sidewalk, PCC, 4" Thick	SY	770					
46	7030-108-E-0	Sidewalk, PCC, 6" Thick	SY	65					
47	7030-108-G-0	Detectable Warning	SF	30	Detectable warning panel color, type, and material shall be as approved by the Jurisdiction.				
48	7030-108-H-1	Driveway, Paved, PCC, 6" Thick	SY	192					
49	7040-108-A-0	Full Depth Patches (7" PCC)	SY	65					
50	7040-108-B-0	Subbase Over-excavation	TON	25	Item is for replacement of existing subgrade/subbase below Full Depth Patches to a depth of 6". Place new material in accordance with Section 7040 3.02 B. 3. of the Specifications. Place new subbase material to bottom of 7" PCC patch.				
51	8030-108-A-0	Temporary Traffic Control	LS	1					
52	9010-108-B-0	Hydraulic Seeding, Seeding, Fertilizing, and Mulching	LS	1	All areas disturbed by construction shall be seeded, fertilized, and mulched. Complete seeding, fertilizing, and mulching in accordance with Section 9010 of the Specifications (Use Type 1 Permanent Lawn Mixture). Payment for seeding, fertilizing, and mulching will be based on a Lump Sum Price (no measurements will be made).				
53	9040-108-A-1	SWPPP Preparation	LS	1					
54	9040-108-A-2	SWPPP Management	LS	1					
55	9040-108-J-0	Rip Rap, Class D	TON	95					
56	9040-108-N-1	Silt Fence	LF	2,000	Install as necessary and ordered by the Jurisdiction to prevent runoff from leaving site or entering the sewer system. The limitation for increase or decrease in work outlined in Specification Section 1040 1.06 does not apply to this bid item.				
57	9040-108-N-2	Silt Fence, Removal of Sediment	LF	2,000	The limitation for increase or decrease in work outlined in Specification Section 1040 1.06 does not apply to this bid item.				
58	9040-108-N-3	Silt Fence, Removal of Device	LF	2,000	The limitation for increase or decrease in work outlined in Specification Section 1040 1.06 does not apply to this bid item.				
59	9060-108-D-0	Removal and Reinstallation of Existing Fence	LF	150	Removal and install existing fence in line of construction as noted on the plans. Item includes new materials where existing materials are not salvageable, as directed by the Jurisdiction.				
60	9071-108-A-0	Segmental Block Retaining Wall	SF	900	Provide block color samples to Jurisdiction for color selection prior to ordering blocks. Unit price for segmental block retaining wall includes all labor, equipment, and material to fully construct wall in accordance with Section 9071 of the Specifications.				
61	11,020-108-A	Mobilization	LS	1					
62	XXXX-XXX-X-X	Granular Surfacing for Temporary Access	TON	75	Item is for installation, maintenance, removal, and disposal of Class 'A' Crushed Stone for temporary access during staged construction as noted on the plans. Contractor shall install temporary granular surfacing as agreed to by the Jurisdiction. Upon completion of new pavements for access; remove and dispose of temporary granular surfacing. The limitation for increase or decrease in quantities outlined in Specification Section 1040 1.06 does not apply to this bid item.				



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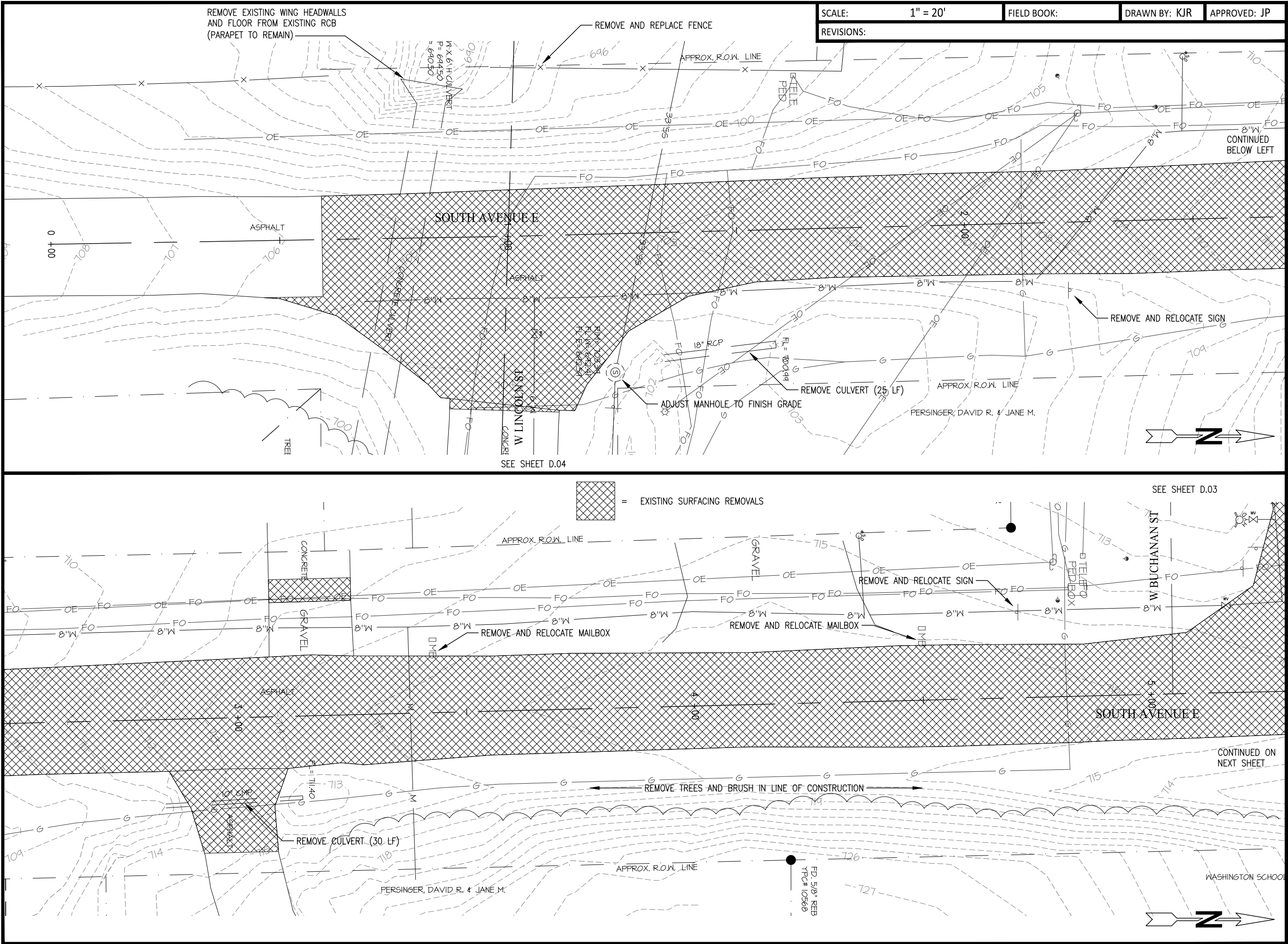
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ESTIMATED
PROJECT
QUANTITIES

DATE:
JUL. 22, 2019

PROJECT NO.:
5018069

SHEET NO.:
C.03

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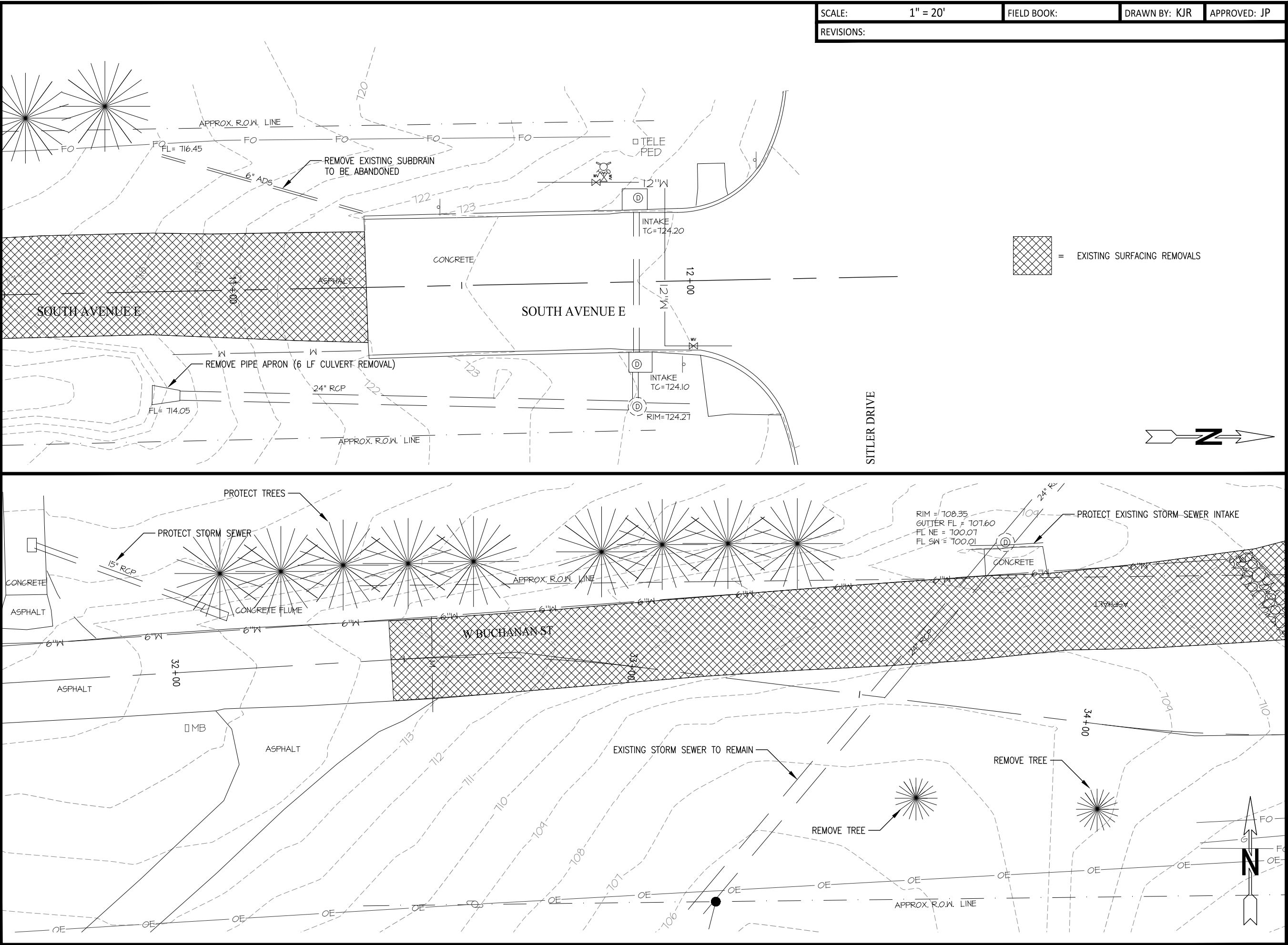
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**EXISTING
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REMOVALS**

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SHEET NO.:
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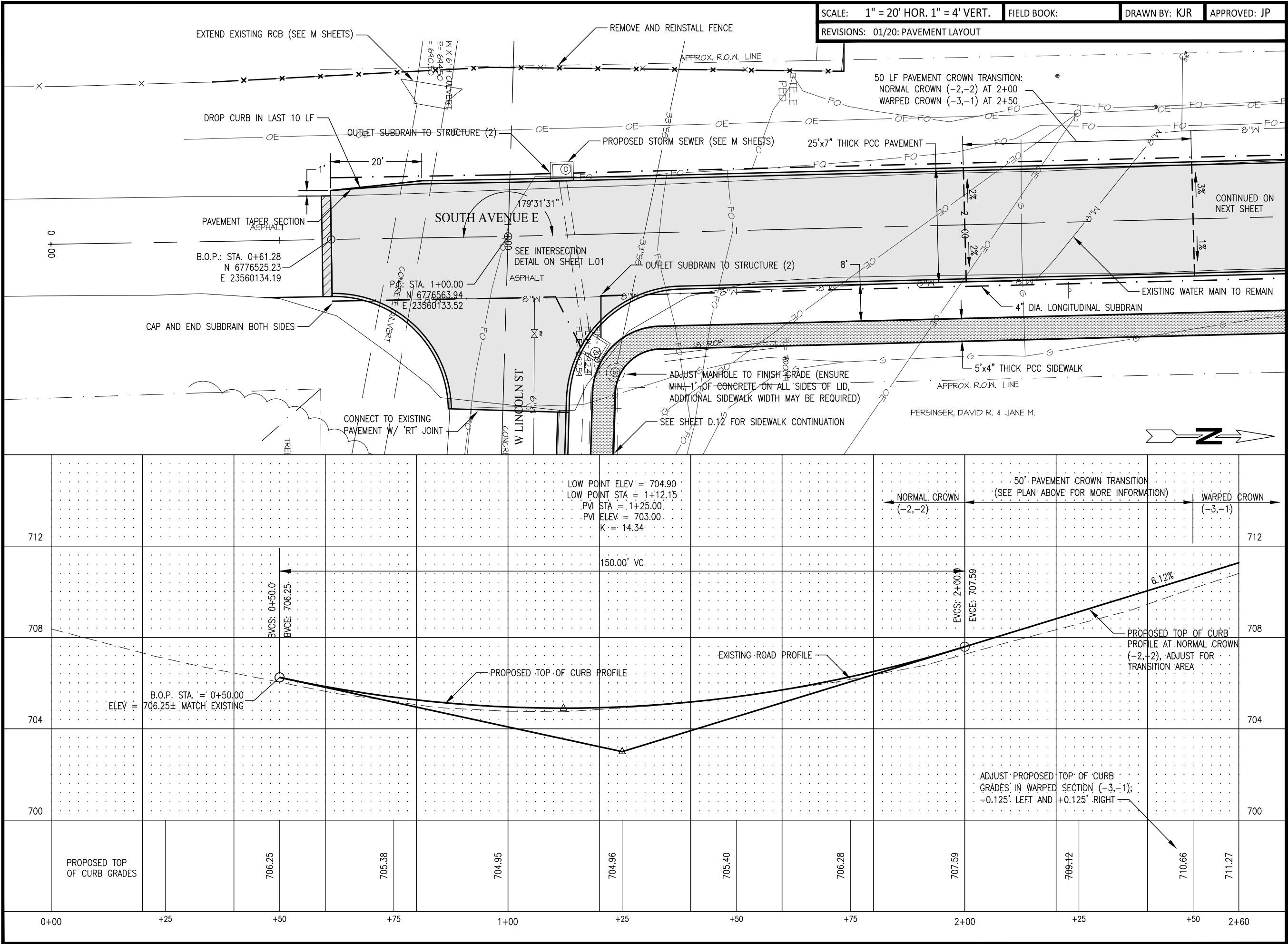
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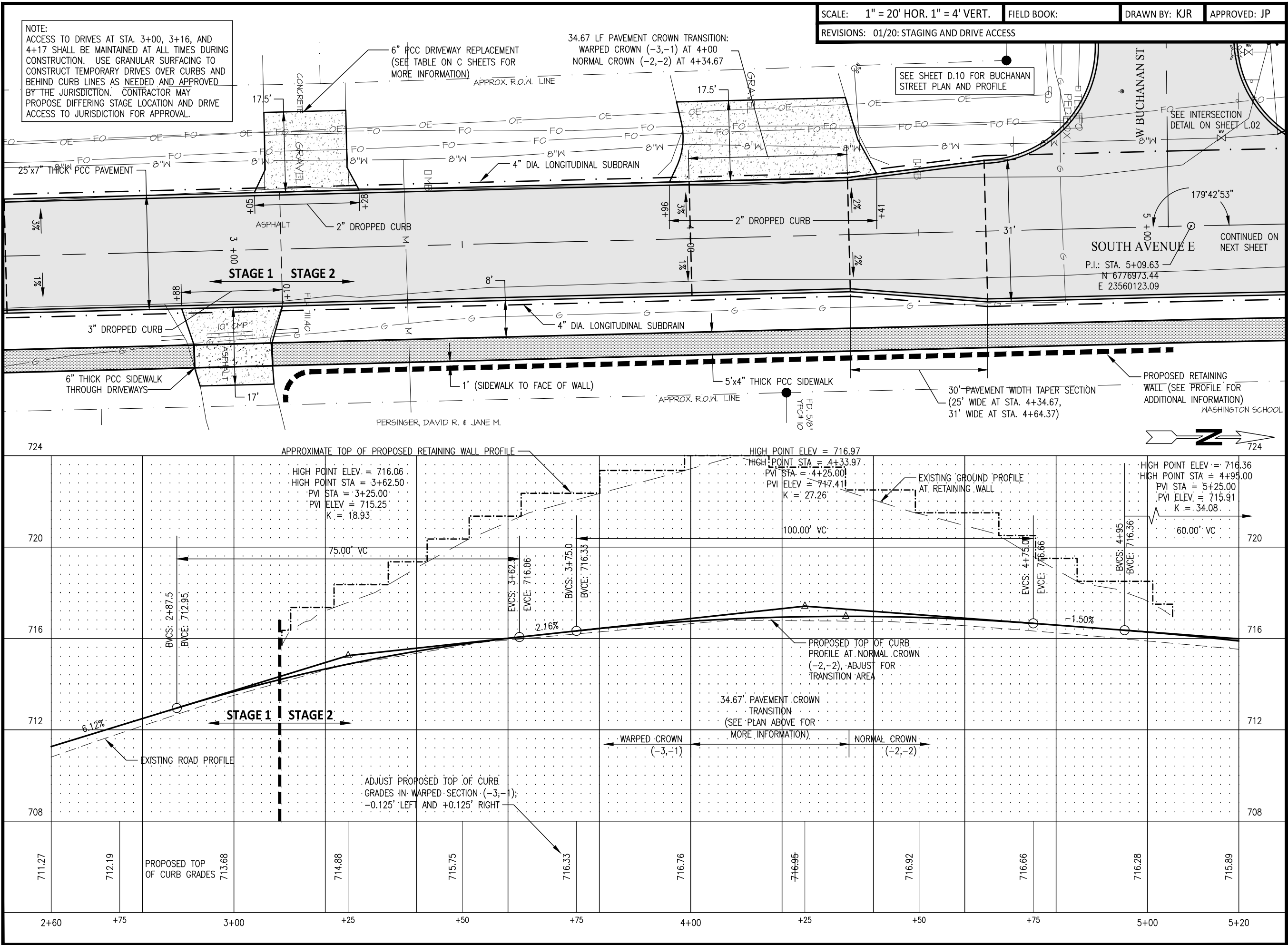
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**SOUTH AVENUE E
PLAN AND PROFILE
B.O.P. TO STA. 2+60**

DATE:
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PROJECT NO.:
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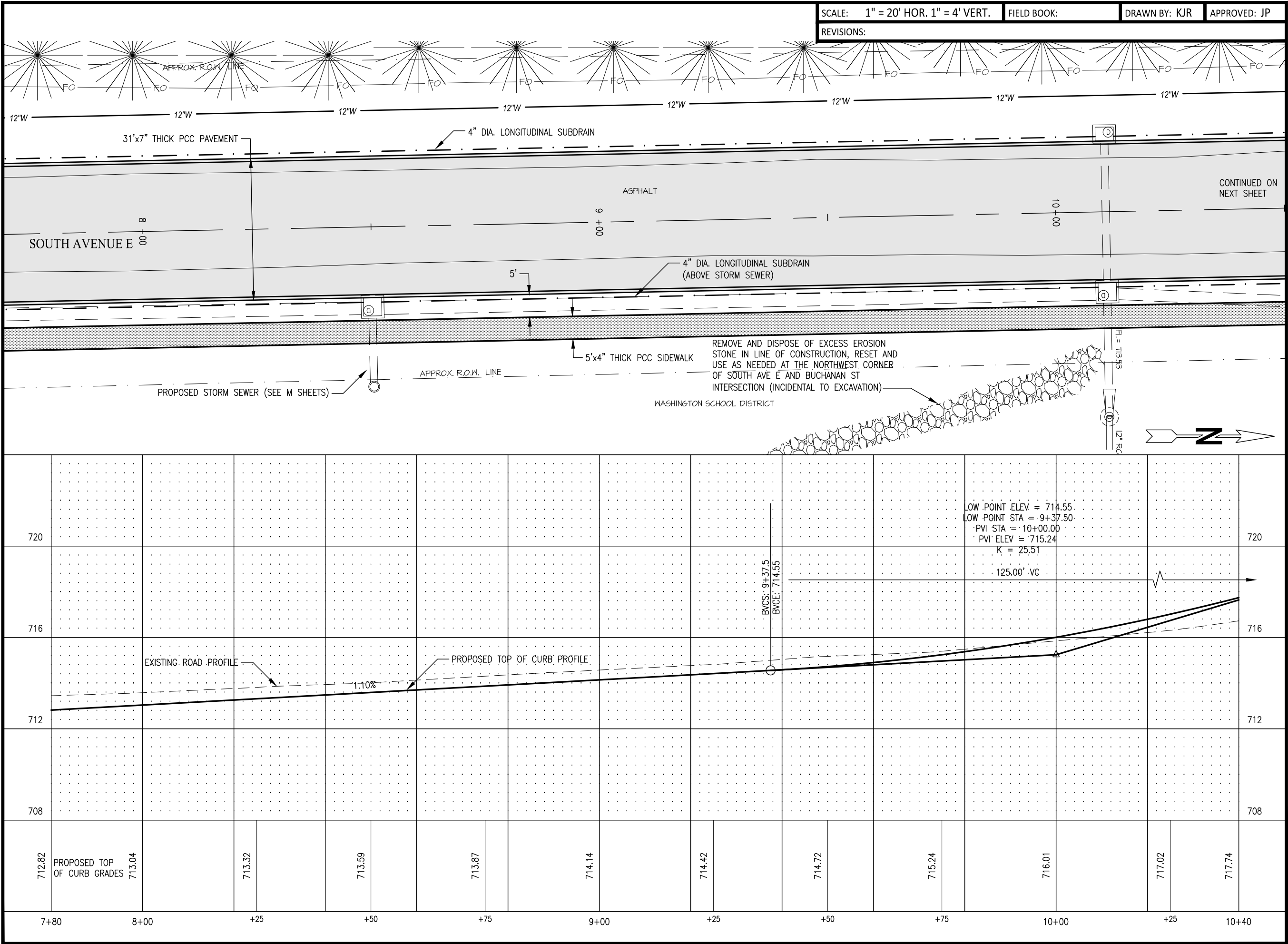
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STA. 2+60 TO 5+20**

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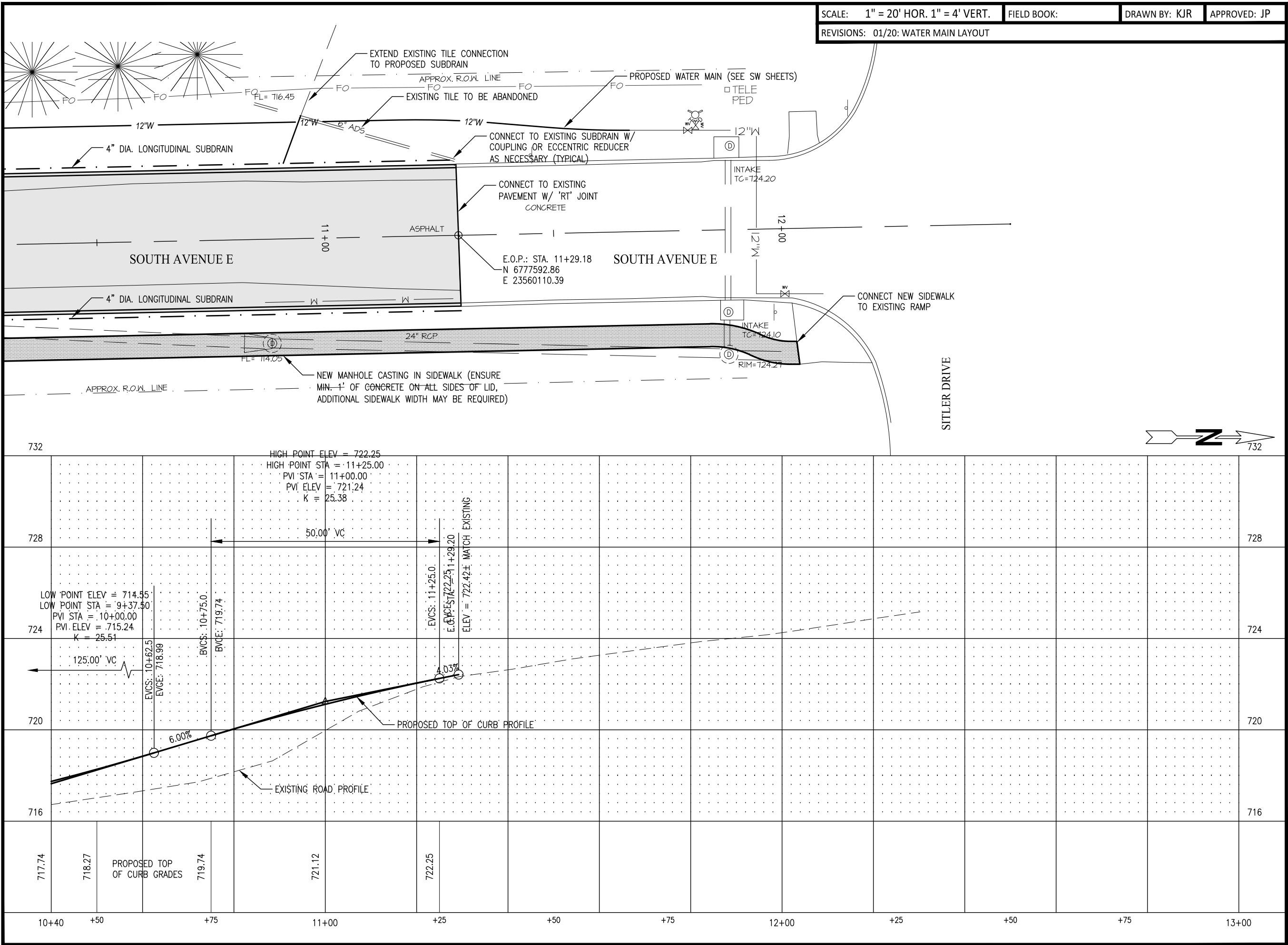
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STA. 7+80 TO 10+40**

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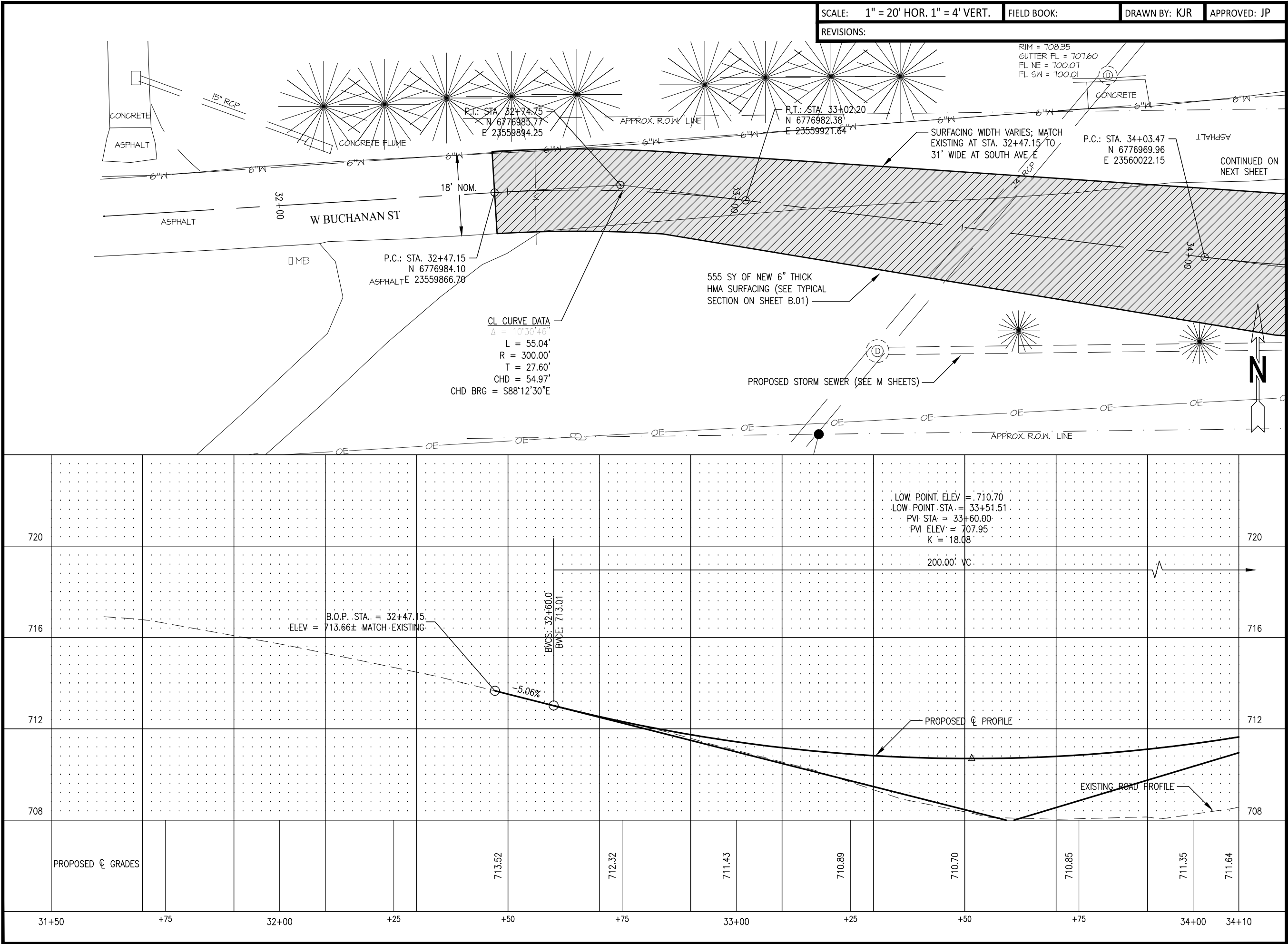
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STA. 10+40 TO E.O.P.**

