

WOODLAND OAKS

Lots 1 thru 42

STREET AND STORM SEWER CONSTRUCTION PLANS

Section 27, Township 48 North, Range 31 West LEE'S SUMMIT, JACKSON COUNTY, MISSOURI

OIL - GAS WELLS

ACCORDING TO EDWARD ALTON MAY JR'S ENVIRONMENTAL IMPACT STUDY OF ABANDONED OIL AND GAS WELLS IN LEE'S SUMMIT, MISSOURI IN 1995, THERE ARE NOT OIL AND GAS WELLS WITHIN 185 FEET OF THE PROPERTY AS SURVEYED HEREON.

FLOOD INFORMATION:

THE SUBJECT PROPERTY SURVEYED LIES WITHIN A FLOOD ZONE DESIGNATED ZONE (X), AREAS LOCATED OUTSIDE THE 100 YEAR FLOOD PLAIN, PER F.E.M.A. MAP, COMMUNITY PANEL NO. 29095C0416G EFFECTIVE DATE: JANUARY 20, 2017.

CONSTRUCTION AND DESIGN NOTES:

STREET & STORM SEWERS:

1 ~ STREET PAVEMENT SHALL CONSIST OF TYPE CG-2 CURBS WITH PAVEMENT PER TABLE LS-2 OF THE LEE'S SUMMIT DESIGN AND CONSTRUCTION MANUAL

RESIDENTIAL LOCAL STREET SEE BELOW FOR TYPICAL SECTION.

- OPTION 1) 4" TYPE 5 ASPHALT BASE AND 2" TYPE 5 OR 6 ASPHALT SURFACE OVER A 6" MoDOT TYPE 5 BASE AND A SUBGRADE MIXTURE OF 6" FLY ASH STABILIZED SUBGRADE IN ACCORDANCE WITH THE CITY OF LEE'S SUMMIT DESIGN AND CONSTRUCTION MANUAL.
- OPTION 2) 4" TYPE 5 ASPHALT BASE AND 2" TYPE 5 OR 6 ASPHALT SURFACE OVER 10" MoDOT TYPE 5 BASE OVERTOP A BIAXIAL GEOGRID PER THE CITY'S APPROVED PRODUCT LIST.

2 ~ STORM SEWER PIPE SHALL BE HIGH DENSITY POLYETHYLENE (HDPE) AS APPROVED BY CITY OF LEE'S SUMMIT DESIGN AND CONSTRUCTION MANUAL.

3 ~ JUNCTION BOXES SHALL BE PER CITY OF LEE'S SUMMIT STANDARD DRAWING NO. STM-3. FIELD INLETS SHALL BE PER CITY OF LEE'S SUMMIT STANDARD DRAWING STM-2. TOEWALLS SHALL BE PER CITY OF LEE'S SUMMIT DRAWING NO. STM-5. JUNCTION BOXES SHALL BE PER CITY OF LEE'S SUMMIT STM-3. ROCK LINING AND RIP RAP SHALL BE PER CITY OF LEE'S SUMMIT.

GENERAL NOTES:

1 ~ ALL CONSTRUCTION SHALL CONFORM TO THE CITY OF LEE'S SUMMIT DESIGN AND CONSTRUCTION MANUAL AS ADOPTED BY ORDINANCE 5813.

2 ~ ALL REQUIRED EASEMENTS WITHIN THE BOUNDARY OF THIS PROJECT SHALL BE PROVIDED FOR ON THE FINAL PLAT.

3 ~ ANY REQUIRED EASEMENT LOCATED OUTSIDE OF THE BOUNDARY OF THIS PROJECT SHALL BE PROVIDED FOR BY SEPARATE INSTRUMENT PRIOR TO ISSUANCE OF CONSTRUCTION PERMITS.

4 ~ THE CONTRACTOR SHALL CONTACT THE CITY'S DEVELOPMENT SERVICES ENGINEERING INSPECTION TO SCHEDULE A PRE-CONSTRUCTION MEETING WITH A FIELD ENGINEERING INSPECTOR PRIOR TO ANY LAND DISTURBANCE WORK AT (816) 969-1200.

5 ~ THE CONTRACTOR SHALL NOTIFY ENGINEERING SOLUTIONS AT 816.623.9888 OF ANY CONFLICT WITH THE IMPROVEMENTS PROPOSED BY THESE PLANS AND SITE CONDITIONS.

6 ~ THE CONTRACTOR SHALL NOTIFY THE CITY ENGINEER AND OBTAIN THE APPROPRIATE BLASTING PERMITS FOR A REQUIRED BLASTING. IF BLASTING IS ALLOWED, ALL BLASTING SHALL CONFORM TO STATE REGULATIONS AND LOCAL ORDINANCES.

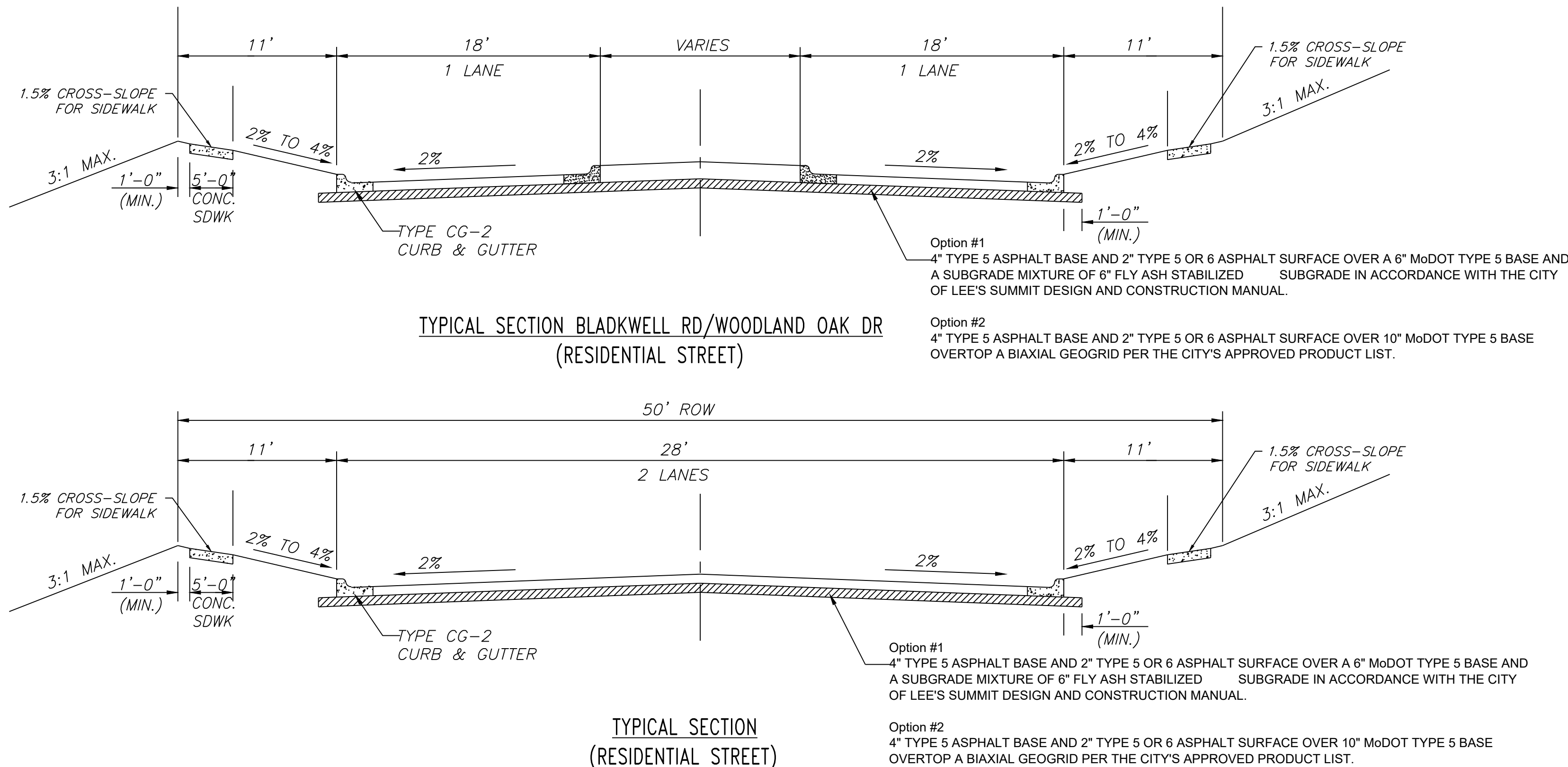
UTILITY COMPANIES:

THE FOLLOWING LIST OF UTILITY COMPANIES IS PROVIDED FOR INFORMATION ONLY. WE DO NOT OFFER ANY GUARANTEE OR WARRANTY THAT THIS LIST IS COMPLETE OR ACCURATE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL UTILITY COMPANIES THAT MAY BE AFFECTED BY THE PROPOSED CONSTRUCTION AND VERIFYING THE ACTUAL LOCATION OF EACH UTILITY LINE. THE CONTRACTOR SHALL NOTIFY ENGINEERING SOLUTIONS AT 816.623.9888 OF ANY CONFLICT WITH PROPOSED IMPROVEMENTS.

EVERGY ~ 298-1196
MISSOURI GAS ENERGY ~ 756-5261
SOUTHWESTERN BELL TELEPHONE ~ 761-5011
COMCAST CABLE ~ 795-1100
WILLIAMS PIPELINE ~ 422-6300
CITY OF LEE'S SUMMIT PUBLIC WORKS ~ 969-1800
CITY OF LEE'S SUMMIT PUBLIC WORKS INSPECTIONS ~ 969-1800
CITY OF LEE'S SUMMIT WATER UTILITIES ~ 969-1900
MISSOURI ONE CALL (DIG RITE) ~ 1-800-344-7483



SITE LOCATION MAP



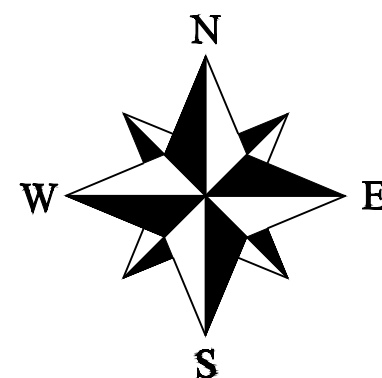
INDEX OF SHEETS:

- C.001 ~ STREET & STORM COVER SHEET
C.050 ~ ESC PHASE 1 - PRE CLEARING PLAN
C.051 ~ ESC PHASE 2 - INITIAL AREA STABILIZATION PLAN
C.052 ~ ESC PHASE 3 - FINAL RESTORATION PLAN
C.053 ~ ESC - STANDARD DETAILS
C.054 ~ ESC - STANDARD DETAILS
C.100 ~ SITE PLAN
C.200 ~ MASTER DRAINAGE PLAN SHEET 1 OF 3 GRADING PLAN - SWPPP
C.201 ~ MASTER DRAINAGE PLAN SHEET 2 OF 3 SPOT ELEVATIONS
C.202 ~ MASTER DRAINAGE PLAN SHEET 3 OF 3 DRAINAGE AREA MAP
C.203 ~ STREET PLAN & PROFILE
C.204 ~ STREET PLAN & PROFILE
C.205 ~ SIDEWALK AND INTERSECTION PLAN
C.206 ~ DETENTION BASIN PLAN
C.207 ~ BYPASS CHANNEL PLAN
C.208 ~ STREET SIGNAGE PLAN
C.300 ~ STORM SEWER GENERAL LAYOUT
C.301 ~ STORM SEWER PLAN & PROFILE
C.302 ~ STORM SEWER PLAN & PROFILE
C.303 ~ STORM SEWER PLAN & PROFILE
C.304 ~ STORM SEWER PLAN & PROFILE
C.305 ~ STORM SEWER TABLES - 10 YEAR
C.306 ~ STORM SEWER TABLES - 100 YEAR
C.600 ~ CONSTRUCTION DETAILS
C.601 ~ CONSTRUCTION DETAILS

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CITY OF LEE'S SUMMIT WATER UTILITIES ~ 969-1900
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LEGEND:

- B/L ~ BUILDING SET-BACK
C/A ~ COMMON AREA
D/E ~ DRAINAGE EASEMENT
FND. ~ FOUND
L/E ~ LANDSCAPE EASEMENT
L.N.A. ~ LIMITS OF NO ACCESS
R/W ~ RIGHT OF WAY
SAN ~ SANITARY SEWER LINE
S/W ~ SIDEWALK
U/E ~ UTILITY EASEMENT
W ~ WATER LINE
ST ~ STORM SEWER LINE

Summary of Quantities:

ITEM AND DESCRIPTION	UNIT	ESTIMATED QUANTITY
ASPHALT PAVING	S.Y.	7,187.12
CURBING	FT	4643.65
MoDOT Type 5 Base	S.Y.	7,689.66
GEOGRID	S.Y.	7,689.66
CLEARING, GRADING & GRUBBING	LS	1.00
SILT FENCE	FT	12,550.00
INLET PROTECTION	UNIT	81.00
SEEDING / MULCHING/ FERTILIZING	AC	19.51
CONST. ENTRANCE	UNIT	1.00
RIP RAP W/ FABRIC	S.Y.	142.05
SEDIMENT TRAP ROCK	C.Y.	19.00
FAIRCLOTH SKIMMER ASSEMBLY	UNIT	1.00
STORM		
15" HDPE	FT	1598.78
18" HDPE	FT	829.84
24" HDPE	FT	307.87
30" HDPE	FT	51.00
15" HDPE END SECTION / TOE WALL	LS	3.00
18" HDPE END SECTION / TOE WALL	LS	1.00
24" HDPE END SECTION / TOE WALL	LS	4.00
30" HDPE END SECTION / TOE WALL	LS	1.00
4' x 4' STORM FIELD INLET	EA	10.00
5' x 5' JUNCTION BOX	EA	2.00
5' x 4' STORM CURB INLET	EA	14.00
5' x 5' CONTROL STRUCTURE	EA	1.00
5' x 4' CONTROL STRUCTURE	EA	1.00

ENGINEER'S CERTIFICATION:

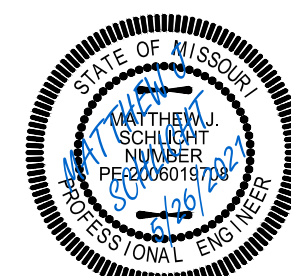
I HEREBY CERTIFY THAT THIS PROJECT HAS BEEN DESIGNED AND THESE PLANS PREPARED IN ACCORDANCE WITH THE CURRENT DESIGN CRITERIA OF THE CITY OF LEE'S SUMMIT, MISSOURI AND THE STATE OF MISSOURI. I FURTHER CERTIFY THAT THESE PLANS WERE DESIGNED IN ACCORDANCE TO AASHTO STANDARDS.

Street, Stormwater, Master Drainage Plan, and Erosion and Sediment Control

Street & Storm Cover Sheet

Construction Plans for:
WOODLAND OAKS
Lots 1 thru 42

Lee's Summit, Jackson County, Missouri



Matthew J. Schlicht
MO PE 0006019708
KS PE 19071
OK PE 25226
NE PE E-14335

REVISIONS

REV. 5/5/2021

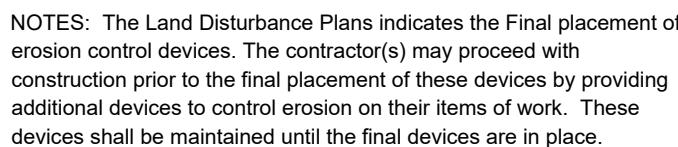
REV. 5/26/2021

C. 001

Professional Registration
Missouri
Engineering 2005002186-D
Surveying 2005008319-D
Kansas
Engineering E-1685
Surveying LS-218
Oklahoma
Engineering 6254
Nebraska
Engineering CA2821

Part of the Southeast 1
Section 27, Township 48 North, Range 31 West
Lee's Summit, Jackson County, Missouri

Project:
WOODLAND OAKS
LSMO
Issue Date:
February 25, 2021



LEGEND

PHASE 1 SILT FENCE ———— SF-1 ———— SF-1 ————

PHASE 2 SILT FENCE ———— SF-2 ———— SF-2 ————

INLET PROTECTION **■**

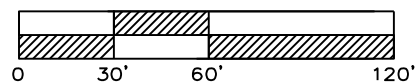
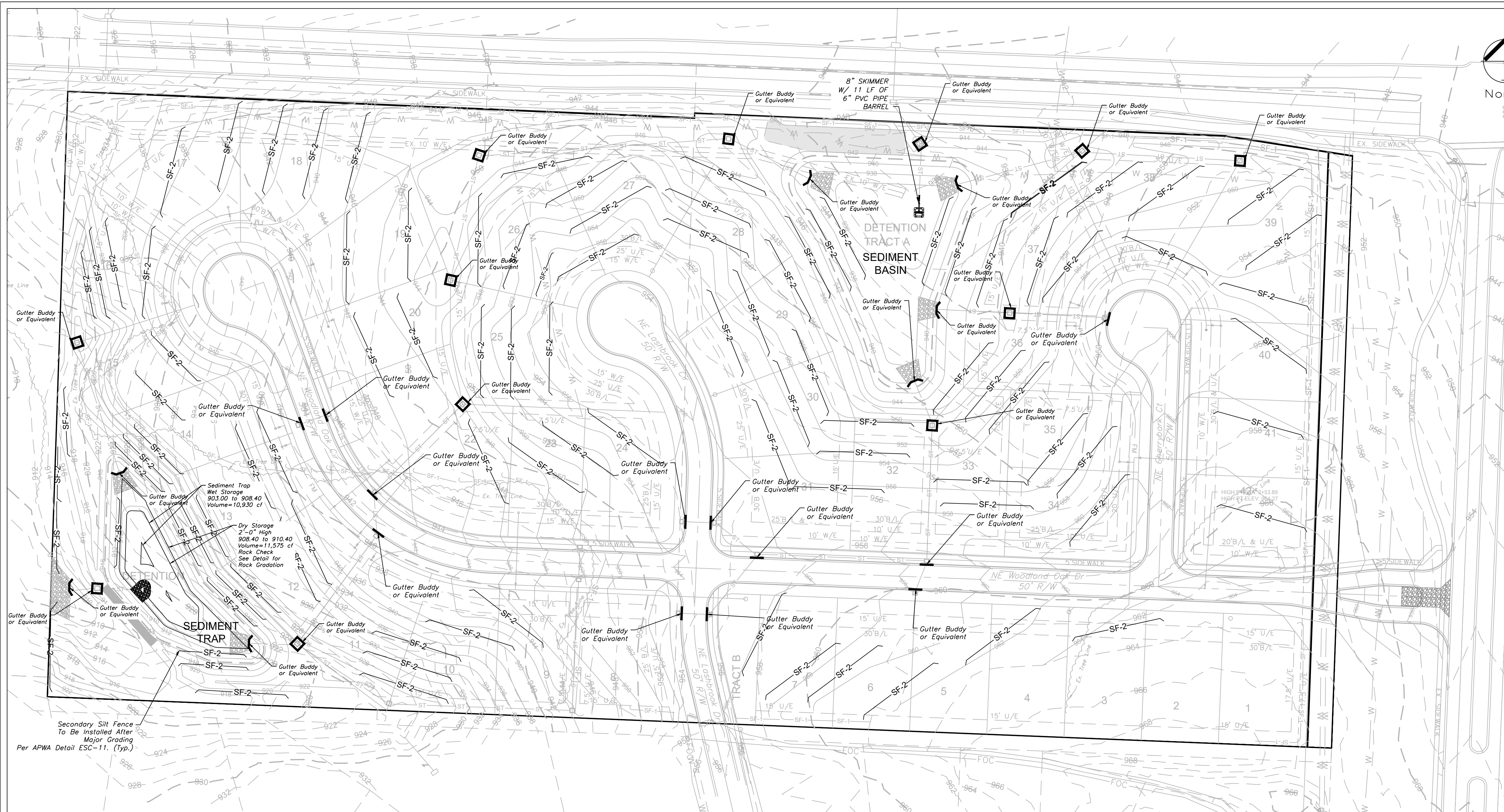
DURING ALL PHASES OF CONSTRUCTION,
INACTIVE AREA STABILIZATION METHODS AS
DESCRIBED IN APWA SECTION 5111.3 SHALL BE
USED TO CONTROL EROSION AND SILTATION.



Perimeter Silt Fence
Must Be Installed Prior to
Any Land Disturbance Activities
Per APWA Detail ESC-11. (Typ.)

*Temporary Construction Entrance
Must Be Installed Prior to
Any Land Disturbance Activities
Per APWA Detail ESC-01.*

Perimeter Silt Fence
Must Be Installed Prior to
Any Land Disturbance Activities
Per APWA Detail ESC-11. (Typ.)



INACTIVE AREA STABILIZATION PLAN

SCALE: 1" = 60'

NOTES: The Land Disturbance Plans indicates the Final placement of erosion control devices. The contractor(s) may proceed with construction prior to the final placement of these devices by providing additional devices to control erosion on their items of work. These devices shall be maintained until the final devices are in place.