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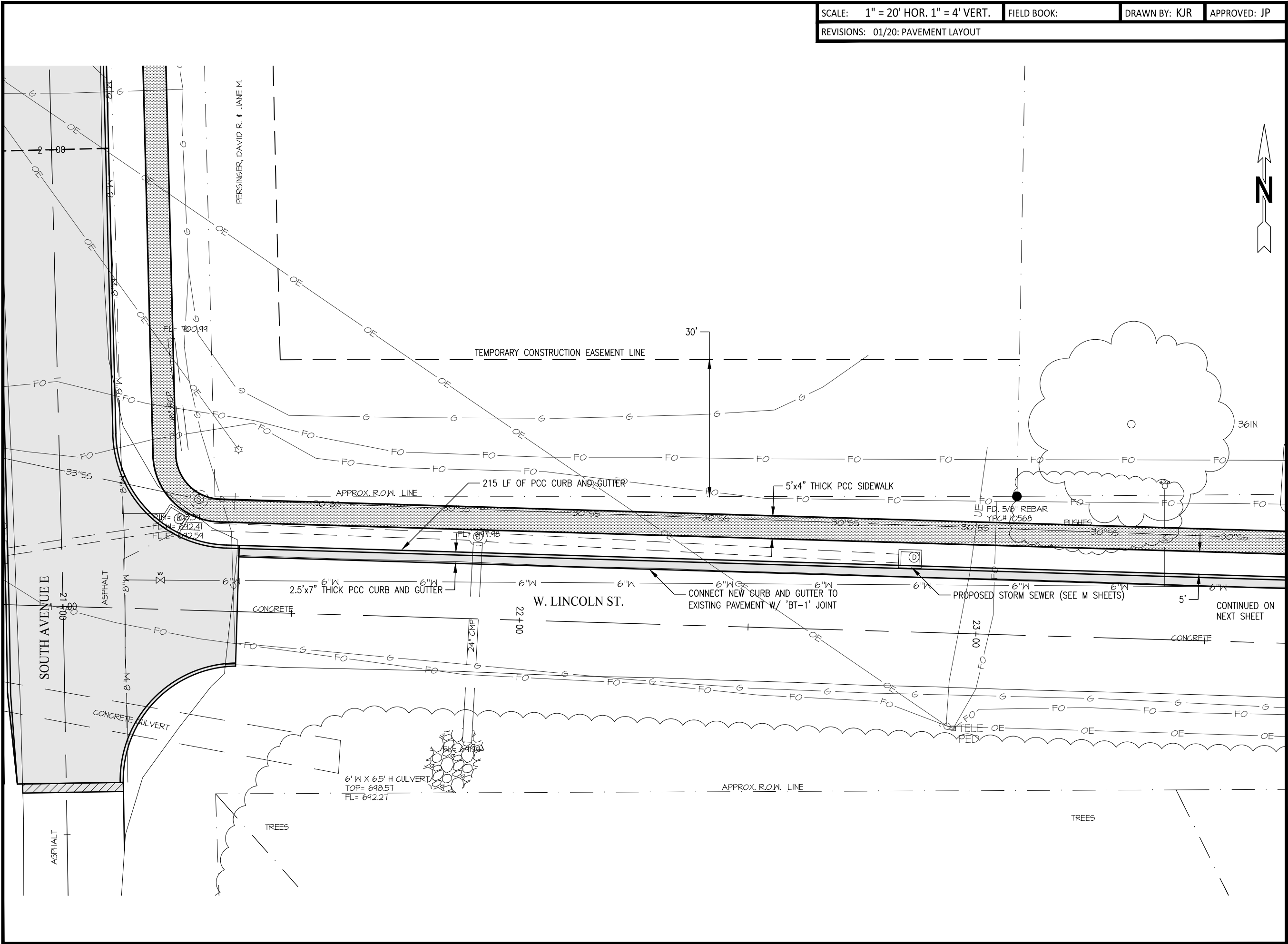
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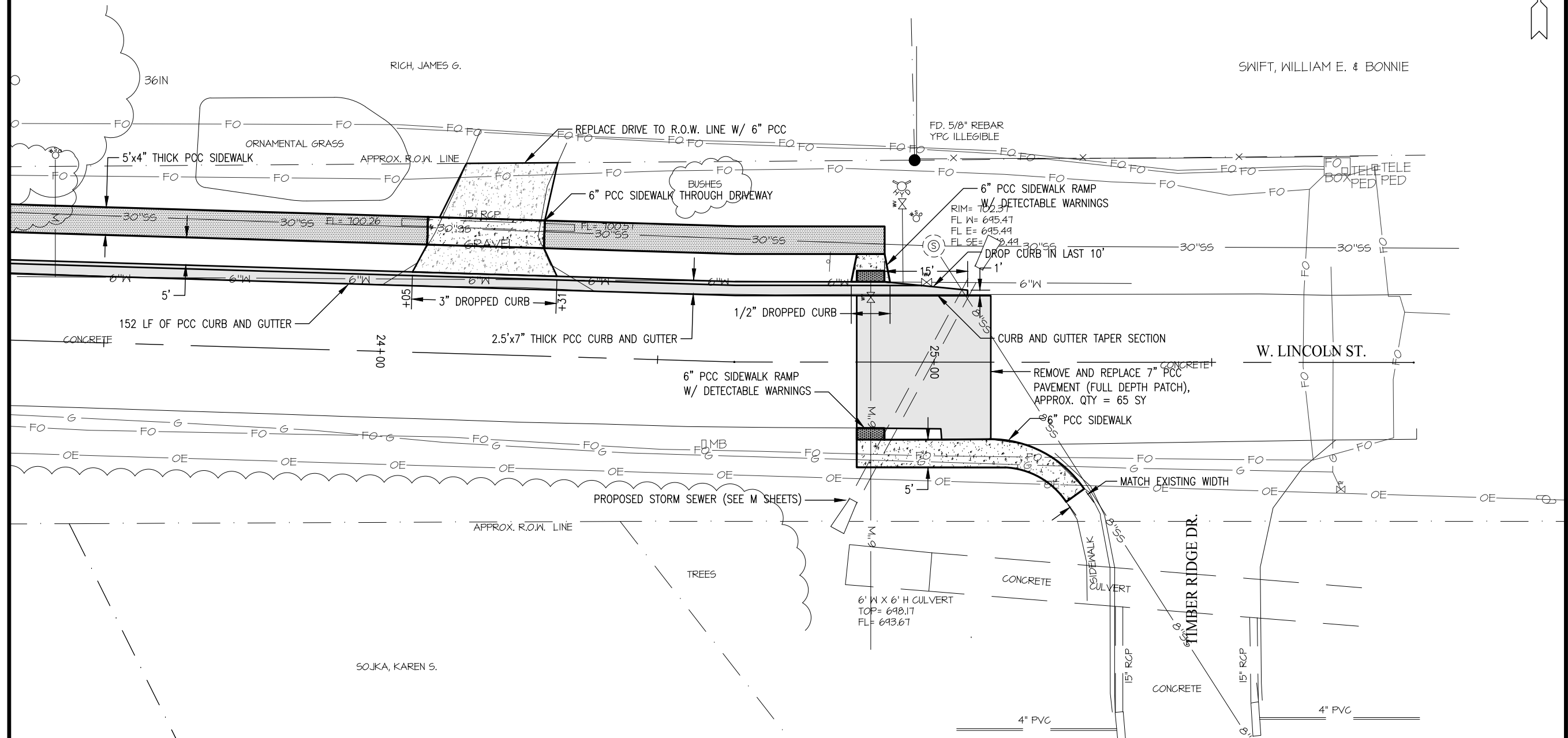
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WEST LINCOLN ST
SIDEWALK PLAN

DATE:
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WEST LINCOLN ST
SIDEWALK PLAN

DATE: JUL. 22, 2019

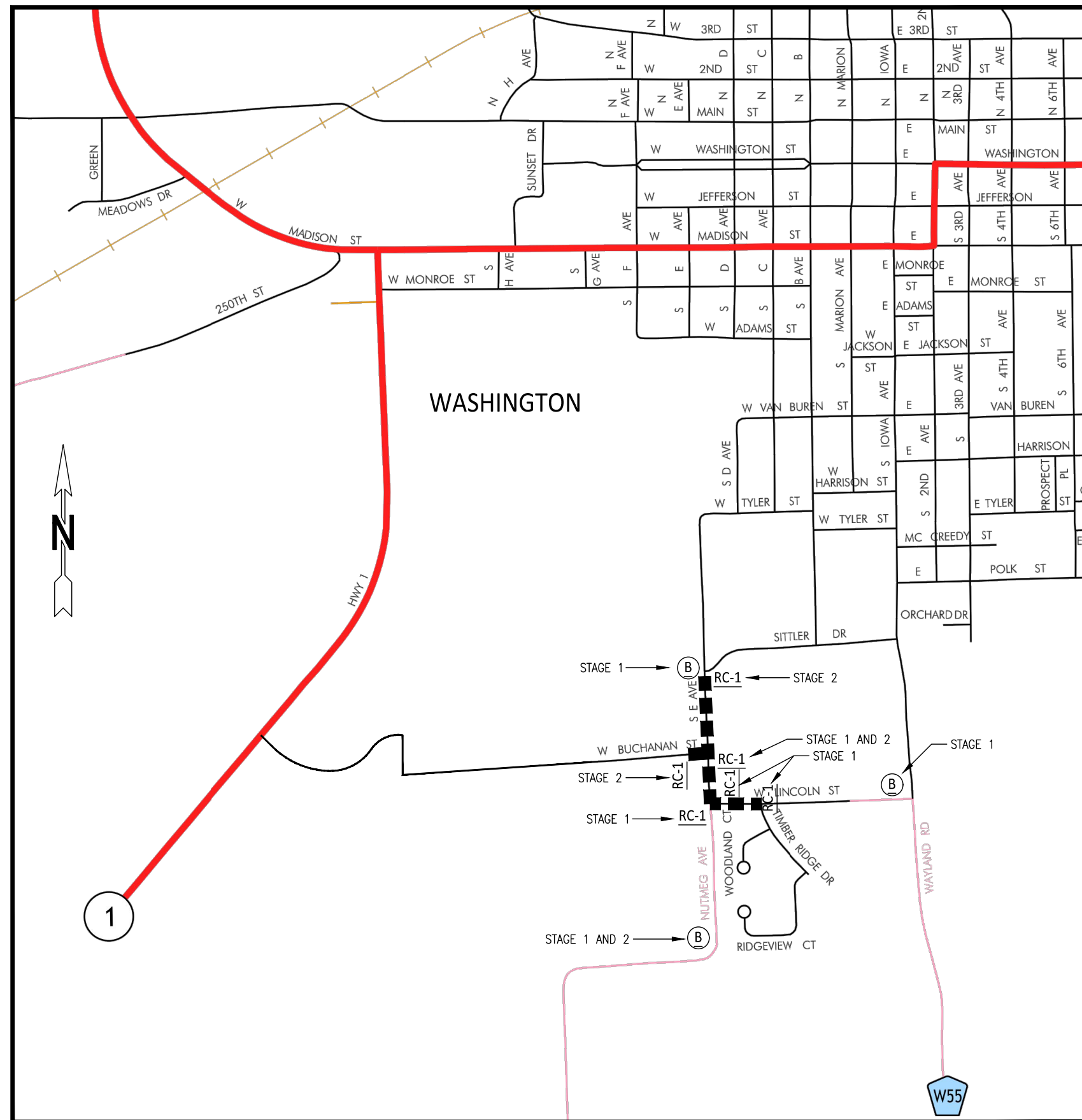
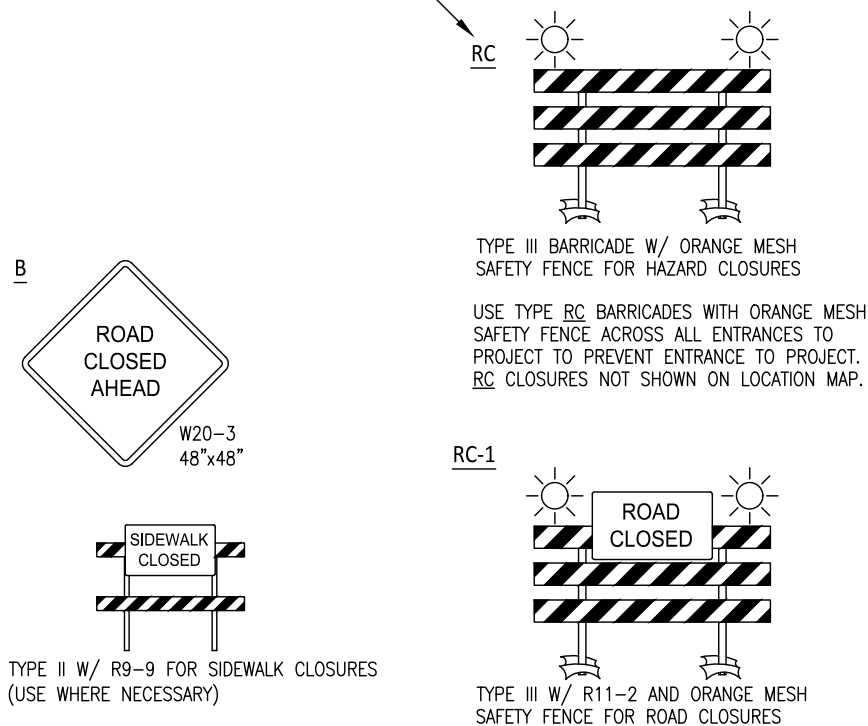
PROJECT NO.:
5018069

SHEET NO.: **D.13**

1. TEMPORARY TRAFFIC CONTROL SHALL BE THE RESPONSIBILITY OF AND PROVIDED BY THE CONTRACTOR. FURNISH, ERECT, OPERATE, MAINTAIN, MOVE, AND REMOVE ALL TRAFFIC CONTROL DEVICES REQUIRED. COMPLY WITH THE CURRENT EDITION OF THE MUTCD AS ADOPTED BY THE IOWA DOT.
2. ALL EMERGENCY SERVICES AND SCHOOL DISTRICT SHALL BE NOTIFIED UPON TRAFFIC CONTROL DEVICES BEING INSTALLED AND PRIOR TO ANY CHANGES IN TRAFFIC CONTROL DEVICES BEING MADE.
3. NOT ALL TRAFFIC CONTROL DEVICES MAY BE SHOWN ON THE TEMPORARY TRAFFIC CONTROL PLAN. PRIOR TO ANY CHANGES BEING MADE TO THE TEMPORARY TRAFFIC CONTROL PLAN, THE CONTRACTOR SHALL SUBMIT A REVISED PLAN TO THE JURISDICTION FOR REVIEW AND APPROVAL, PRIOR TO INSTALLATION.

1. STAGE 1 CONSTRUCTION SHALL CONSIST OF ALL STORM SEWER, GRADING, SIDEWALK, AND PAVING IMPROVEMENTS ALONG W LINCOLN STREET AND SOUTH AVENUE E FROM B.O.P. TO APPROXIMATELY STATION 3+10.
2. SOUTH AVENUE E AND W LINCOLN STREET WILL BE CLOSED TO THROUGH TRAFFIC FOR THE DURATION OF STAGE 1 CONSTRUCTION.
3. STAGE 2 CONSTRUCTION SHALL CONSIST OF ALL NEW STORM SEWER, GRADING, SIDEWALK, AND PAVING IMPROVEMENTS FROM APPROXIMATELY STA. 3+10 TO E.O.P. FOR SOUTH AVENUE E AND REALIGNMENT AND CONSTRUCTION OF W BUCHANAN STREET.
4. SOUTH AVENUE E AND W BUCHANAN STREET WILL BE CLOSED TO THROUGH TRAFFIC FOR THE DURATION OF STAGE 2 CONSTRUCTION.
5. RESIDENTIAL ACCESS TO DRIVES ON SOUTH AVENUE E AT STATIONS; 3+00, 3+16, AND 4+17 SHALL BE MAINTAINED AT ALL TIMES. USE TEMPORARY GRANULAR SURFACING AS NOTED ON THE PLANS.
6. RESIDENTIAL ACCESS TO W BUCHANAN STREET WILL BE FROM HIGHWAY 1 (WEST OF PROJECT) DURING STAGE 2 CONSTRUCTION.
7. STAGE 1 CONSTRUCTION SHALL BE COMPLETE PRIOR TO ANY WORK BEING PERFORMED ON STAGE 2 CONSTRUCTION UNLESS OTHERWISE APPROVED BY THE JURISDICTION.
8. RETAINING WALL MAY BE CONSTRUCTED IN STAGES OR ENTIRELY DURING STAGE 1 OR 2, AT CONTRACTOR'S OPTION.

TYPICAL SIGN DESIGNATION – SEE
SITE MAP FOR INSTALLATION LOCATIONS



LOCATION MAP
SCALE: 1" = 1,000'±



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SOUTH AVENUE E
RECONSTRUCTION
WASHINGTON, IOWA

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SHEET TITLE
TEMPORARY TRAFFIC
CONTROL PLAN

DATE: JUL. 22, 2019

PROJECT NO.: 5018069

SHEET NO.: J.01

email@gardenassociates.net

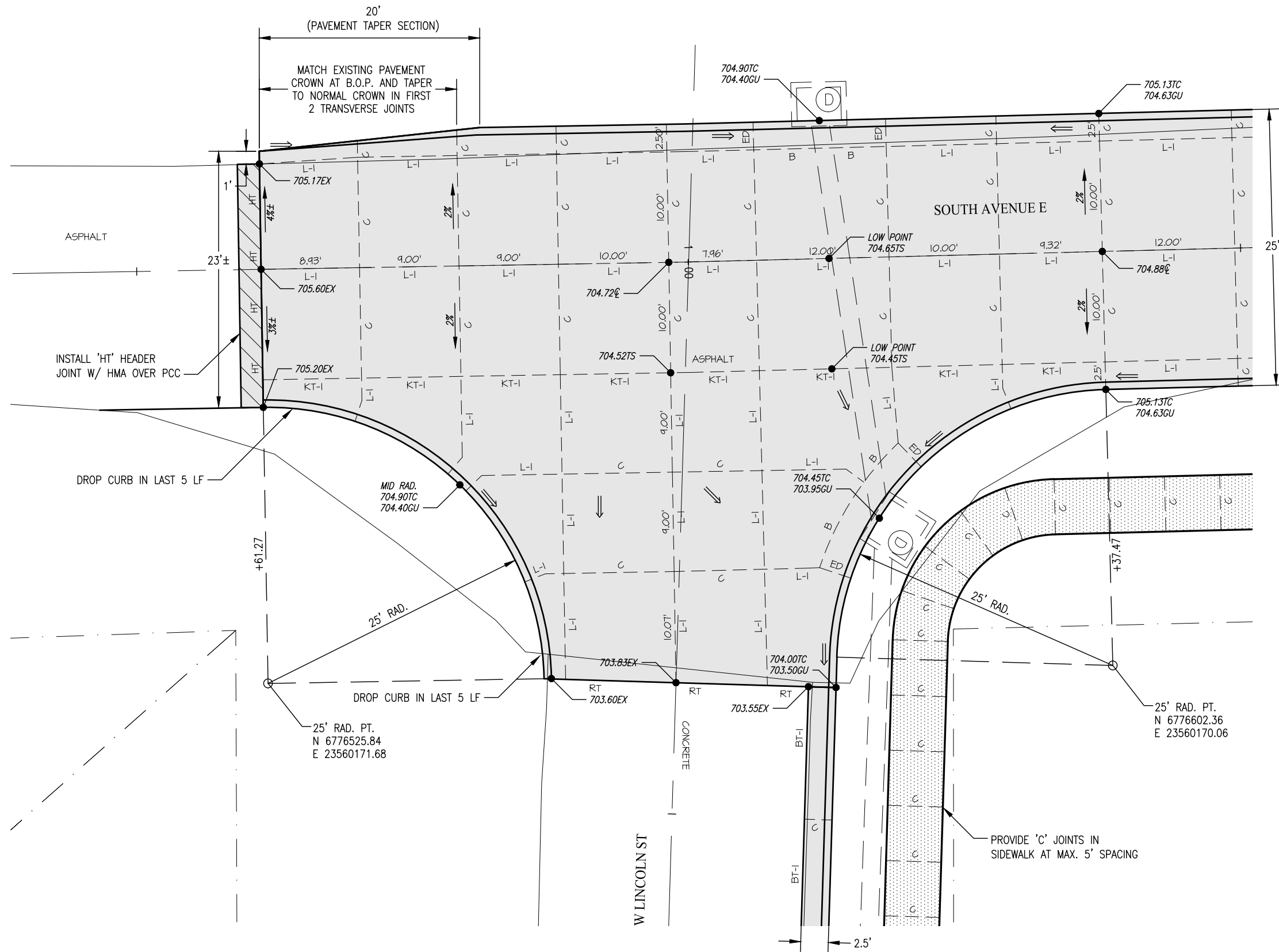
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TC = TOP OF CURB ELEVATION
DC = DROPPED CURB ELEVATION
GU = GUTTER ELEVATION
TS = TOP OF SLAB ELEVATION
EX = EXISTING ELEVATION
CL = CENTERLINE ELEVATION

SCALE: 1" = 10'
FIELD BOOK:
DRAWN BY: KJR
APPROVED: JP

REVISIONS:



SOUTH AVENUE E AND WEST LINCOLN STREET



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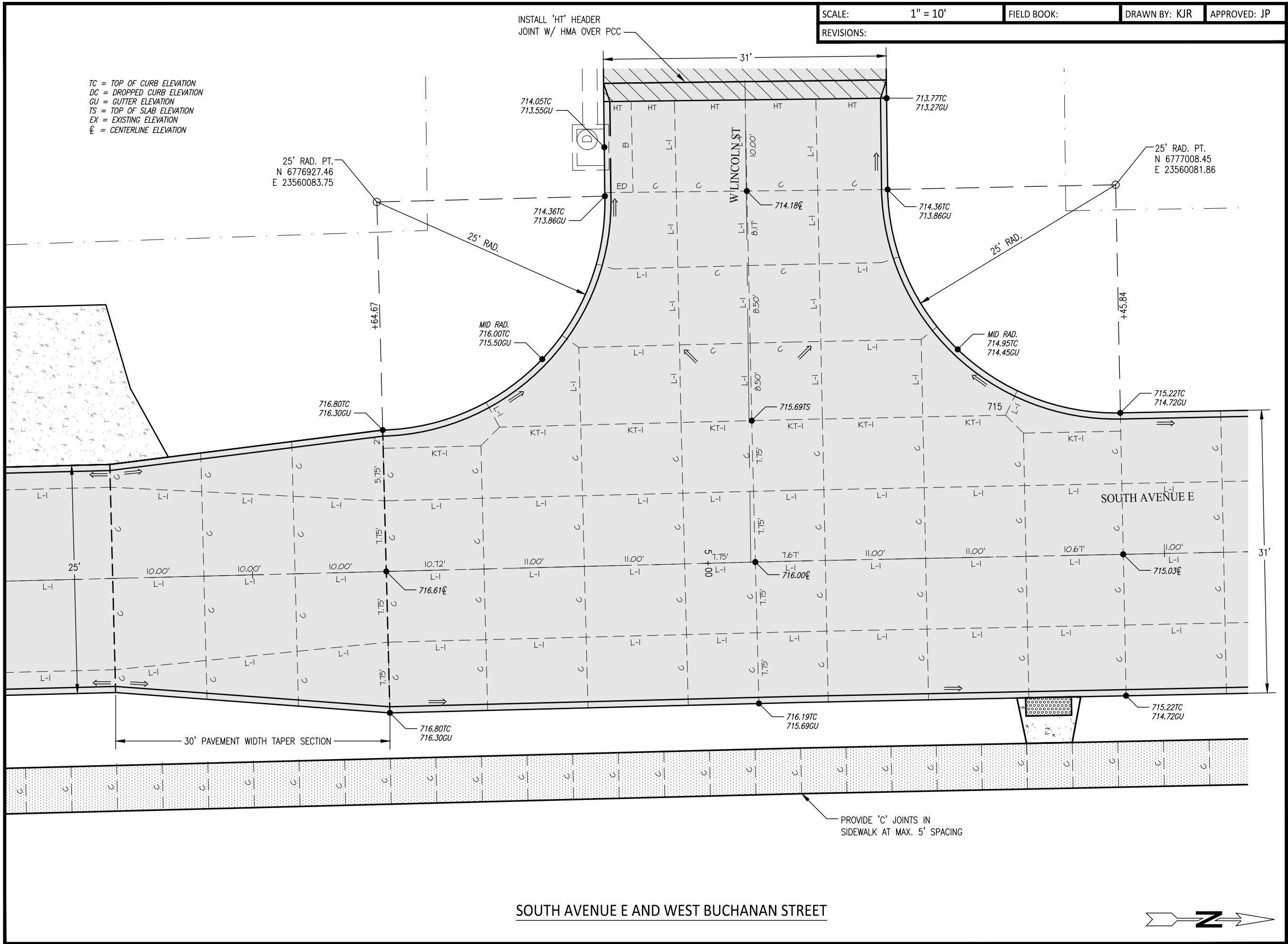
SHEET TITLE
**INTERSECTION
DETAILS**

DATE:
JUL. 22, 2019

PROJECT NO.:
5018069

SHEET NO.:
L.01

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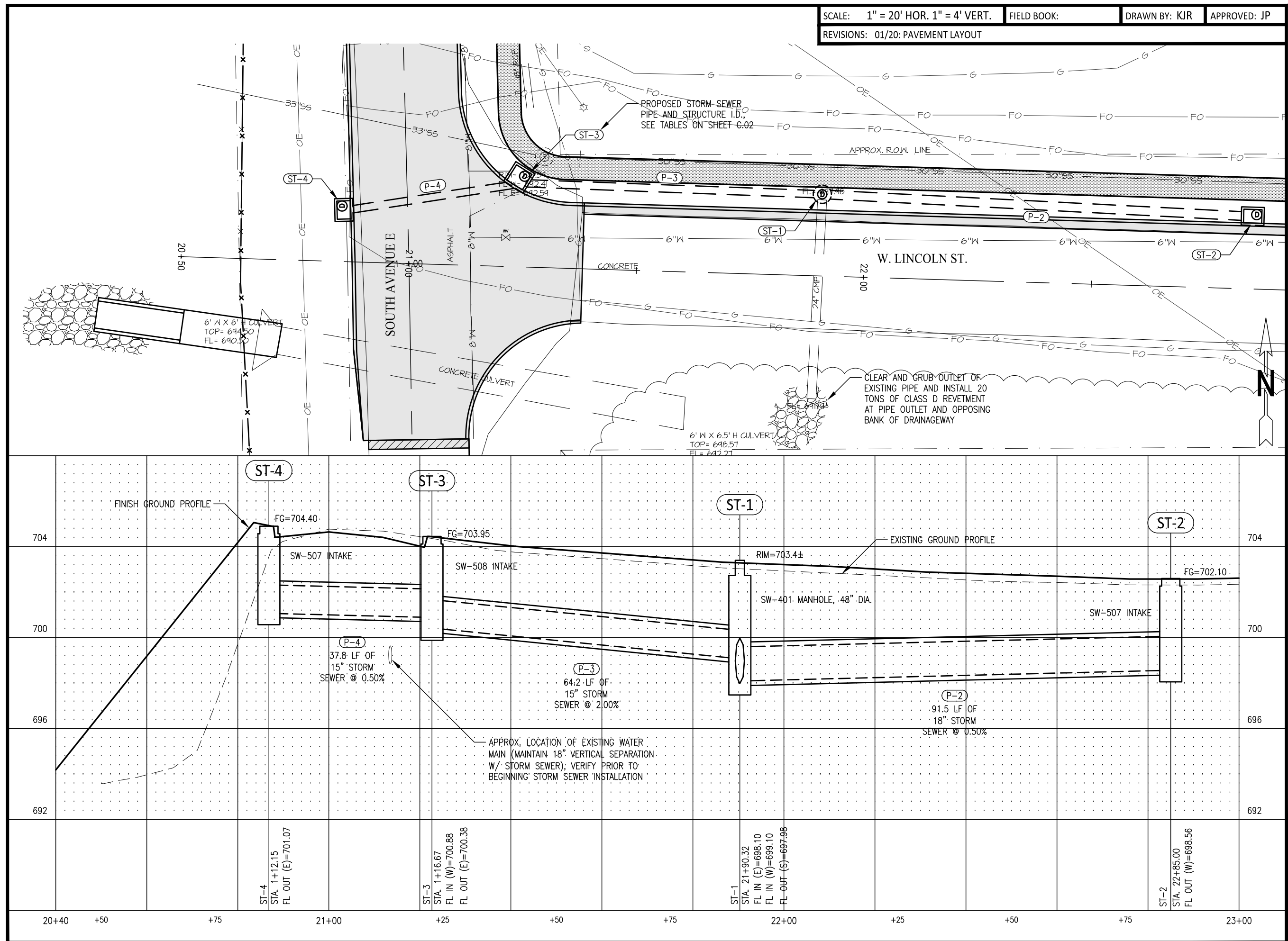
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**INTERSECTION
DETAILS**

DATE:
JUL. 22, 2019

PROJECT NO.:
5018069

SHEET NO.:
L.02

SHEET NO.:
M.01



SCALE: 1" = 20' HOR. 1" = 4' VERT.	FIELD BOOK:	DRAWN BY: KJR	APPROVED: JP
REVISIONS: 01/20: PAVEMENT LAYOUT			

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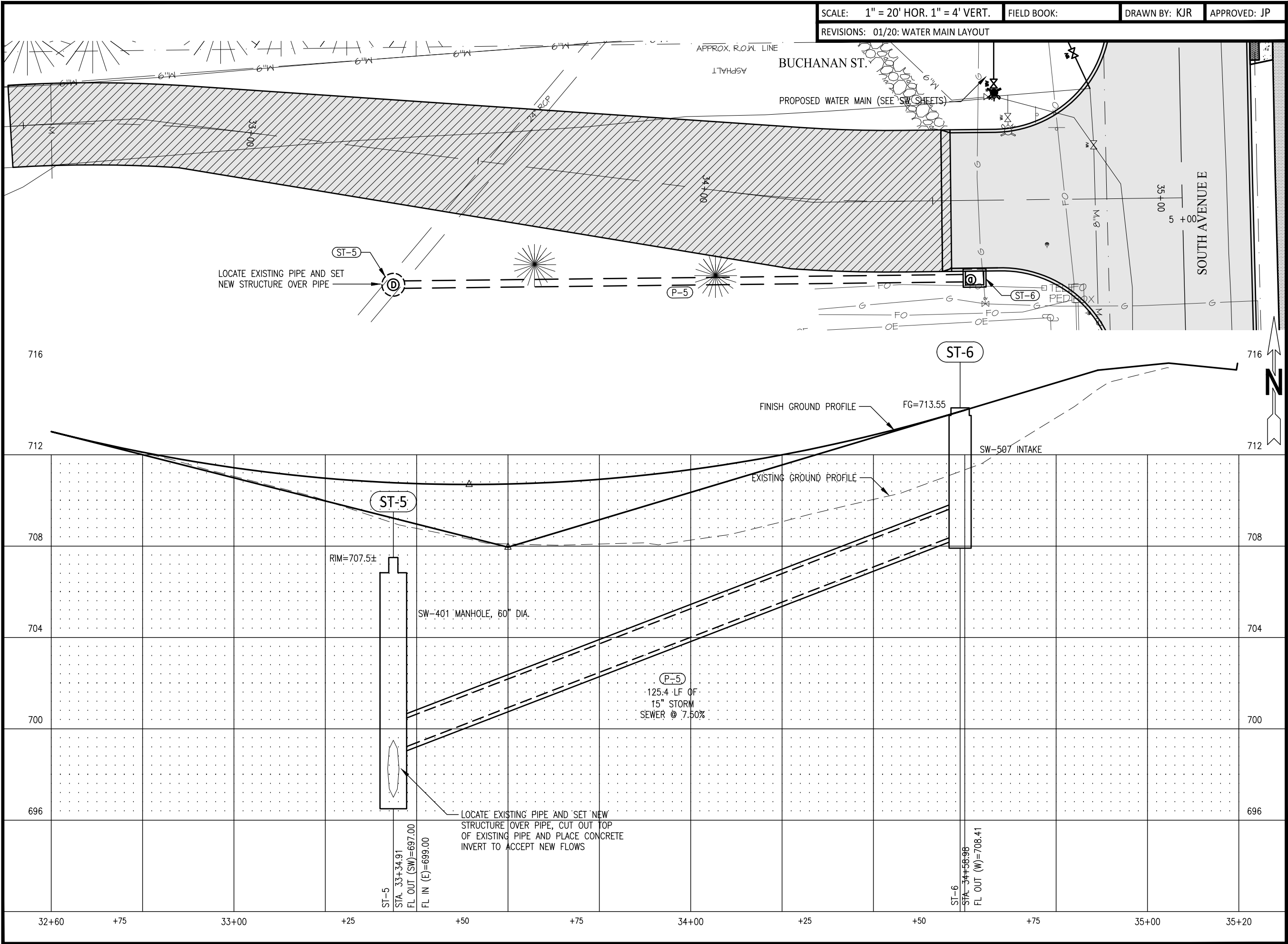
SHEET TITLE
STORM SEWER
PLAN AND PROFILE

DATE: JUL. 22, 2019

PROJECT NO.:
5018069

SHEET NO.: M.02

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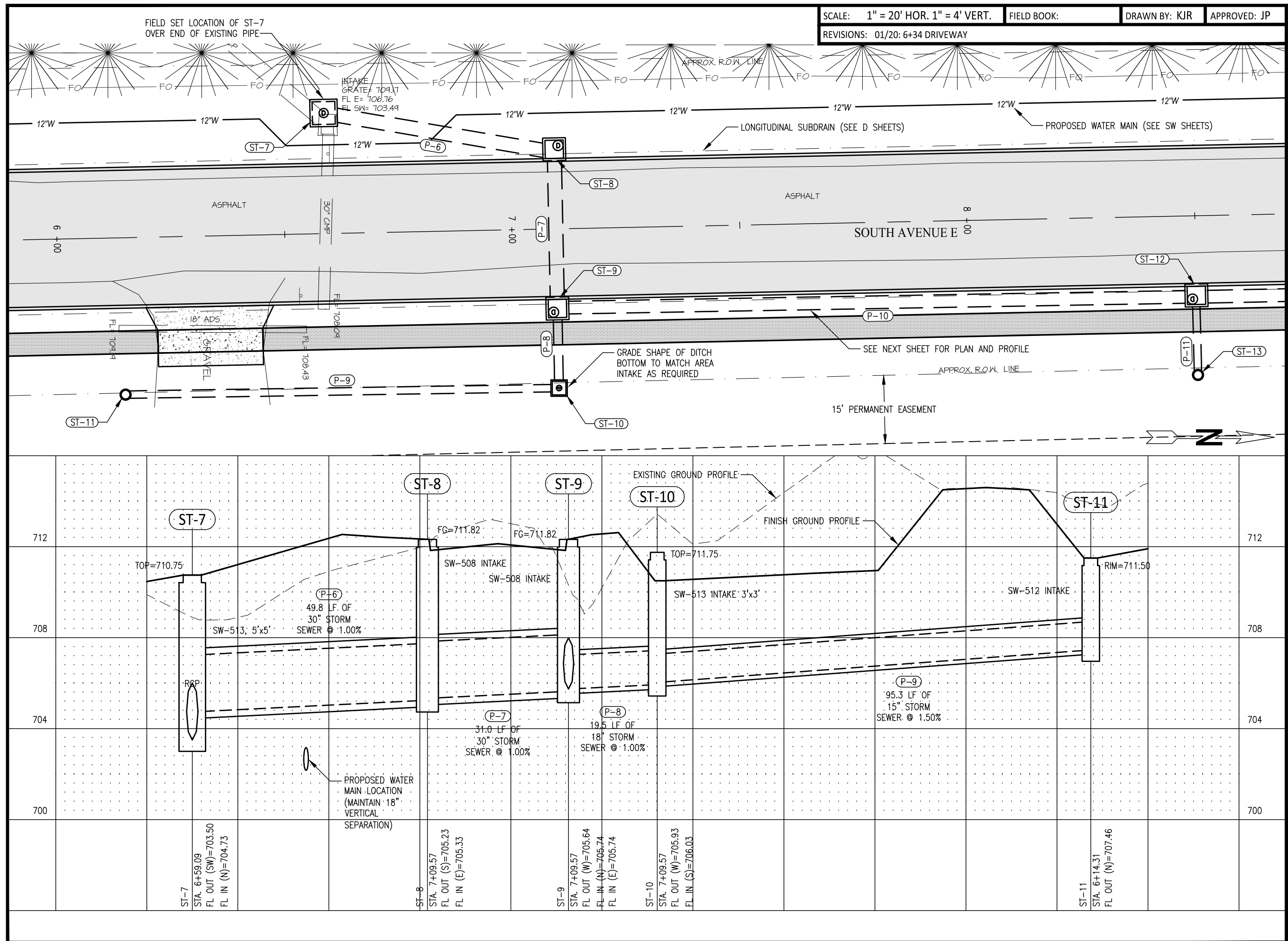
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SHEET TITLE
**STORM SEWER
PLAN AND PROFILE**

DATE:
JUL. 22, 2019

PROJECT NO.:
5018069

SHEET NO.:
M.03



SCALE: 1" = 20' HOR. 1" = 4' VERT.	FIELD BOOK:	DRAWN BY: KJR	APPROVED: JP
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REVISIONS: 01/20: 6+34 DRIVEWAY

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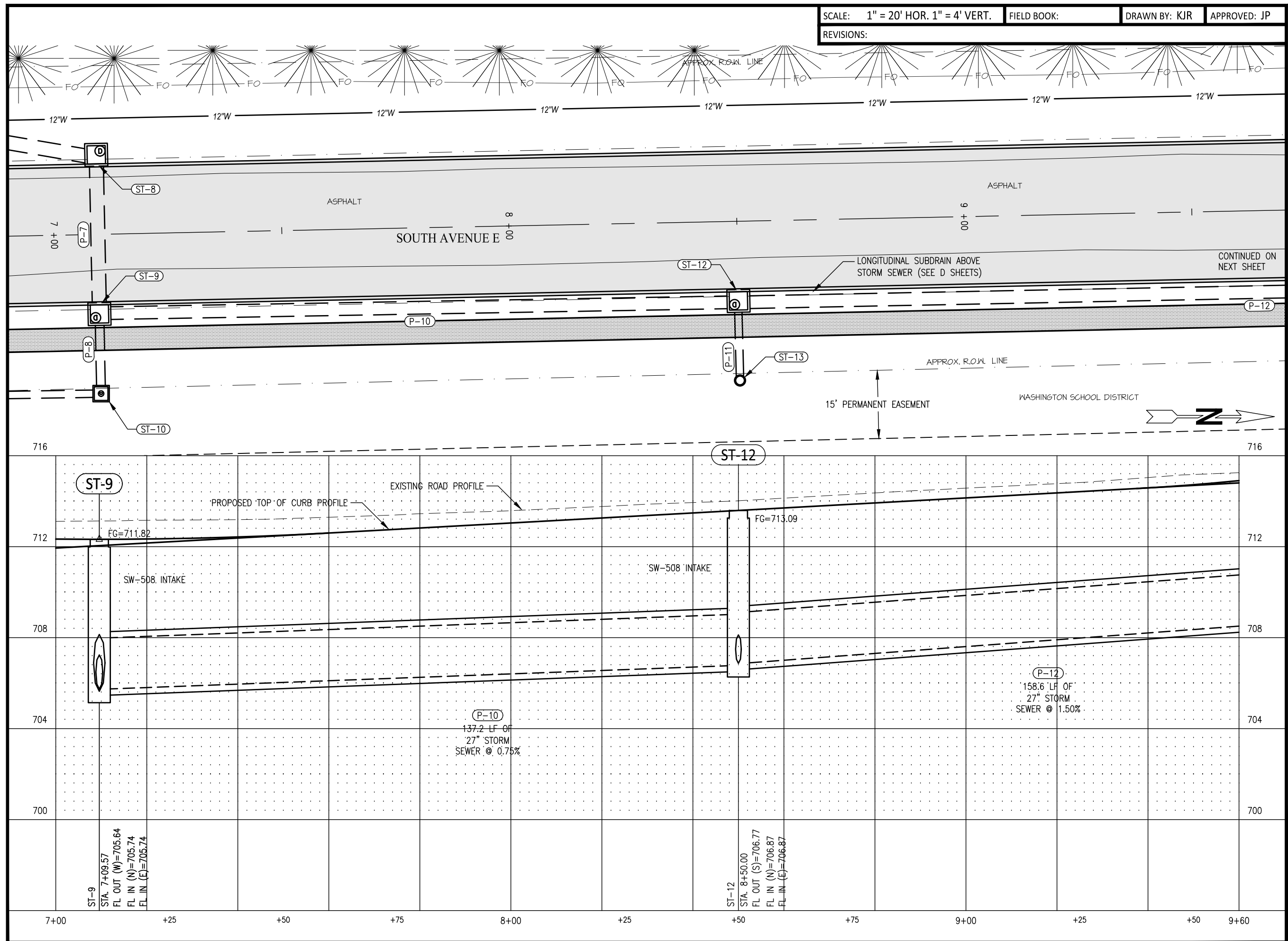
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SHEET TITLE
STORM SEWER
PLAN AND PROFILE

DATE: JUL. 22, 2019

PROJECT NO.:
5018069

SHEET NO.: M.04



SCALE: 1" = 20' HOR. 1" = 4' VERT.	FIELD BOOK:	DRAWN BY: KJR	APPROVED: JP
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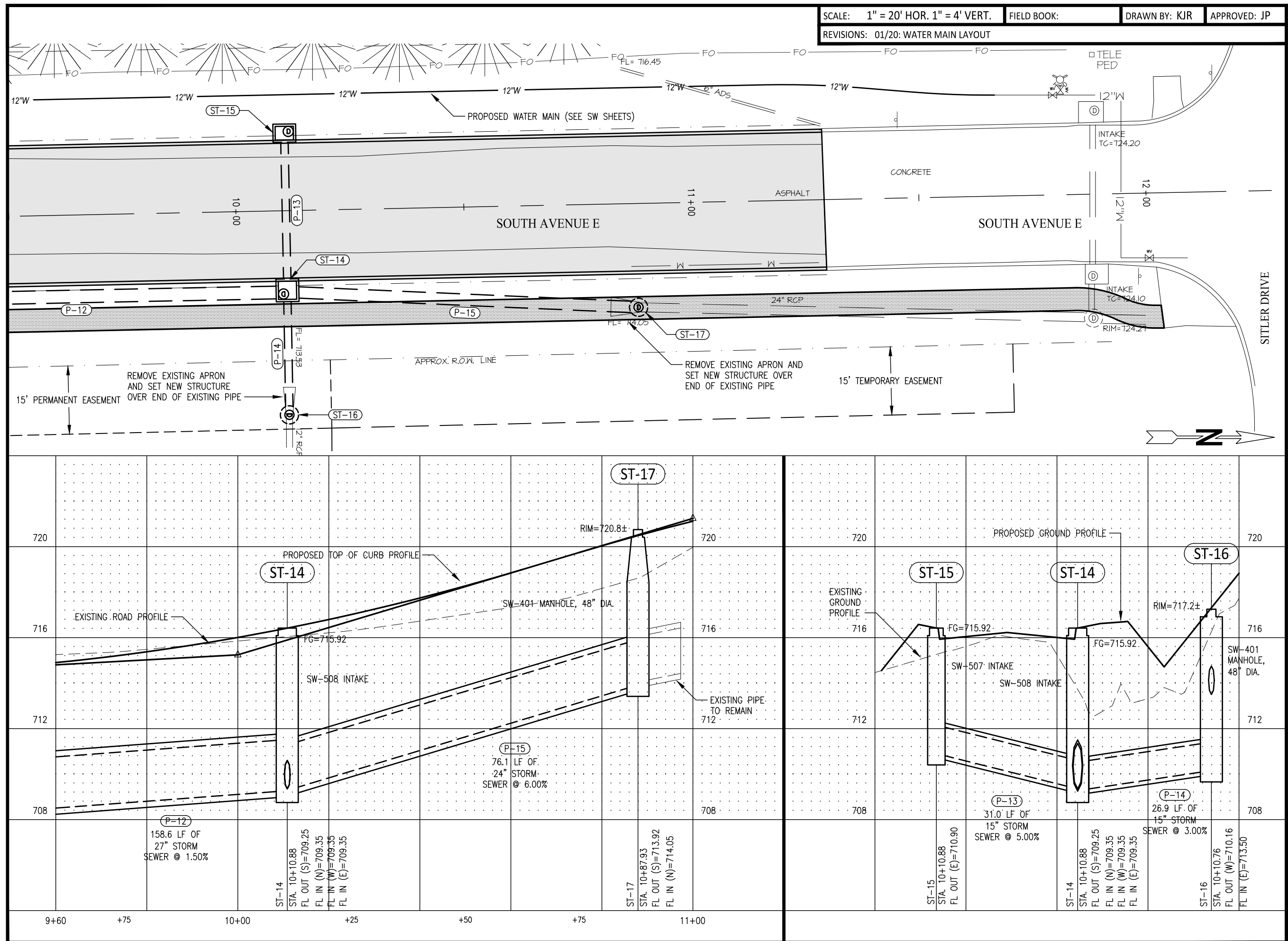
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STORM SEWER
PLAN AND PROFILE

DATE: JUL. 22, 2019

PROJECT NO.:
5018069

SHEET NO.: **M.05**



SCALE: 1" = 20' HOR. 1" = 4' VERT.	FIELD BOOK:	DRAWN BY: KJR	APPROVED: JP
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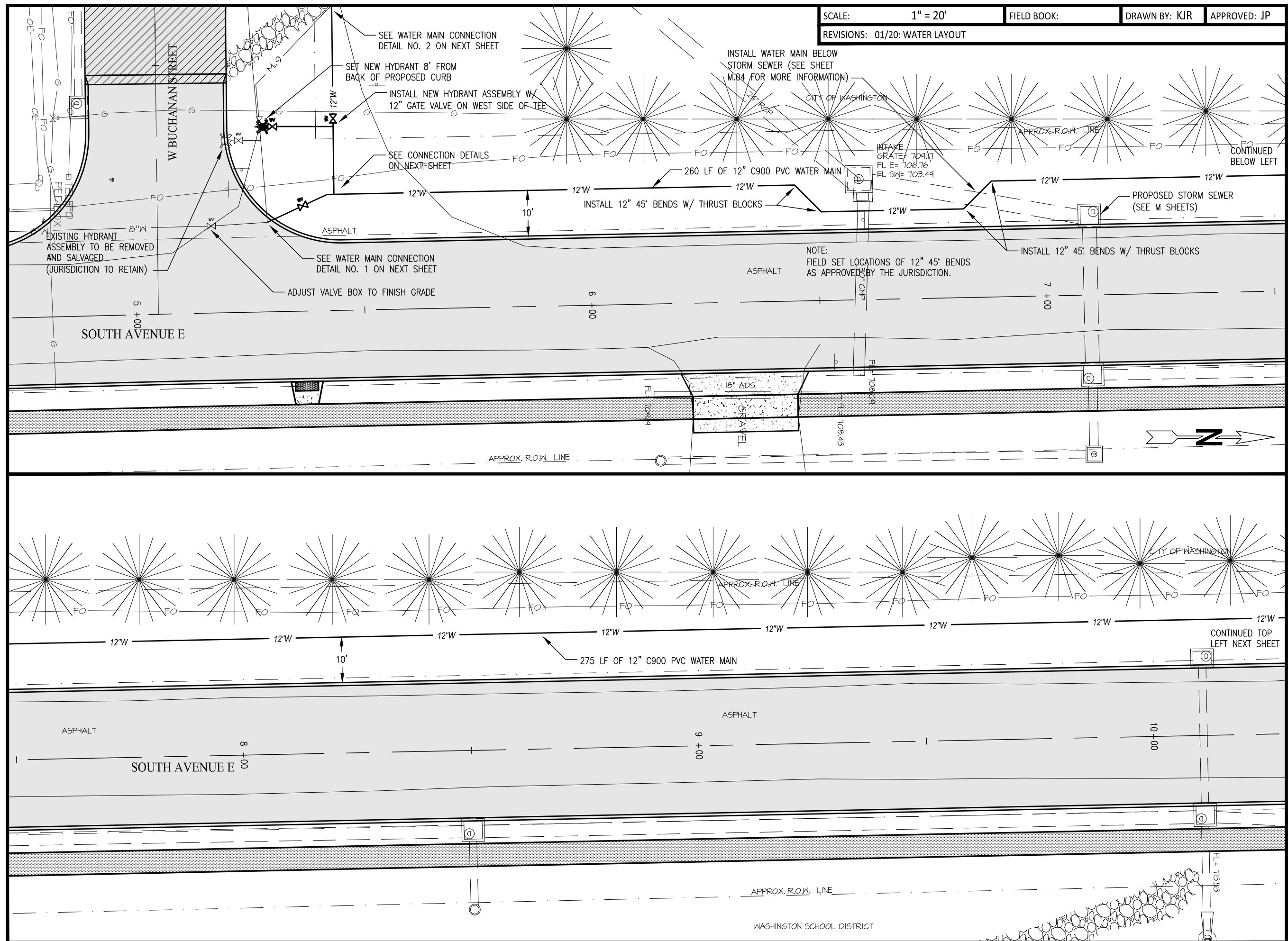
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STORM SEWER
PLAN AND PROFILE

DATE: JUL. 22, 2019

PROJECT NO.:
5018069

SHEET NO.: M.06



SCALE:	1" = 20'	FIELD BOOK:	DRAWN BY: KJR	APPROVED: JP
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REVISIONS: 01/20: WATER LAYOUT

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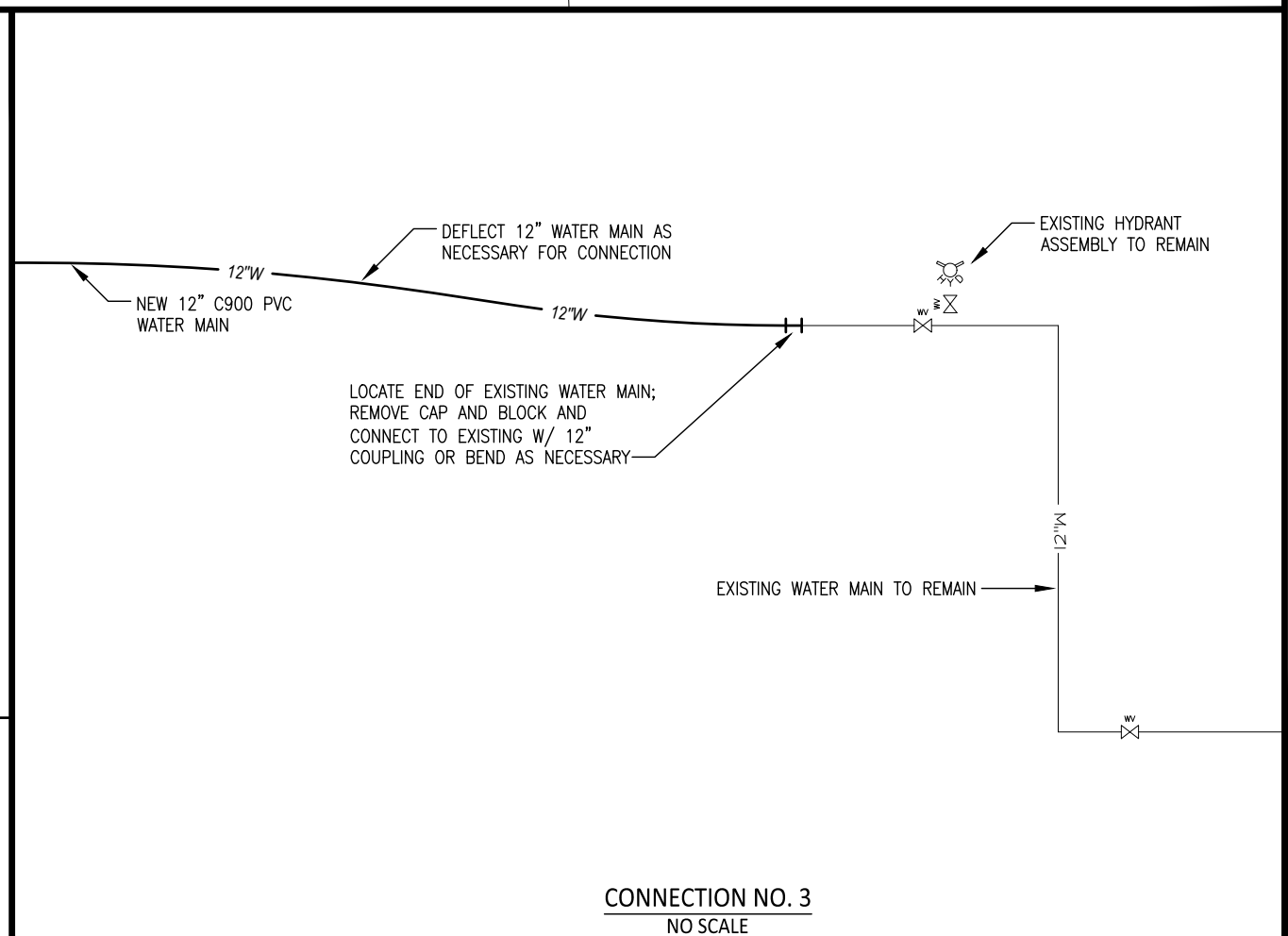
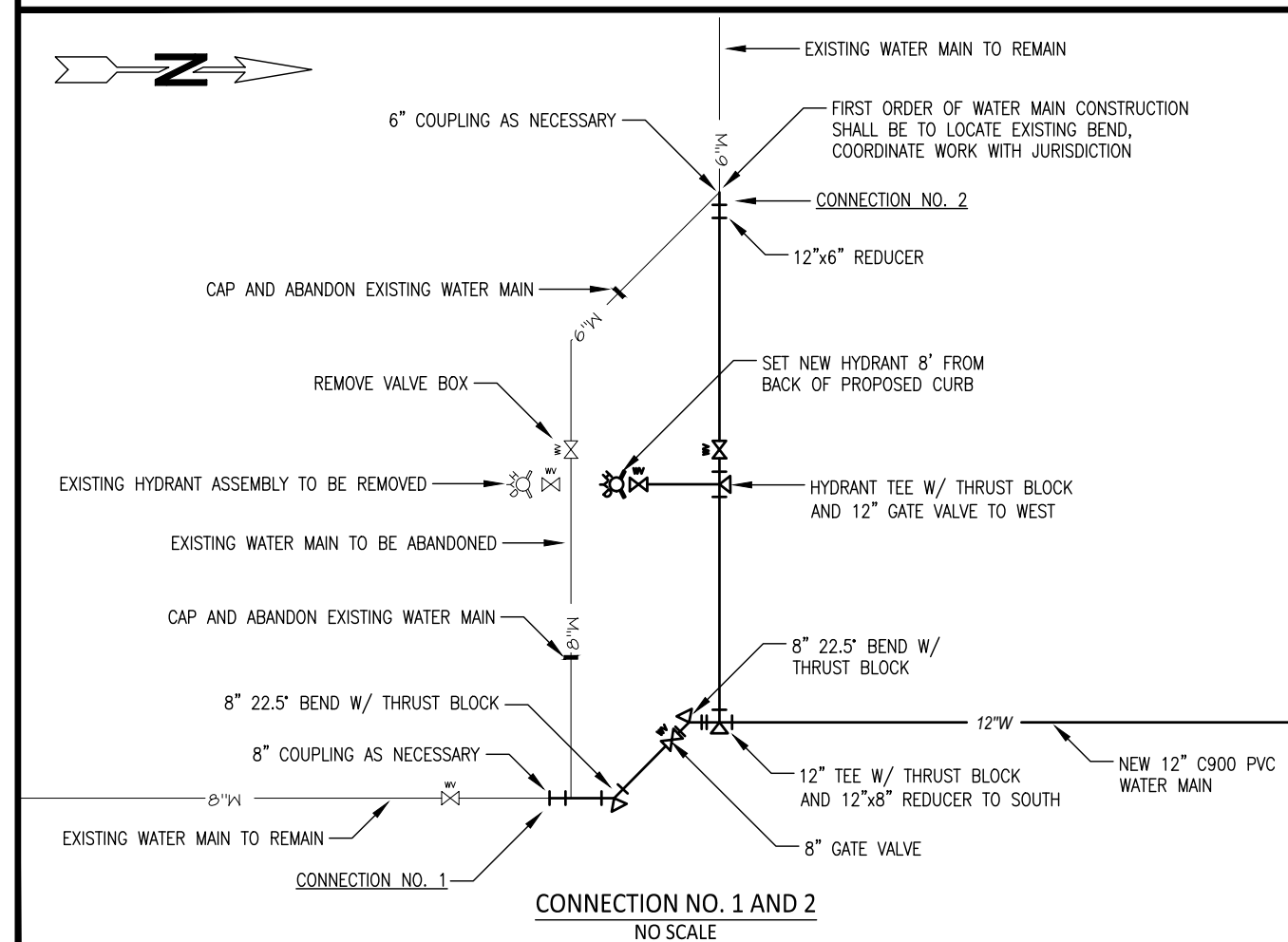
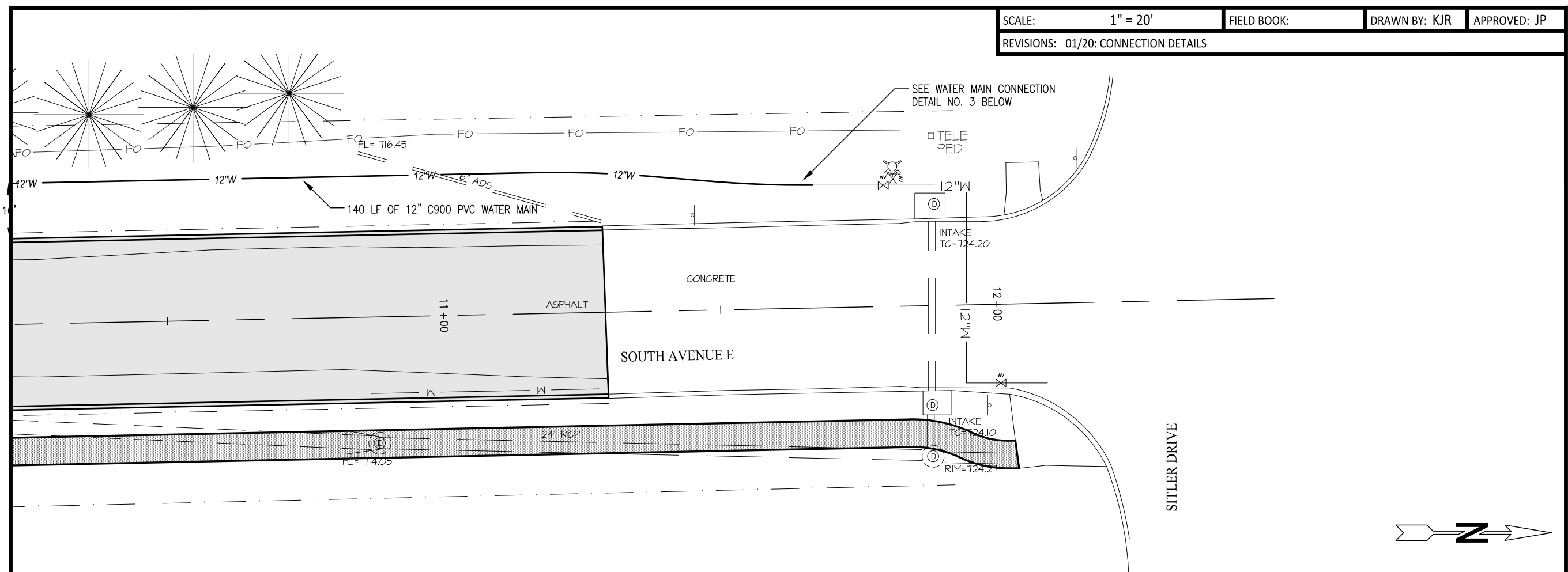
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SHEET TITLE
WATER MAIN PLAN

DATE: JUL. 22, 2019

PROJECT NO.:
5018069

SHEET NO.:
SW.01



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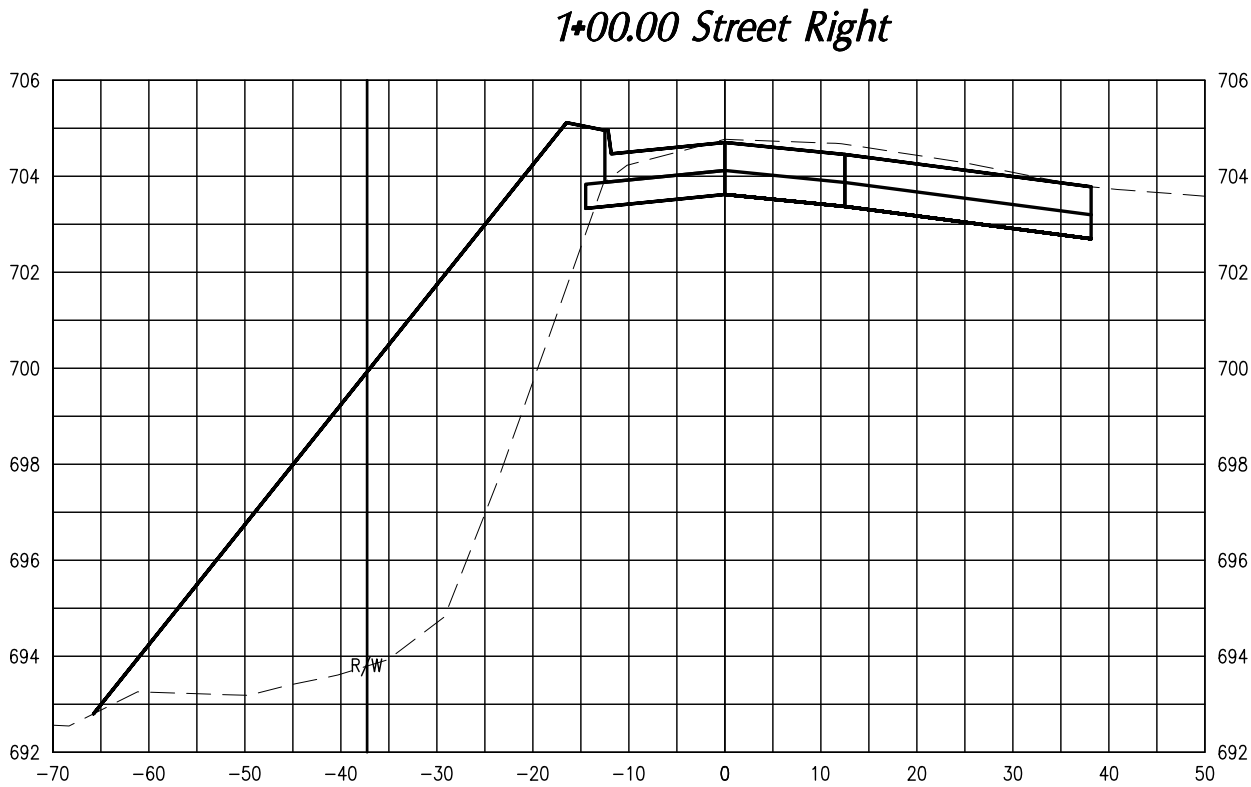
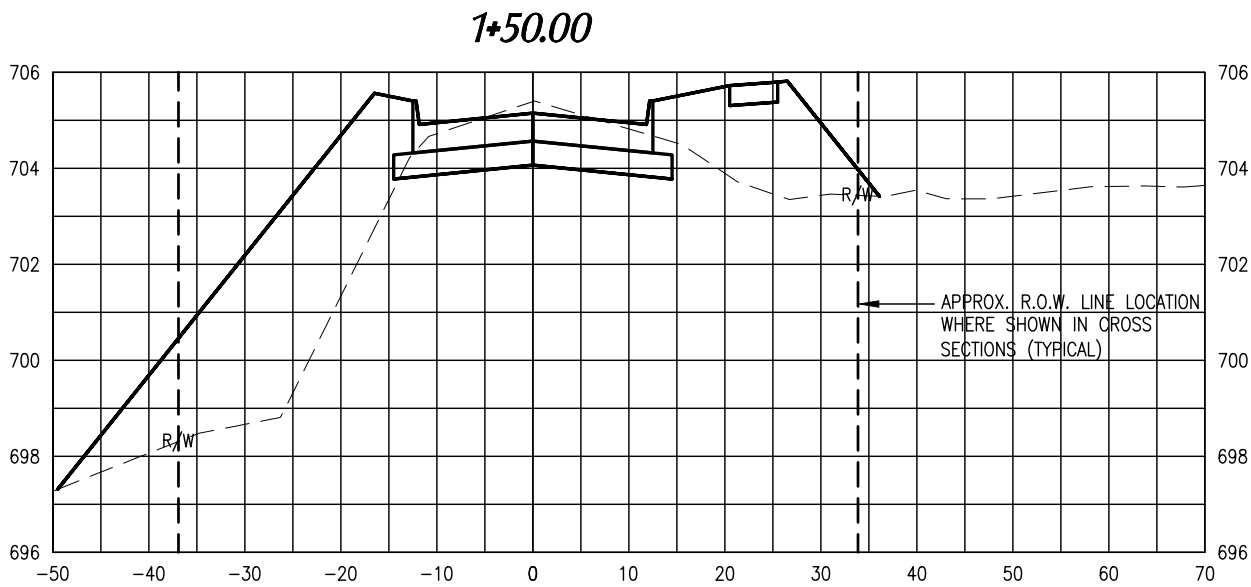
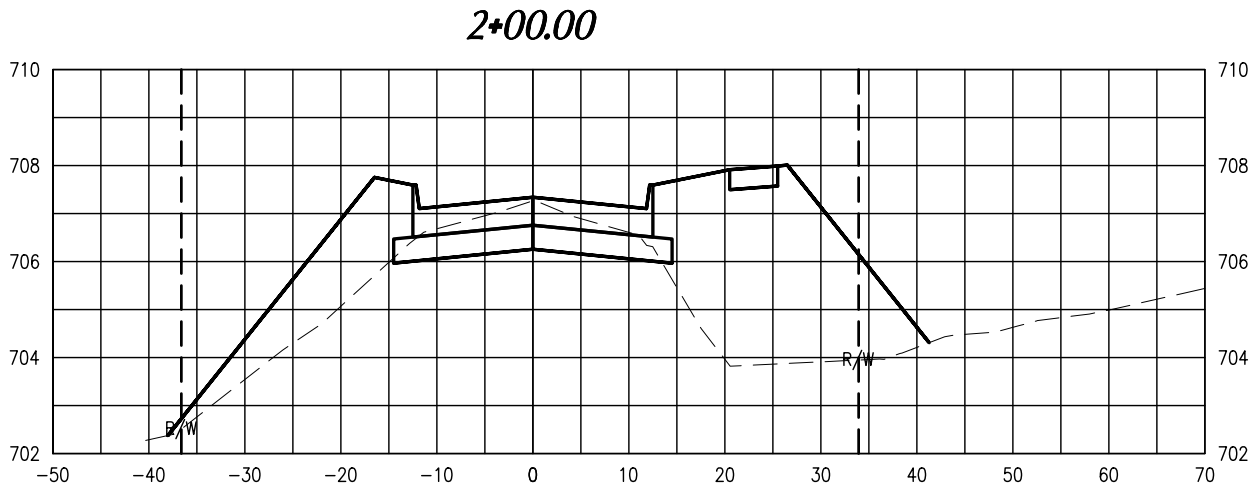
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AND CONNECTION
DETAILS