SILT FENCE PROTECTION
TO BE MAINTAINED BY CONTRACTOR

LEGEND

PHASE 1 SILT FENCE

SF-1

PHASE 2 SILT FENCE

SF-2

INLET PROTECTION
GUTTER BUDDY OR EQUIVALENT



DURING ALL PHASES OF CONSTRUCTION,
INACTIVE AREA STABILIZATION METHODS AS
DESCRIBED IN APWA SECTION 5111.3 SHALL BE
USED TO CONTROL EROSION AND SILTATION.

MAINTENANCE:
TO MAINTAIN THE EROSION AND SEDIMENT CONTROLS, THE FOLLOWING PROCEDURES WILL BE PERFORMED:
SEDIMENT CAPTURE DEVICES: SEDIMENT WILL BE REMOVED FROM THE UPSTREAM OR UPSLOPE SIDE OF THE FILTER FABRIC FENCES, WHEN THE DEPTH OF ACCUMULATED SEDIMENT REACHES ABOUT ONE-THIRD THE HEIGHT OF THE STRUCTURE.
STORM SEWER INLETS: ANY SEDIMENT IN THE STORM SEWER INLETS WILL BE REMOVED AND DISPOSED OF PROPERLY.
TEMPORARY CONTROLS: ALL TEMPORARY CONTROLS WILL BE REMOVED AFTER THE DISTURBED AREAS HAVE BEEN STABILIZED.

INSPECTION PROCEDURES:
INSPECTIONS WILL BE DONE BY THE RESPONSIBLE PERSON(S) AT LEAST ONCE EVERY WEEK AND WITHIN 24 HOURS EACH STORM EVENT PRODUCING ANY AMOUNT OF RAINFALL. AREAS THAT HAVE BEEN RESEEDED WILL BE INSPECTED REGULARLY AFTER SEED GERMINATION TO ENSURE COMPLETE COVERAGE OF EXPOSED AREAS. DISTURBED AREAS THAT HAVE NOT BEEN FINALLY STABILIZED SHALL HAVE ALL POLLUTION CONTROL MEASURES INSPECTED FOR PROPER INSTALLATION, OPERATION AND MAINTENANCE. LOCATIONS WHERE STORM WATER LEAVES THE SITE SHALL BE INSPECTED FOR EVIDENCE OF EROSION OR SEDIMENT DEPOSITION. ANY DEFICIENCIES SHALL BE NOTED IN A REPORT OF THE INSPECTION AND CORRECTED WITHIN SEVEN CALENDAR DAYS OF THE INSPECTION. THE PERMITTEE SHALL PROMPTLY NOTIFY THE SITE CONTRACTORS RESPONSIBLE FOR OPERATION AND MAINTENANCE OF POLLUTION CONTROL DEVICES OF DEFICIENCIES.

IF THE EXISTING GROUND COVER IS NATURAL GRASS, DISTURBED AREAS SHALL BE TEMPORARILY SEEDED WITH WHEAT/RYE AT A RATE OF 1.5 POUNDS PER 1000 SQUARE FEET. PERMANENT SEEDING SHALL CONSIST OF 90% IN THREE EQUAL PARTS OF THIN BLADE, TURF-TYPE, TALL FESCUE AND 10% BLUEGRASS SEED AT A RATE OF 10 POUNDS PER 1000 SQUARE FEET. BOTH TEMPORARY AND PERMANENT SEEDED AREAS SHALL BE MULCHED AND WATERED TO MAINTAIN THE PROPER MOISTURE LEVEL OF THE SOIL TO ESTABLISH GRASS. NEW GRASS SHALL BE WATERED AND MAINTAINED UNTIL IT REACHES A HEIGHT OF 3 INCHES. ANY BARE AREAS SHALL BE RESEDED.

ALL EROSION CONTROL DEVICES SHALL BE REMOVED BY GENERAL CONTRACTOR AFTER SITE STABILIZATION IS COMPLETE AND APPROVED BY ENGINEER.

THE DEVELOPER WILL DESIGNATE A QUALIFIED PERSON OR PERSONS TO PERFORM THE FOLLOWING INSPECTIONS:
STABILIZATION MEASURES: DISTURBED AREAS AND AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION WILL BE INSPECTED FOR EVIDENCE OF, OR THE POTENTIAL FOR, POLLUTANTS ENTERING THE DRAINAGE SYSTEM. AFTER A PORTION OF THE SITE IS FINALLY STABILIZED, INSPECTIONS WILL BE CONDUCTED AT LEAST ONCE EVERY MONTH THROUGHOUT THE LIFE OF THE PROJECT. CONTRACTOR CAN CONTACT ENGINEERING SOLUTIONS FOR COPIES OF THE INSPECTION FORM TO BE USED FOR STABILIZATION MEASURES.

STRUCTURAL CONTROLS: FILTER FABRIC FENCES AND ALL OTHER EROSION AND SEDIMENT CONTROL MEASURES IDENTIFIED IN THE PLAN WILL BE INSPECTED REGULARLY FOR PROPER POSITIONING, ANCHORING, AND EFFECTIVENESS IN TRAPPING SEDIMENTS. SEDIMENT WILL BE REMOVED FROM THE UPSTREAM OR UPSLOPE SIDE OF THE FILTER FABRIC. CONTRACTOR CAN CONTACT ENGINEERING SOLUTIONS FOR COPIES OF THE INSPECTION FORM TO BE USED FOR STABILIZATION MEASURES.

DISCHARGE POINTS: DISCHARGE POINTS OR LOCATIONS WILL BE INSPECTED TO DETERMINE WHETHER EROSION CONTROL MEASURES ARE EFFECTIVE IN PREVENTING SIGNIFICANT AMOUNTS OF POLLUTANTS FROM ENTERING RECEIVING WATERS.

CONSTRUCTION ENTRANCE: LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE WILL BE INSPECTED FOR EVIDENCE OF OFF-SITE SEDIMENT TRACKING.

A LOG OF EACH INSPECTION SHALL BE KEPT. THE INSPECTION REPORT IS TO INCLUDE THE FOLLOWING MINIMUM INFORMATION: INSPECTOR'S NAME, DATE OF INSPECTION, OBSERVATIONS RELATIVE TO THE EFFECTIVENESS OF THE POLLUTION CONTROL DEVICES, ACTIONS TAKEN OR NECESSARY TO CORRECT DEFICIENCIES, AND LISTING OF AREAS WHERE LAND DISTURBANCE OPERATIONS HAVE PERMANENTLY OR TEMPORARILY STOPPED. THE INSPECTION REPORT SHALL BE SIGNED BY THE PERMITTEE OR BY THE PERSON PERFORMING THE INSPECTION IF DULY AUTHORIZED TO DO SO.

EROSION CONTROL DESCRIPTION:
1) SILT FENCE SHALL BE PLACED AT THE PERIMETER OF THE GRADING AND AT INTERMEDIATE AREAS THROUGHOUT THE SITE AS SHOWN ON THE PLAN.
2) INLET SEDIMENT TRAPS SHALL BE PLACED SURROUNDING ALL STORM INLETS.
3) INSTALL TEMPORARY CONSTRUCTION ENTRANCE AS SHOWN ON PLAN.
4) INSTALL SEDIMENT BASINS AND/OR TRAPS AS EARLY AS POSSIBLE DURING PHASE 3 INITIAL AREA STABILIZATION MASS GRADING AS SHOWN ON PLAN. SEDIMENT TRAPS TO BE INCORPORATED INTO PERMANENT DETENTION BASIN.

EROSION CONTROL PROCEDURE:
1) SILT FENCE AND TEMPORARY CONSTRUCTION ENTRANCE SHALL BE INSTALLED AT THE PERIMETER OF THE GRADED AREAS PRIOR TO BEGINNING OF CLEARING OR DEMOLITION OPERATIONS. THE CONTRACTOR SHALL INSTALL SILT FENCE AS SHOWN ON PLANS AS GRADING PROGRESSES.
2) SEDIMENT BASINS AND/OR TRAPS SHALL BE CLEANED OUT WHEN THE SEDIMENT CAPACITY HAS BEEN REDUCED BY 20% OF ITS ORIGINAL DESIGN VOLUME. REMOVE SEDIMENT BASINS AND/OR TRAPS DURING PHASE 3 INACTIVE AREA STABILIZATION AS THE FINAL STEP IN MASS GRADING ACTIVITIES. IF A SEDIMENTATION BASIN IS EMPLOYED THE SKIMMER SHALL REMAIN IN SERVICE UNTIL ALL AREAS CONTRIBUTING RUNOFF HAVE BEEN STABILIZED WITH THE ESTABLISHMENT OF VEGETATION 90% MINIMUM.

TEMPORARY CONSTRUCTION ENTRANCE NOTES:
A.) INSTALLATION
1) AVOID LOCATING ON STEEP SLOPES OR AT CURVES ON PUBLIC STREETS. IF POSSIBLE, LOCATE WHERE PERMANENT ROADS WILL EVENTUALLY BE CONSTRUCTED.
2) REMOVE ALL VEGETATION AND OTHER UNSUITABLE MATERIAL FROM THE FOUNDATION AREA, GRADE AND CROWN FOR POSITIVE DRAINAGE.
3) IF SLOPE TOWARDS THE PUBLIC ROAD EXCEEDS 2%, CONSTRUCT A 6 TO 8 INCH HIGH RIDGE WITH 3% - 1% SIDE SLOPES ACROSS THE FOUNDATION APPROXIMATELY 15 FEET FROM THE EDGE OF THE PUBLIC ROAD TO DIVERT RUNOFF AWAY FROM IT.
4) INSTALL PIPE UNDER THE ENTRANCE IF NEEDED TO MAINTAIN DRAINAGE DITCHES ALONG PUBLIC ROADS.
5) PLACE STONE TO DIMENSIONS AND GRADES AS SHOWN ON PLANS. LEAVE SURFACE SMOOTH AND SLOPED FOR DRAINAGE.
6) DIVERT ALL SURFACE RUNOFF AND DRAINAGE FROM THE ENTRANCE TO A SEDIMENT CONTROL DEVICE.
7) IF WET CONDITIONS ARE ANTICIPATED PLACE GEOTEXTILE FABRIC ON THE GRADED FOUNDATION TO IMPROVE STABILITY.

TEMPORARY CONSTRUCTION ENTRANCE NOTES (CONT'D):
B.) TROUBLESHOOTING
1) CONSULT WITH A QUALIFIED DESIGN PROFESSIONAL IF ANY OF THE FOLLOWING OCCUR:
- INADEQUATE RUNOFF CONTROLS TO THE EXTENT THAT SEDIMENT WASHES ONTO PUBLIC ROADS
- INSTALL DIVERSIONS OR OTHER RUNOFF CONTROL MEASURES
- SMALL STONE, THIN PAD, OR ABSENCE OF GEOTEXTILE FABRIC RESULTS IN RUTS AND MUDDY CONDITIONS AS STONE IS PRESSED INTO SOIL - INCREASE STONE SIZE OR PAD THICKNESS OR ADD GEOTEXTILE FABRIC
- PAD TOO SHORT FOR HEAVY CONSTRUCTION TRAFFIC - EXTEND PAD BEYOND THE MINIMUM 50 FOOT LENGTH AS NECESSARY
C.) INSPECTION AND MAINTENANCE
1) INSPECT STONE PAD AND SEDIMENT DISPOSAL AREA WEEKLY AND AFTER ANY RAIN EVENT
2) REPAIR PAD AS NEEDED FOR PROPER DRAINAGE AND RUNOFF CONTROL
3) TOP DRESS WITH CLEAN 2 AND 3 INCH STONE AS NEEDED
4) IMMEDIATELY REMOVE MUD OR SEDIMENT TRACKED OR WASHED ONTO PUBLIC ROADWAY. REPAIR ANY BROKEN ROAD PAVEMENT IMMEDIATELY
5) REMOVE ALL TEMPORARY ROAD MATERIALS FROM AREAS WHERE PERMANENT VEGETATION WILL BE ESTABLISHED

TEMPORARY SEDIMENT TRAP CALCULATIONS: (AREA D1)

1. TRIBUTARY AREA = 6.00 ac
2. REQUIRED WET VOLUME OF TRAP = 67 cy/ac
= 6.00 X 67 = 402 cy = 10,854 cf
3. REQUIRED DRY VOLUME OF TRAP = 67 cy/ac
= 6.00 X 67 = 402 cy = 10,854 cf
4. WET VOLUME OF PROPOSED TRAP = 10,930 cf
4. DRY VOLUME OF PROPOSED TRAP = 11,585 cf

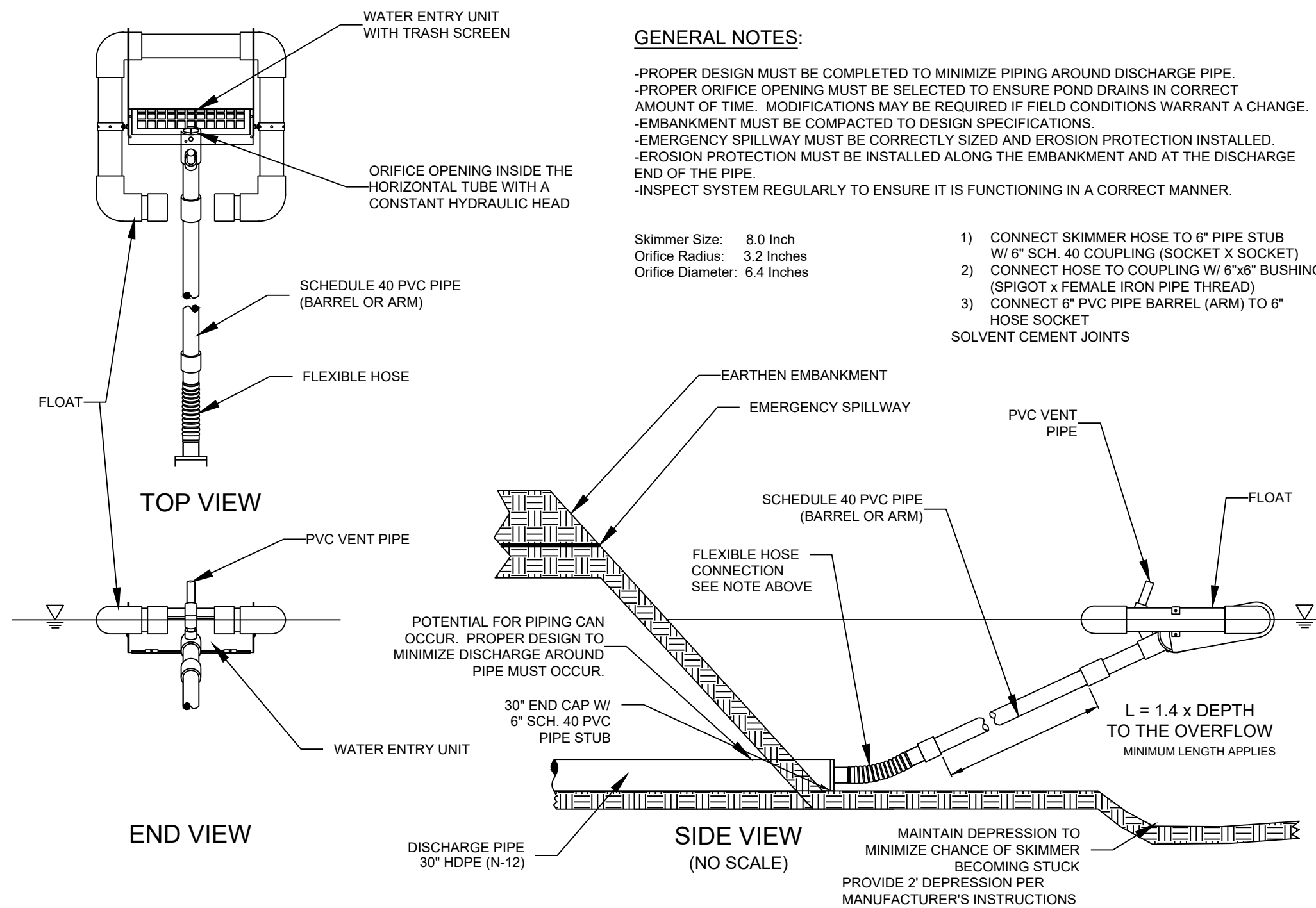
TEMPORARY SEDIMENT BASIN CALCULATIONS:
1. TOTAL AREA DRAINING TO BASIN = 11.0 ac
2. REQUIRED VOLUME OF TRAP = 3,600cft PER acre
= 11.0 X 3,600 = 39,600 cft
3. VOLUME OF PROPOSED TRAP = 129,219 cft

GENERAL NOTES:

-PROPER DESIGN MUST BE COMPLETED TO MINIMIZE PIPING AROUND DISCHARGE PIPE.
-PROPER ORIFICE OPENING MUST BE SELECTED TO ENSURE POND DRAINS IN CORRECT AMOUNT OF TIME. MODIFICATIONS MAY BE REQUIRED IF FIELD CONDITIONS WARRANT A CHANGE.
-EMBANKMENT MUST BE COMPACTED TO DESIGN SPECIFICATIONS.
-EMERGENCY SPILLWAY MUST BE CORRECTLY SIZED AND EROSION PROTECTION INSTALLED.
-EROSION PROTECTION MUST BE INSTALLED ALONG THE EMBANKMENT AND AT THE DISCHARGE END OF THE PIPE.
-INSPECT SYSTEM REGULARLY TO ENSURE IT IS FUNCTIONING IN A CORRECT MANNER.

Skimmer Size: 8.0 Inch
Orifice Radius: 3.2 Inches
Orifice Diameter: 6.4 Inches

- 1) CONNECT SKIMMER HOSE TO 6" PIPE STUB W/ 6" SCH. 40 COUPLING (SOCKET X SOCKET)
- 2) CONNECT HOSE TO COUPLING W/ 6"x6" BUSHING (SPIGOT x FEMALE IRON PIPE THREAD)
- 3) CONNECT 6" PVC PIPE BARREL (ARM) TO 6" HOSE SOCKET
SOLVENT CEMENT JOINTS





0 30' 60' 120'

North

SCALE: 1" = 60'

SILT FENCE PROTECTION TO BE MAINTAINED BY CONTRACTOR

LEGEND

PHASE 1 SILT FENCE ——— SF-1 ——— SF-1 ———

PHASE 2 SILT FENCE ——— SF-2 ——— SF-2 ———

INLET PROTECTION ———

GUTTER BUDDY OR EQUIVALENT ———

DURING ALL PHASES OF CONSTRUCTION, INACTIVE AREA STABILIZATION METHODS AS DESCRIBED IN APWA SECTION 5111.3 SHALL BE USED TO CONTROL EROSION AND SILTATION.

NOTES: The Land Disturbance Plans indicates the Final placement of erosion control devices. The contractor(s) may proceed with construction prior to the final placement of these devices by providing additional devices to control erosion on their items of work. These devices shall be maintained until the final devices are in place.

SEED AND MULCH NOTES:

All areas disturbed by construction activities shall be seeded and mulched. Seeding shall be done before the proposed seedbed becomes eroded, crusted over, or dried out and shall not be done when the ground is frozen, or covered with snow. The seed shall comply with the requirements of the Missouri Seed Law and the Federal Seed Act. Also, it shall contain no seed of any plant on the Federal Noxious Weed List. Other weed seeds shall not exceed one percent by weight of mix.

Seed and Fertilizer Rate:

Mix I - Rye Grass / Blue Grass 100 lbs. per Acre
Mix II - Tall Fescue / Blue Grass 195 lbs. per Acre
Lime 2000 lbs per Acre (50 lbs. per 1000 sq. ft.)
Fertilizer 800 to 1200 lbs per Acre (25 lbs per 1000 sq. ft.)

During the dates December 15th through May 31 ALL lime fertilizer, seed and mulch shall be applied to finished slopes of disturbed areas. During the months of June, July, October and November 1st through December 15th, lime fertilizer, seed and mulch shall be applied at the following rates:

Lime - 100% of specified quantity
Fertilizer - 75% of the specified quantity
Seed - 50% of the specified quantity
Mulch - 100% of the specified quantity

Mulch shall be Vegetative type, cereal straw from stalks of oats, rye, or barley, or approved equal. The straw shall be free of prohibited weed seed and relatively free of all other noxious and undesirable seed. Mulch shall be applied at the rate of 2 tons per acre, (70 to 90 lbs per 1000 sq. ft.). Mulch shall be embedded by a mulch anchoring tool or disk type roller having flat serrated disks spaced not more than 10 inches apart and cleaning scrapers shall be provided

ONCE SITE IS 90% VEGETATED ALL ESC DEVICES SHALL BE REMOVED AND ANY DISTURBED AREAS SHALL BE RESTORED

ENGINEERING SOLUTIONS

ENGINEERING & SURVEYING

50 SE 30TH STREET
LEE'S SUMMIT, MO 64082
P: (816) 623-9888 F: (816) 623-9849

Professional Registration

Missouri
Engineering 2005002186-D
Surveying 2005008319-D

Kansas
Engineering E-1695
Surveying LS-218

Oklahoma
Engineering 6254

Nebraska
Engineering CA2821

Part of the Southeast 1/4
Section 27, Township 48 North, Range 31 West
Lee's Summit, Jackson County, Missouri

Project: WOODLAND OAKS
LSMO

Issue Date: February 25, 2021

ESC PHASE 3 - Final Restoration Plan

Construction Plans for:
WOODLAND OAKS
Lots 1 thru 42
Lee's Summit, Jackson County, Missouri

STATE OF MISSOURI
MATTHEW J. SCHLICHT
REGISTERED PROFESSIONAL ENGINEER
No. 000000000

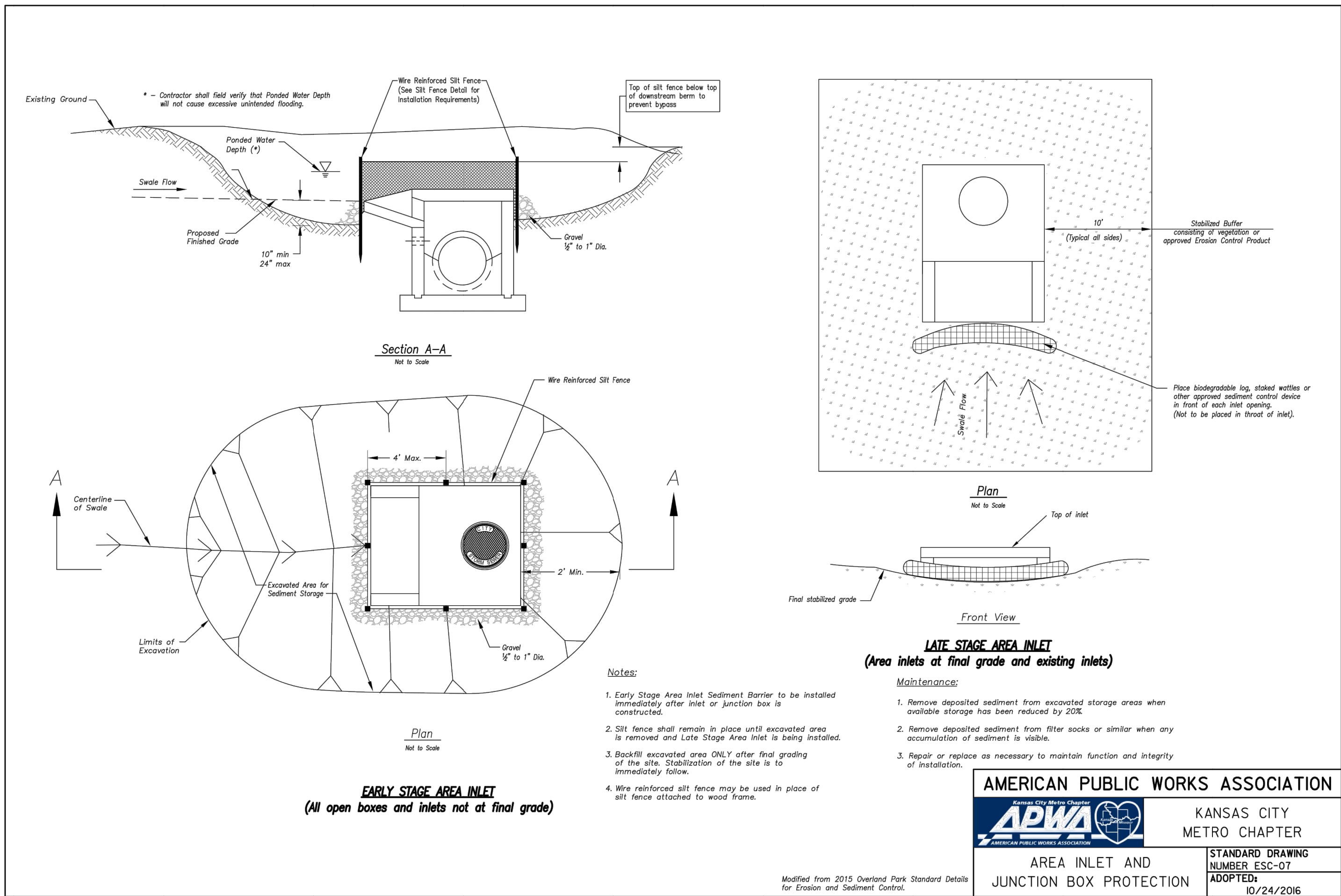
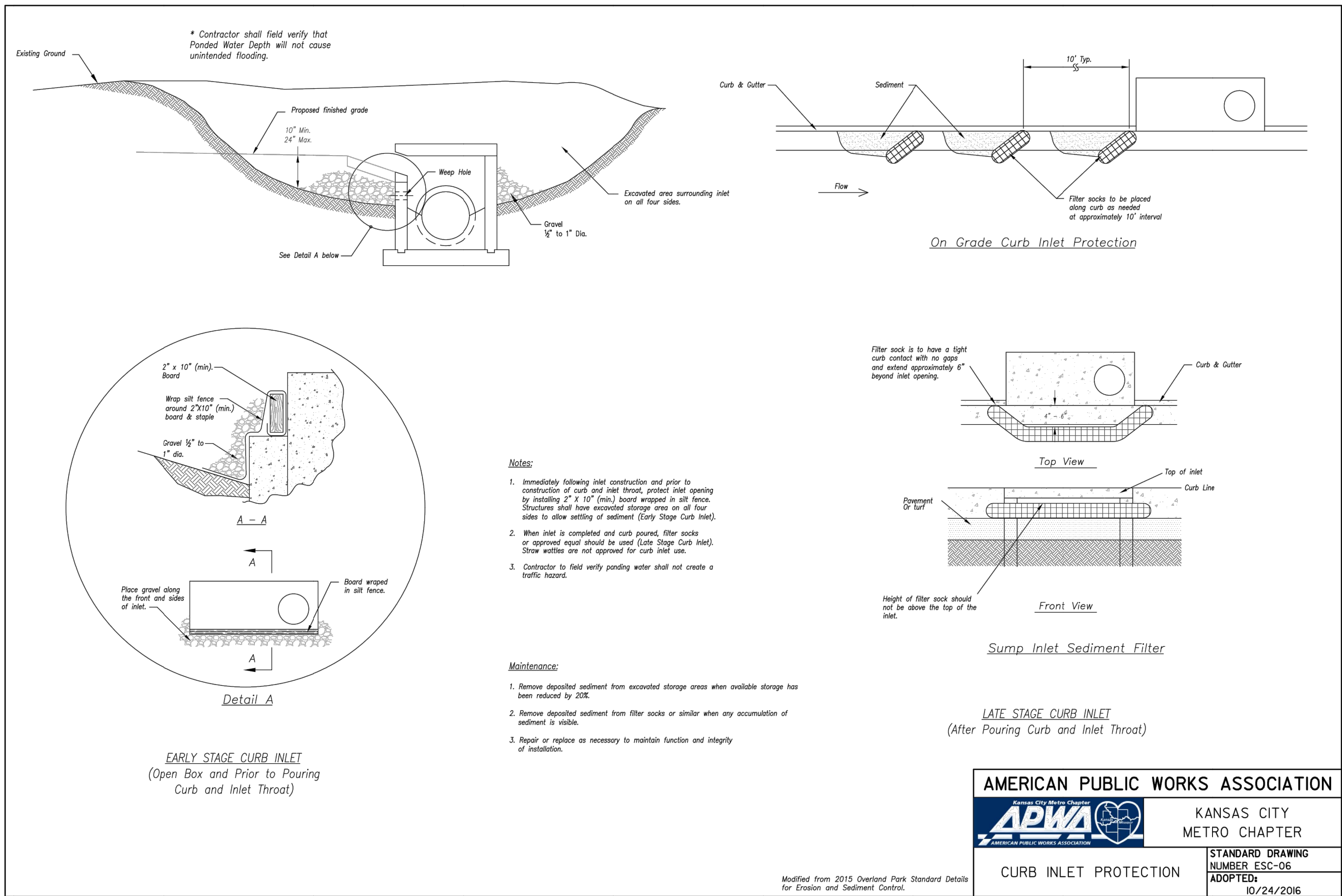
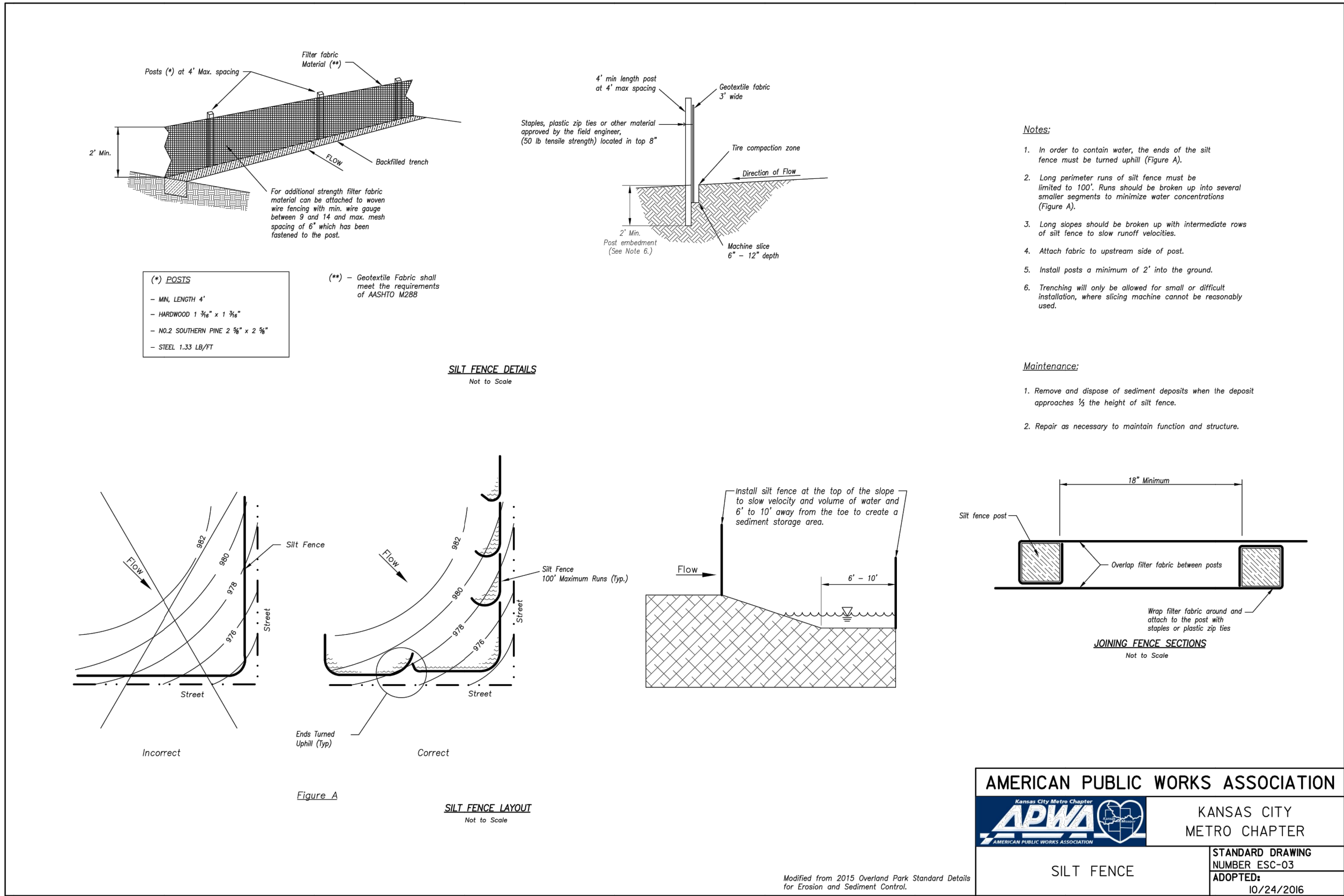
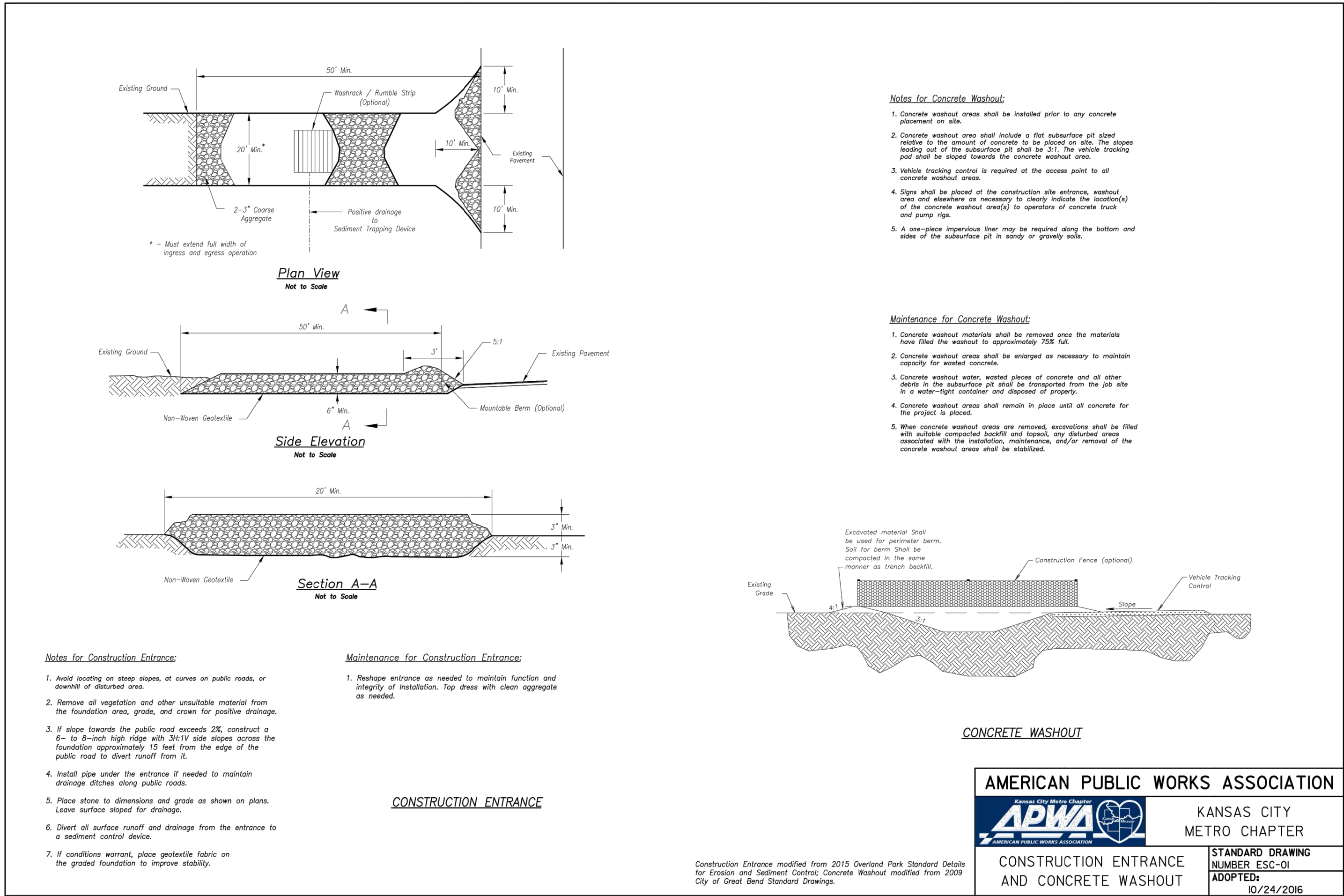
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MO PE 2006019708
KS PE 19071
OK PE 25226
NE PE E-14335

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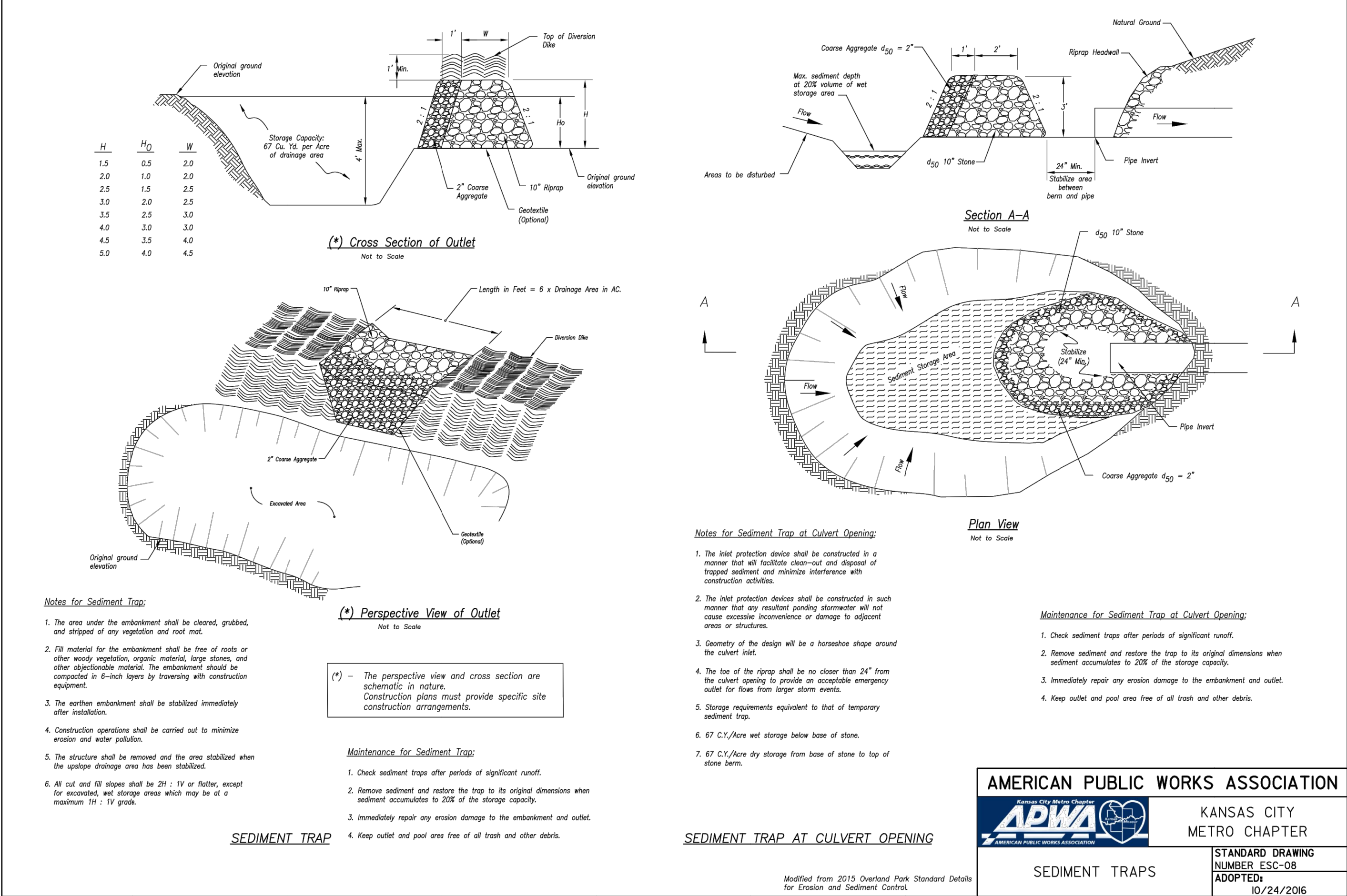
C.052