DATE: JUL. 22, 2019

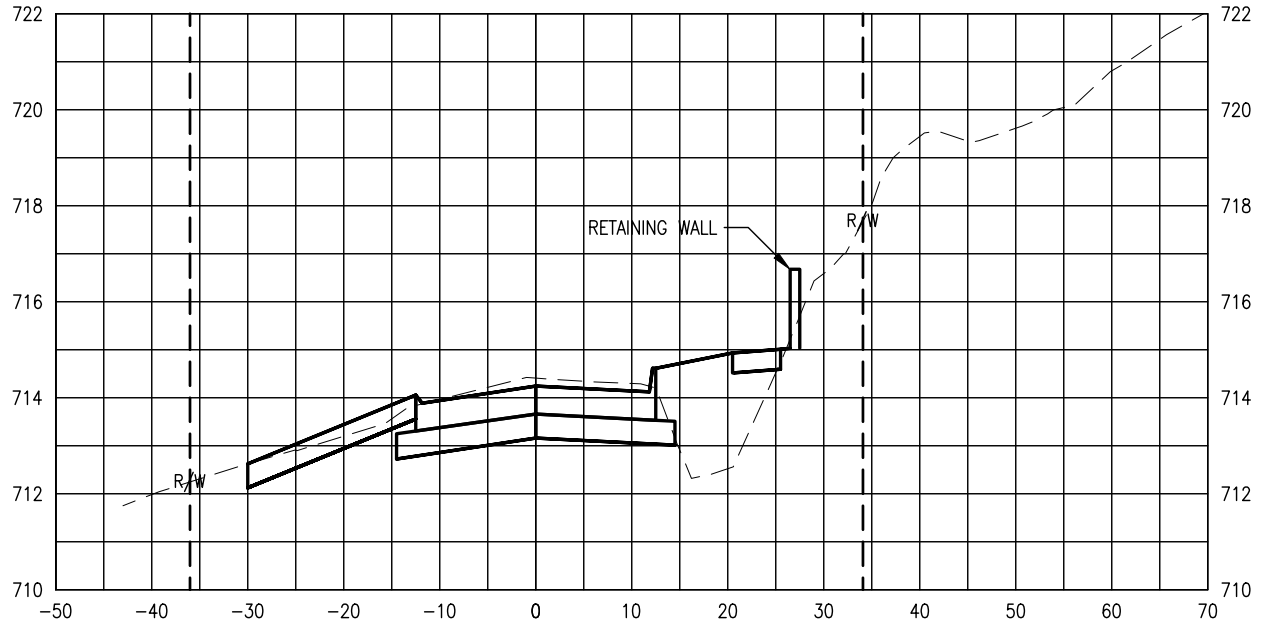
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SW.02

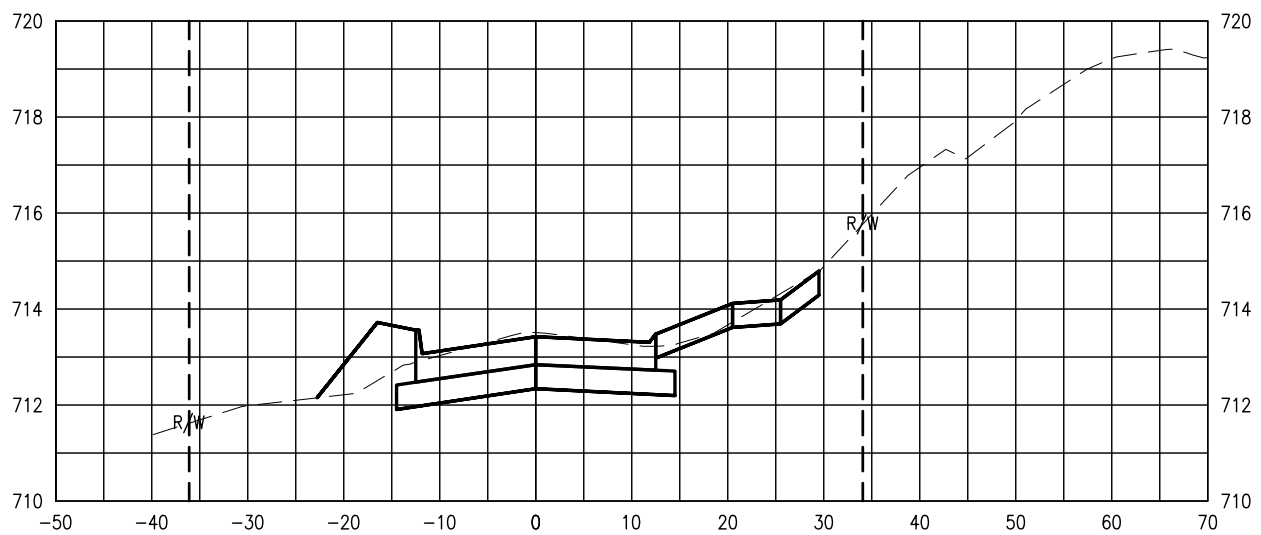
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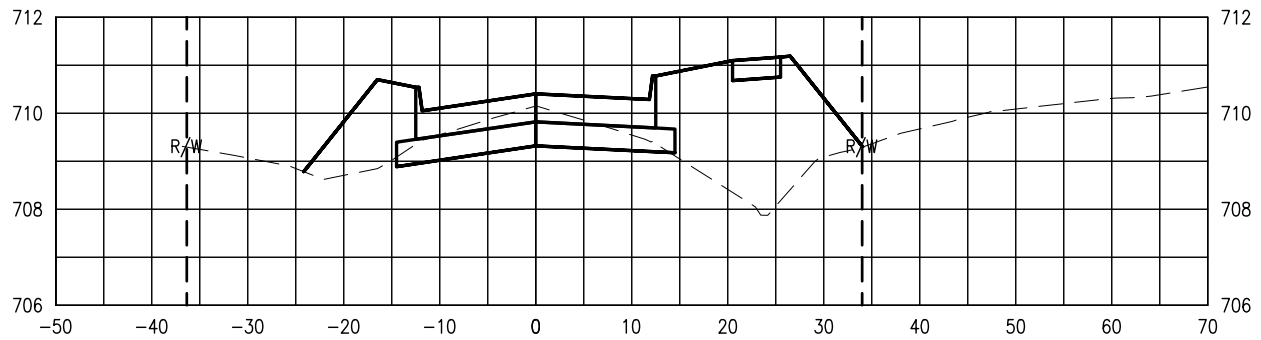
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3+00 Drive Right

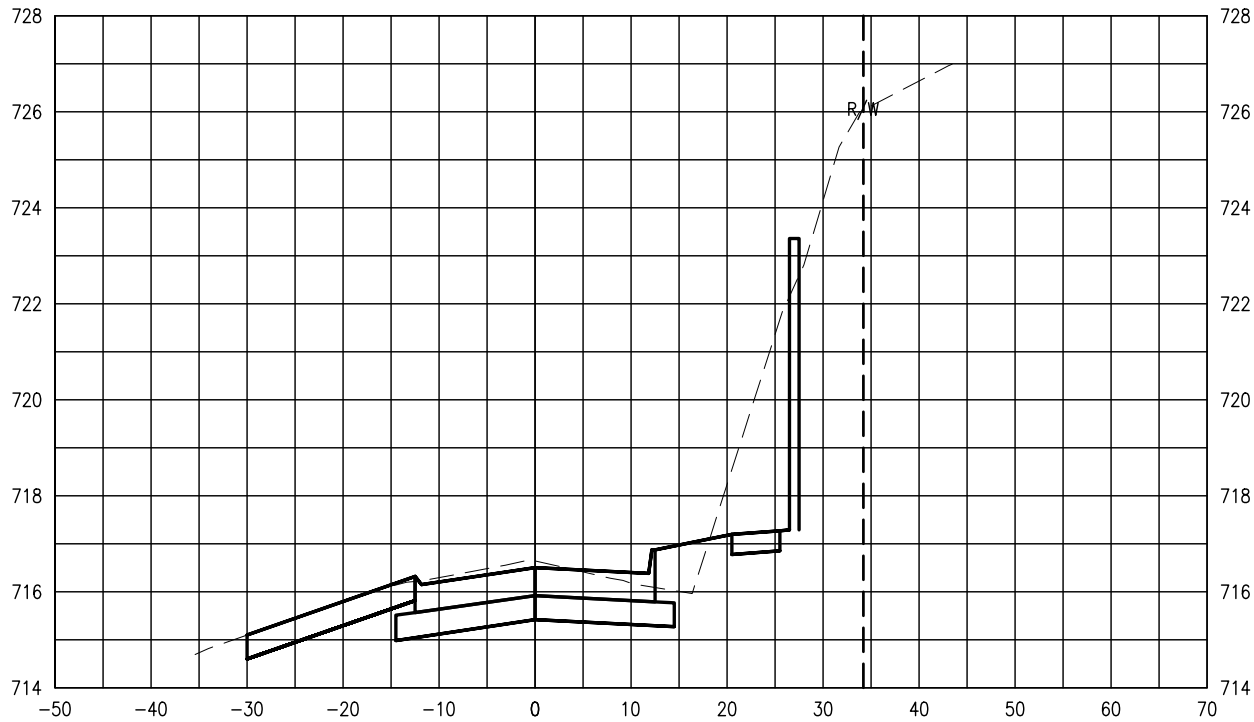


2+50.00

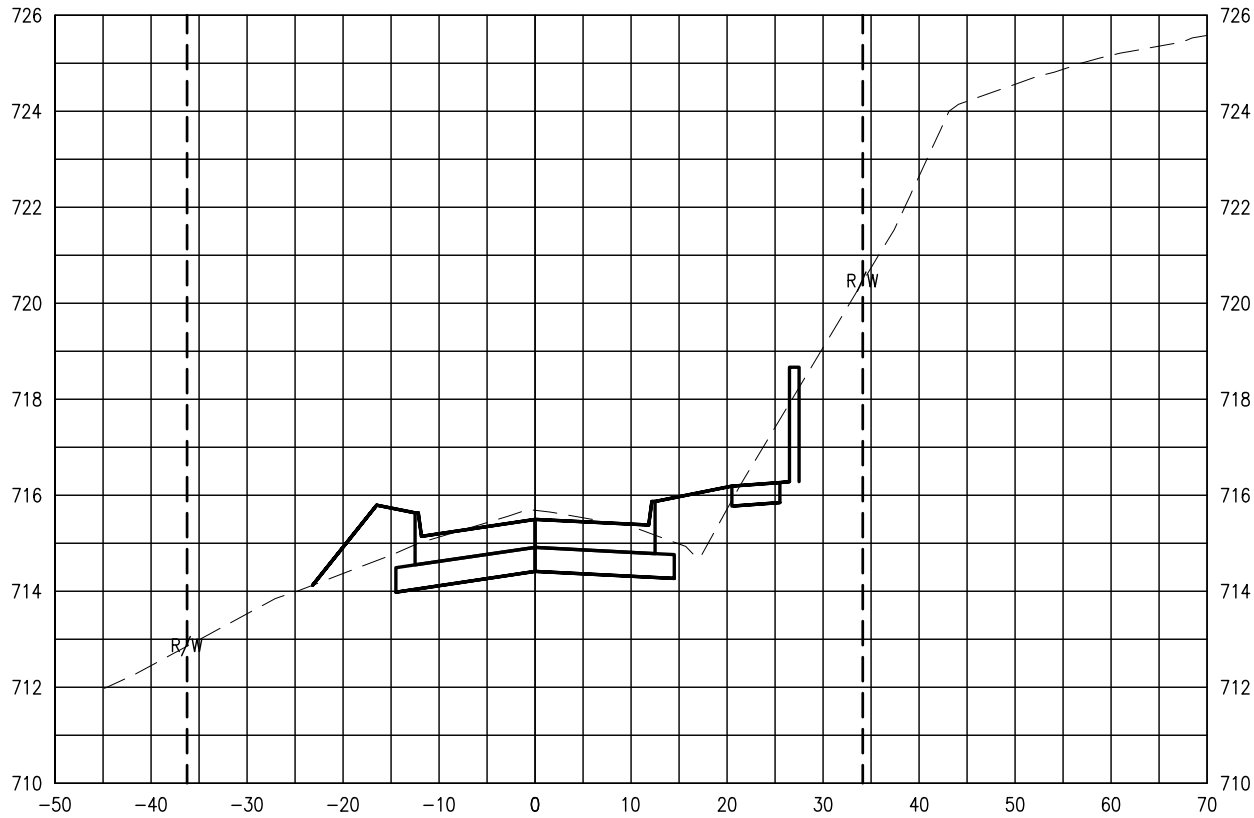


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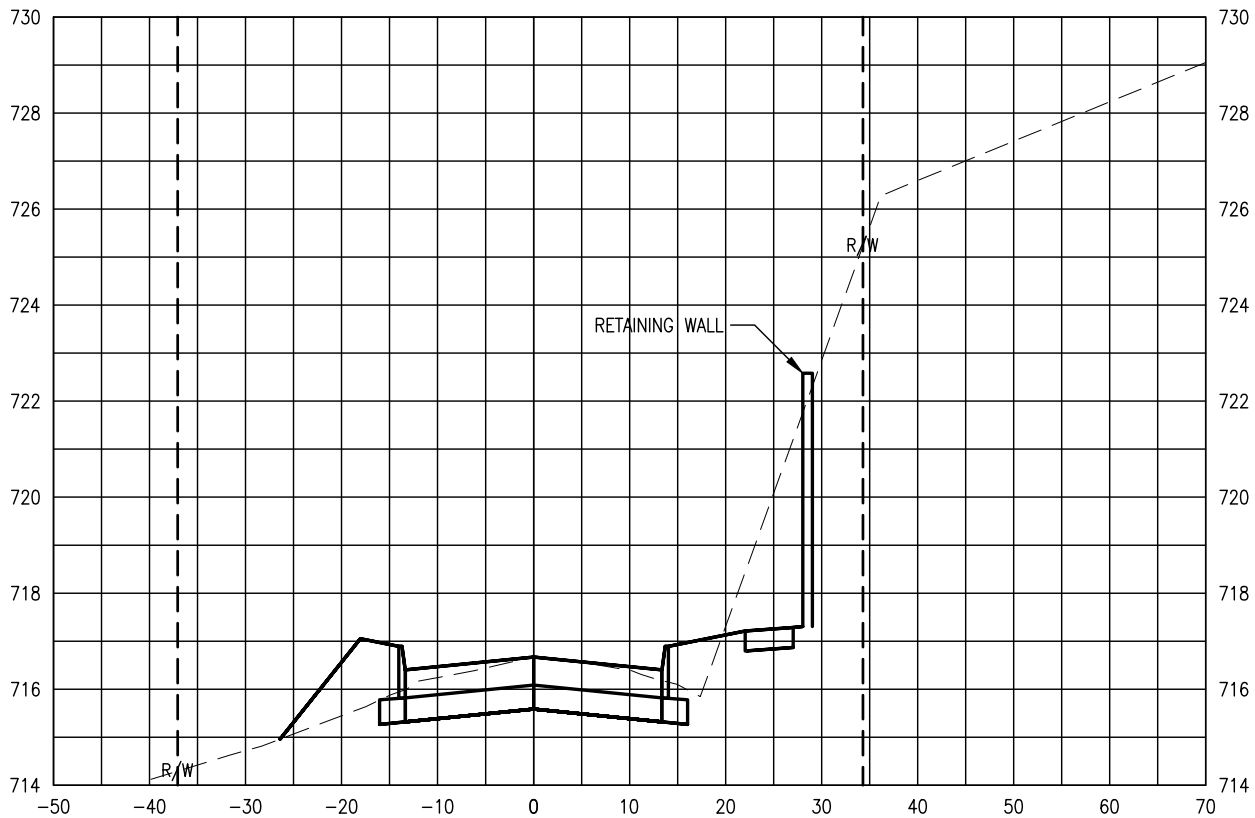
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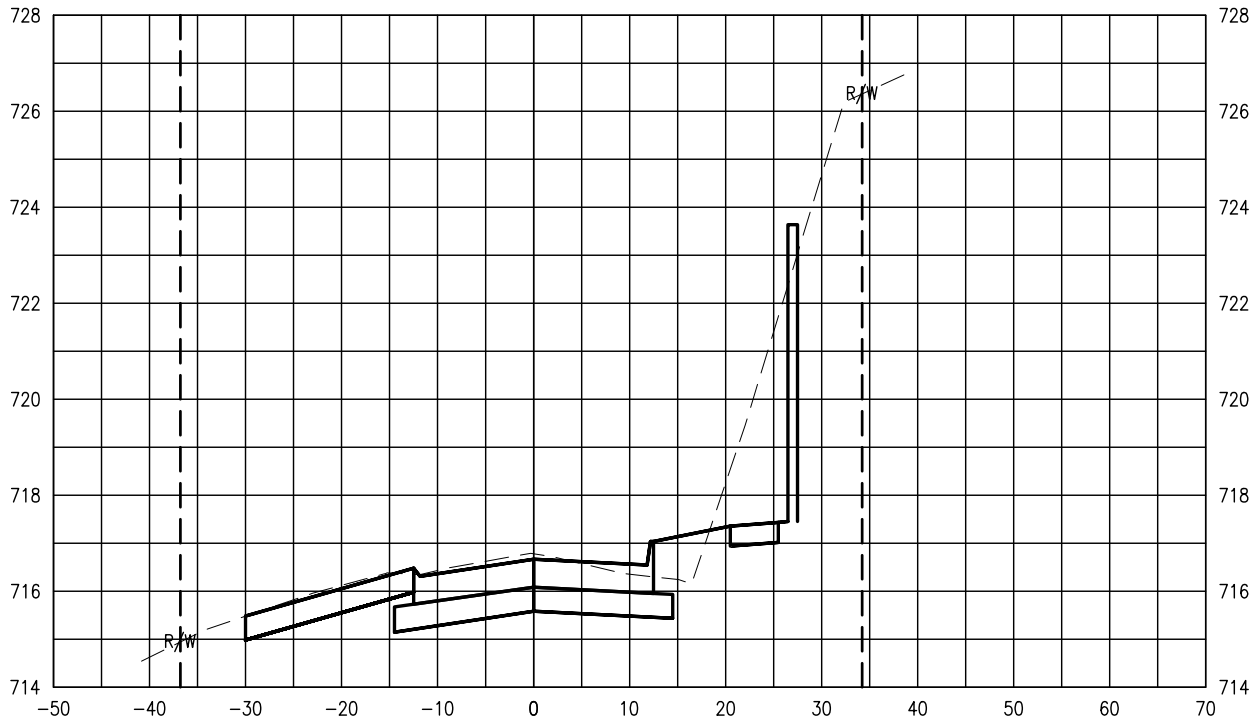
3+50.00



4+50.00



4+17 Drive Left



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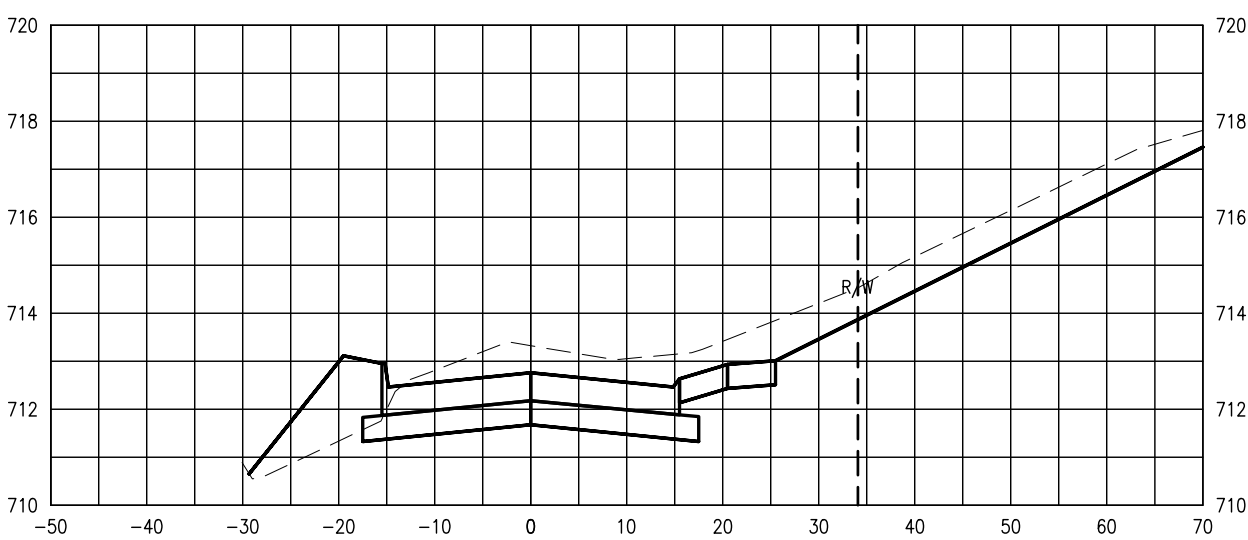
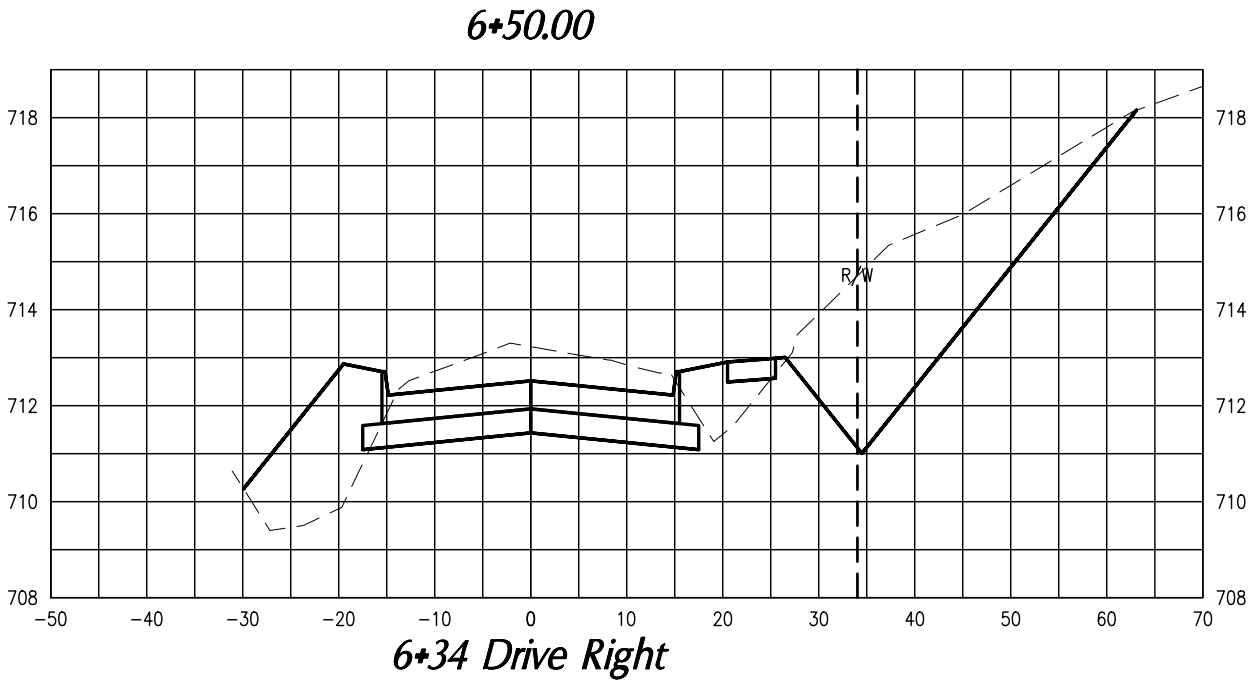
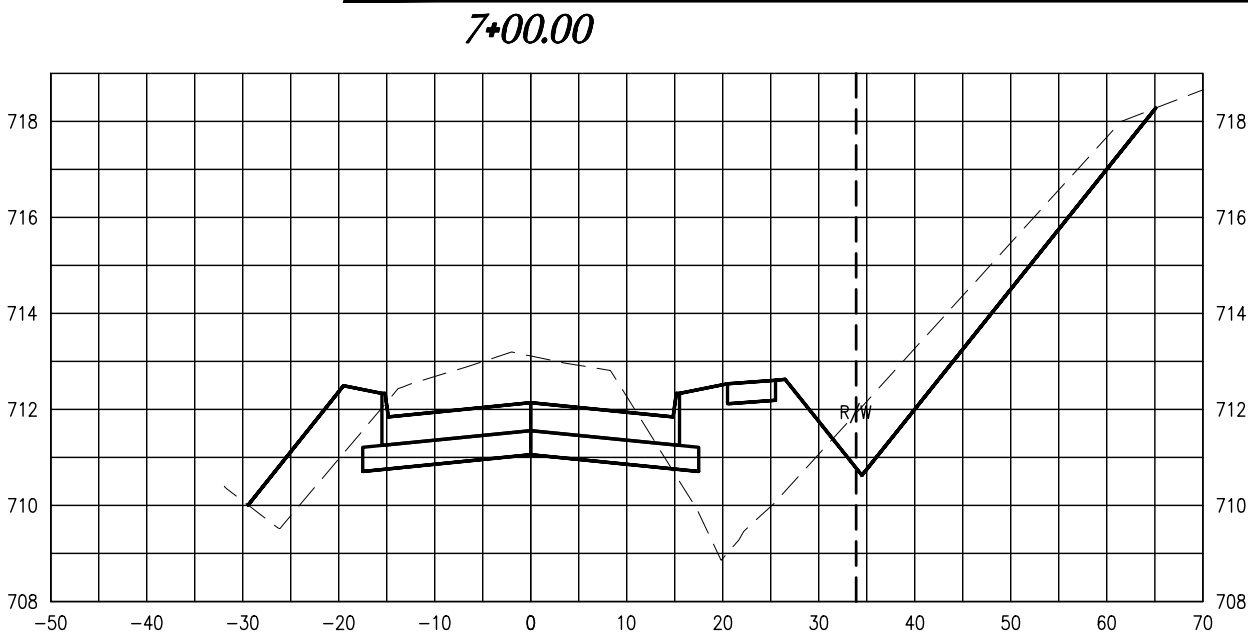
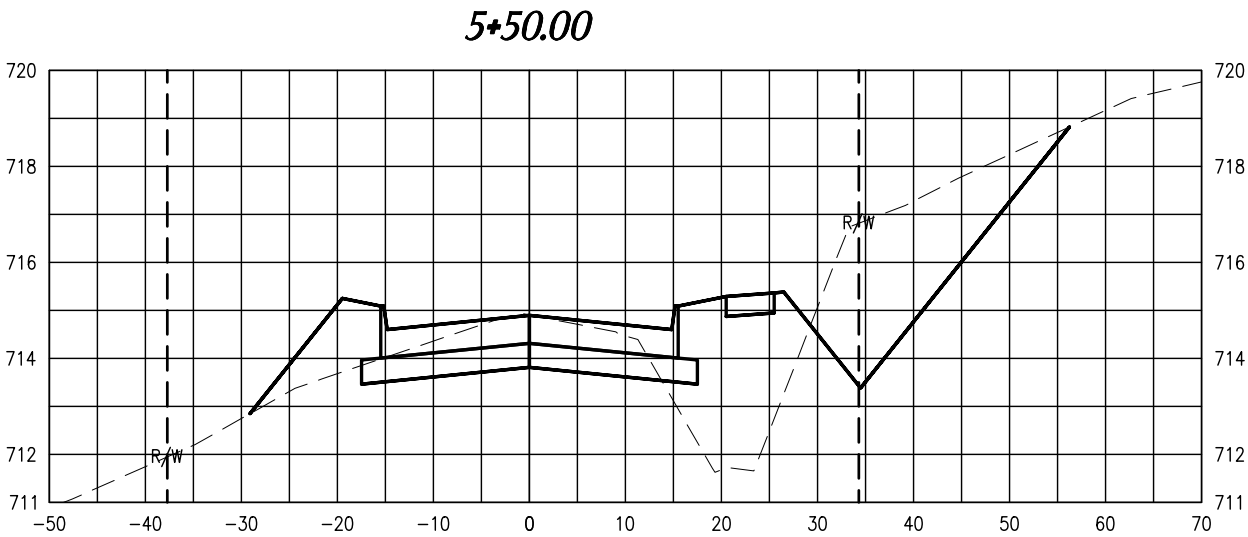
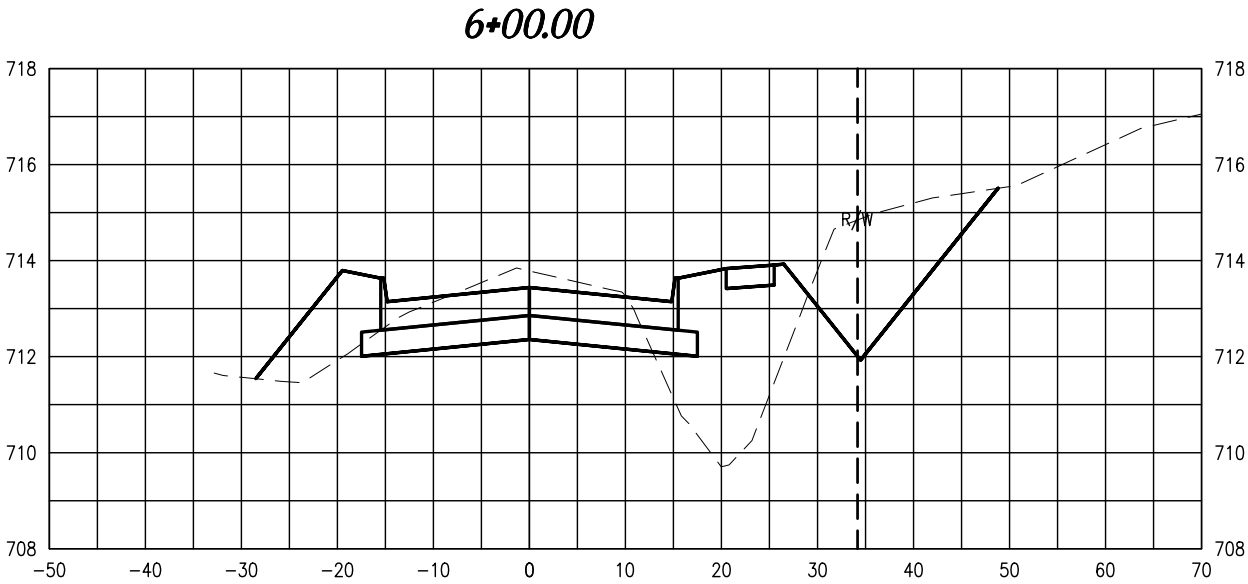
SHEET TITLE
SOUTH AVENUE E
CROSS SECTIONS