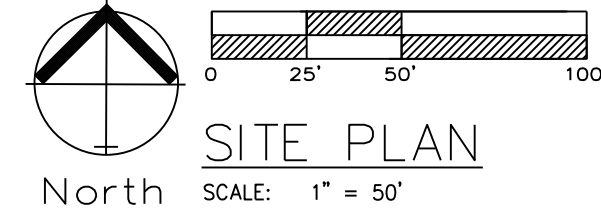




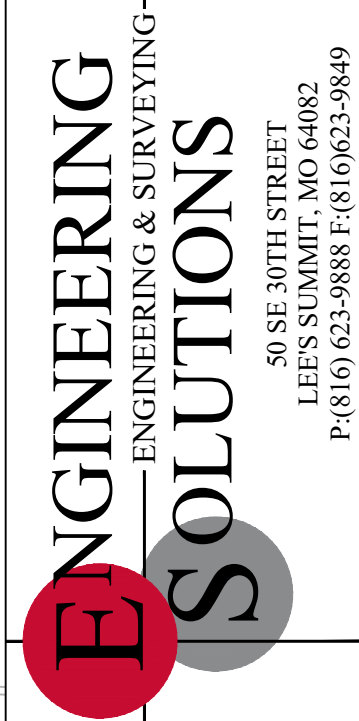
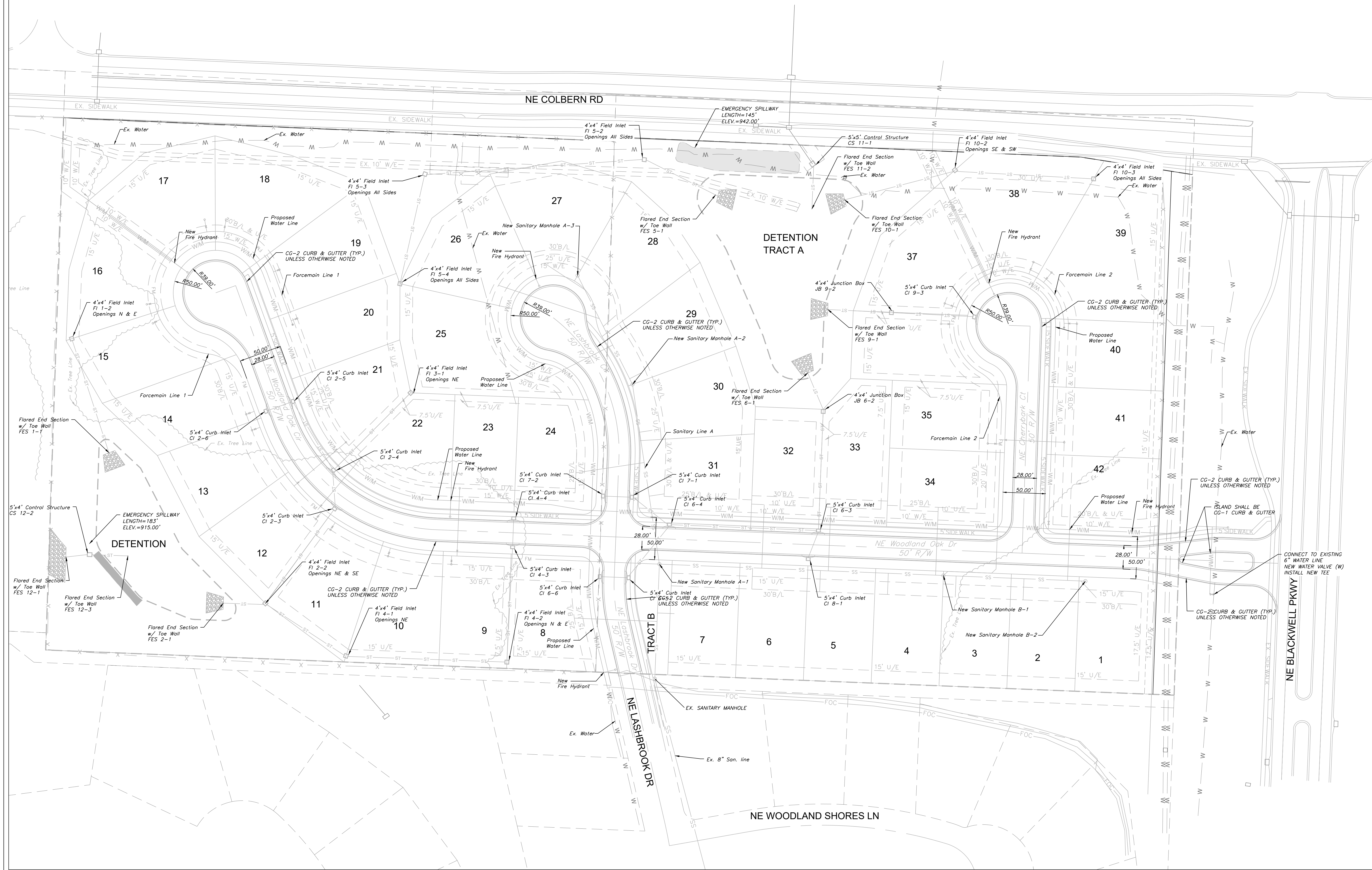
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SITE PLAN



Professional Registration
Missouri
Engineering 2005002186-D
Surveying 2005008319-D
Kansas
Engineering E-1695
Surveying L-S-218
Oklahoma
Engineering 6254
Nebraska
Engineering CA2821

Part of the Southeast 1
Section 27, Township 48 North, Range 31 West
Lee's Summit, Jackson County, Missouri

Project: WOODLAND OAKS
LSMO
Issue Date: February 25, 2021

Site Plan
Construction Plans for:
WOODLAND OAKS
Lots 1 thru 42
Lee's Summit, Jackson County, Missouri



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NOTE: Swale should be lined with "Straw with Net" turf reinforcement (Curlex Blanket or Eqv.). Per Table 5607-1 in APWA Manual

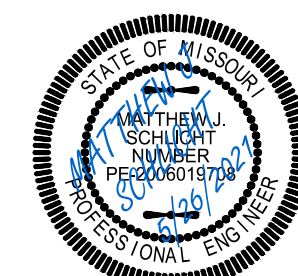


FOR DRAINAGE PLAN SHEET
GRADING PLAN - SWPPP

Construction Plans for:

Part of the Southeast $\frac{1}{4}$
Section 27, Township 48 North, Range 31 West
Lee's Summit, Jackson County, Missouri

Professional Registration
Missouri
Engineering 2005002186-D
Surveying 20050008319-D
Kansas
Engineering E-1695
Surveying LS-218
Oklahoma
Engineering 6254
Nebraska
Engineering CA2821

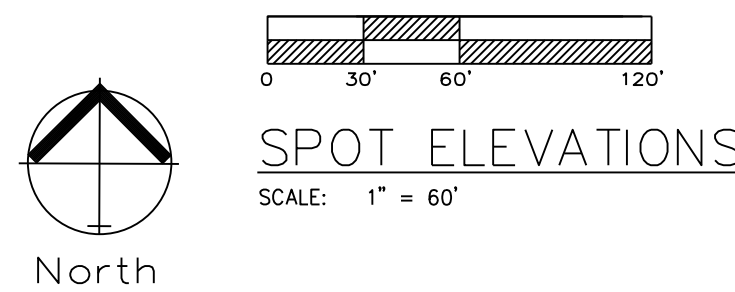
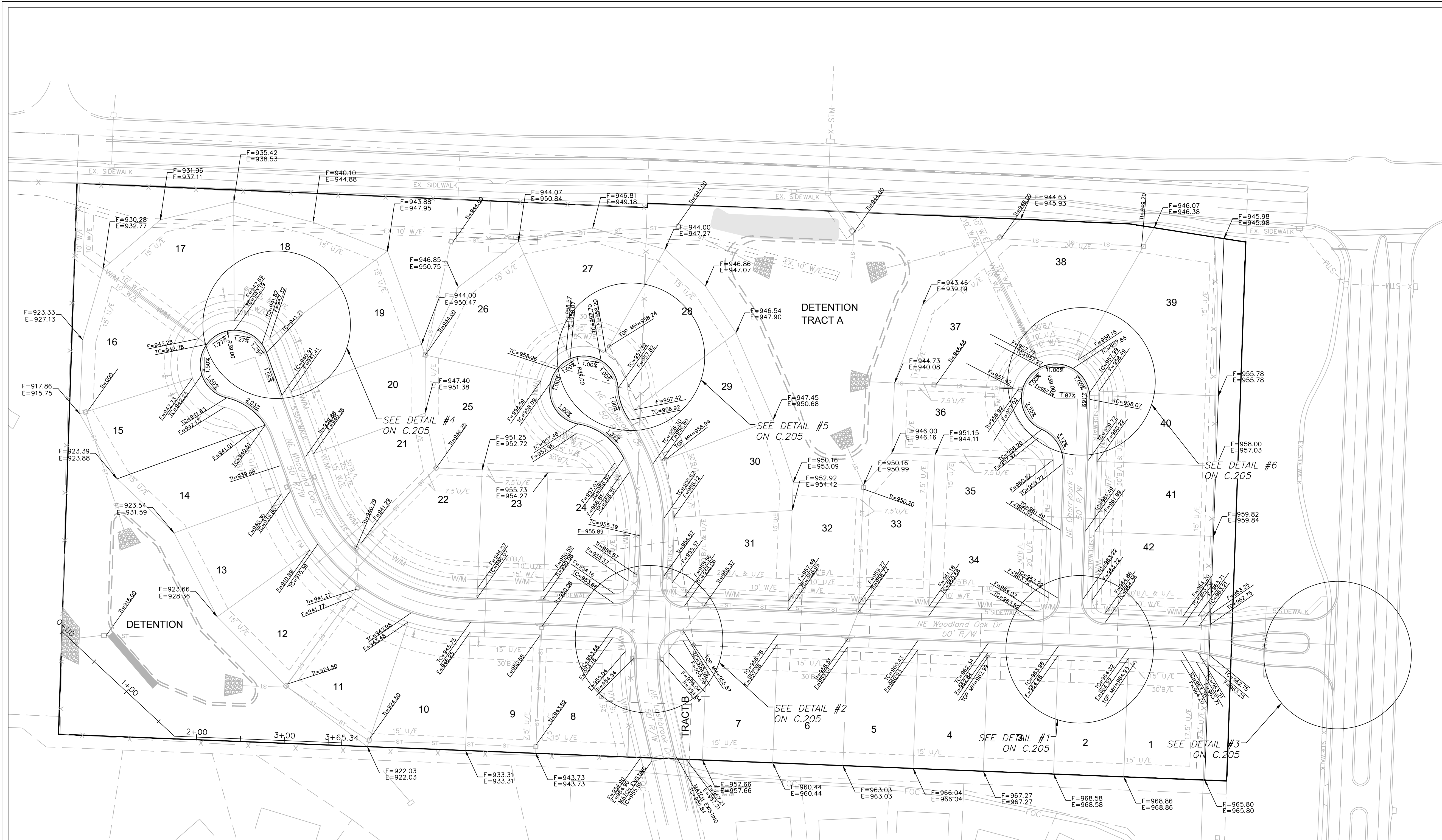


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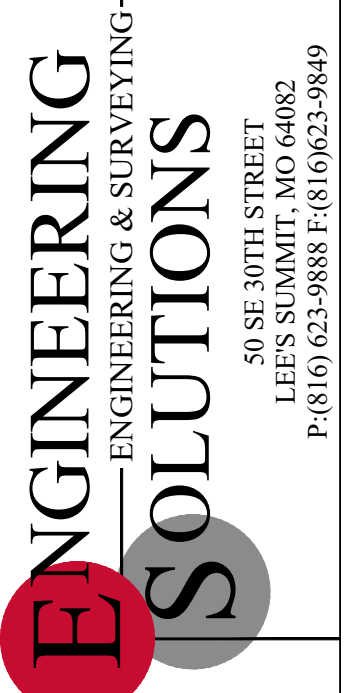
REVISIONS

REV. 5/5/202
2 REV. 5/26/202

C.200



Lot Number	Basement Type	MBOE
1	Standard	
2	Standard	
3	Standard	
4	Standard	
5	Standard	
6	Standard	
7	Standard	
8	Walkout	945.58
9	Walkout	945.58
10	Walkout	925.86
11	Walkout	925.65
12	Walkout	925.65
13	Walkout	917.4
14	Walkout	917.4
15	Walkout	919.77
16	Daylight	919.77
17	Standard	
18	Standard	
19	Standard	945.15
20	Standard	945.14
21	Standard	947.42
22	Standard	947.42
23	Standard	
24	Standard	
25	Walkout	945.14
26	Walkout	945.15
27	Walkout	945.12
28	Walkout	943.49
29	Walkout	943.49
30	Daylight	943.49
31	Standard	
32	Walkout	943.49
33	Walkout	943.49
34	Daylight	
35	Daylight	
36	Walkout	943.49
37	Walkout	943.49
38	Daylight	947.17
39	Daylight	950.93
40	Daylight	
41	Daylight	
42	Standard	



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Kansas
Engineering E-1685
Surveying LS-218
Oklahoma
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Nebraska
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Part of the Southeast 1
Section 27, Township 48 North, Range 31 West
Lee's Summit, Jackson County, Missouri

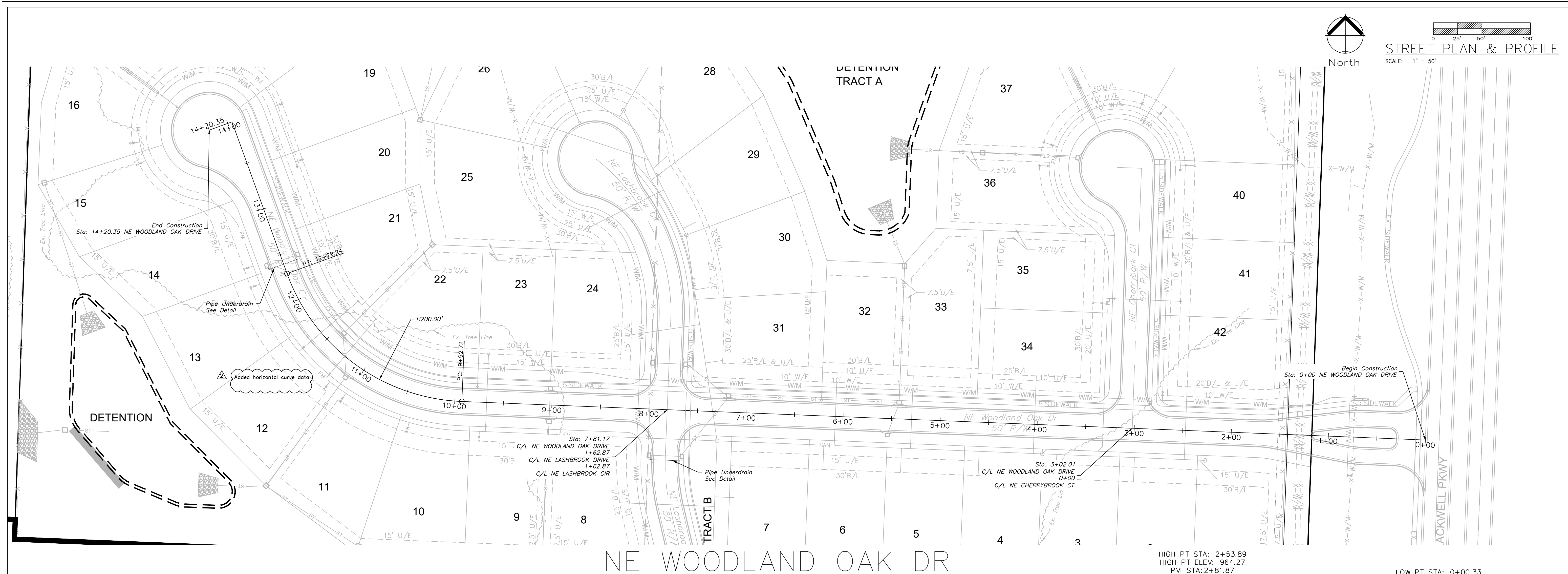
Project:
WOODLAND OAKS
LSMO
Issue Date:
February 25, 2021

MASTER DRAINAGE PLAN SHEET 2 OF 3
SPOT ELEVATIONS
Construction Plans for:
WOODLAND OAKS
Lots 1 thru 42
Lee's Summit, Jackson County, Missouri

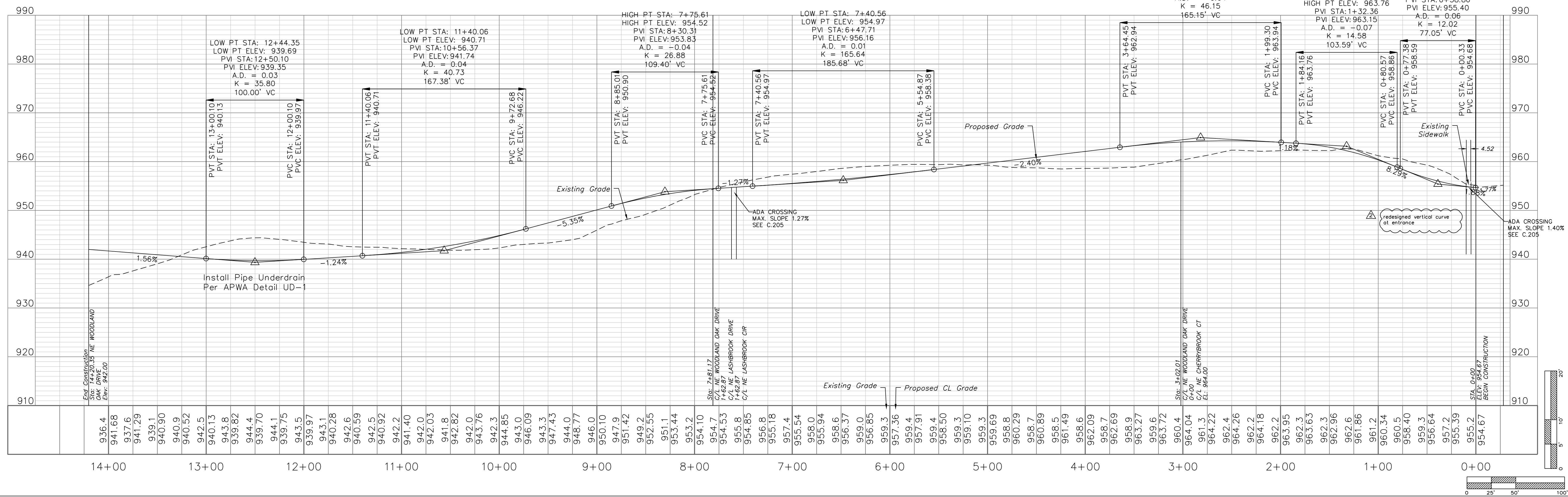


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NE PE E-14335

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NE WOODLAND OAK DR



ENGINEERING SOLUTIONS
ENGINEERING & SURVEYING
50 SE 30TH STREET
LEE'S SUMMIT, MO 64082
P: (816) 623-9888 F: (816) 623-9849

Professional Registration
Missouri
Engineering 2005002186-D
Surveying 2005008319-D
Kansas
Engineering E-1695
Surveying LS-218
Oklahoma
Engineering 5254
Nebraska
Engineering CA2821

Part of the Southeast 1/4
Section 27, Township 48 North, Range 31 West
Lee's Summit, Jackson County, Missouri

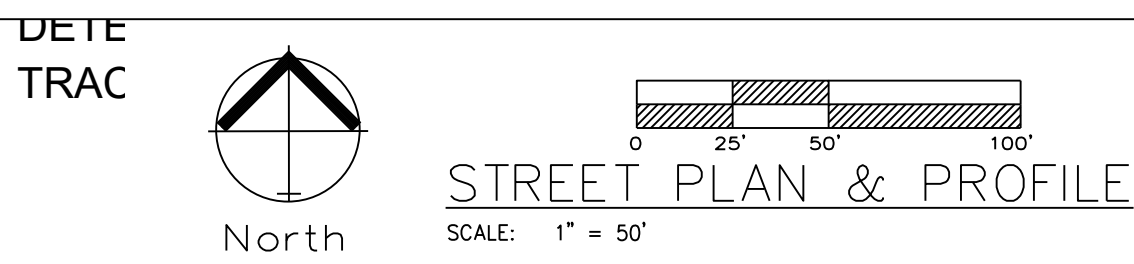
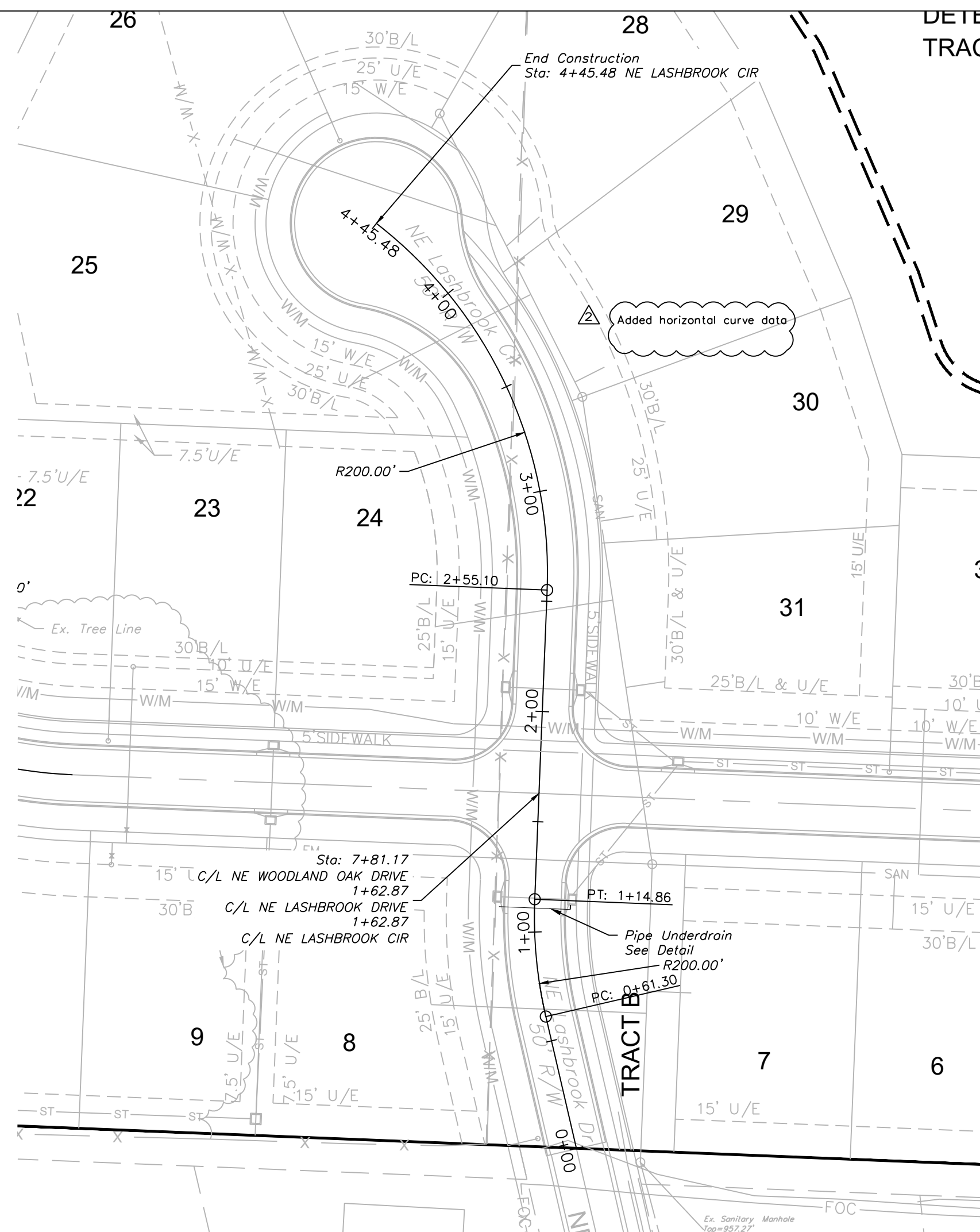
Project:
WOODLAND OAKS
LSMO
Issue Date:
February 25, 2021