DATE:
JUL. 22, 2019

PROJECT NO.:
5018069

SHEET NO.:
W.02

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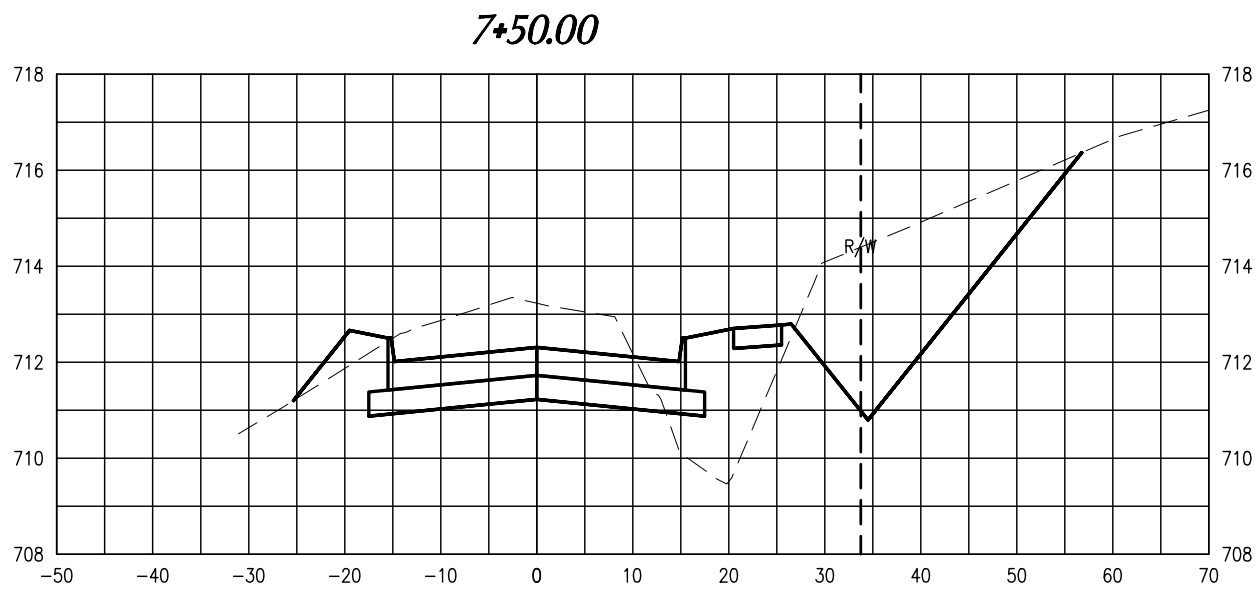
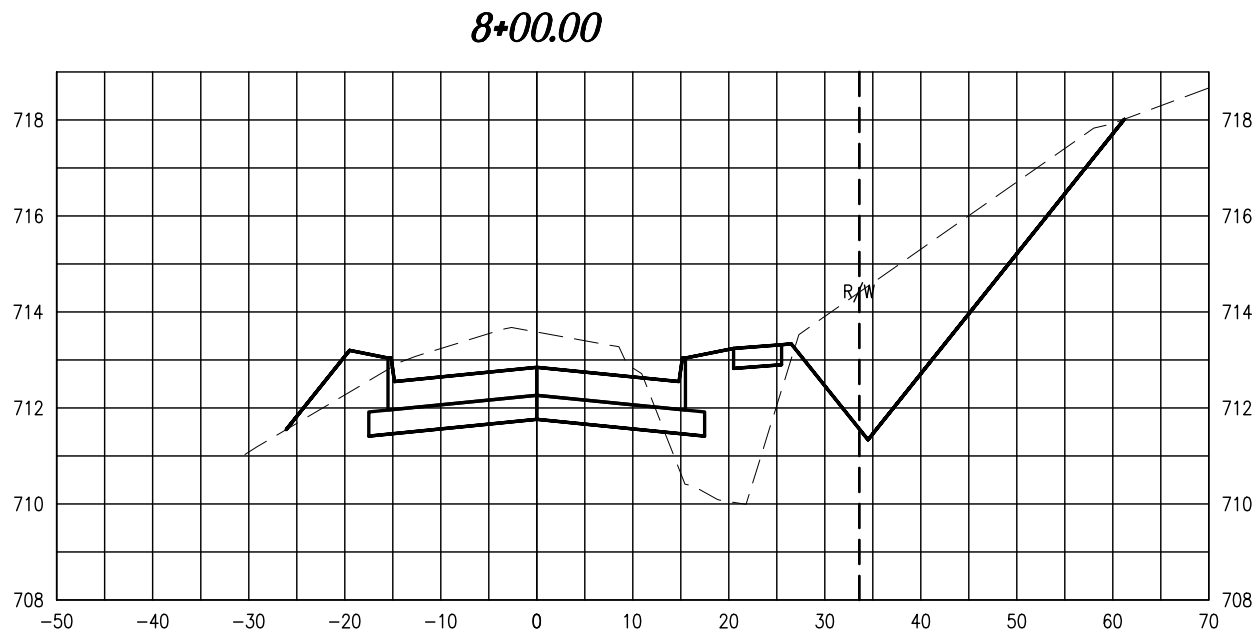
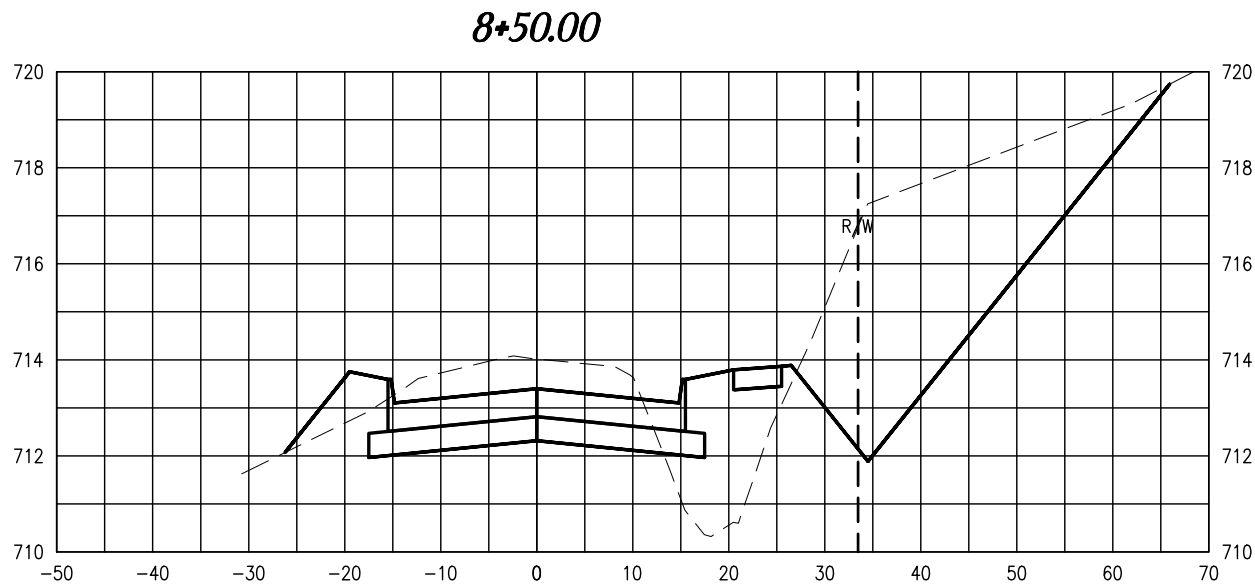
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**SOUTH AVENUE E
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DATE:
JUL. 22, 2019

PROJECT NO.:
5018069

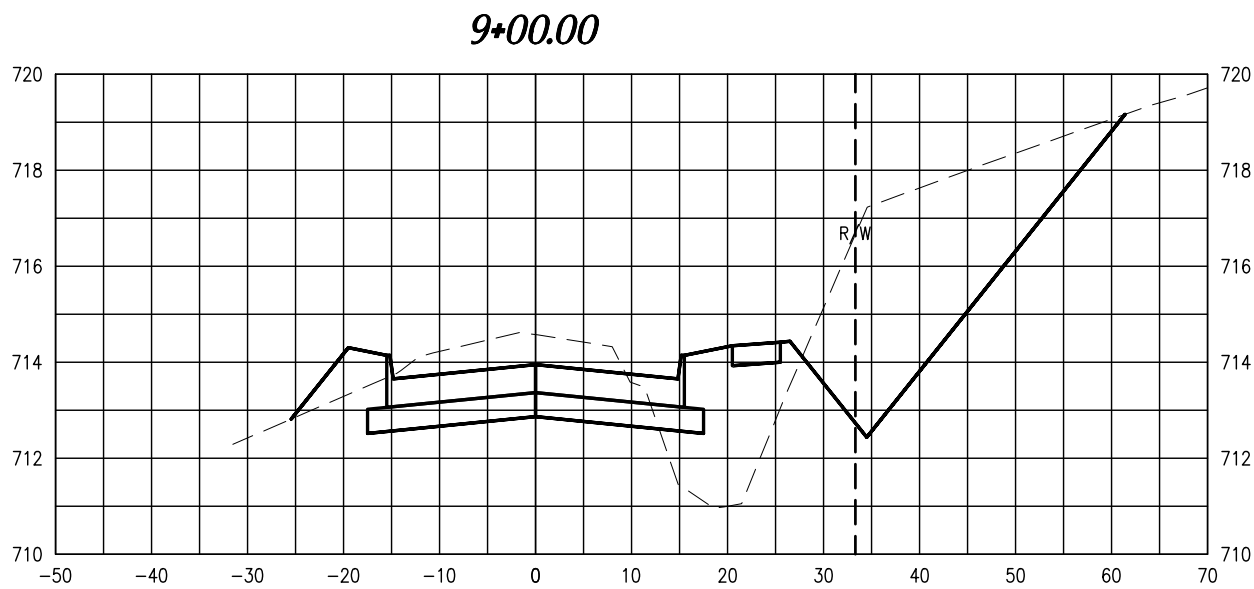
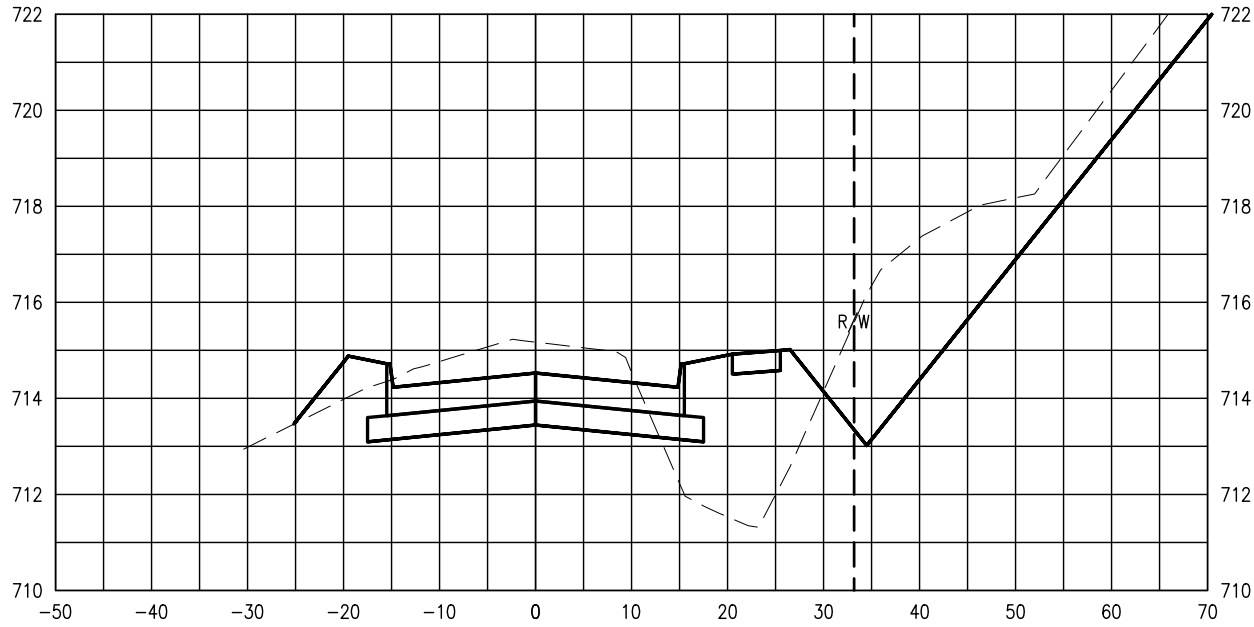
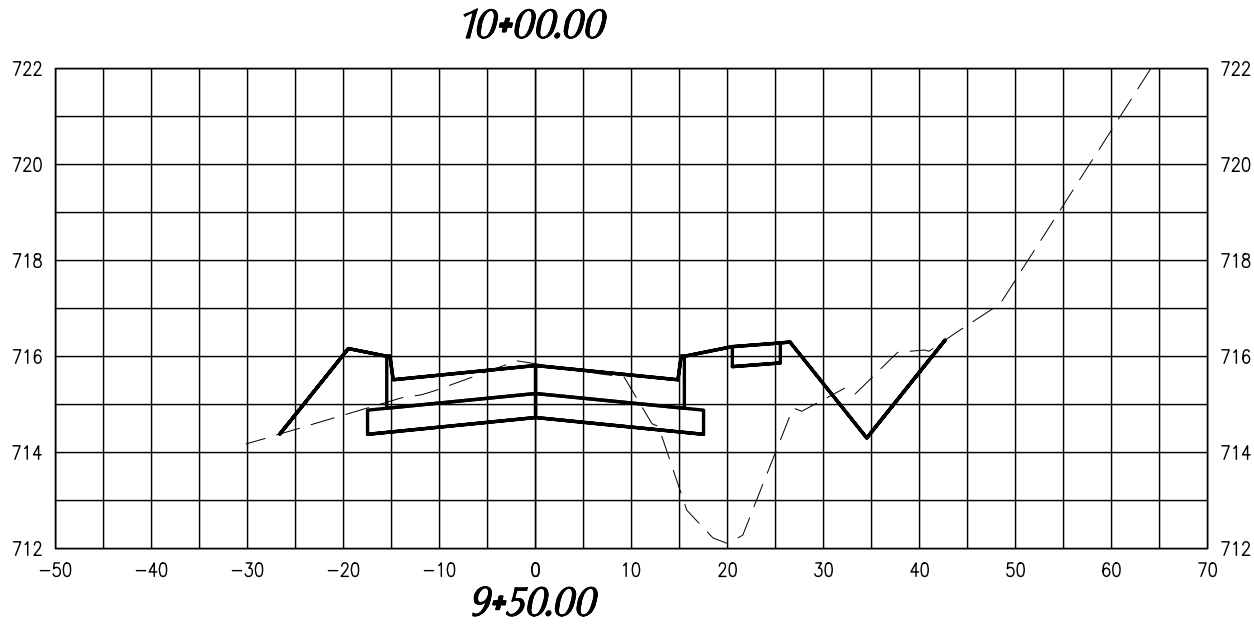
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REVISIONS:



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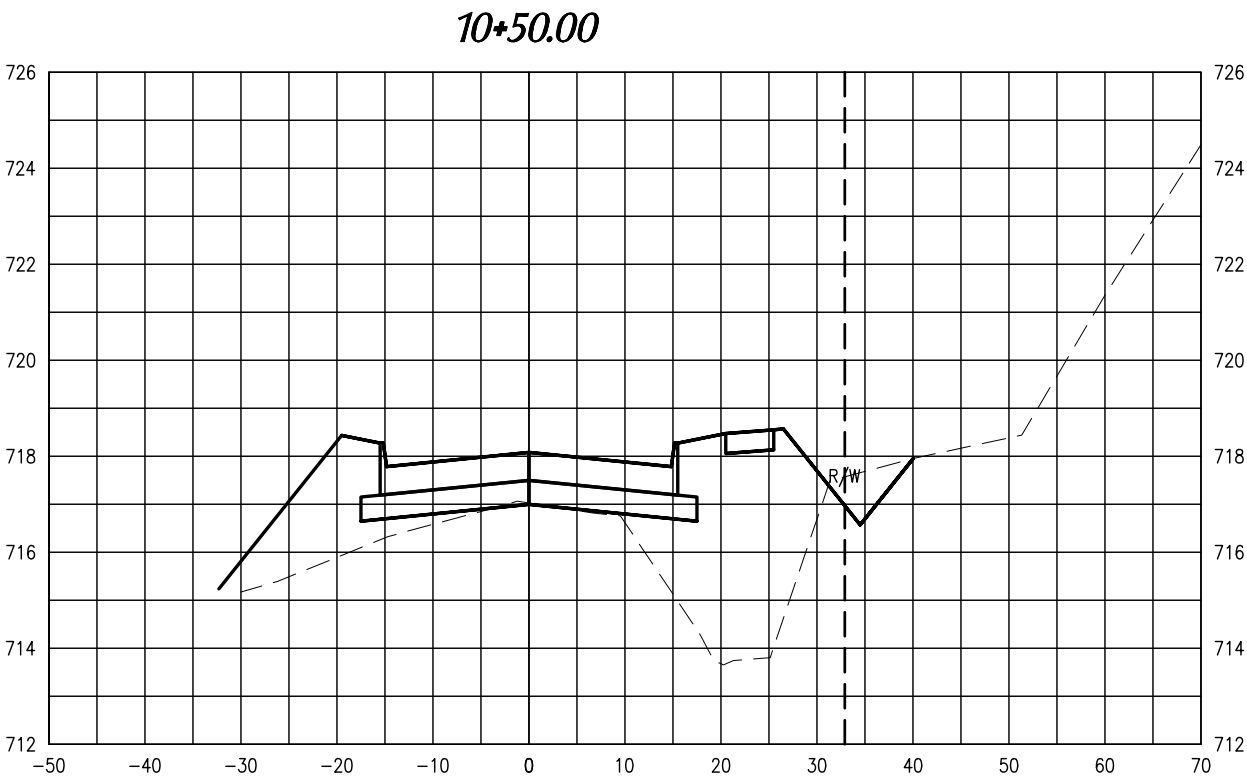
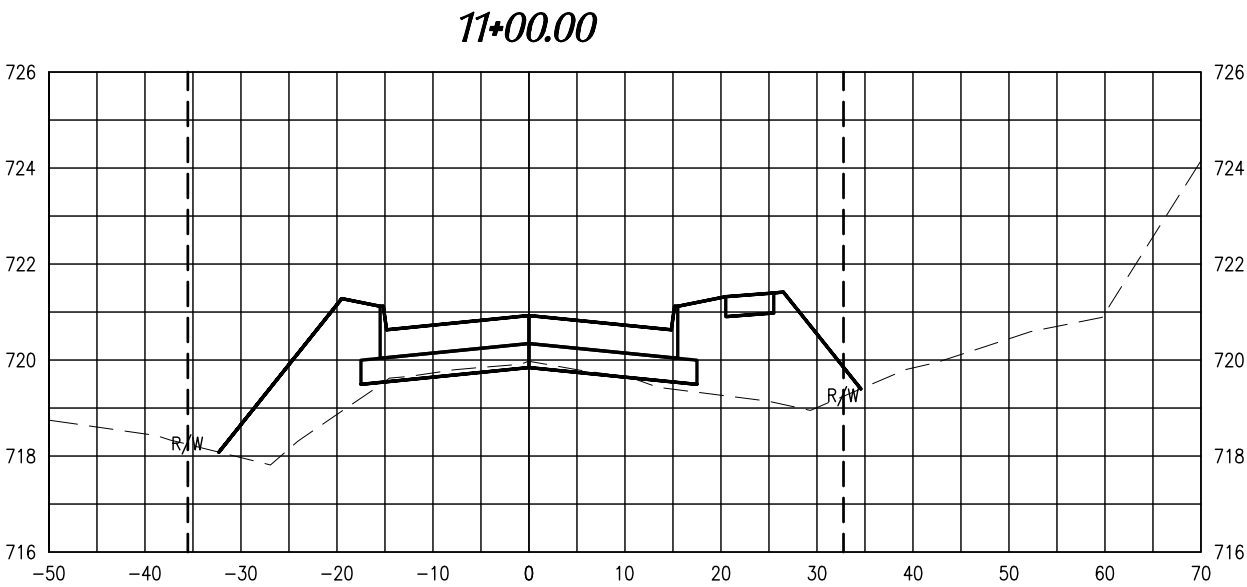
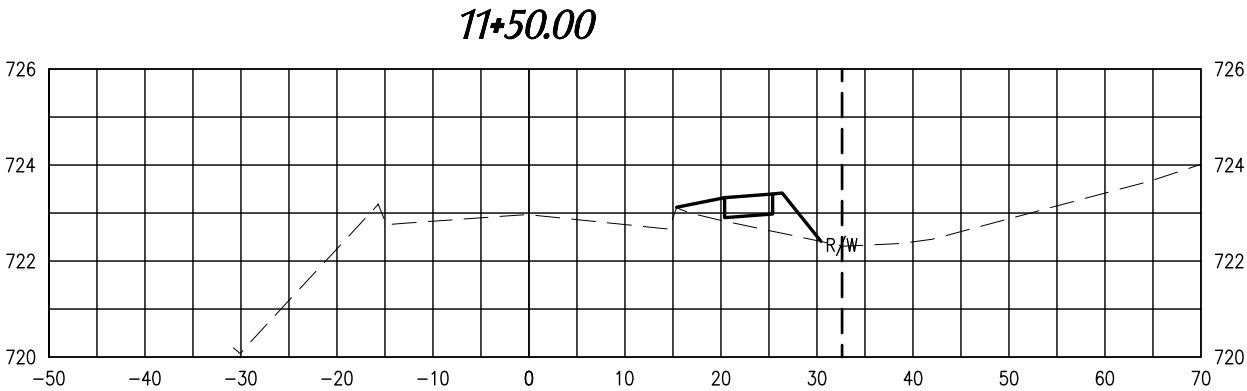
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PROJECT NO.:
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SHEET NO.:
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SHEET TITLE
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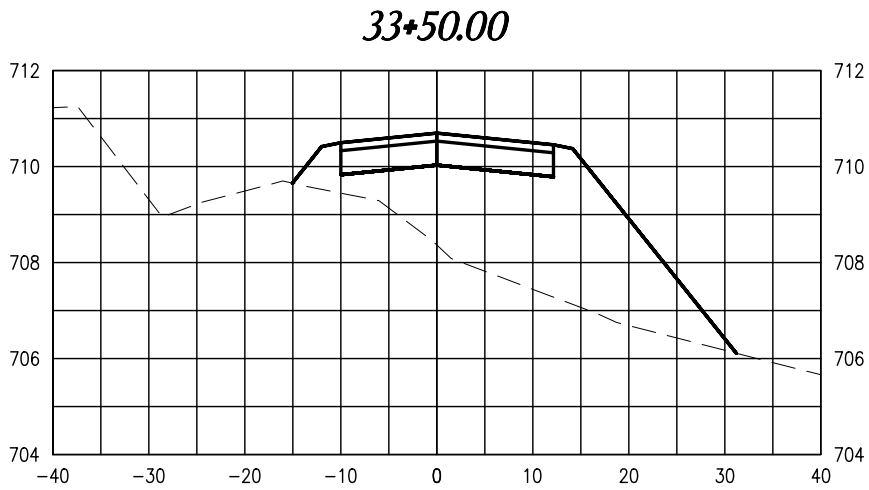
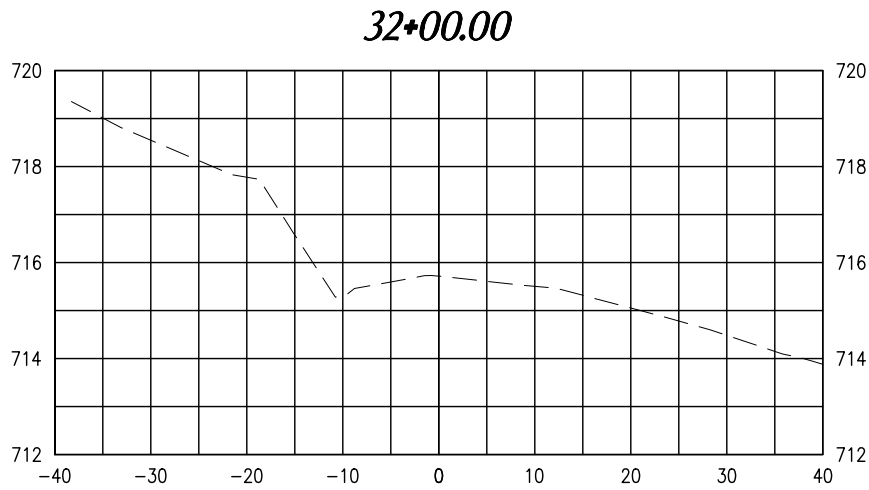
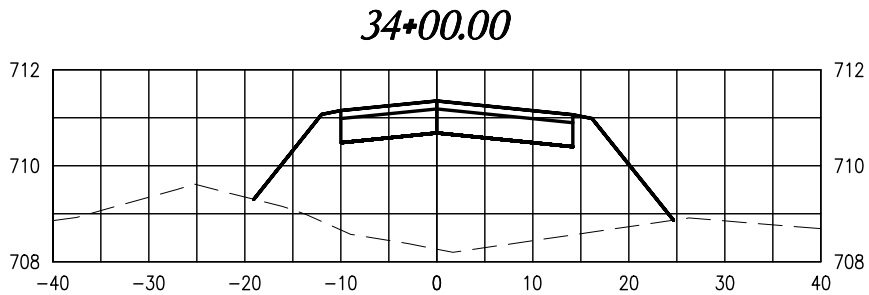
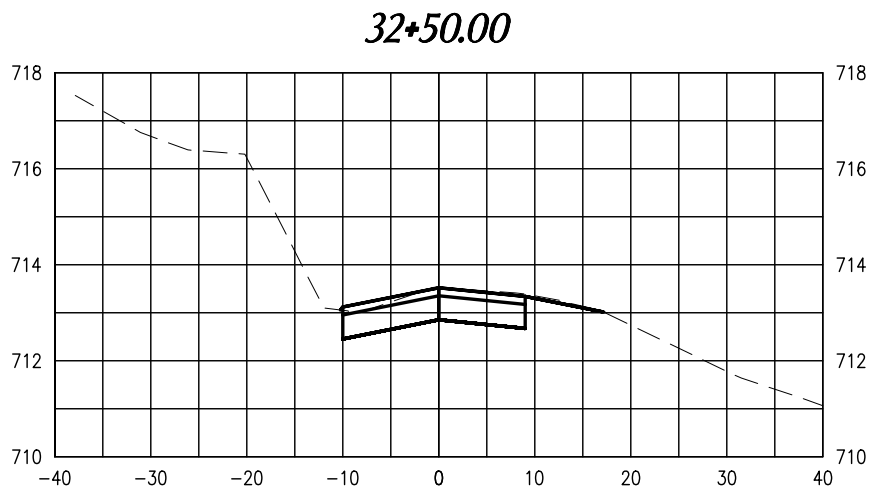
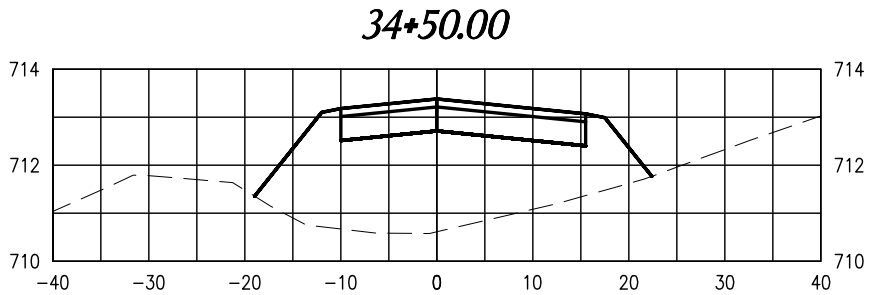
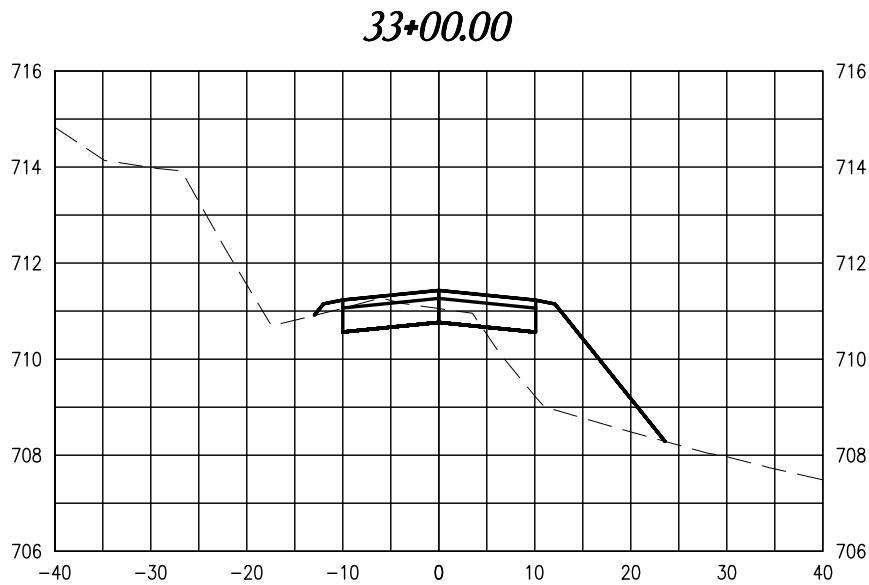
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W.05

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SCALE: 1' = 20' HOR. 1" = 4' VERT.	FIELD BOOK:	DRAWN BY: KJR	APPROVED: JP
REVISIONS:			



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**SOUTH AVENUE E
RECONSTRUCTION
WASHINGTON, IOWA**

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SHEET TITLE
**BUCHANAN STREET
CROSS SECTIONS**

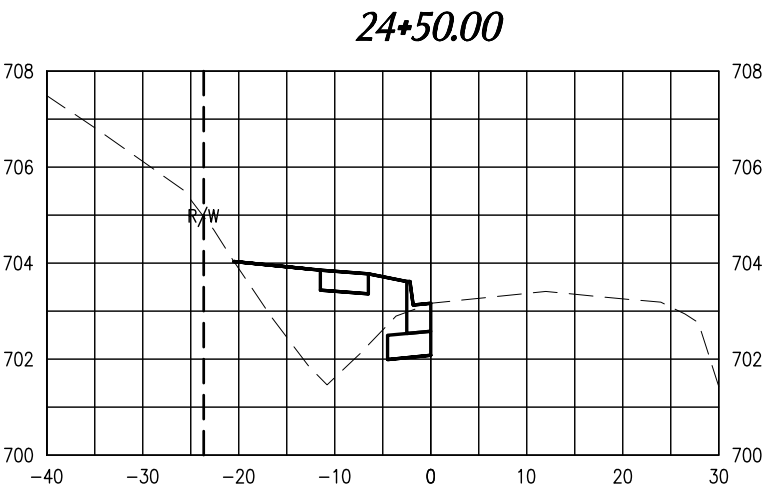
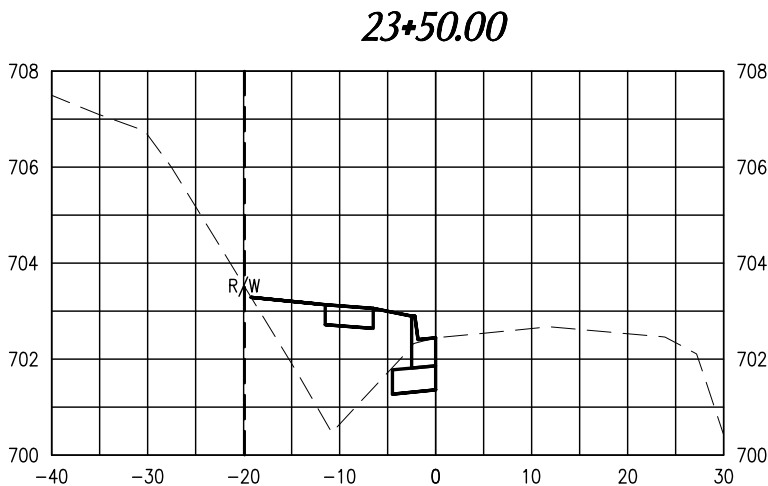
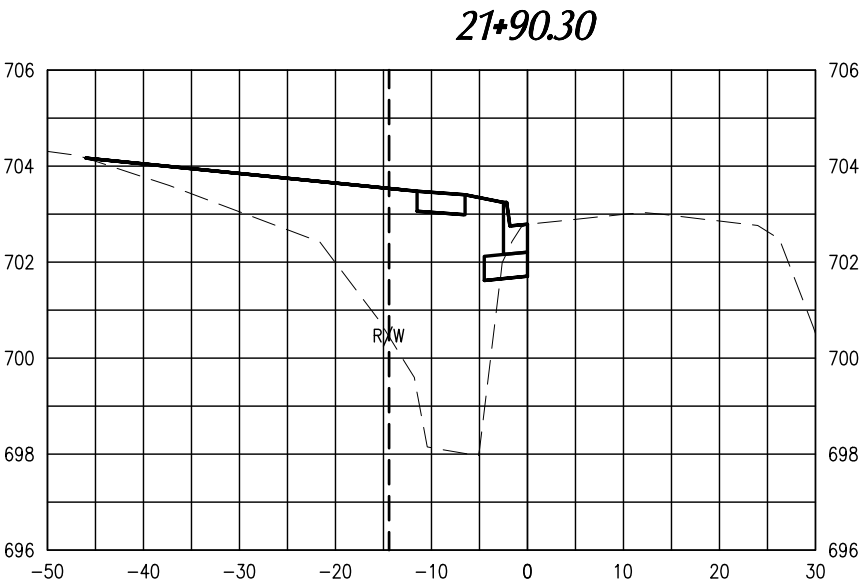
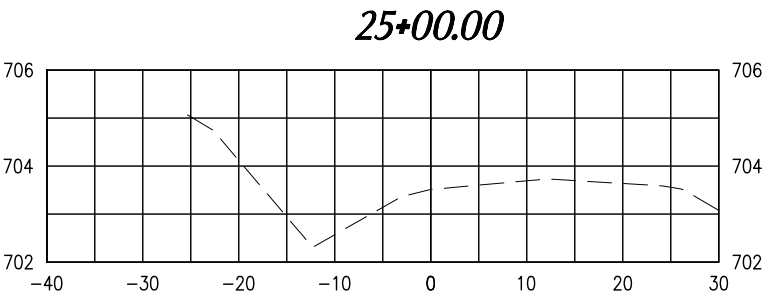
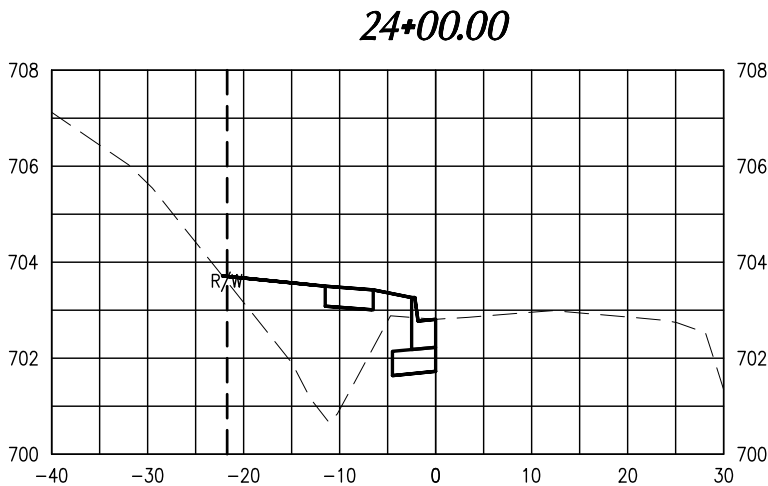
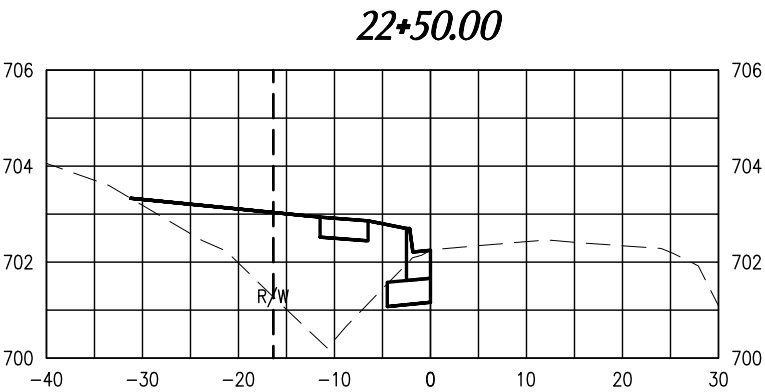
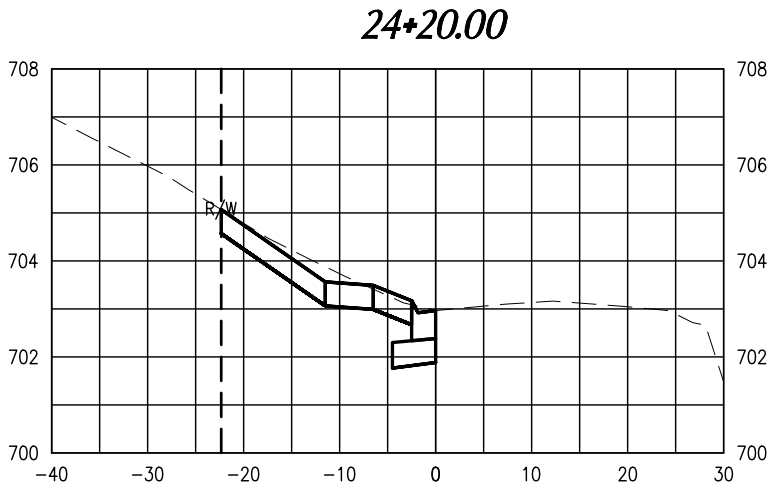
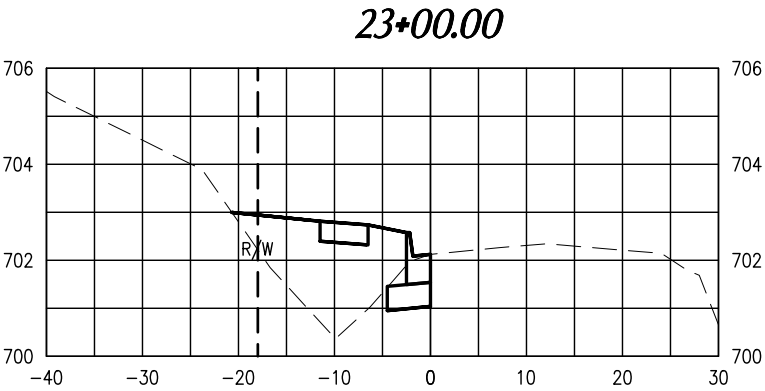
DATE:
JUL. 22, 2019

PROJECT NO.:
5018069

SHEET NO.:
W.06

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SOUTH AVENUE E
RECONSTRUCTION
WASHINGTON, IOWA

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SHEET TITLE
WEST LINCOLN ST
CROSS SECTIONS

DATE:
JUL. 22, 2019

PROJECT NO.:
5018069

SHEET NO.:
W.07

REVISED 10-12 - DELETED THE REFERENCE TO THE DESIGN MANUAL IN NOTE 19 PERTAINING TO DETAILS IN THE DESIGN MANUAL.
REVISED 01-2016 - UPDATED NOTE 17 PERTAINING TO CONCRETE FORMS. (OLD NOTE: REMAINING IN PLACE 5 DAYS OR LONGER, EXCEPT MIN. CONC. FLEXURAL STRENGTH BEFORE REMOVAL SHALL BE 575 PSI).
REVISED 07-2016 - ADDED THE DESIGN VERTICAL AND HORIZONTAL EARTH PRESSURES AND RENUMBERED THE GENERAL NOTES. CHANGED DISTANCE IN NOTE #20 FROM 20 INCHES TO 18.
ENGLISHLRFDSignedSingleCulverts.dgn - RCB G1-12 - THIS SHEET ISSUED 04-12.



SINGLE REINFORCED CONCRETE BOX CULVERT STANDARDS

GENERAL NOTES:

- THE RCB CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF VARYING HEIGHTS.
- VERTICAL EARTH PRESSURE, $E_v=0.120$ kcf.
HORIZONTAL EARTH PRESSURE, $E_{hmax} = 0.060$ kcf MAX, $E_{hmin} = 0.030$ kcf.
- THE RCB CULVERT SECTIONS ARE DESIGNED FOR CLASS I EXPOSURE CONDITIONS EXCEPT: CLASS 2 EXPOSURE CONDITION IS UTILIZED FOR THE SLAB DESIGN IN O'FILL INSTANCES.
- ALL SLAB AND FLOOR REINFORCING STEEL IS TO BE SUPPORTED AT INTERVALS OF NOT MORE THAN 3'-0 IN EITHER DIRECTION AS OUTLINED IN THE STANDARD SPECIFICATIONS.
- THE CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR EDGE OR END OF REINFORCING BAR TO BE 2" UNLESS OTHERWISE NOTED.
- EXCEPT FOR DOWEL BARS 5r1 IN SLAB, LONGITUDINAL REINFORCING IS NOT TO EXTEND THRU THE CONSTRUCTION JOINTS.
- FLOOR OF BARREL IS TO BE FINISHED SMOOTH. SIDES OF FOOTING ARE TO BE FORMED TO INSURE CORRECT LINE AND GRADE.
- THE PERMISSIBLE CONSTRUCTION JOINT AT THE TOP OF THE WALLS MAY BE LOWERED AT THE CONTRACTOR'S OPTION WITH ENGINEER'S APPROVAL.
- THE REINFORCEMENT SUPPLIED FOR THIS STRUCTURE SHALL BE GRADE 60 REINFORCEMENT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. THE DESIGN STRESSES ARE BASED ON GRADE 60 REINFORCEMENT.
- THE VERTICAL BARS IN THE WALLS MAY BE SPLICED ABOVE THE FOOTING AT THE CONTRACTOR'S OPTION AS FOLLOWS:

BAR SIZE NUMBER	4	5	6	7	8	9
MINIMUM SPLICE LENGTH	17"	21"	25"	31"	41"	51"

- THIS SPLICE, IF USED, WILL BE AT THE CONTRACTOR'S EXPENSE.
- REINFORCING BAR CLEARANCES WILL BE AS FOLLOWS:
EDGE CLEARANCES: 2" EXCEPT
TOP OF FLOOR 2 1/4" TO NEAR TRANSVERSE REINFORCING BAR
BOTTOM OF FLOOR 3 1/2" TO NEAR TRANSVERSE REINFORCING BAR
END CLEARANCES:
VERTICAL TOP 2"
VERTICAL BOTTOM 3" OR 3 1/2" IF OVERALL HEIGHT OF THE CULVERT IS NOT TO A FULL INCH
TRANSVERSE 2"
 - ALL CONSTRUCTION JOINTS SHALL BE FORMED WITH A BEVELED KEYWAY EXCEPT AT BELL JOINTS.
 - ALL BEVELED KEYWAYS SHALL BE CENTERED.
 - KEYWAY SIZE SHALL BE 2x4 EXCEPT AS FOLLOWS:
KEYWAY BETWEEN THE FLOOR AND WALL SHALL BE 2x6 WHEN THE WALL IS GREATER THAN 10 INCHES WIDE.
 - KEYWAY DIMENSIONS SHOWN ON THE PLANS ARE BASED ON NOMINAL DIMENSIONS UNLESS STATED OTHERWISE. IN ADDITION, THE BEVEL USED ON THE KEYWAY SHALL BE LIMITED TO A MAXIMUM OF 10 DEGREES FROM VERTICAL.
 - IF O' OF FILL IS SPECIFIED, DETAILS FOR PAVING NOTCH AND REFERENCE TO EPOXY COATING OF SLAB REINFORCING STEEL, IF APPLICABLE, SHALL BE INCLUDED IN THE FINAL PLANS.
 - ALL DIMENSIONS ARE IN FEET AND INCHES UNLESS OTHERWISE NOTED OR SHOWN.
 - SEE CURRENT STANDARD SPECIFICATIONS REGARDING CONCRETE FORM REMOVAL.
 - THESE CULVERT STANDARDS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (501 IS 5/8 INCH DIAMETER BAR). ENGLISH REINFORCING STEEL RECEIVED IN THE FIELD MAY DISPLAY THE FOLLOWING "BAR DESIGNATION". THE "BAR DESIGNATION" IS THE STAMPED IMPRESSION ON THE REINFORCING BARS, AND IS EQUIVALENT TO THE BAR DIAMETER IN MILLIMETERS.

ENGLISH SIZE	4	5	6	7	8	9
BAR DESIGNATION	13	16	19	22	25	29

- IN THE EVENT THE SLAB THICKNESS AT THE BARREL END SECTION EXCEEDS 18 INCHES, THE CULVERT PARAPET SHALL EXTEND A MINIMUM OF 6 INCHES ABOVE THE TOP OF THE CULVERT SLAB. REFER TO THE CULVERT DESIGN MANUAL FOR INSTRUCTIONS. THESE DETAILS ARE TO BE INCLUDED IN THE DESIGN PLANS TO ADDRESS THESE SITUATIONS.

INDEX FOR SINGLE CULVERT STANDARDS:

RCB G1-12	INDEX & GENERAL NOTES
RCB G2-12	TYPICAL CULVERT BARREL DETAILS
RCB 3-3-12	CULVERT BARREL DETAILS, 3 x 3 BARREL SECTIONS
RCB 4-4-12	CULVERT BARREL DETAILS, 4 x 4 BARREL SECTIONS
RCB 5-3-12	CULVERT BARREL DETAILS, 5 x 3 BARREL SECTIONS
RCB 5-4-12	CULVERT BARREL DETAILS, 5 x 4 BARREL SECTIONS
RCB 5-5-12	CULVERT BARREL DETAILS, 5 x 5 BARREL SECTIONS
RCB 5-6-12	CULVERT BARREL DETAILS, 5 x 6 BARREL SECTIONS
RCB 6-3-12	CULVERT BARREL DETAILS, 6 x 3 BARREL SECTIONS
RCB 6-4-12	CULVERT BARREL DETAILS, 6 x 4 BARREL SECTIONS
RCB 6-5-12	CULVERT BARREL DETAILS, 6 x 5 BARREL SECTIONS
RCB 6-6-12	CULVERT BARREL DETAILS, 6 x 6 BARREL SECTIONS
RCB 6-7-12	CULVERT BARREL DETAILS, 6 x 7 BARREL SECTIONS
RCB 6-8-12	CULVERT BARREL DETAILS, 6 x 8 BARREL SECTIONS
RCB 8-4-12	CULVERT BARREL DETAILS, 8 x 4 BARREL SECTIONS
RCB 8-5-12	CULVERT BARREL DETAILS, 8 x 5 BARREL SECTIONS
RCB 8-6-12	CULVERT BARREL DETAILS, 8 x 6 BARREL SECTIONS
RCB 8-7-12	CULVERT BARREL DETAILS, 8 x 7 BARREL SECTIONS
RCB 8-8-12	CULVERT BARREL DETAILS, 8 x 8 BARREL SECTIONS
RCB 8-9-12	CULVERT BARREL DETAILS, 8 x 9 BARREL SECTIONS
RCB 8-10-12	CULVERT BARREL DETAILS, 8 x 10 BARREL SECTIONS
RCB 10-4-12	CULVERT BARREL DETAILS, 10 x 4 BARREL SECTIONS
RCB 10-5-12	CULVERT BARREL DETAILS, 10 x 5 BARREL SECTIONS
RCB 10-6-12	CULVERT BARREL DETAILS, 10 x 6 BARREL SECTIONS
RCB 10-7-12	CULVERT BARREL DETAILS, 10 x 7 BARREL SECTIONS
RCB 10-8-12	CULVERT BARREL DETAILS, 10 x 8 BARREL SECTIONS
RCB 10-9-12	CULVERT BARREL DETAILS, 10 x 9 BARREL SECTIONS
RCB 10-10-12	CULVERT BARREL DETAILS, 10 x 10 BARREL SECTIONS
RCB 10-11-12	CULVERT BARREL DETAILS, 10 x 11 BARREL SECTIONS
RCB 10-12-12	CULVERT BARREL DETAILS, 10 x 12 BARREL SECTIONS
RCB 12-4-12	CULVERT BARREL DETAILS, 12 x 4 BARREL SECTIONS
RCB 12-5-12	CULVERT BARREL DETAILS, 12 x 5 BARREL SECTIONS
RCB 12-6-12	CULVERT BARREL DETAILS, 12 x 6 BARREL SECTIONS
RCB 12-7-12	CULVERT BARREL DETAILS, 12 x 7 BARREL SECTIONS
RCB 12-8-12	CULVERT BARREL DETAILS, 12 x 8 BARREL SECTIONS
RCB 12-9-12	CULVERT BARREL DETAILS, 12 x 9 BARREL SECTIONS
RCB 12-10-12	CULVERT BARREL DETAILS, 12 x 10 BARREL SECTIONS
RCB 12-11-12	CULVERT BARREL DETAILS, 12 x 11 BARREL SECTIONS
RCB 12-12-12	CULVERT BARREL DETAILS, 12 x 12 BARREL SECTIONS
PWH 0-1-12	PARALLEL WING HDWLS., 0° SKEW, DIMENSION TABLE
PWH 0-2-12	PARALLEL WING HDWLS., 0° SKEW, CROSS SECTION DETAILS
PWH 0-3-12	PARALLEL WING HDWLS., 0° SKEW, WINGWALL ELEV. & BOTT. APRON REINF.
PWH 0-4-12	PARALLEL WING HDWLS., 0° SKEW, TOP APRON REINF.
PWH 0-5-12	PARALLEL WING HDWLS., 0° SKEW, QUANTITY TABULATION, 12'-0 SPAN
PWH 0-6-12	PARALLEL WING HDWLS., 0° SKEW, QUANTITY TABULATION, 10'-0 SPAN
PWH 0-7-12	PARALLEL WING HDWLS., 0° SKEW, QUANTITY TABULATION, 8'-0 SPAN
PWH 0-8-12	PARALLEL WING HDWLS., 0° SKEW, QUANTITY TABULATION, 6'-0 SPAN
PWH 0-9-12	PARALLEL WING HDWLS., 0° SKEW, QUANTITY TABULATION, 5'-0, 4'-0, & 3'-0 SPANS
PWH 15-1-12	PARALLEL WING HDWLS., 15° SKEW, DIMENSION TABLE
PWH 15-2-12	PARALLEL WING HDWLS., 15° SKEW, CROSS SECTION DETAILS
PWH 15-3-12	PARALLEL WING HDWLS., 15° SKEW, WINGWALL ELEV. & BOTT. APRON REINF.
PWH 15-4-12	PARALLEL WING HDWLS., 15° SKEW, TOP APRON REINF.
PWH 15-5-12	PARALLEL WING HDWLS., 15° SKEW, QUANTITY TABULATION, 12'-0 SPAN
PWH 15-6-12	PARALLEL WING HDWLS., 15° SKEW, QUANTITY TABULATION, 10'-0 SPAN
PWH 15-7-12	PARALLEL WING HDWLS., 15° SKEW, QUANTITY TABULATION, 8'-0 SPAN
PWH 15-8-12	PARALLEL WING HDWLS., 15° SKEW, QUANTITY TABULATION, 6'-0 SPAN
PWH 15-9-12	PARALLEL WING HDWLS., 15° SKEW, QUANTITY TABULATION, 5'-0 SPAN
PWH 30-1-12	PARALLEL WING HDWLS., 30° SKEW, DIMENSION TABLE
PWH 30-2-12	PARALLEL WING HDWLS., 30° SKEW, CROSS SECTION DETAILS
PWH 30-3-12	PARALLEL WING HDWLS., 30° SKEW, WINGWALL ELEV. & BOTT. APRON REINF.
PWH 30-4-12	PARALLEL WING HDWLS., 30° SKEW, TOP APRON REINF.
PWH 30-5-12	PARALLEL WING HDWLS., 30° SKEW, QUANTITY TABULATION, 12'-0 SPAN
PWH 30-6-12	PARALLEL WING HDWLS., 30° SKEW, QUANTITY TABULATION, 10'-0 SPAN
PWH 30-7-12	PARALLEL WING HDWLS., 30° SKEW, QUANTITY TABULATION, 8'-0 SPAN
PWH 30-8-12	PARALLEL WING HDWLS., 30° SKEW, QUANTITY TABULATION, 6'-0 SPAN
PWH 30-9-12	PARALLEL WING HDWLS., 30° SKEW, QUANTITY TABULATION, 5'-0 SPAN

INDEX FOR SINGLE CULVERT STANDARDS (CONT'D):

PWH 45-1-12	PARALLEL WING HDWLS., 45° SKEW, DIMENSION TABLE
PWH 45-2-12	PARALLEL WING HDWLS., 45° SKEW, CROSS SECTION DETAILS
PWH 45-3-12	PARALLEL WING HDWLS., 45° SKEW, WINGWALL ELEV. & BOTT. APRON REINF.
PWH 45-4-12	PARALLEL WING HDWLS., 45° SKEW, TOP APRON REINF.
PWH 45-5-12	PARALLEL WING HDWLS., 45° SKEW, QUANTITY TABULATION, 12'-0 SPAN
PWH 45-6-12	PARALLEL WING HDWLS., 45° SKEW, QUANTITY TABULATION, 10'-0 SPAN
PWH 45-7-12	PARALLEL WING HDWLS., 45° SKEW, QUANTITY TABULATION, 8'-0 SPAN
PWH 45-8-12	PARALLEL WING HDWLS., 45° SKEW, QUANTITY TABULATION, 6'-0 SPAN
PWH 45-9-12	PARALLEL WING HDWLS., 45° SKEW, QUANTITY TABULATION, 5'-0 SPAN
CBJ 1-12	CULVERT BELL JOINTS, 3', 4' & 5' SPANS
CBJ 2-12	CULVERT BELL JOINTS, 6' & 8' SPANS
CBJ 3-12	CULVERT BELL JOINTS, 10' & 12' SPANS
CBJ 4-12	CULVERT BELL JOINTS, ALL SPANS

SPECIFICATIONS:

DESIGN:
AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 5TH ED., SERIES OF 2010.

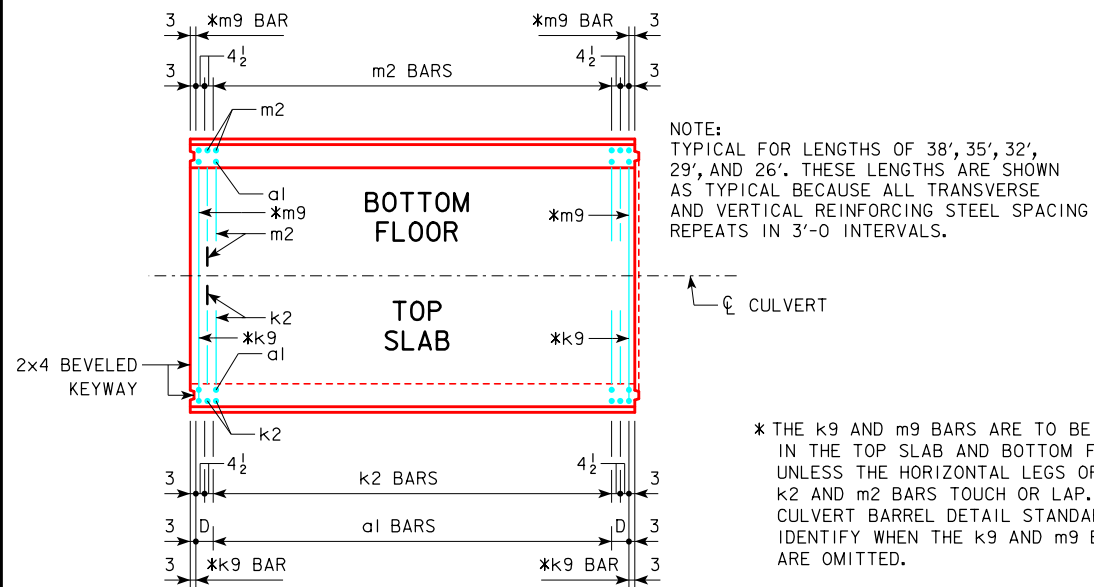
CONSTRUCTION:
IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, CURRENT SERIES, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS

DESIGN STRESSES:

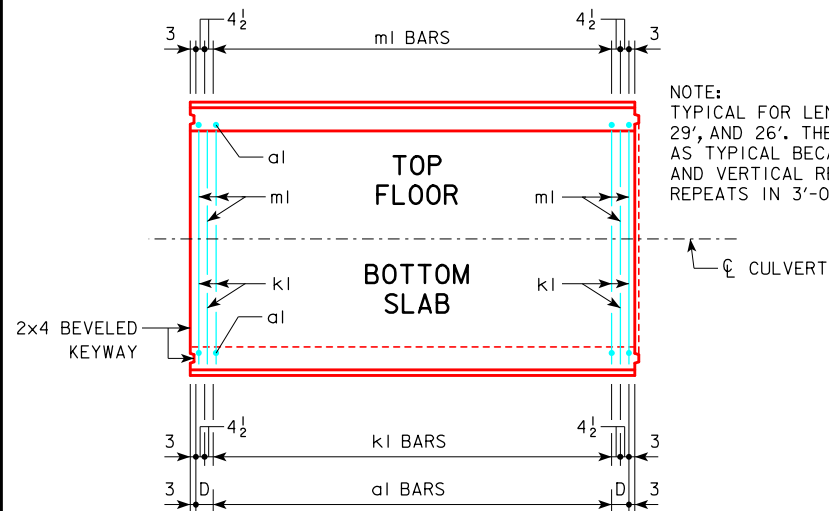
DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 5TH ED., SERIES OF 2010:
REINFORCING STEEL IN ACCORDANCE WITH AASHTO LRFD SECTION 5, GRADE 60.
CONCRETE IN ACCORDANCE WITH AASHTO LRFD SECTION 5, f'c = 4.0 KSI.

07-2016 LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER		
		STANDARD DESIGN SINGLE REINFORCED CONCRETE BOX CULVERTS APRIL, 2012	
		INDEX & GENERAL NOTES	RCB G1-12

REVISED 07-14 - TRANSITION WALL DETAILS.
REVISED 03-2016 - ADDED SKEWED TRANSITION WALL DETAILS.
REVISED 12-2016 - EDITED KEYWAY NOTES IN PLAN VIEWS AND CORRECTED TYPINGS.
ENGLISHLRFD\SignedSingleCulverts.dgn - RCB G2-12 - THIS SHEET ISSUED 04-12.



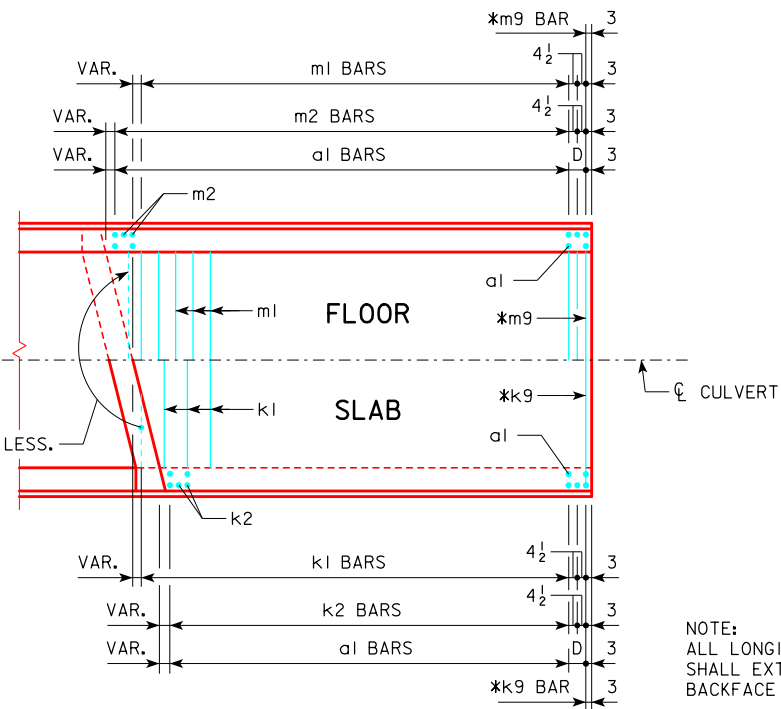
STANDARD SECTION PLAN VIEW
(KEYWAY IS TO BE OMITTED WHEN BELL JOINTS ARE USED)



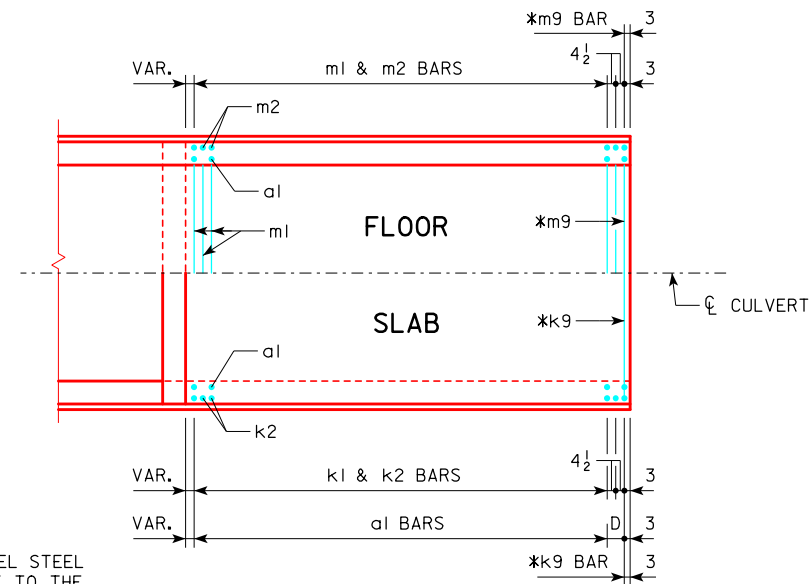
STANDARD SECTION PLAN VIEW
(KEYWAY IS TO BE OMITTED WHEN BELL JOINTS ARE USED)

* THE k9 AND m9 BARS ARE TO BE PLACED
IN THE TOP SLAB AND BOTTOM FLOOR
UNLESS THE HORIZONTAL LEGS OF THE
k2 AND m2 BARS TOUCH OR LAP. THE
CULVERT BARREL DETAIL STANDARDS
IDENTIFY WHEN THE k9 AND m9 BARS
ARE OMITTED.

CUT & RELOCATE BARS AS
REQUIRED. k1 BARS ALL FILLS &
k2 BARS ZERO FILL ONLY. m1 BARS
TO EXTEND INTO HEADWALL APRON.
DISCARD CUT LENGTHS OF 2'-0 OR LESS.