Street Plan and Profile
Construction Plans for:
WOODLAND OAKS
Lots 1 thru 42
Lee's Summit, Jackson County, Missouri

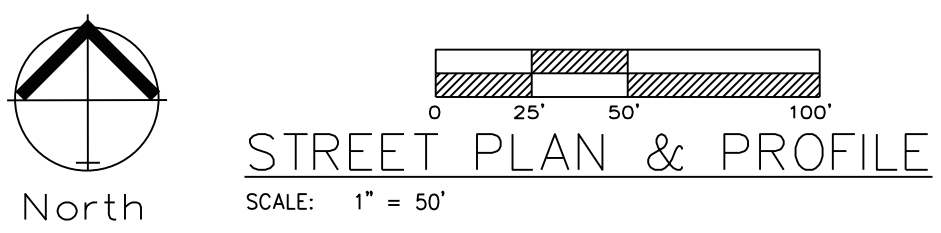
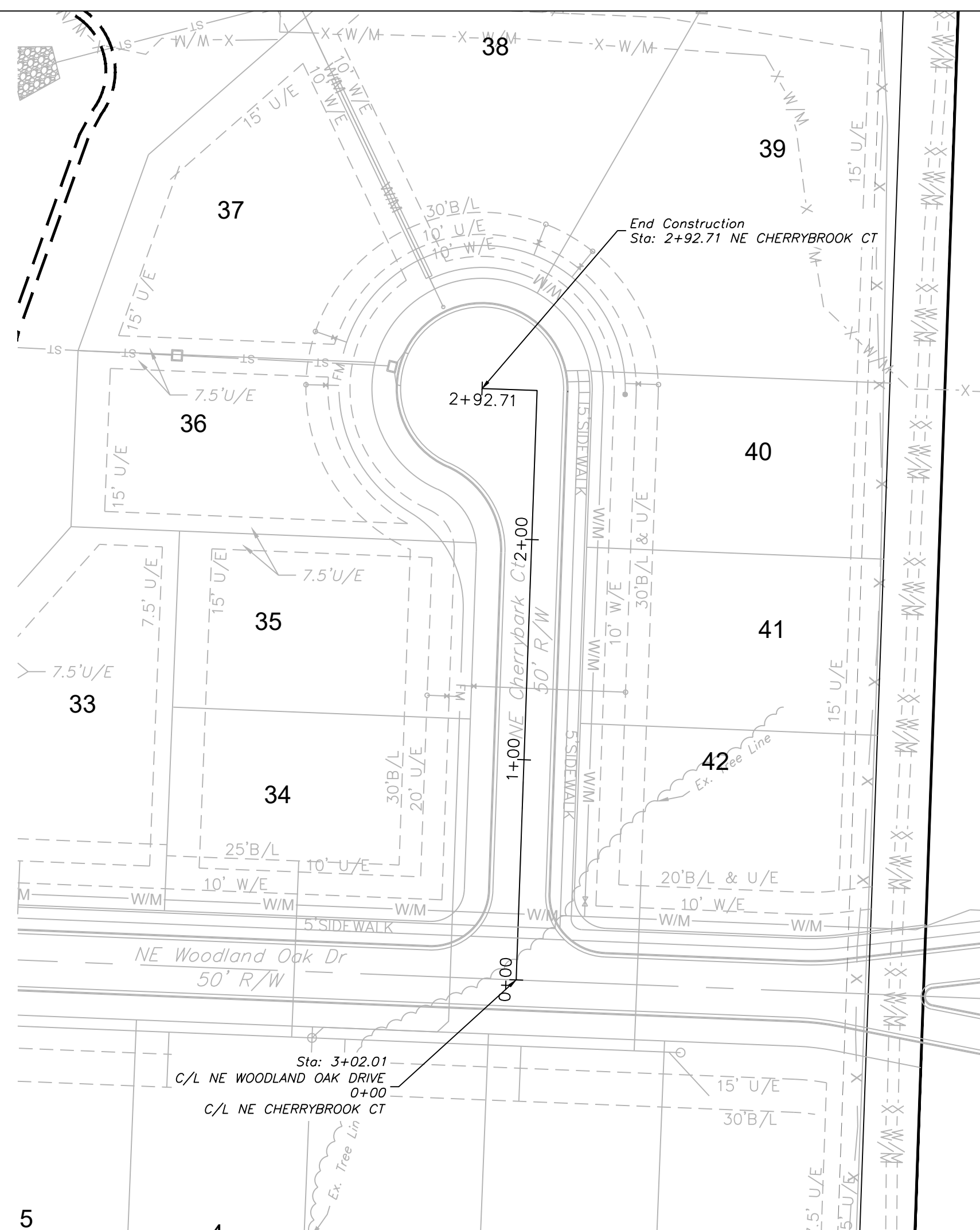
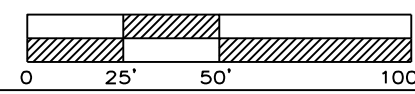
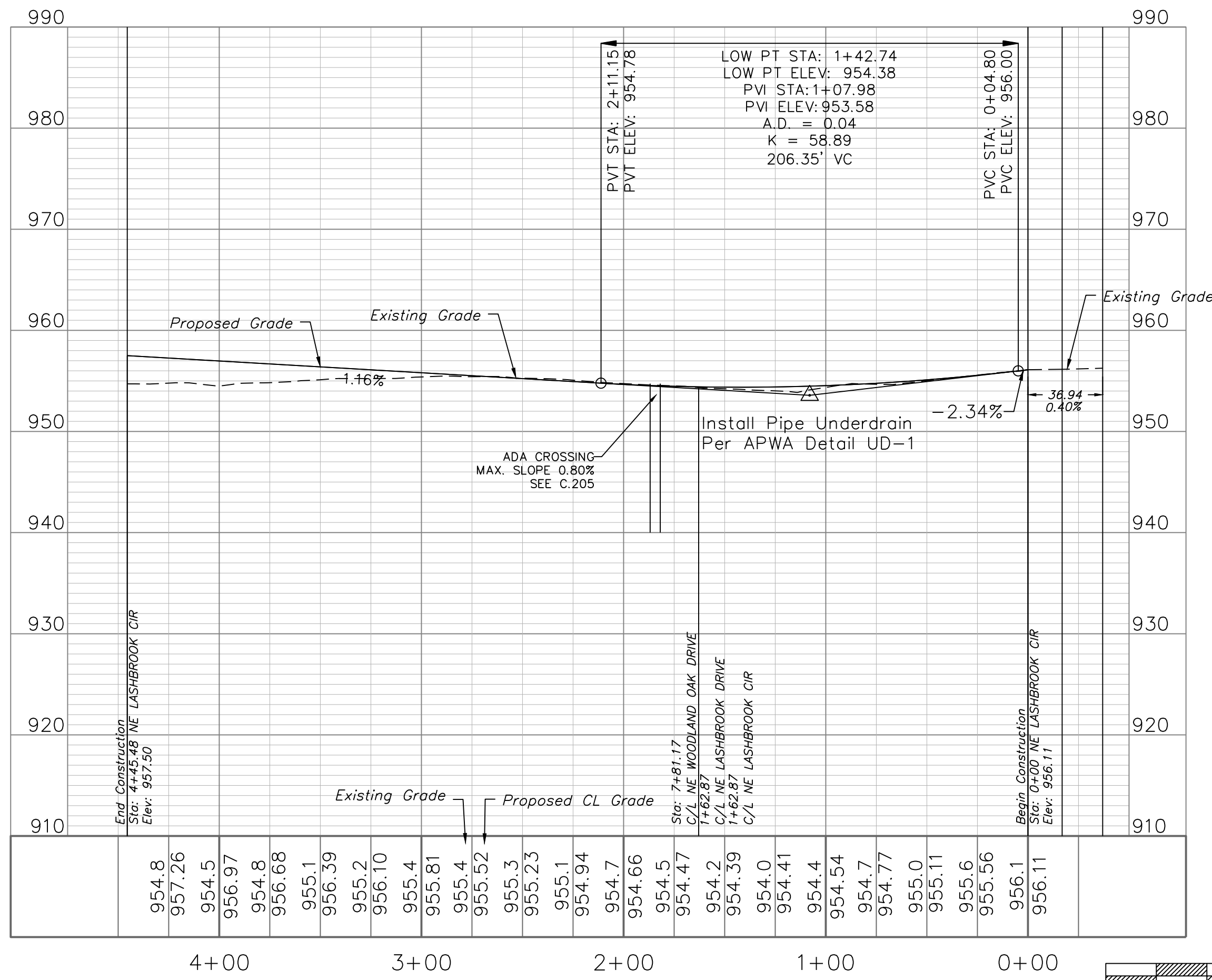
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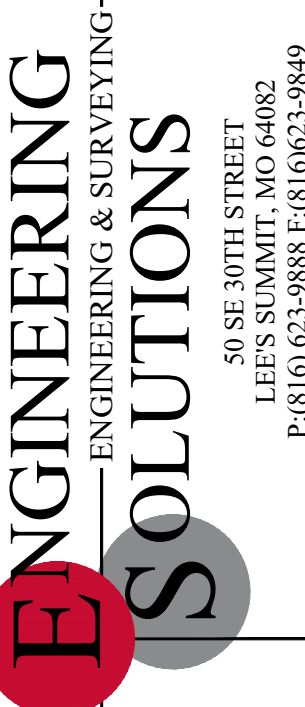
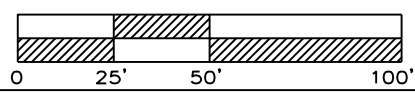
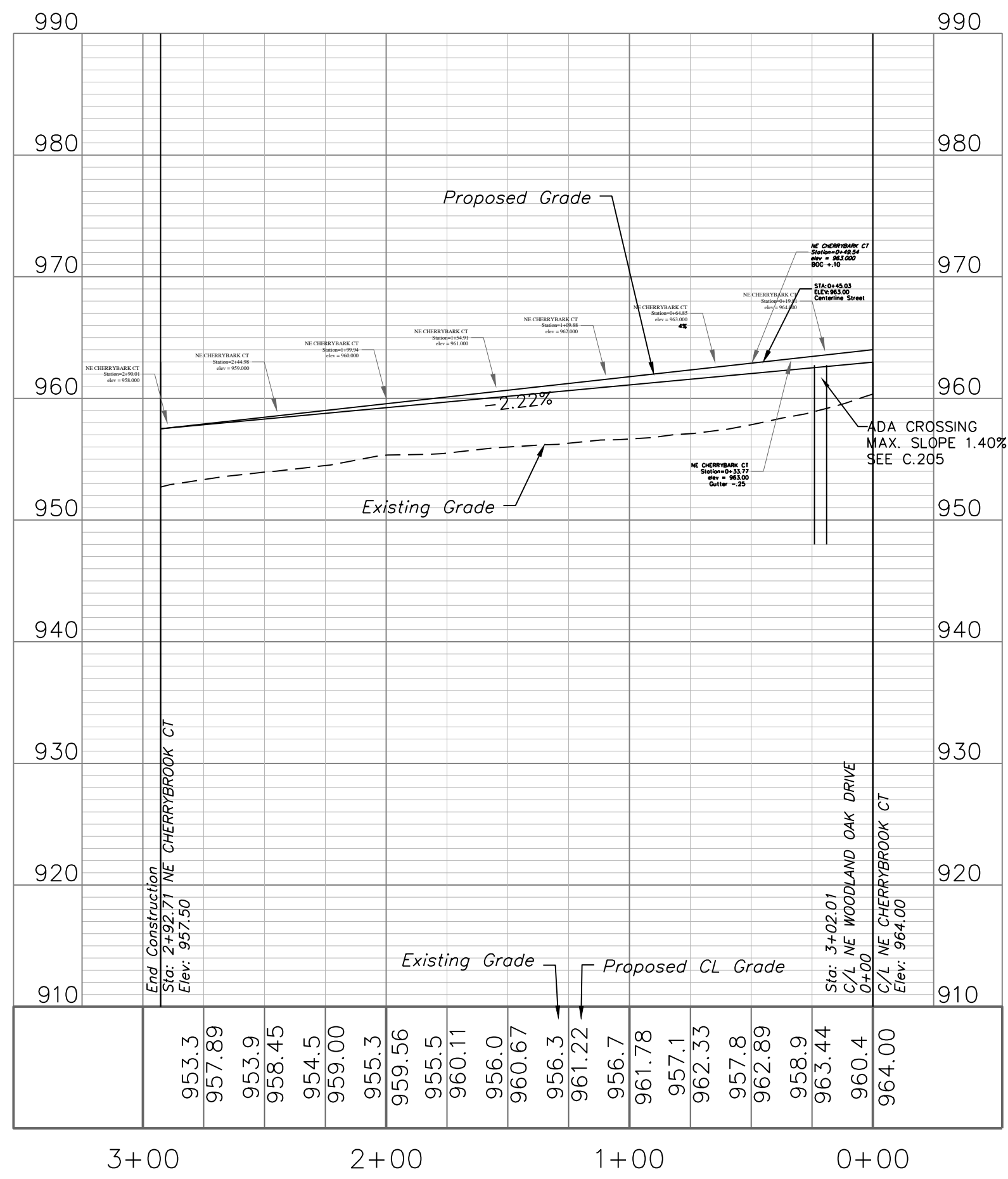
C.203



NE LASHBROOK DR



NE CHERRYBARK CT



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Missouri
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Surveying 2005008319-D
Kansas
Engineering E-1685
Surveying LS-218
Oklahoma
Engineering 5254
Nebraska
Engineering CA2821

Part of the Southeast
Section 27, Township 48 North, Range 31 West
Lee's Summit, Jackson County, Missouri

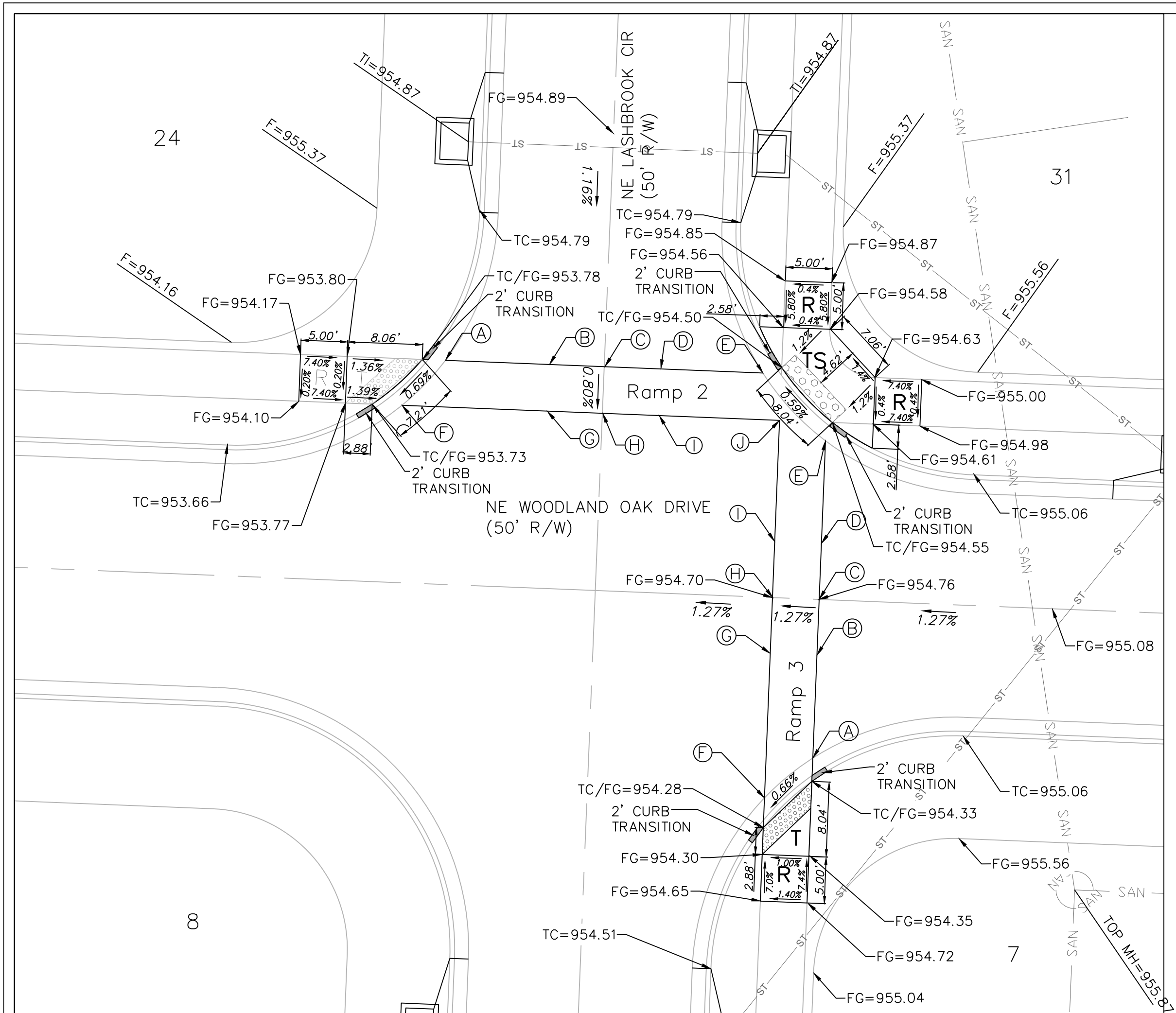
Project:
WOODLAND OAKS
LSMO
Issue Date:
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Street Plan and Profile
Construction Plans for:
WOODLAND OAKS
Lots 1 thru 42
Lee's Summit, Jackson County, Missouri

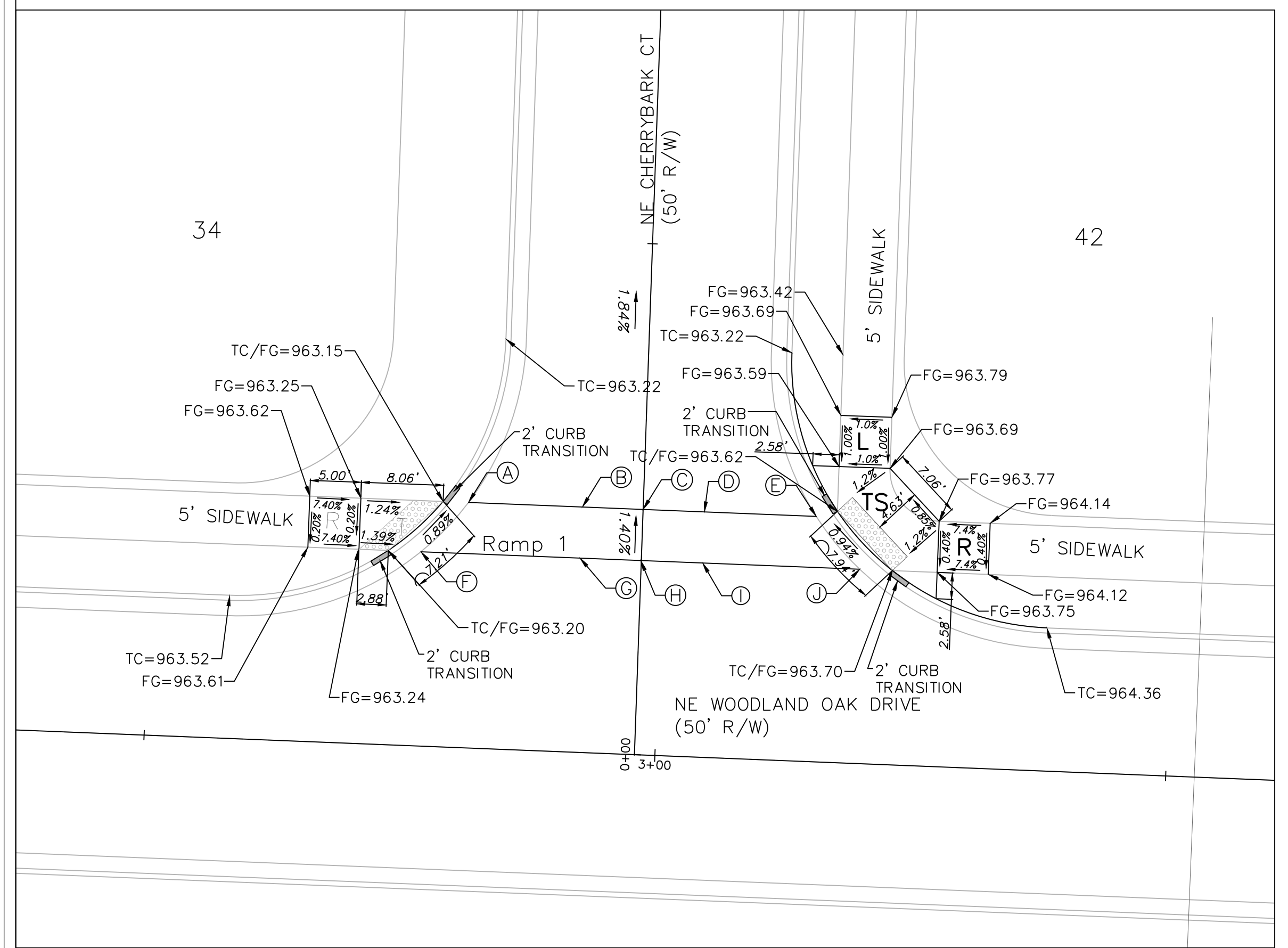


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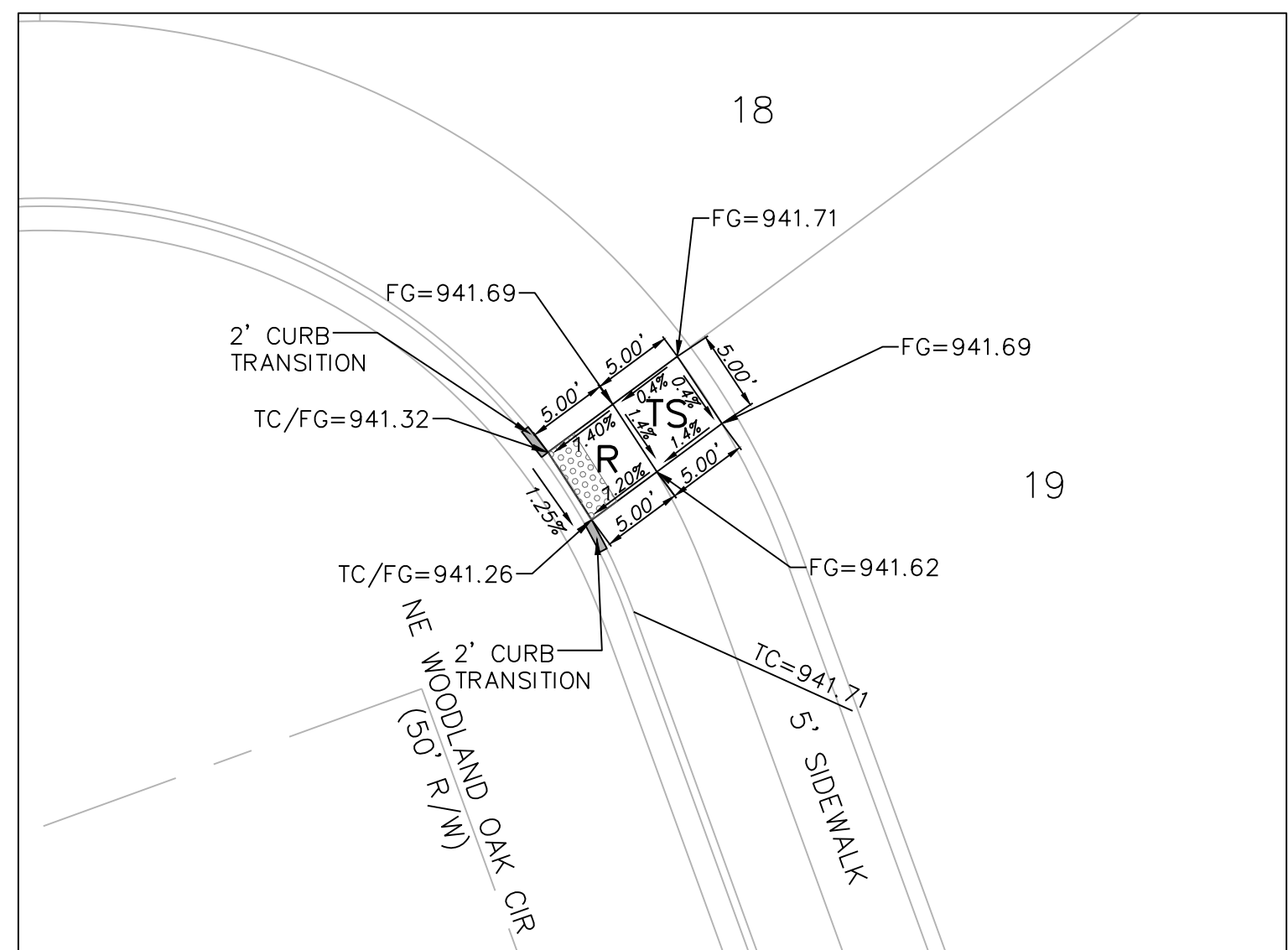
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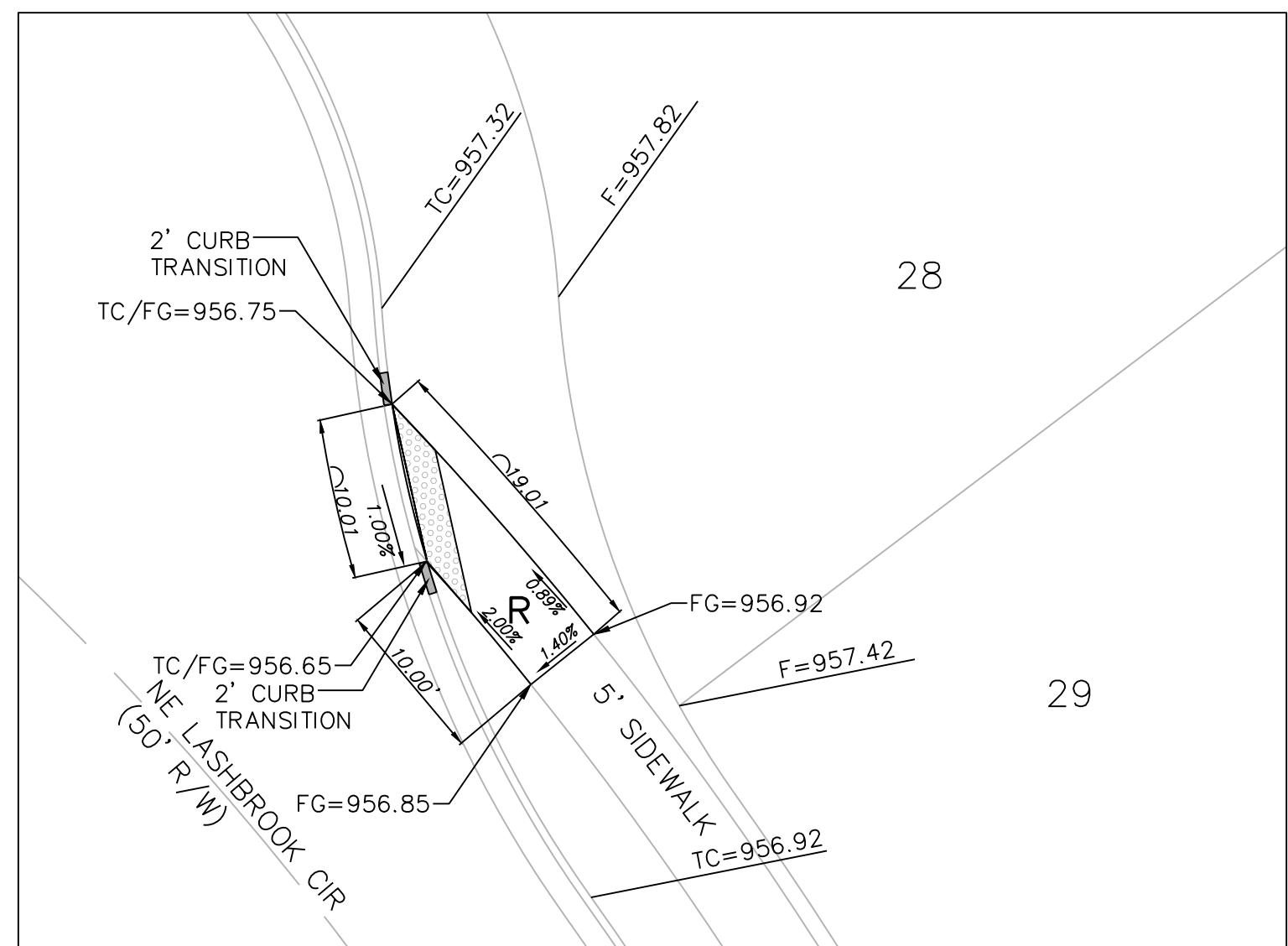
DETAIL 2



DETAIL 1



DETAIL 4



DETAIL 5

SPOT ELEVATION TABLE				
Spot	Ramp 1 Elevation	Ramp 2 Elevation	Ramp 3 Elevation	Ramp 4 Elevation
A	963.05	953.78	954.33	955.27
B	963.18	954.43	954.45	955.08
C	963.32	954.55	954.76	954.89
D	963.43	954.47	954.64	954.70
E	963.52	954.40	954.45	954.50
F	963.10	953.73	954.28	955.34
G	963.25	954.39	954.58	955.01
H	963.39	954.51	954.70	954.82
I	963.50	954.43	954.58	954.67
J	963.60	954.45	954.45	954.43

Legend:

EX TC = Existing Top of Curb

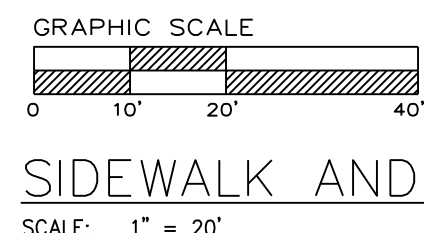
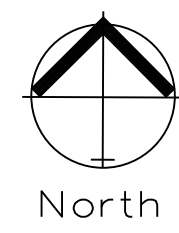
EX FG = Existing Finished Grade

FG = Finished Grade

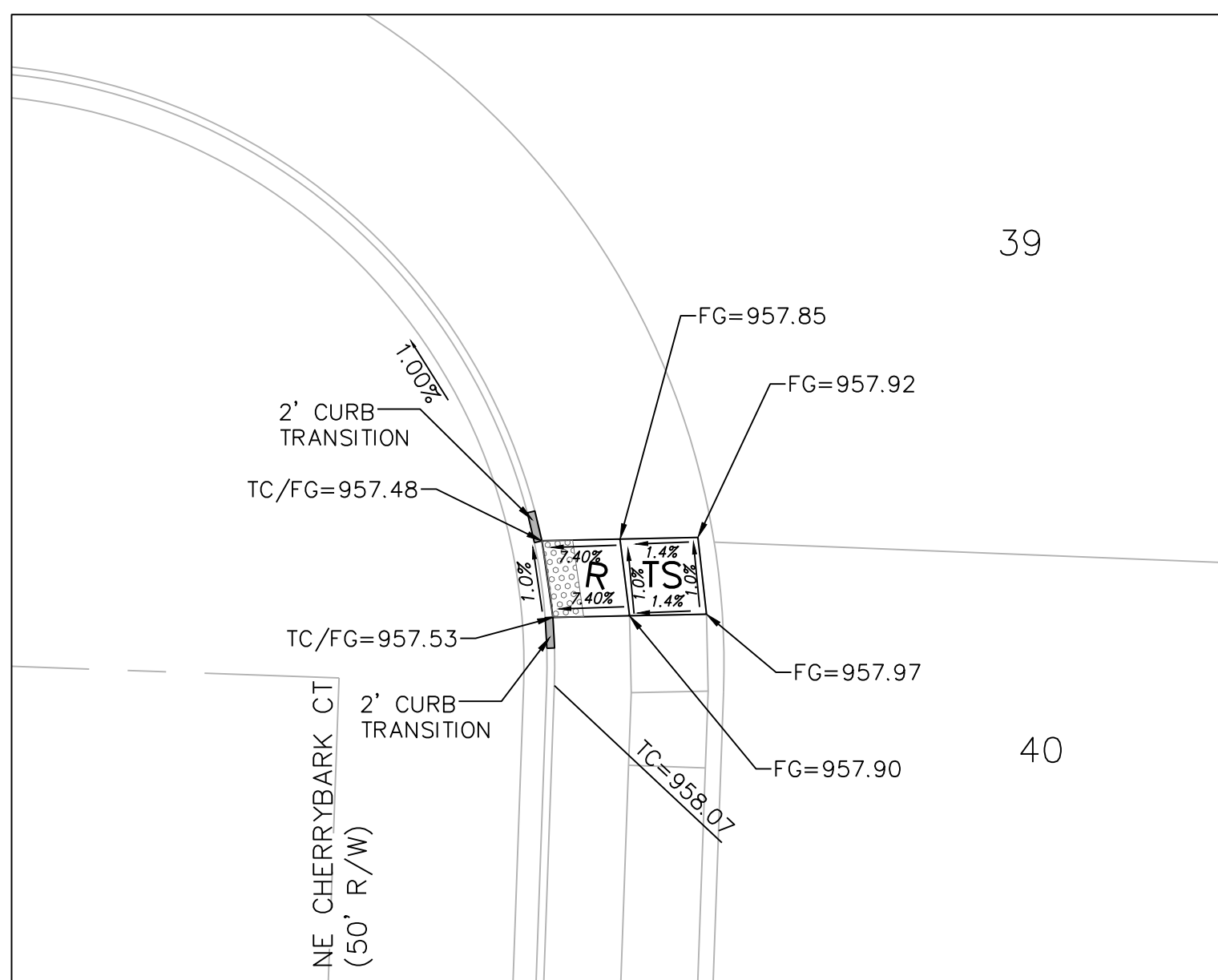
TC = Top of Curb

TC/FG = Top of Curb/Finished Grade

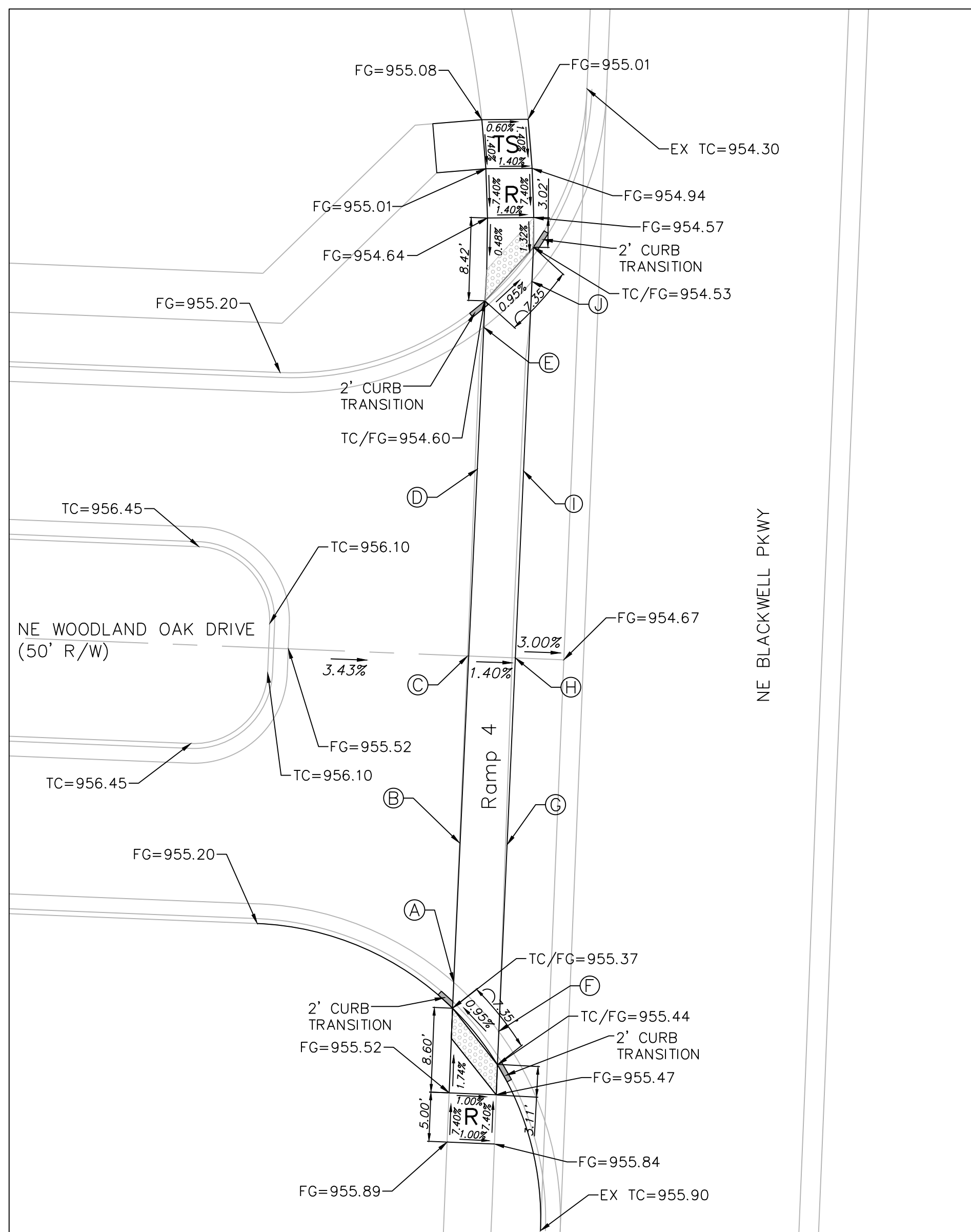
Detectable Warning



SIDEWALK AND INTERSECTION PLAN



DETAL 6



DETAIL 3

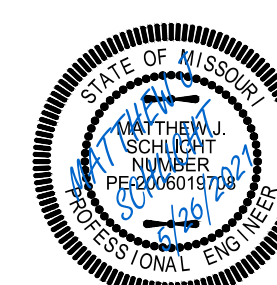


Professional Registration
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Kansas
Engineering E-1685
Surveying LS-218
Oklahoma
Engineering 6254
Nebraska
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Part of the Southeast
Section 27, Township 48 North, Range 31 West
Lee's Summit, Jackson County, Missouri

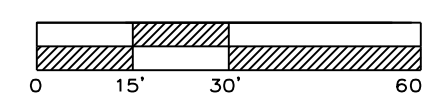
Project:
WOODLAND OAKS
LSMO
Issue Date:
February 25, 2021

Sidewalk and
Intersection Plans for:
WOODLAND OAKS
Lots 1 thru 42
Lee's Summit, Jackson County, Missouri



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KS PE 19071
OK PE 25226
NE PE E-14335

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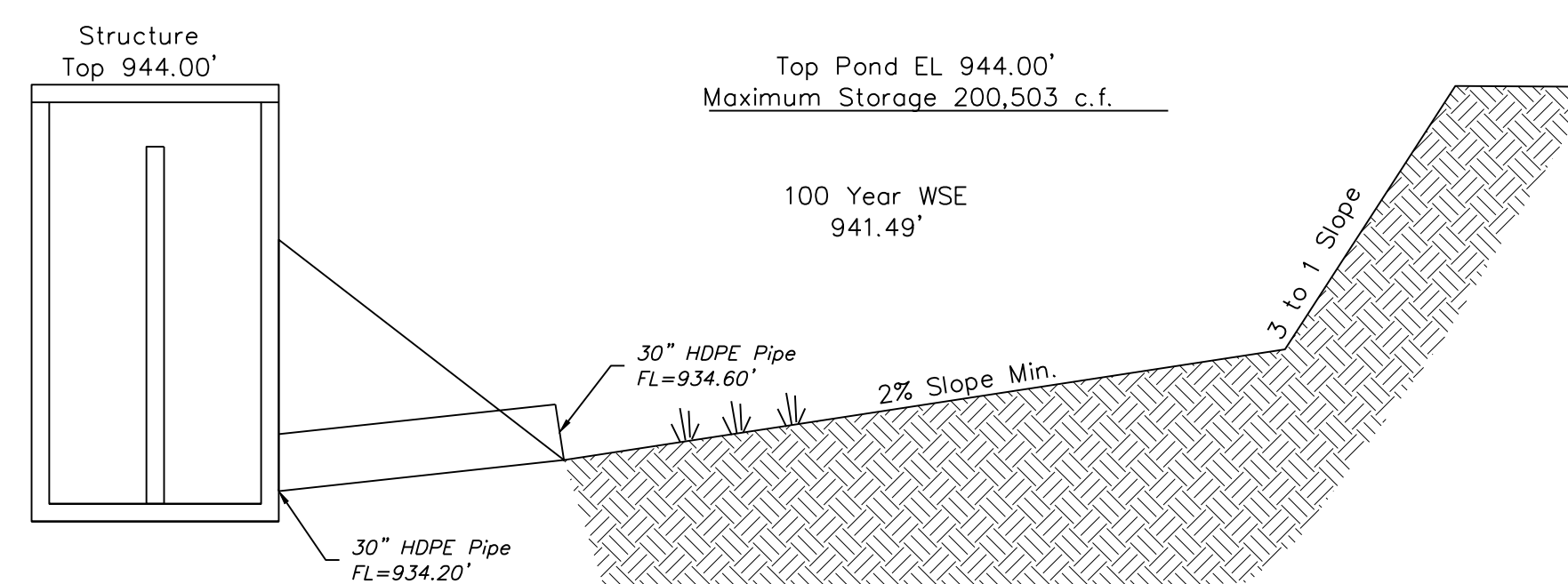