TYPICAL SKEW

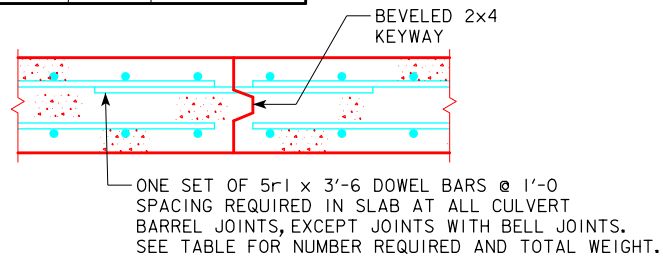


0° SKEW

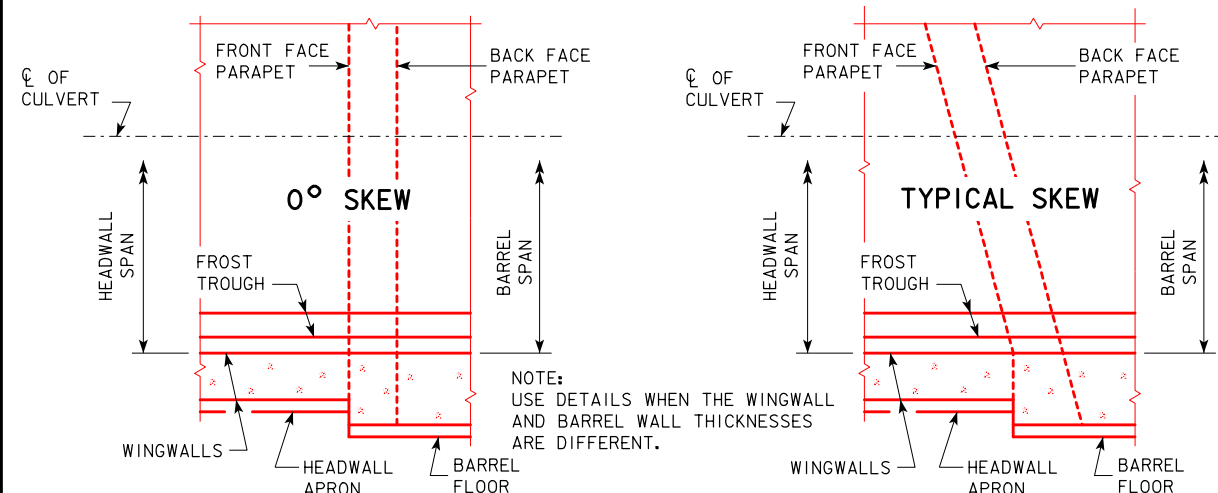
END SECTION PLAN VIEWS
(KEYWAYS NOT SHOWN)

NOTE:
END SECTION DETAILS SHOWN ARE FOR A 15° SKEW BARREL.
USE FOR SKEWS OF 30° & 45° BY INCREASING THE NUMBER
OF TRANSVERSE REINFORCING BARS REQUIRED TO BE CUT
AND RELOCATED.

5r1 BARS - ONE CONST. JT.		
SPAN	NO.	WEIGHT (LB)
3'-0	4	15
4'-0	5	18
5'-0	6	22
6'-0	7	26
8'-0	9	33
10'-0	11	40
12'-0	13	47



TOP SLAB CONSTRUCTION JOINT DETAIL



TRANSITION WALL DETAILS



STANDARD DESIGN
SINGLE REINFORCED CONCRETE
BOX CULVERTS
APRIL, 2012

TYPICAL CULVERT
BARREL DETAILS

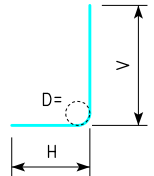
RCB G2-12

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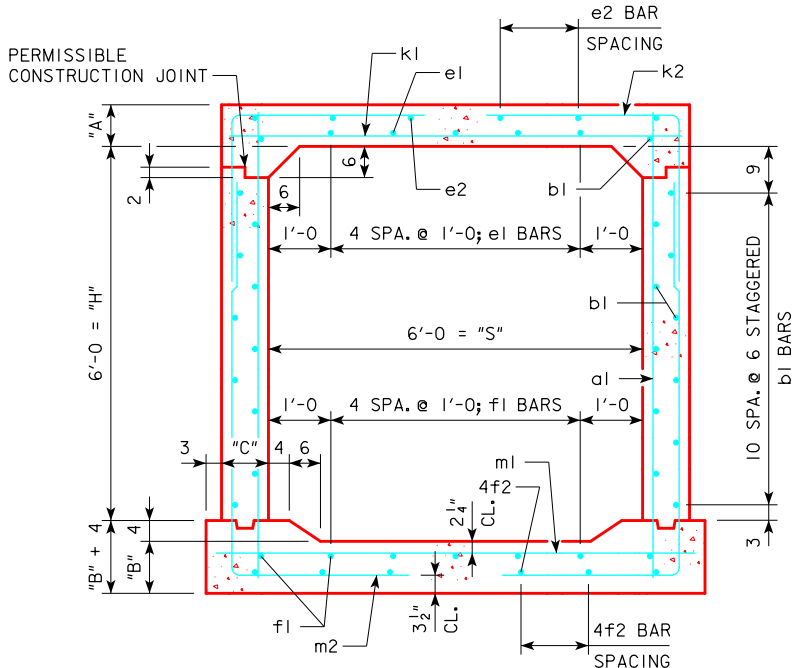
VARIABLE DIMENSIONS AND QUANTITIES FOR 6 x 6 BARREL SECTIONS																																																	
DIMENSIONS								BAR LIST																																	QUANTITIES								
								a1			b1			e1			e2			f1			f2			k1			k2				k9			m1			m2				m9			CONCRETE (CY/FT)			
FILL	S	H	A	B	C	D	SIZE	SP.	L	SIZE	SP.	NO.	SIZE	SP.	NO.	SIZE	SP.	NO.	SIZE	SP.	NO.	SIZE	SP.	NO.	SIZE	SP.	L	SIZE	SP.	L	SIZE	SP.	L	SIZE	SP.	L	SIZE	SP.	L	SIZE	SP.	L	SLAB	FLOOR	WALLS	TOTAL	(LB/FT)		
0	6	6	10.5	10	9	9	4	12	7'-7	4	6	24	5	12	5	4	14	6	4	12	7	4	14	6	6	9	7'-2	4	6	7'-7	4'-6	3'-1	--	--	6	9	7'-8	4	6	10'-1	3'-10	6'-3	--	--	0.275	0.284	0.313	0.872	122.92
1	6	6	9	10	9	9	4	9	7'-6	4	6	24	5	12	5	4	14	6	4	12	7	4	14	6	6	9	7'-2	5	12	7'-5	4'-6	2'-11	--	--	6	9	7'-8	5	12	10'-9	4'-6	6'-3	--	--	0.241	0.284	0.313	0.838	119.03
2	6	6	8	10	9	9	4	9	7'-5	4	6	24	5	12	5	4	14	6	4	12	7	4	17	6	6	9	7'-2	5	12	7'-4	4'-6	2'-10	--	--	6	9	7'-8	5	12	9'-9	3'-6	6'-3	5	7'-8	0.218	0.284	0.313	0.815	116.87
3	6	6	8	10	9	9	4	9	7'-5	4	6	24	4	12	5	4	17	6	4	12	7	4	15	6	5	9	7'-2	5	12	6'-4	3'-6	2'-10	5	7'-2	6	9	7'-8	5	12	9'-4	3'-1	6'-3	5	7'-8	0.218	0.284	0.313	0.815	107.63
4-7	6	6	8	10	9	9	4	9	7'-5	4	6	24	4	12	5	4	15	6	4	12	7	4	13	6	5	9	7'-2	5	12	6'-2	3'-1	3'-1	5	7'-2	6	9	7'-8	5	12	9'-1	2'-10	6'-3	5	7'-8	0.218	0.284	0.313	0.815	106.68
8-10	6	6	8	10	9	9	4	9	7'-5	4	6	24	4	12	5	4	11	6	4	12	7	4	11	6	4	6	7'-2	5	12	5'-4	2'-6	2'-10	5	7'-2	6	9	7'-8	5	12	8'-9	2'-6	6'-3	5	7'-8	0.218	0.284	0.313	0.815	103.34
11-15	6	6	8	10	9	9	4	12	7'-5	4	6	24	4	12	5	4	18	4	4	12	7	4	18	4	6	9	7'-2	4	6	4'-11	2'-1	2'-10	4	7'-2	6	9	7'-8	4	6	8'-4	2'-1	6'-3	4	7'-8	0.218	0.284	0.313	0.815	106.79
16-20	6	6	8	10	9	9	4	12	7'-5	4	6	24	4	12	5	4	18	4	4	12	7	4	18	4	5	6	7'-2	4	6	4'-11	2'-1	2'-10	4	7'-2	5	6	7'-8	4	6	8'-4	2'-1	6'-3	4	7'-8	0.218	0.284	0.313	0.815	107.08
21-25	6	6	8	10	9	9	5	12	7'-5	4	6	24	4	12	5	4	18	4	4	12	7	4	18	4	6	6	7'-2	4	6	4'-11	2'-1	2'-10	4	7'-2	6	6	7'-8	4	6	8'-4	2'-1	6'-3	4	7'-8	0.218	0.284	0.313	0.815	126.58
26-30	6	6	8.5	11	9	9	5	12	7'-6	4	6	24	4	12	5	4	10	6	4	12	7	4	10	6	6	6	7'-2	6	12	5'-6	2'-3	3'-3	6	7'-2	6	6	7'-8	6	12	8'-7	2'-3	6'-4	6	7'-8	0.229	0.308	0.313	0.850	139.82
31-35	6	6	9.5	12	9	9	4	12	7'-8	4	6	24	4	12	5	4	9	6	4	12	7	4	10	6	6	6	7'-2	5	6	5'-2	2'-2	3'-0	5	7'-2	6	6	7'-8	5	6	8'-8	2'-3	6'-5	5	7'-8	0.252	0.333	0.313	0.898	146.74
36-40	6	6	10.5	12.5	9.5	9	4	12	7'-10	4	6	24	4	12	5	4	9	6	4	12	7	4	10	6	8	9	7'-3	6	9	5'-7	2'-3	3'-4	6	7'-3	8	9	7'-9	6	9	8'-10	2'-4	6'-6	6	7'-9	0.279	0.349	0.330	0.958	159.97
41-45	6	6	11	13.5	10	9	4	12	7'-11	4	6	24	4	12	5	4	9	6	4	12	7	4	10	6	8	9	7'-4	5	6	5'-4	2'-3	3'-1	5	7'-4	8	9	7'-10	5	6	9'-0	2'-5	6'-7	5	7'-10	0.295	0.379	0.347	1.021	160.53
46-50	6	6	11.5	14	11	9	4	9	8'-0	4	6	24	4	12	5	4	10	6	4	12	7	4	10	6	8	9	7'-6	6	9	5'-11	2'-5	3'-6	6	7'-6	8	9	8'-0	6	9	9'-1	2'-6	6'-7	6	8'-0	0.316	0.399	0.383	1.098	167.92
51-55	6	6	12	14.5	11.5	9	4	9	8'-1	4	6	24	4	12	5	4	9	6	4	12	7	4	10	6	8	9	7'-7	5	6	5'-7	2'-5	3'-2	5	7'-7	8	9	8'-1	5	6	9'-2	2'-6	6'-8	5	8'-1	0.332	0.417	0.400	1.149	167.84

BENT BAR DETAIL

BARS	D
4	3
5	3 1/4
6	4 1/2



NOTE:
ALL DIMENSIONS ARE OUT TO OUT.
D = PIN DIAMETER.



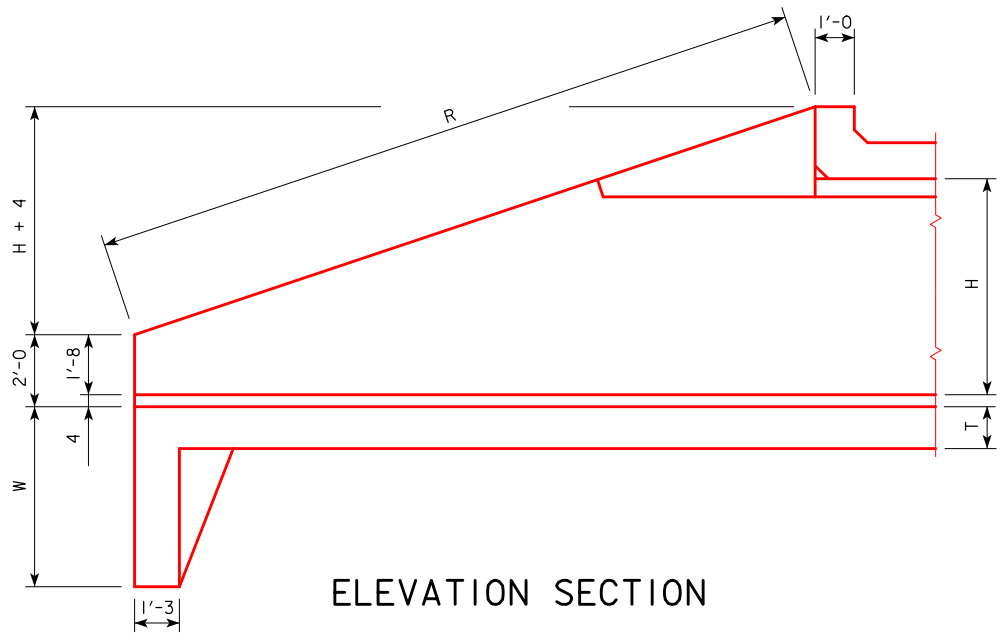
6 x 6 BARREL SECTION

NOTES:

1. DIMENSIONS LISTED ON THIS SHEET TO BE USED IN CONJUNCTION WITH SHEET RCB G2-12.
2. THE K2 AND M2 BARS HORIZONTAL LEGS MAY LAP IN LOW FILL SITUATIONS.
3. DIMENSIONS "A", "B", "C", "D", AND "SP." LISTED IN THE BAR LIST ARE IN INCHES.

LATEST REVISION DATE	<i>Norman L. McDaniel</i> APPROVED BY BRIDGE ENGINEER		
		STANDARD DESIGN SINGLE REINFORCED CONCRETE BOX CULVERTS APRIL, 2012	
		CULVERT BARREL DETAILS 6 x 6 BARREL SECTIONS	RCB 6-6-12

REVISED 12-2016: REMOVED NOTE STATING LOCATION FOR HEADWALL NOTES.
ENGLISHLRFDDESIGNEDSINGLECULVERTS.DGN - PWH 0-1-12 - THIS SHEET ISSUED 04-12.



ELEVATION SECTION

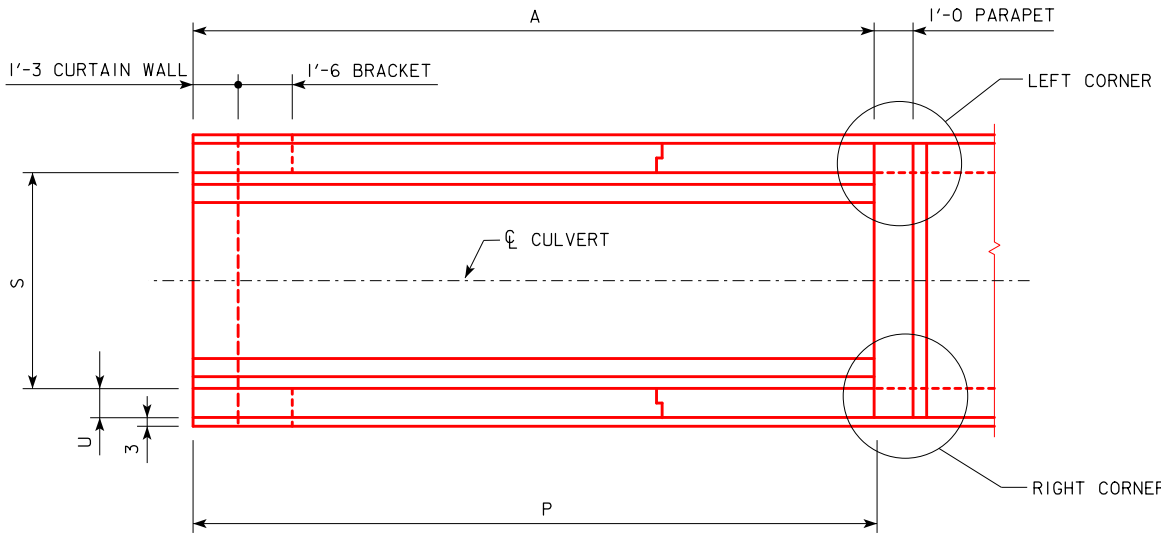
DIMENSION TABLE																				
S x H		12' x 12'	12' x 11'	12' x 10'	12' x 9'	12' x 8'	12' x 7'	12' x 6'	12' x 5'	12' x 4'	10' x 12'	10' x 11'	10' x 10'	10' x 9'	10' x 8'	10' x 7'	10' x 6'	10' x 5'	10' x 4'	S x H
HEADWALL DIMENSIONS	A	37'-0	34'-0	31'-0	28'-0	25'-0	22'-0	19'-0	16'-0	13'-0	37'-0	34'-0	31'-0	28'-0	25'-0	22'-0	19'-0	16'-0	13'-0	A
	H	12'-0	11'-0	10'-0	9'-0	8'-0	7'-0	6'-0	5'-0	4'-0	12'-0	11'-0	10'-0	9'-0	8'-0	7'-0	6'-0	5'-0	4'-0	H
	P	37'-0	34'-0	31'-0	28'-0	25'-0	22'-0	19'-0	16'-0	13'-0	37'-0	34'-0	31'-0	28'-0	25'-0	22'-0	19'-0	16'-0	13'-0	P
	R	39'-0 ¹ ₁₆	35'-10 ¹ ₈	32'-8 ¹ ₈	29'-6 ³ ₁₆	26'-4 ¹ ₄	23'-2 ⁵ ₁₆	20'-0 ³ ₈	16'-10 ⁷ ₁₆	13'-8 ¹ ₂	39'-0 ¹ ₁₆	35'-10 ¹ ₈	32'-8 ¹ ₈	29'-6 ³ ₁₆	26'-4 ¹ ₄	23'-2 ⁵ ₁₆	20'-0 ³ ₈	16'-10 ⁷ ₁₆	13'-8 ¹ ₂	R
	S	12'-0	12'-0	12'-0	12'-0	12'-0	12'-0	12'-0	12'-0	12'-0	10'-0	10'-0	10'-0	10'-0	10'-0	10'-0	10'-0	10'-0	10'-0	S
	T	1'-2	1'-2	1'-2	1'-2	1'-2	1'-2	1'-2	1'-2	1'-2	1'-1	1'-1	1'-1	1'-1	1'-1	1'-1	1'-1	1'-1	1'-1	T
	U	1'-0	1'-0	10	10	10	9	9	9	9	1'-0	1'-0	10	10	10	9	9	9	9	U
BAR SPACINGS	W	5'-0	4'-9	4'-6	4'-3	4'-0	3'-9	3'-6	3'-6	3'-6	5'-0	4'-9	4'-6	4'-3	4'-0	3'-9	3'-6	3'-6	3'-6	W
	M	14'-0	13'-0	11'-0	10'-0	9'-0	8'-0	7'-0	—	—	14'-0	13'-0	11'-0	10'-0	9'-0	8'-0	—	—	—	M
	B	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	B
	C	6	9	9	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	6	9	9	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	C
	D	6	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	6	6	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	D
E	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	E	

DIMENSION TABLE

DIMENSION TABLE																					
S x H	8' x 10'	8' x 9'	8' x 8'	8' x 7'	8' x 6'	8' x 5'	8' x 4'	6' x 8'	6' x 7'	6' x 6'	6' x 5'	6' x 4'	6' x 3'	5' x 6'	5' x 5'	5' x 4'	5' x 3'	4' X 4'	3' x 3'	S x H	
HEADWALL DIMENSIONS	A	31'-0	28'-0	25'-0	22'-0	19'-0	16'-0	13'-0	25'-0	22'-0	19'-0	16'-0	13'-0	10'-0	19'-0	16'-0	13'-0	10'-0	13'-0	10'-0	A
	H	10'-0	9'-0	8'-0	7'-0	6'-0	5'-0	4'-0	8'-0	7'-0	6'-0	5'-0	4'-0	3'-0	6'-0	5'-0	4'-0	3'-0	4'-0	3'-0	H
	P	31'-0	28'-0	25'-0	22'-0	19'-0	16'-0	13'-0	25'-0	22'-0	19'-0	16'-0	13'-0	10'-0	19'-0	16'-0	13'-0	10'-0	13'-0	10'-0	P
	R	32'-8 ¹ ₈	29'-6 ³ ₁₆	26'-4 ¹ ₄	23'-2 ⁵ ₁₆	20'-0 ³ ₈	16'-10 ⁷ ₁₆	13'-8 ¹ ₂	26'-4 ¹ ₄	23'-2 ⁵ ₁₆	20'-0 ³ ₈	16'-10 ⁷ ₁₆	13'-8 ¹ ₂	10'-6 ¹ ₂	20'-0 ³ ₈	16'-10 ⁷ ₁₆	13'-8 ¹ ₂	10'-6 ¹ ₂	13'-8 ¹ ₂	10'-6 ¹ ₂	R
	S	8'-0	8'-0	8'-0	8'-0	8'-0	8'-0	8'-0	6'-0	6'-0	6'-0	6'-0	6'-0	6'-0	5'-0	5'-0	5'-0	5'-0	4'-0	3'-0	S
	T	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	T
	U	10	10	10	9	9	9	9	10	9	9	9	9	9	9	9	9	9	9	9	U
BAR SPACINGS	W	4'-6	4'-3	4'-0	3'-9	3'-6	3'-6	3'-6	4'-0	3'-9	3'-6	3'-6	3'-6	3'-6	3'-6	3'-6	3'-6	3'-6	3'-6	3'-6	W
	M	11'-0	10'-0	9'-0	8'-0	—	—	—	9'-0	8'-0	—	—	—	—	—	—	—	—	—	—	M
	B	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	B
	C	6	9	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	C
	D	6	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	D
E	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	1'-0	E

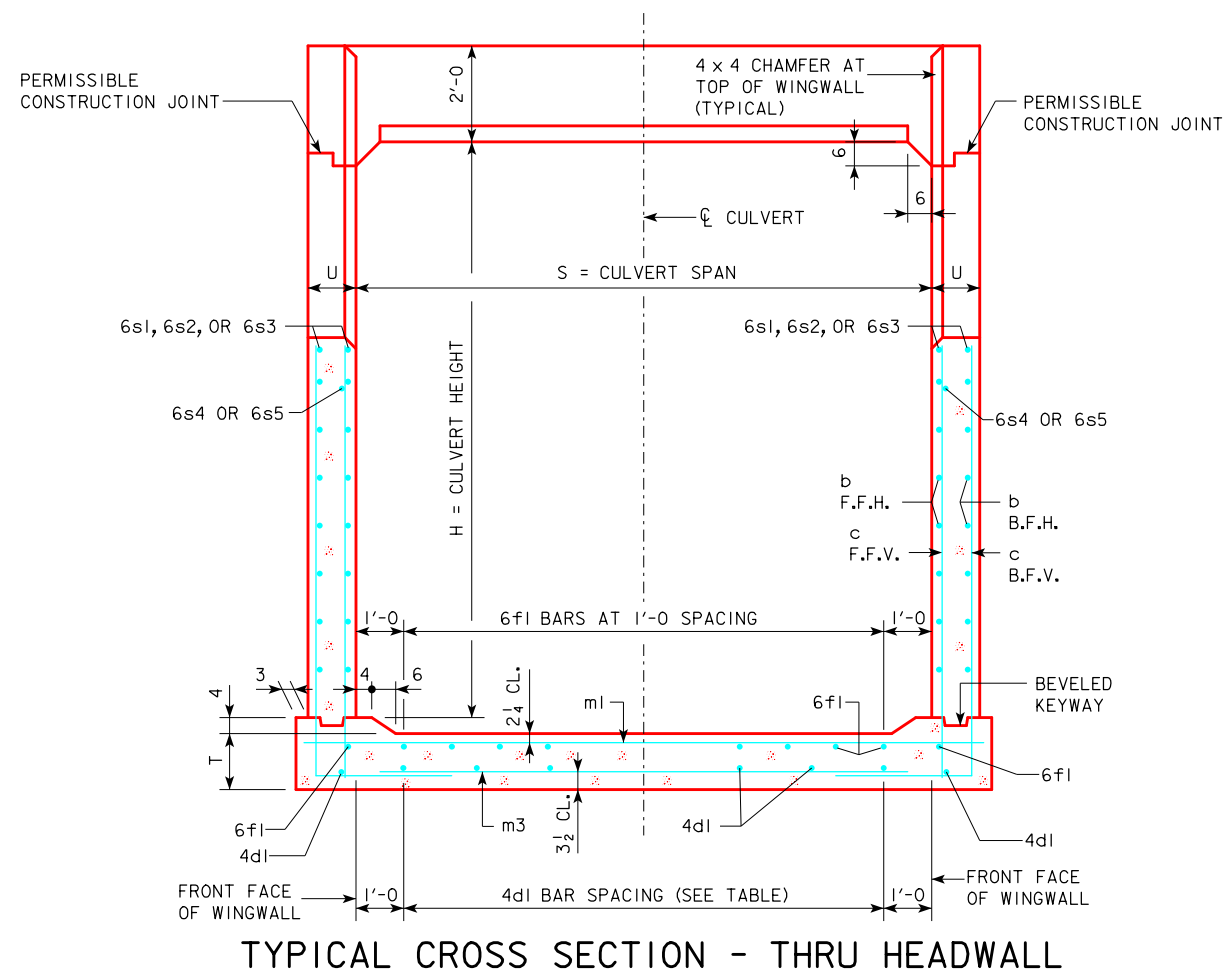
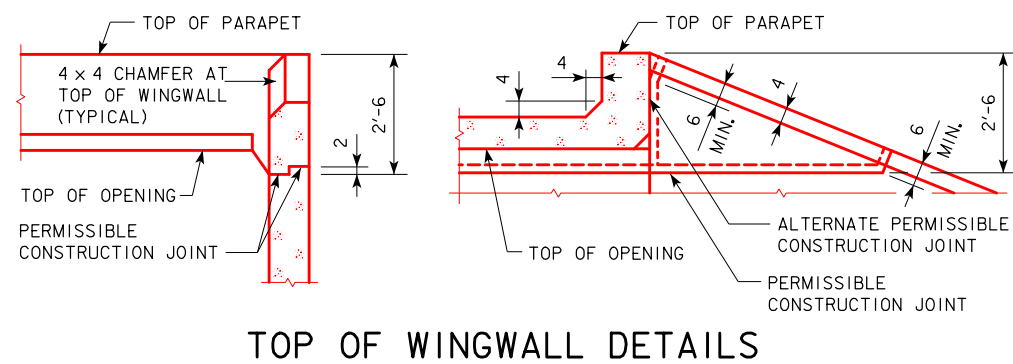
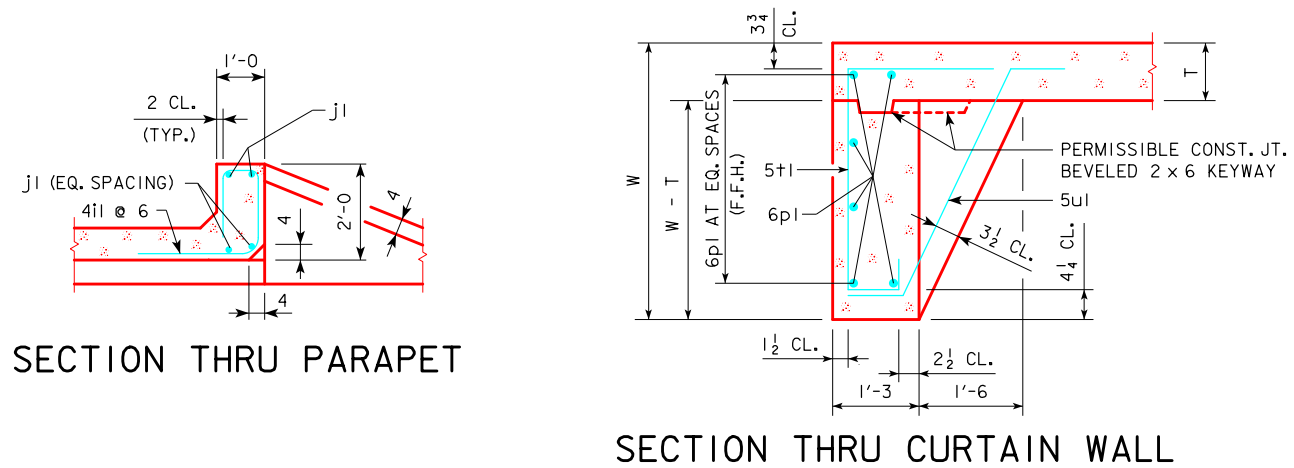
NOTES:

1. SEE DRAWING RCB-G1-12 AND RCB-G2-12 FOR GENERAL NOTES, SPECIFICATIONS, AND DESIGN STRESSES.
2. SEE DRAWING PWH 0-2-12 THRU 0-4-12 FOR LOCATION OF CERTAIN DIMENSIONS TABULATED.