DETENTION BASIN PLAN

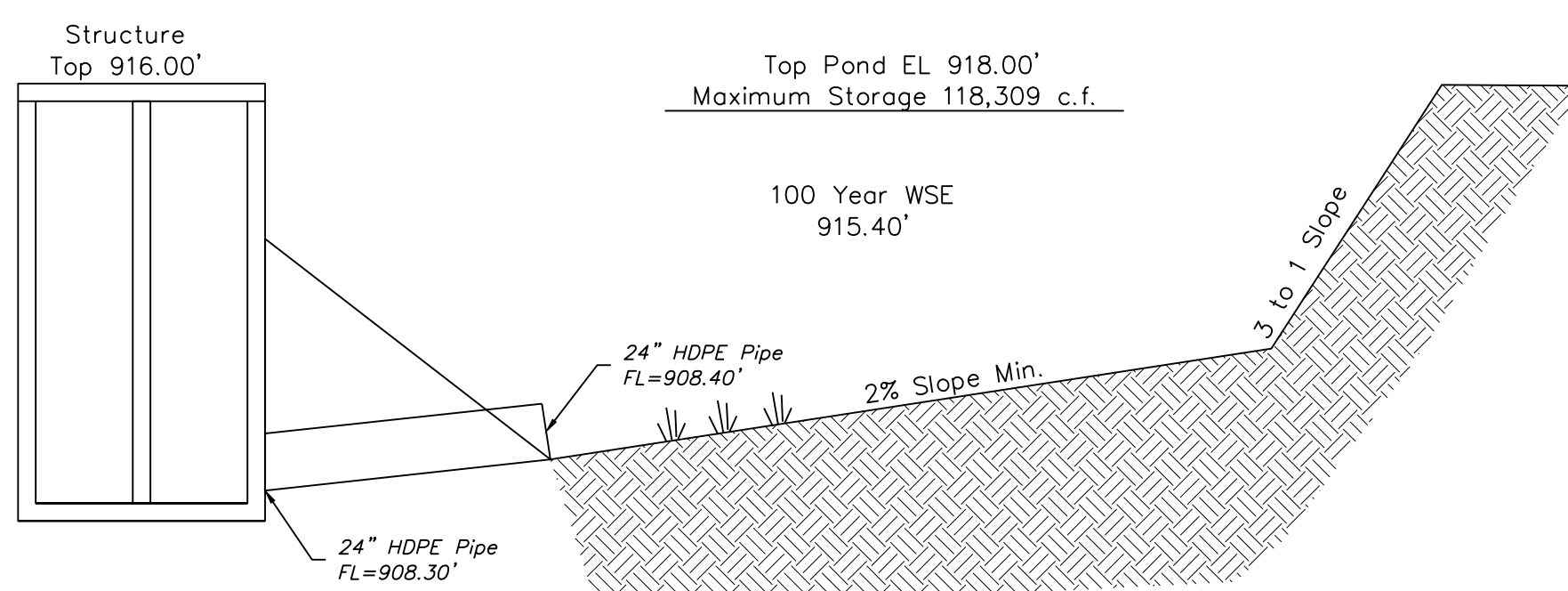
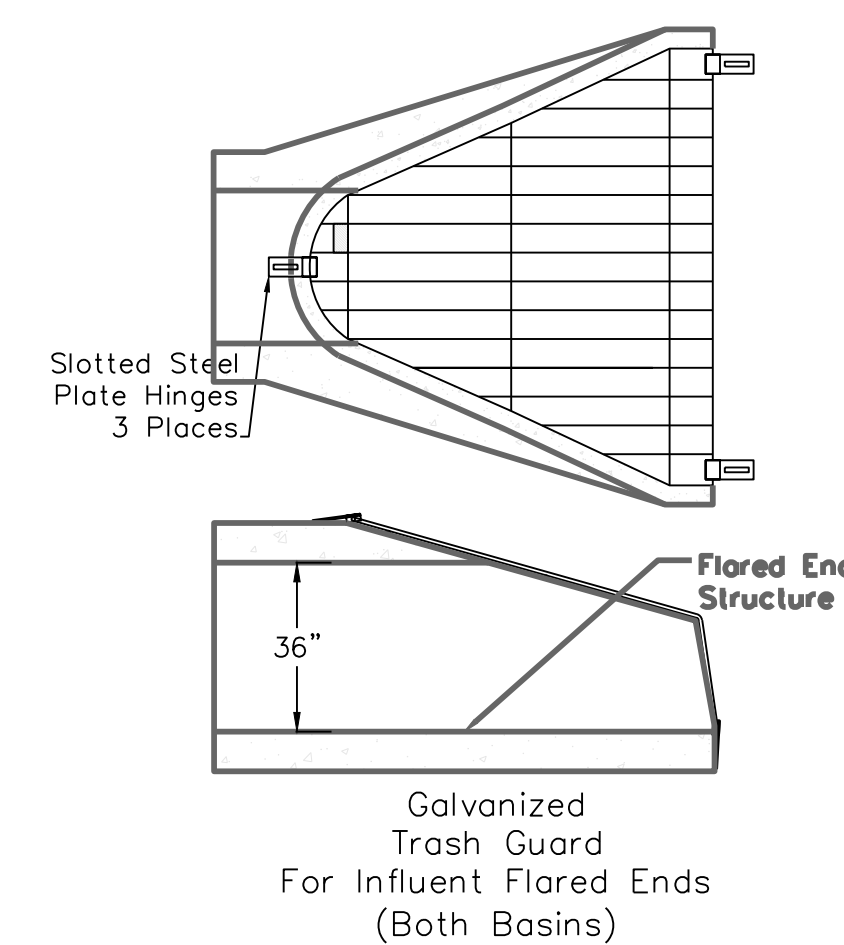
SCALE: 1" = 30'

NOTES:

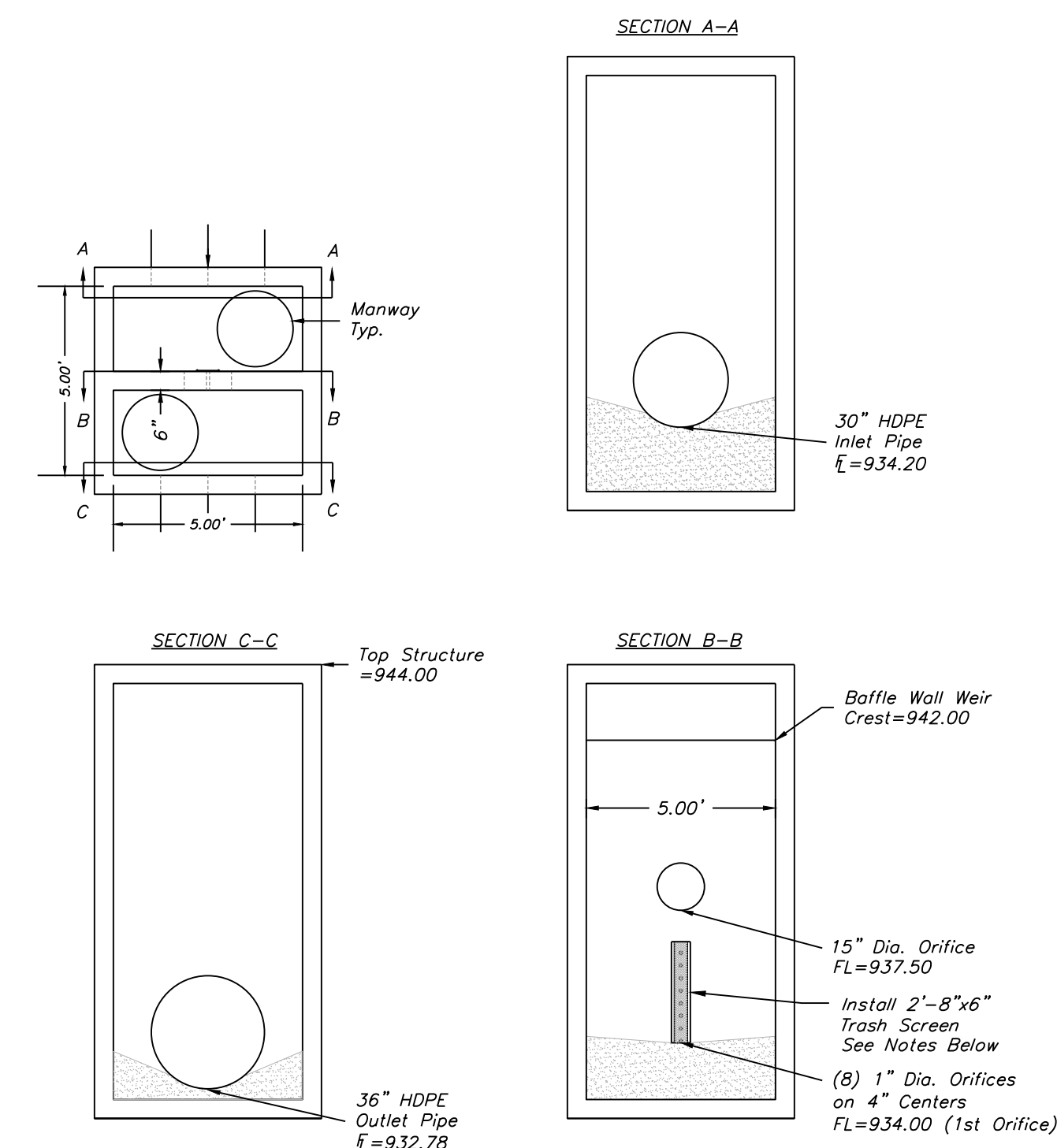
- NOTES:
1. BOTH BASINS SHALL BE CONSTRUCTED WITH THE EROSION AND SEDIMENT CONTROL MEASURES.
 2. AN AS-BUILT DETENTION BASIN PLAN SHALL BE SUBMITTED AND ACCEPTED PRIOR TO ISSUANCE OF A CERTIFICATE OF SUBSTANTIAL COMPLETION, WITH AS-BUILT VERSUS PROPOSED STORAGE.



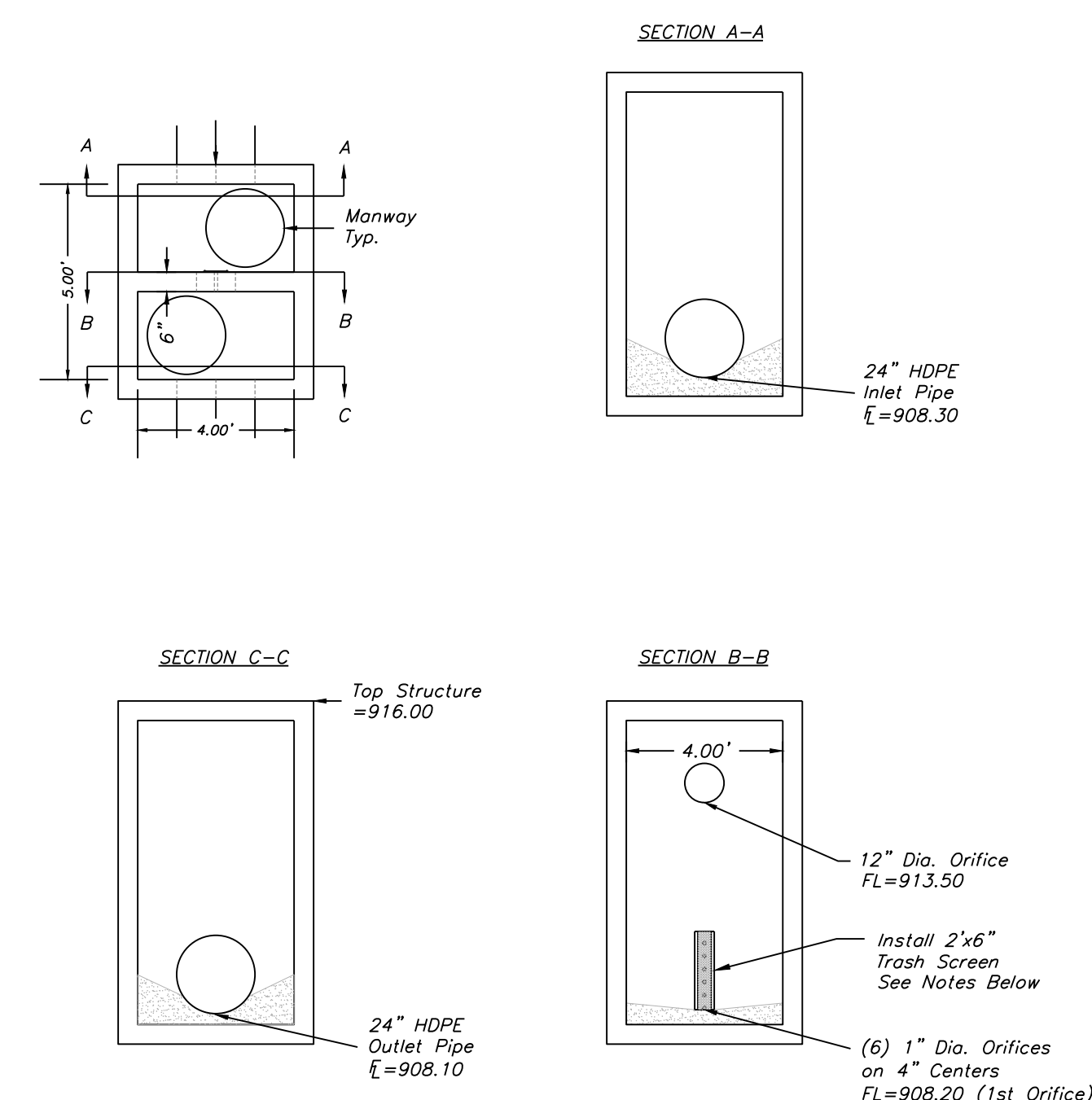
SECTION VIEW - BASIN E
N.T.S.



SECTION VIEW – BASIN D1
N.T.S.



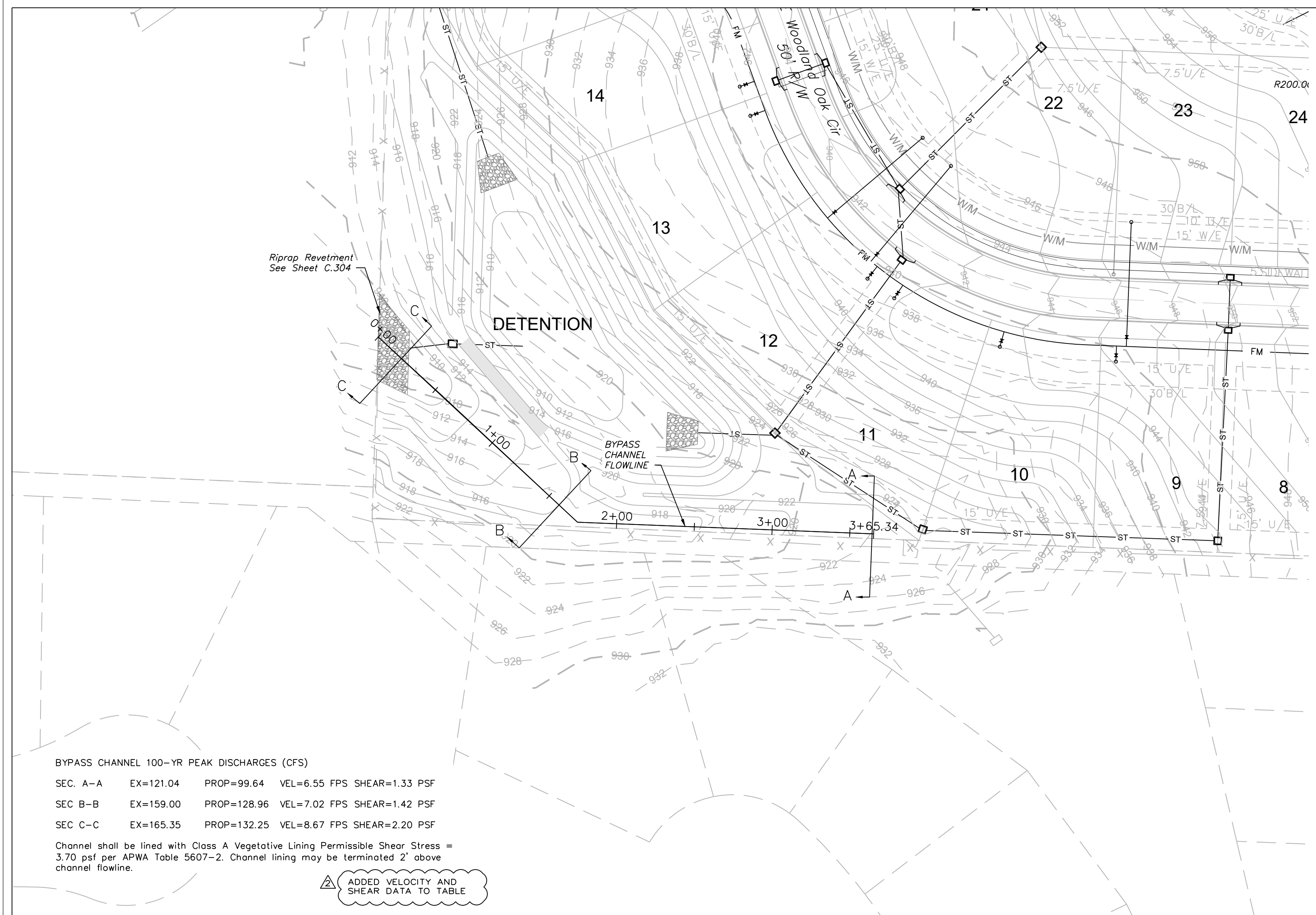
CONTROL STRUCTURE - BASIN E
 $\frac{1}{4}'' = 1'-0''$



CONTROL STRUCTURE - BASIN D1
 $\frac{1}{4}" = 1'-0"$

Notes:

1. Trash Screen Shall be Galvanized Wire Mesh Panel w/ $\frac{1}{2}$ " Mesh x 10 Gauge Wire
2. Fasten Screen to Baffle Wall w/ 1"x $\frac{1}{4}$ " Galvanized Metal Straps bolt on 1' centers w/ $\frac{3}{8}$ " Anchor Bolts



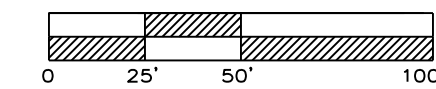
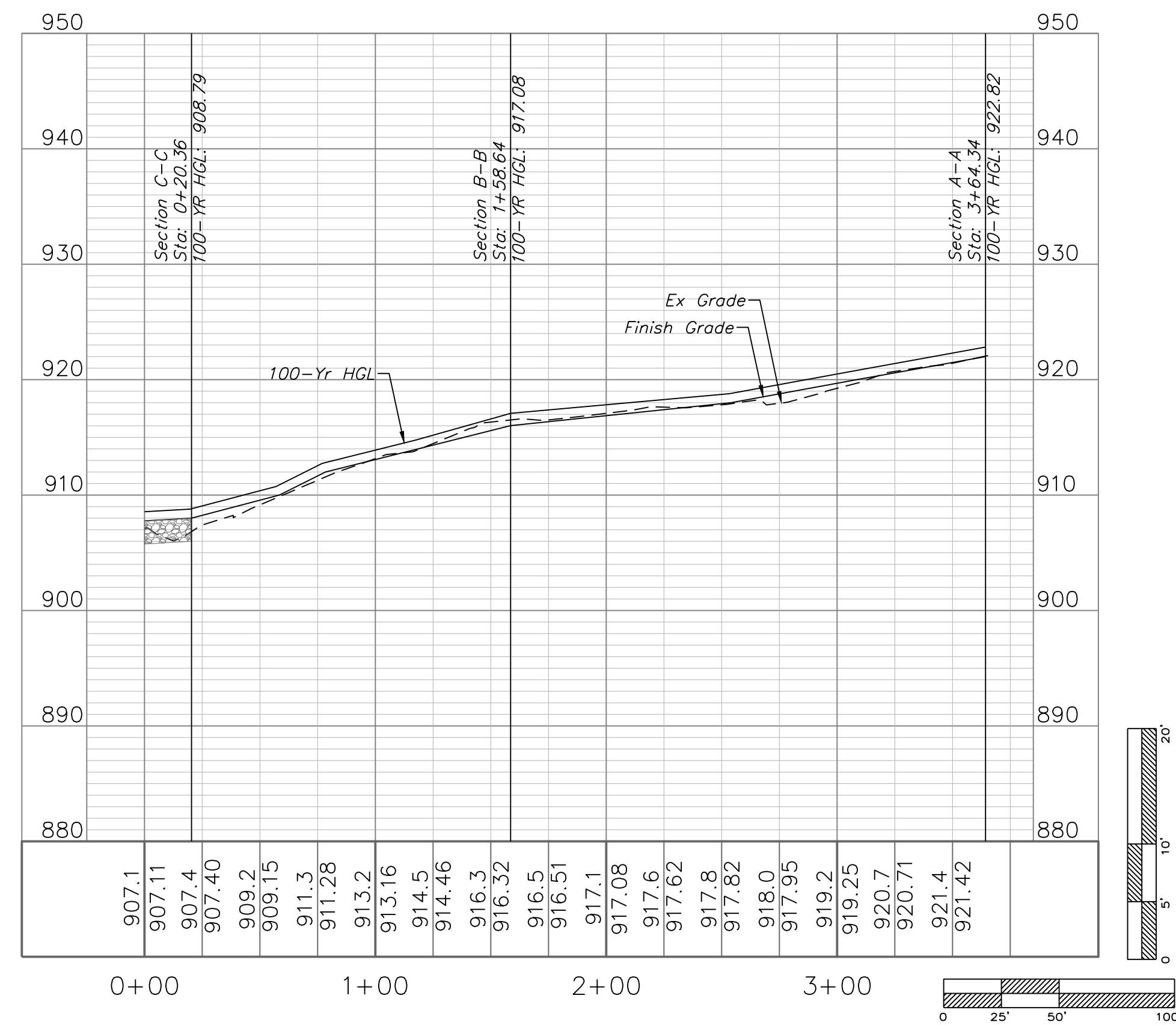
BYPASS CHANNEL 100-YR PEAK DISCHARGES (CFS)

SEC. A-A	EX=121.04	PROP=99.64	VEL=6.55 FPS	SHEAR=1.33 PSF
SEC B-B	EX=159.00	PROP=128.96	VEL=7.02 FPS	SHEAR=1.42 PSF
SEC C-C	EX=165.35	PROP=132.25	VEL=8.67 FPS	SHEAR=2.20 PSF

Channel shall be lined with Class A Vegetative Lining Permissible Shear Stress = 3.70 psf per APWA Table 5607-2. Channel lining may be terminated 2' above channel flowline.