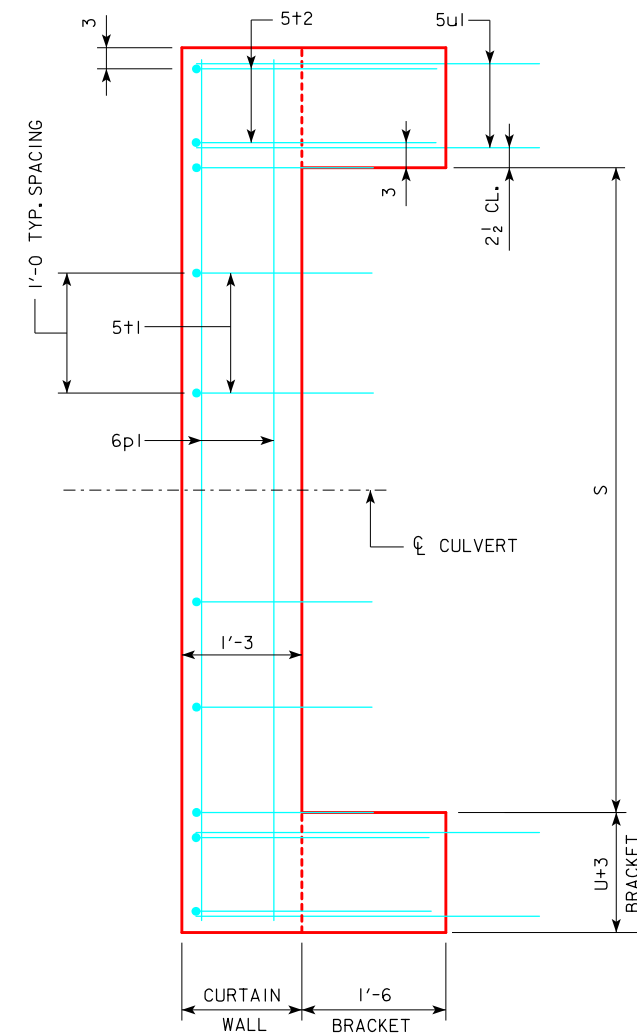
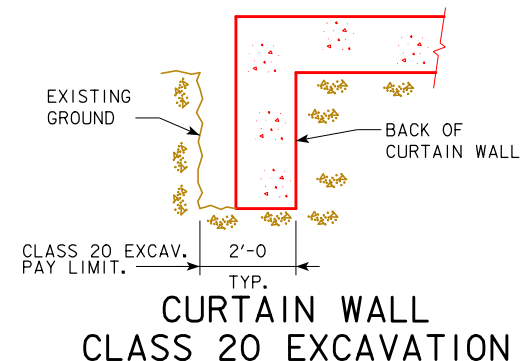


PLAN VIEW

12-2016 LATEST REVISION DATE	<i>Norman L. McDaniel</i> APPROVED BY BRIDGE ENGINEER	 Highway Division STANDARD DESIGN - SINGLE REINFORCED CONCRETE BOX CULVERTS PARALLEL WING HEADWALLS APRIL, 2012
DIMENSION TABLE 0° SKEW		PWH 0-1-12



4dI BAR SPACING		
SPAN	SPACING	NO. OF BARS
3'-0	1 SPA. AT 1'-0	4
4'-0	2 SPA. AT 1'-0	5
5'-0	2 SPA. AT 1'-6	5
6'-0	3 SPA. AT 1'-4	6
8'-0	4 SPA. AT 1'-6	7
10'-0	6 SPA. AT 1'-4	9
12'-0	8 SPA. AT 1'-3	11



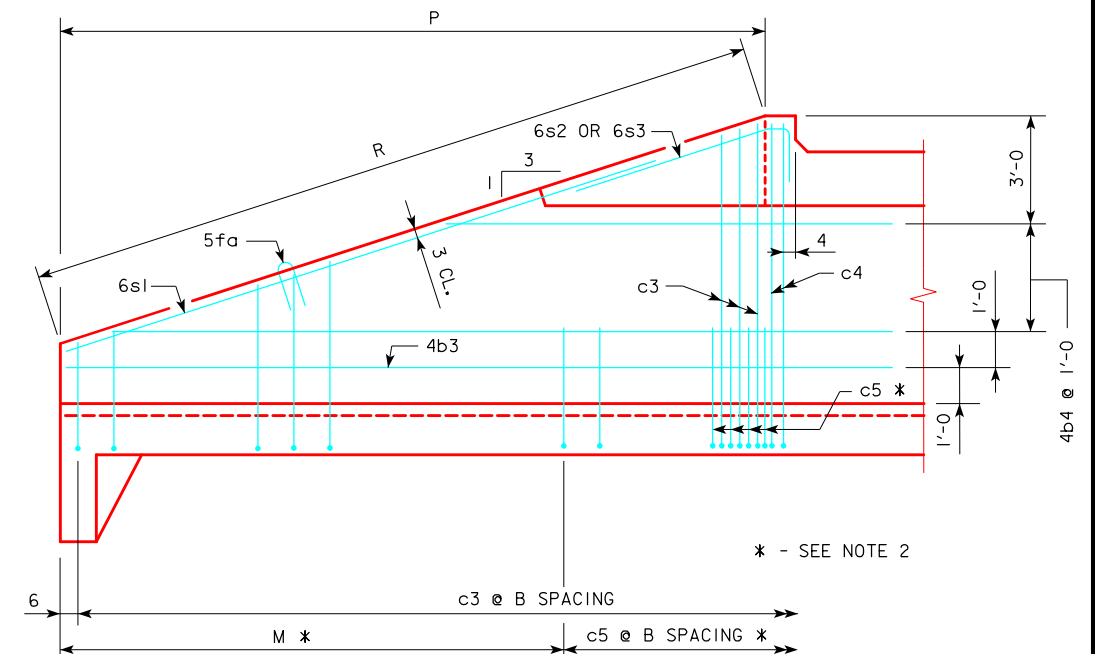
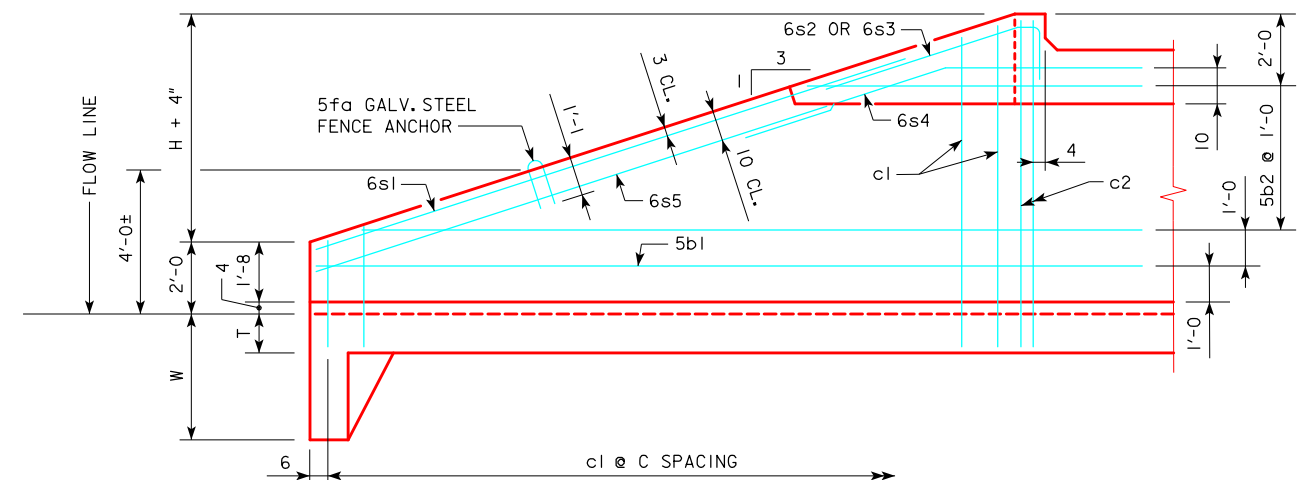
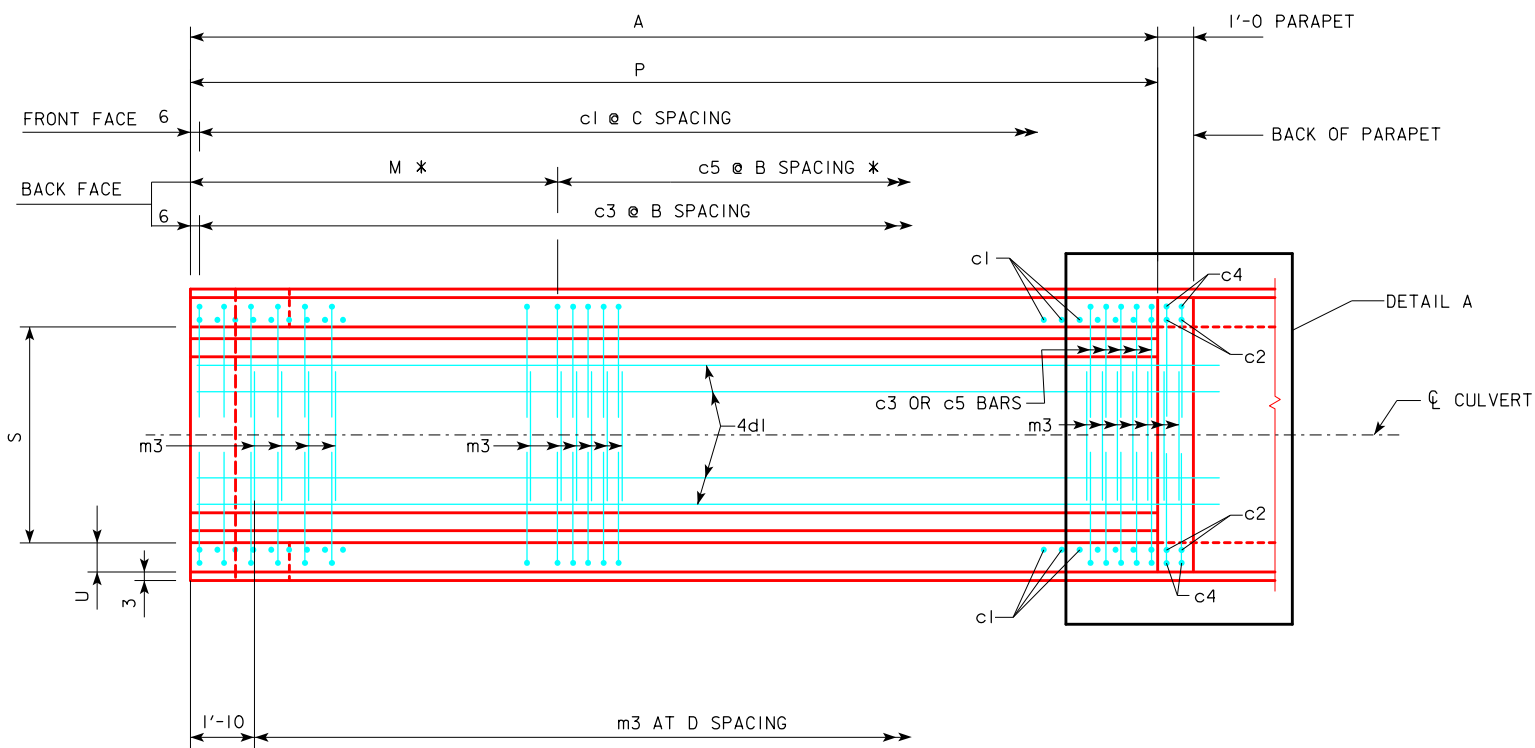
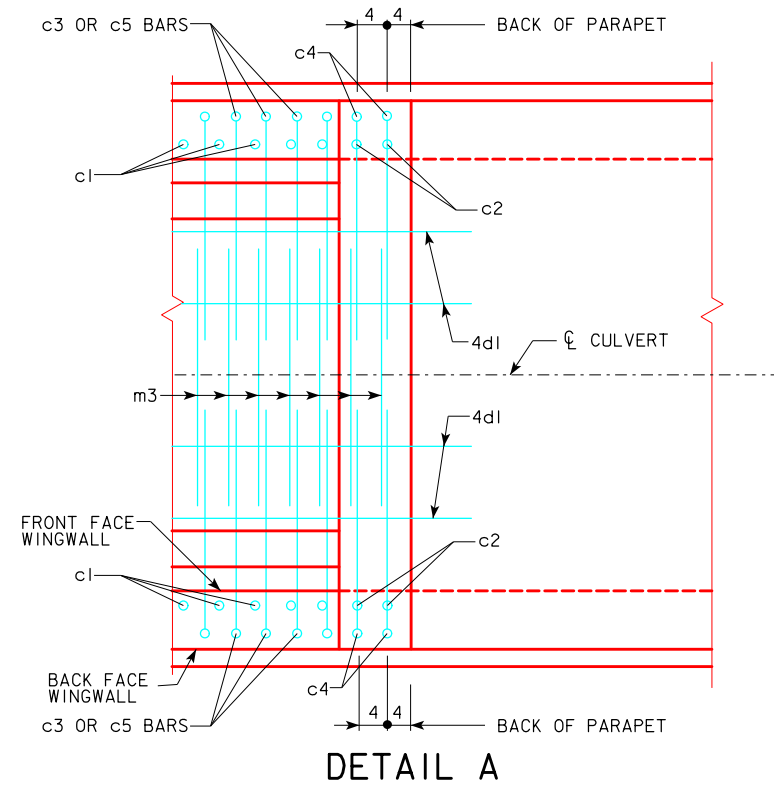
CURTAIN WALL DETAIL - PLAN VIEW
APRON IS NOT SHOWN

NOTES:

1. SEE DRAWING RCB-G1-12 AND RCB-G2-12 FOR GENERAL NOTES, SPECIFICATIONS, AND DESIGN STRESSES.
2. FOR DIMENSION TABLE SEE DRAWING PWH 0-1-12.

12-2016 LATEST REVISION DATE <i>Norman L. McDaniel</i> APPROVED BY BRIDGE ENGINEER		
	STANDARD DESIGN - SINGLE REINFORCED CONCRETE BOX CULVERTS PARALLEL WING HEADWALLS	
	APRIL, 2012	
CROSS SECTION DETAILS 0° SKEW		PWH 0-2-12

1/30/2017 9:57:32 AM bkloss W:\Highway\Bridge\Standards\Culverts\LRFD\EnglishLRFDSignedSingleCulverts.dgn PWH 0-3-12 11x17_.pdf.pltcf

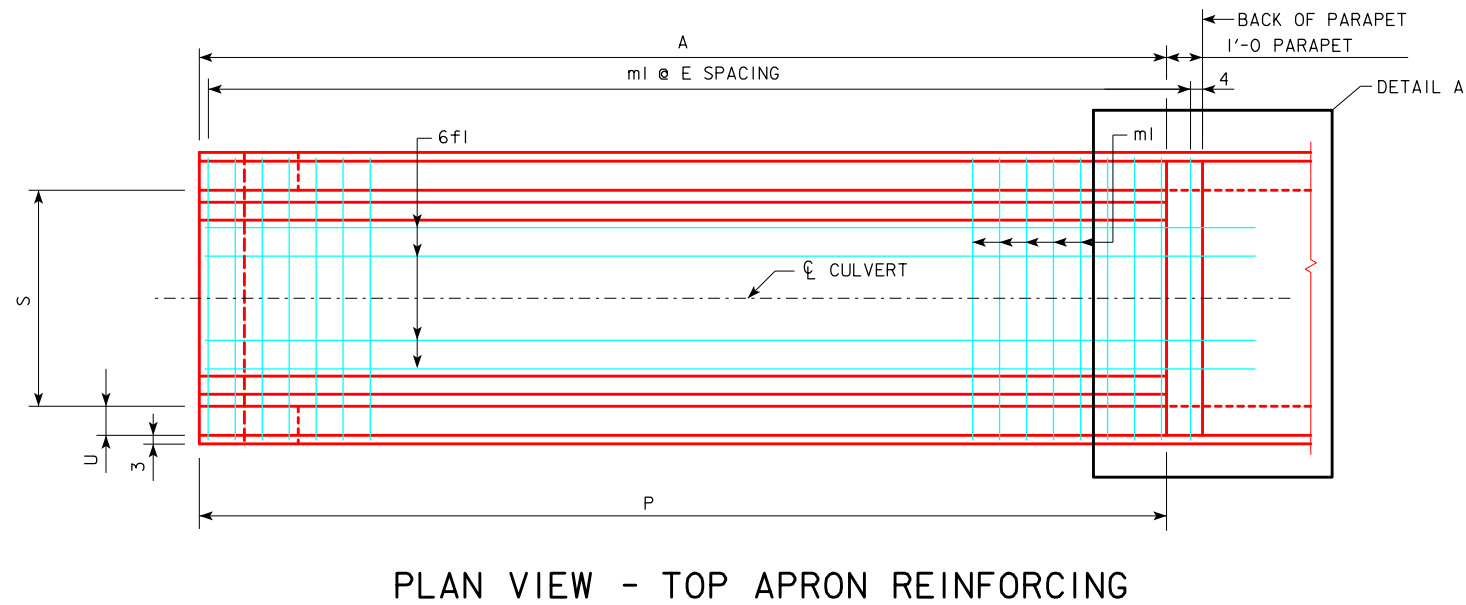
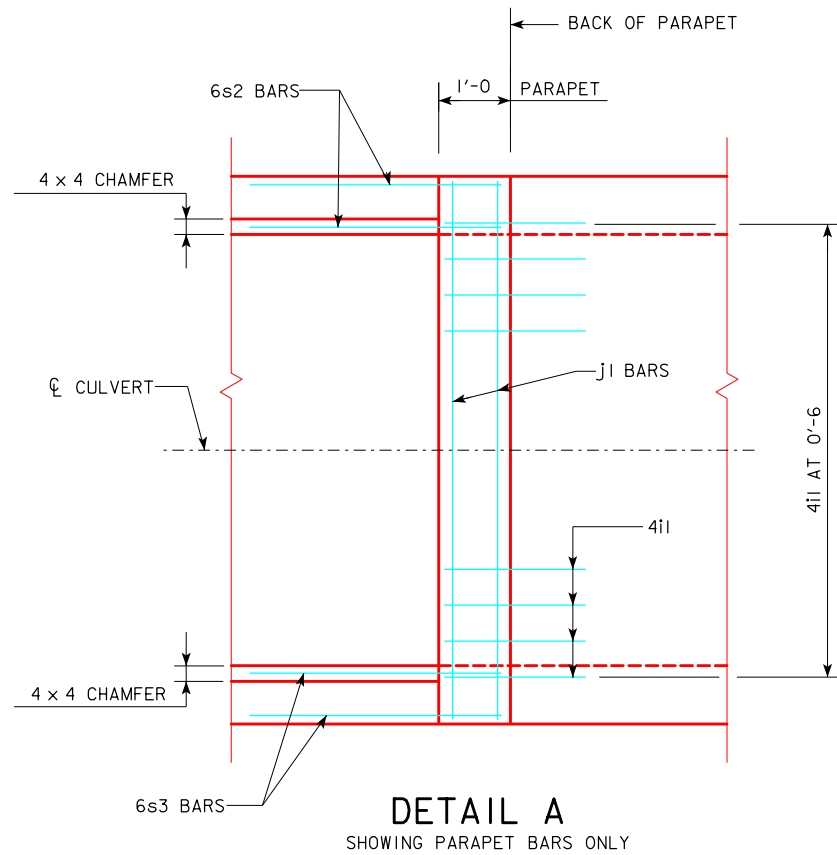


NOTES :

1. BAR SPACINGS AND POSITIONS SHOWN ARE SIMILAR FOR ALL SIZES OF HEADWALLS IN THIS STANDARD.
2. NOT APPLICABLE FOR THE FOLLOWING HEADWALL SIZES: 12x5, 12x4, 10x6, 10x5, 10x4, 8x6, 8x5, 8x4, 6x6, 6x5, 6x4, 6x3, 5x6, 5x5, 5x4, 5x3, 4x4 AND 3x3.
3. FOR HEADWALL DIMENSIONS AND BAR SPACING SEE DRAWING PWH 0-1-12.
4. WINGWALL BARS CONSISTENTLY REFERENCED FROM END OF WING FOR ALL WINGWALLS.
5. APRON m3 BARS ARE TO BE CENTERED ON $\bar{C}$ CULVERT.
6. B.F.V. (c4) AND F.F.V. (c2) BARS ARE APPROXIMATELY 4" FROM THE BACK OF PARAPET FOR ALL HEADWALLS.

07-2016 LATEST REVISION DATE <i>Thomas L. McQuinn</i> APPROVED BY BRIDGE ENGINEER	 Highway Division	
	STANDARD DESIGN - SINGLE REINFORCED CONCRETE BOX CULVERTS PARALLEL WING HEADWALLS	
	APRIL, 2012	
WINGWALL ELEVATIONS & BOTTOM APRON REINFORCING 0° SKEW	PWH 0-3-12	

ENGLISHLRFD\IGNED\INGLECULVERTS.DGN - PWH 0-4-12 - THIS SHEET ISSUED 04-12.



NOTES :

1. BAR SPACINGS AND POSITIONS SHOWN ARE SIMILAR FOR ALL SIZES OF HEADWALLS IN THIS STANDARD.
2. FOR HEADWALL DIMENSIONS AND BAR SPACING SEE DRAWING PWH 0-1-12.
3. TOP TRANSVERSE APRON BARS ARE REFERENCED APPROXIMATELY 4" FROM THE BACK OF THE PARAPET FOR ALL HEADWALLS.

LATEST REVISION DATE	<i>Norman L. McQuinn</i> APPROVED BY BRIDGE ENGINEER	 STANDARD DESIGN - SINGLE REINFORCED CONCRETE BOX CULVERTS PARALLEL WING HEADWALLS	
		APRIL, 2012	
		PARAPET REINFORCING & TOP APRON REINFORCING 0° SKEW	PWH 0-4-12

REVISED 07-2016 - CHANGED FENCE ANCHOR BAR (5fa) FROM 3'-1 TO 2'-10.
ENGLISHLRFDSignedSingleCulverts.dgn - PWH 0-8-12 - THIS SHEET ISSUED 04-12.

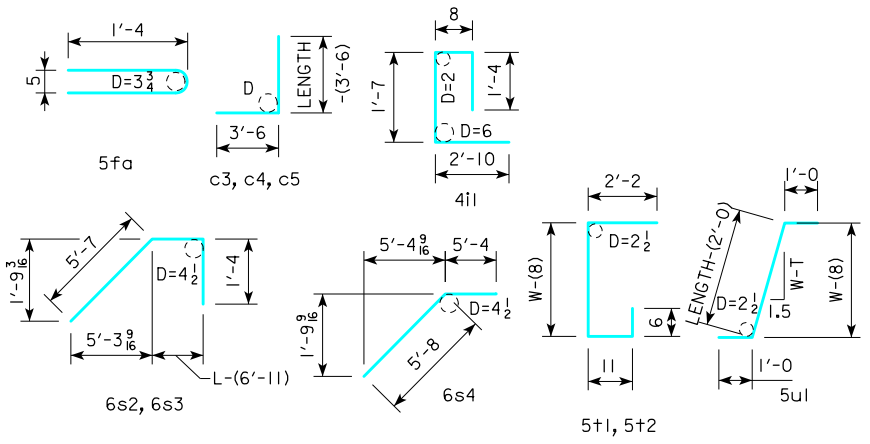
BILL OF REINFORCING FOR ONE HEADWALL 0° SKEW CULVERT SPAN × CULVERT HEIGHT

LOCATION		SHAPE	6' x 8'				6' x 7'				6' x 6'				6' x 5'				6' x 4'				6' x 3'			
			BAR	NO.	LENGTH	WT.	BAR	NO.	LENGTH	WT.	BAR	NO.	LENGTH	WT.	BAR	NO.	LENGTH	WT.	BAR	NO.	LENGTH	WT.	BAR	NO.	LENGTH	WT.
FENCE ANCHOR (GALV.)			5fa	2	2'-10	6	5fa	2	2'-10	6	5fa	2	2'-10	6	5fa	2	2'-10	6	5fa	2	2'-10	6	5fa	2	2'-10	6
WINGWALL, F.F.H.			5b1	2	27'-10	58	5b1	2	24'-10	52	5b1	2	21'-10	46	5b1	2	18'-10	39	5b1	2	15'-10	33	5b1	2	12'-10	27
WINGWALL, F.F.H.			5b2	14 VAR	2 EACH 8'-10:26'-10	260	5b2	12 VAR	2 EACH 8'-10:23'-10	204	5b2	10 VAR	2 EACH 8'-10:20'-10	155	5b2	8 VAR	2 EACH 8'-10:17'-10	111	5b2	6 VAR	2 EACH 8'-10:14'-10	74	5b2	4 VAR	2 EACH 8'-10:11'-10	43
WINGWALL, B.F.H.			4b3	2	27'-10	37	4b3	2	24'-10	33	4b3	2	21'-10	29	4b3	2	18'-10	25	4b3	2	15'-10	21	4b3	2	12'-10	17
WINGWALL, B.F.H.			4b4	12 VAR	2 EACH 11'-10:26'-10	155	4b4	10 VAR	2 EACH 11'-10:23'-10	119	4b4	8 VAR	2 EACH 11'-10:20'-10	87	4b4	6 VAR	2 EACH 11'-10:17'-10	59	4b4	4 VAR	2 EACH 11'-10:14'-10	36	4b4	2	11'-10	16
WINGWALL, F.F.V.			5c1	50 VAR	2 EACH 2'-6:10'-6	339	5c1	44 VAR	2 EACH 2'-6:9'-6	275	4c1	38 VAR	2 EACH 2'-6:8'-6	140	4c1	32 VAR	2 EACH 2'-6:7'-6	107	4c1	26 VAR	2 EACH 2'-6:6'-6	78	4c1	20 VAR	2 EACH 2'-6:5'-6	53
WINGWALL, F.F.V. (L)			5c2	2	10'-9	22	5c2	2	9'-9	20	4c2	2	8'-9	12	4c2	2	7'-9	10	4c2	2	6'-9	9	4c2	2	5'-9	8
WINGWALL, F.F.V. (R)			5c2	2	10'-9	22	5c2	2	9'-9	20	4c2	2	8'-9	12	4c2	2	7'-9	10	4c2	2	6'-9	9	4c2	2	5'-9	8
WINGWALL, B.F.V.			5c3	50 VAR	2 EACH 6'-1:14'-1	526	5c3	44 VAR	2 EACH 6'-1:13'-1	440	6c3	38 VAR	2 EACH 6'-1:12'-1	518	5c3	32 VAR	2 EACH 6'-1:11'-1	286	4c3	26 VAR	2 EACH 6'-1:10'-1	140	4c3	20 VAR	2 EACH 6'-1:9'-1	101
WINGWALL, B.F.V. (L)			5c4	2	14'-3	30	5c4	2	13'-3	28	6c4	2	12'-3	37	5c4	2	11'-3	23	4c4	2	10'-3	14	4c4	2	9'-3	12
WINGWALL, B.F.V. (R)			5c4	2	14'-3	30	5c4	2	13'-3	28	6c4	2	12'-3	37	5c4	2	11'-3	23	4c4	2	10'-3	14	4c4	2	9'-3	12
WINGWALL, B.F.V.			5c5	34	8'-6	301	5c5	30	8'-6	266	c5	—	—	—	c5	—	—	—	c5	—	—	—	c5	—	—	—
APRON, LONGIT., BOT.			4d1	6	27'-10	112	4d1	6	24'-10	100	4d1	6	21'-10	88	4d1	6	18'-10	75	4d1	6	15'-10	63	4d1	6	12'-10	51
APRON, LONGIT., TOP			6f1	7	27'-10	293	6f1	7	24'-10	261	6f1	7	21'-10	230	6f1	7	18'-10	198	6f1	7	15'-10	166	6f1	7	12'-10	135
PARAPET, VERTICAL			4i1	13	6'-5	56	4i1	13	6'-5	56	4i1	13	6'-5	56	4i1	13	6'-5	56	4i1	13	6'-5	56	4i1	13	6'-5	56
PARAPET, HORIZ.			7j1	4	7'-4	60	7j1	4	7'-2	59	7j1	4	7'-2	59	7j1	4	7'-2	59	7j1	4	7'-2	59	7j1	4	7'-2	59
APRON, TRANS., TOP			6m1	26	7'-10	306	6m1	23	7'-8	265	6m1	20	7'-8	230	6m1	17	7'-8	196	6m1	14	7'-8	161	6m1	11	7'-8	127
APRON, TRANS., TOP			m2	—	—	—	m2	—	—	—	m2	—	—	—	m2	—	—	—	m2	—	—	—	m2	—	—	—
APRON, TRANS., BOT.			5m3	25	4'-7	120	5m3	22	4'-5	101	4m3	19	3'-7	45	4m3	16	3'-7	38	4m3	13	3'-7	31	4m3	10	3'-7	24
CURTAIN, HORIZ.			6p1	6	7'-10	71	6p1	5	7'-8	58	6p1	5	7'-8	58	6p1	5	7'-8	58	6p1	5	7'-8	58	6p1	5	7'-8	58
WING SLOPE, BOTH F.			6s1	4	23'-0	138	6s1	4	19'-10	119	6s1	4	16'-8	100	6s1	4	13'-7	82	6s1	4	10'-5	63	6s1	4	7'-3	44
WING SLOPE, BOTH F. (L)			6s2	2	7'-9	23	6s2	2	7'-9	23	6s2	2	7'-9	23	6s2	2	7'-9	23	6s2	2	7'-9	23	6s2	2	7'-9	23
WING SLOPE, BOTH F. (R)			6s3	2	7'-9	23	6s3	2	7'-9	23	6s3	2	7'-9	23	6s3	2	7'-9	23	6s3	2	7'-9	23	6s3	2	7'-9	23
WING SLOPE, F. F.			6s4	2	11'-0	33	6s4	2	11'-0	33	6s4	2	11'-0	33	6s4	2	11'-0	33	6s4	2	11'-0	33	6s4	2	11'-0	33
WING SLOPE, F. F.			6s5	2	20'-9	62	6s5	2	17'-7	53	6s5	2	14'-5	43	6s5	2	11'-3	34	6s5	2	8'-1	24	6s5	2	4'-11	15
CURTAIN, VERT.			5t1	7	6'-11	50	5t1	7	6'-8	49	5t1	7	6'-5	47	5t1	7	6'-5	47	5t1	7	6'-5	47	5t1	7	6'-5	47
CURTAIN, VERT., ENDS			5t2	4	6'-11	29	5t2	4	6'-8	28	5t2	4	6'-5	27	5t2	4	6'-5	27	5t2	4	6'-5	27	5t2	4	6'-5	27
BRACKET, VERT.			5u1	4	5'-8	24	5u1	4	5'-6	23	5u1	4	5'-3	22	5u1	4	5'-3	22	5u1	4	5'-3	22	5u1	4	5'-3	22
ESTIMATED QUANTITIES ONE HEADWALL	REINF. STEEL	3186 LBS.				2742 LBS.				2163 LBS.				1670 LBS.				1290 LBS.				1047 LBS.				
	CONCRETE	PARAPET Δ	1.1	19.7 CU.YD.	PARAPET Δ	1.0	15.7 CU.YD.	PARAPET Δ	1.0	13.3 CU.YD.	PARAPET Δ	1.0	11.0 CU.YD.	PARAPET Δ	1.0	8.9 CU.YD.	PARAPET Δ	1.0	7.1 CU.YD.							
		WINGWALLS	9.0		WINGWALLS	6.4		WINGWALLS	5.0		WINGWALLS	3.7		WINGWALLS	2.5		WINGWALLS	1.6								
		APRON	9.6		APRON	8.3		APRON	7.3		APRON	6.3		APRON	5.4		APRON	4.5								

Δ INCLUDES TOP OF WINGWALL QUANTITIES.

(L) - INDICATES BAR LOCATED AT LEFT CORNER.
(R) - INDICATES BAR LOCATED AT RIGHT CORNER.
NOTE: WEIGHT OF BARS OVER 40'-0 LONG INCLUDE AN ALLOWANCE OF 2'-0 FOR LAP.
REFER TO SHEET PWH 0-1-12 FOR LEFT AND RIGHT CORNER LOCATIONS.

BENT BAR DETAILS



NOTE: ALL DIMENSIONS ARE OUT TO OUT
D = PIN DIAMETER
SEE TABLE AT RIGHT FOR PIN DIAMETER "D" OF c BARS

c BAR PIN DIAMETER	
BAR SIZE	D
4	3
5	3 3/4
6	4 1/2

HEADWALL NOTES:

THIS HEADWALL IS BASED ON A 3:1 SLOPE NORMAL TO CENTERLINE OF ROADWAY.

THE SIDES OF THE FOOTING ARE TO BE FORMED TO INSURE CORRECT LINE AND GRADE.

ALL EXPOSED CORNERS OF 90° OR SHARPER ARE TO BE FILLETED WITH A 3/4" DRESSED AND BEVELED STRIP.

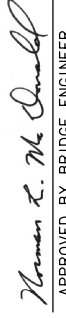
ALL REINFORCING IS TO BE SECURELY WIRED IN PLACE BEFORE THE CONCRETE IS POURED. ALL SLAB AND FLOOR REINFORCING STEEL IS TO BE SUPPORTED BY BAR CHAIRS AT INTERVALS OF NOT MORE THAN 3'-0 IN EITHER DIRECTION AS OUTLINED IN THE STANDARD SPECIFICATIONS.

CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN. CLEARANCE TO THE BOTTOM ENDS OF VERTICAL BARS SHALL BE 3 INCHES.

CONCRETE QUANTITIES ARE ESTIMATED FROM BACK OF PARAPET.

HORIZONTAL TAILS OF BARS "b" & "s" ESTIMATED TO EXTEND 2'-0 BEYOND BACK OF PARAPET (INTO END OF BARREL). LONGITUDINAL BARS "4d1" AND "6f1" ESTIMATED TO PROJECT INTO END SECTION OF BARREL A MINIMUM OF 2'-0 BEYOND BACK OF PARAPET. THE "LENGTH" COLUMN REFLECTS TOTAL NUMBER OF FEET NECESSARY TO MEET THESE REQUIREMENTS.

07-2016
LATEST REVISION DATE


APPROVED BY BRIDGE ENGINEER



STANDARD DESIGN - SINGLE REINFORCED CONCRETE BOX CULVERTS
PARALLEL WING HEADWALLS

APRIL, 2012

QUANTITY TABULATION 6'-0 SPAN 0° SKEW	PWH 0-8-12
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