▲ ADDED VELOCITY AND SHEAR DATA TO TABLE

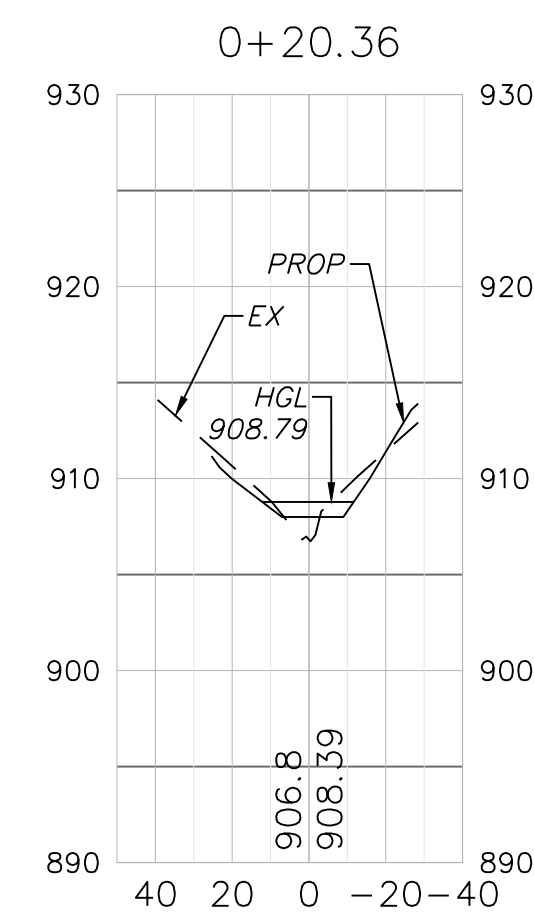
BYPASS CHANNEL FLOWLINE



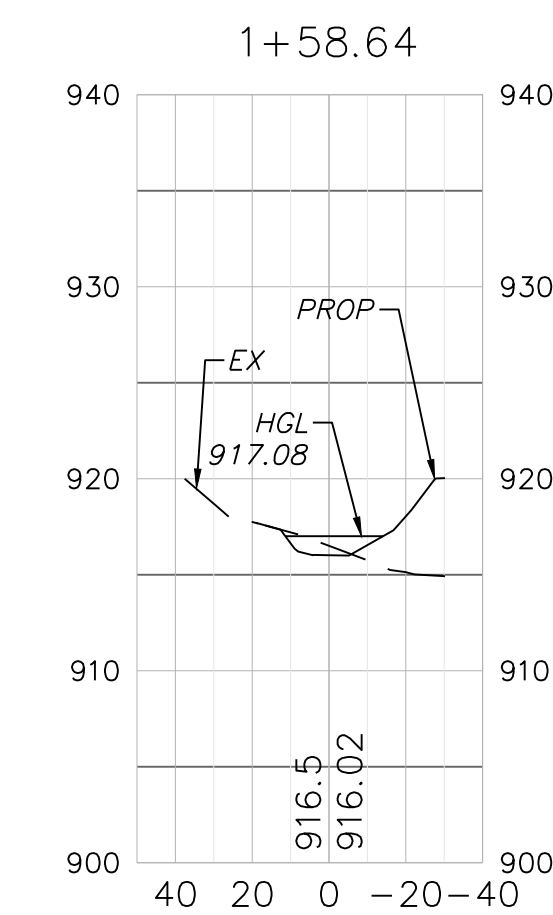
BYPASS CHANNEL PLAN

SCALE: 1" = 50'

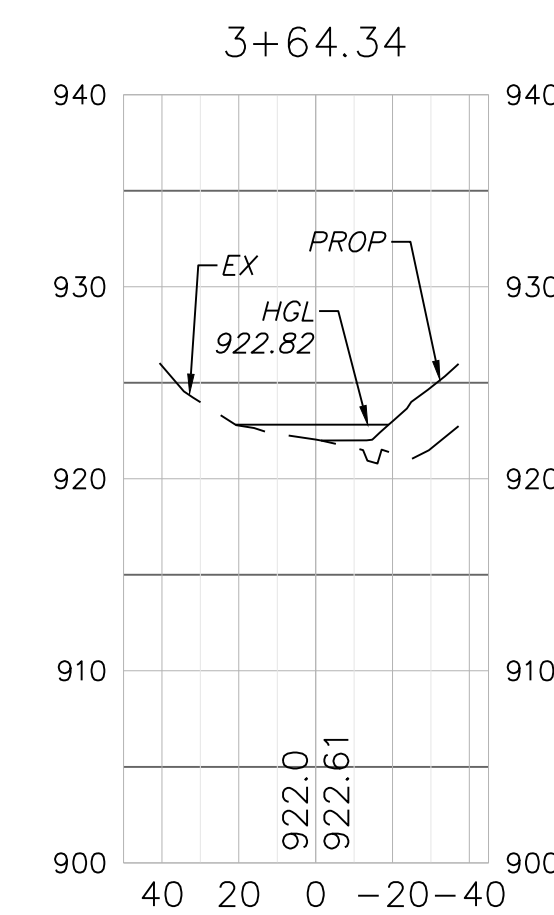
SECTION C-C



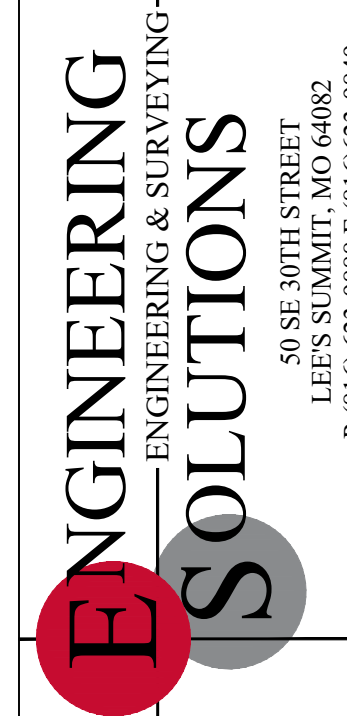
SECTION B-B



SECTION A-A



HGL = 100 YEAR
SEE MACRO DRAINAGE STUDY FOR COMPLETE
HYDRAULIC DATA FOR EACH CROSS SECTION.



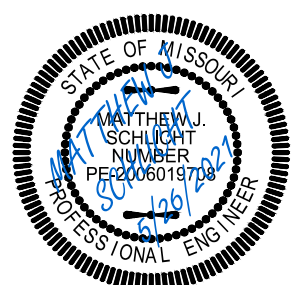
Professional Registration
Missouri
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Surveying 2005008319-D
Kansas
Engineering E-1685
Surveying LS-218
Oklahoma
Engineering 6254
Nebraska
Engineering CA2821

Part of the Southeast
Section 27, Township 48 North, Range 31 West
Lee's Summit, Jackson County, Missouri

Project:
WOODLAND OAKS
LSMO
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February 25, 2021

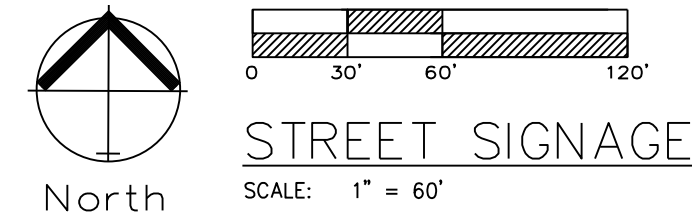
Bypass Channel Plan

Construction Plans for:
WOODLAND OAKS
Lots 1 thru 42
Lee's Summit, Jackson County, Missouri



Matthew J. Schlicht
MO PE 2006019708
KS PE 19071
OK PE 25226
NE PE E-14335

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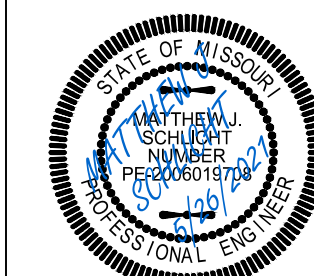


Professional Registration
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Engineering E-1695
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Part of the Southeast 1/4
Section 27, Township 48 North, Range 31 West
Lee's Summit, Jackson County, Missouri

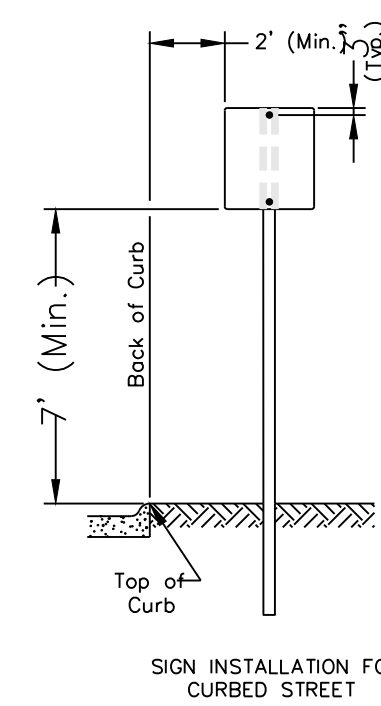
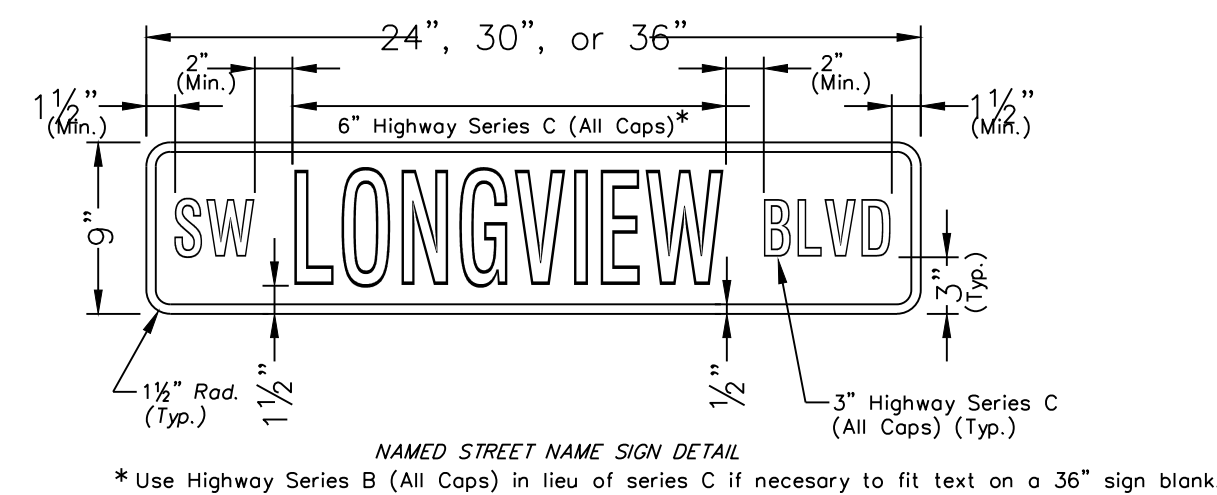
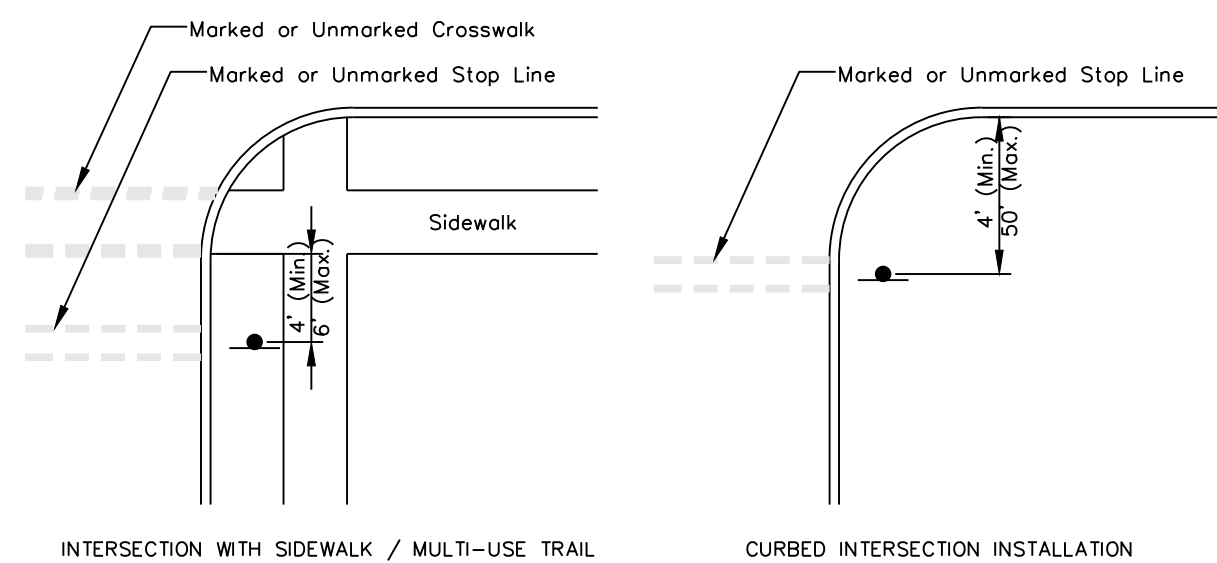
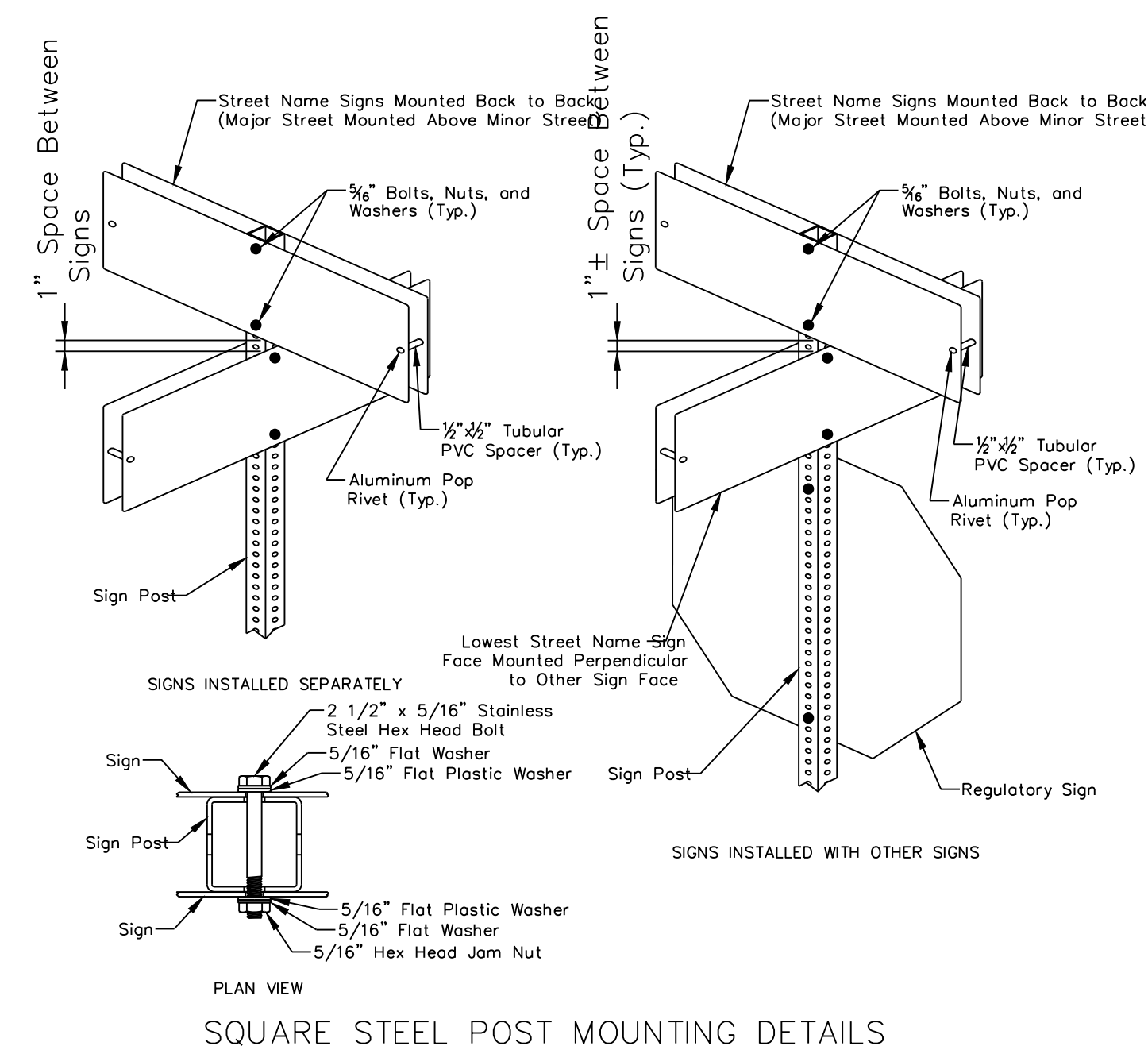
Project:
WOODLAND OAKS
LSMO
Issue Date:
February 25, 2021

Street Signage Plan
Construction Plans for:
WOODLAND OAKS
Lots 1 thru 42
Lee's Summit, Jackson County, Missouri



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KS PE 19071
OK PE 25226
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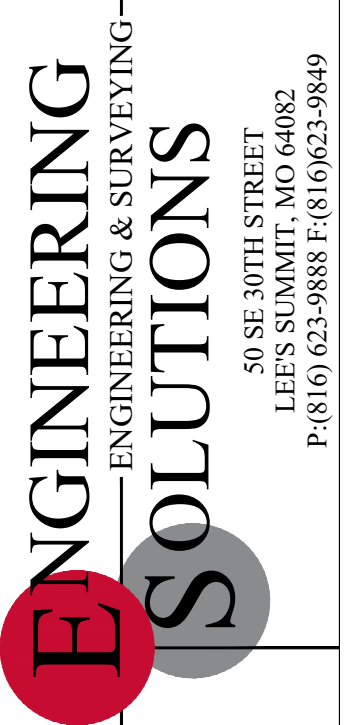
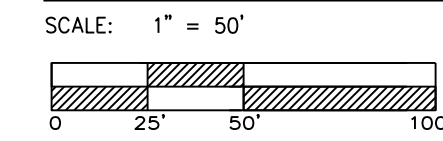
REVISIONS
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REV. 5/26/2021



SIGN MOUNTING DETAILS
* The height to the bottom of a sign when it is located in a pedestrian walkway or extends into a walkway shall be a minimum of 80 inches above the walkway.



STORM SEWER GENERAL LAYOUT

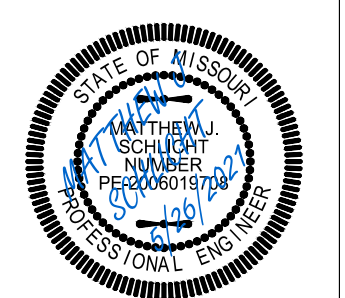


Professional Registration
Missouri
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Kansas
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Surveying LS-218
Oklahoma
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Nebraska
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Part of the Southeast 1
Section 27, Township 48 North, Range 31 West
Lee's Summit, Jackson County, Missouri

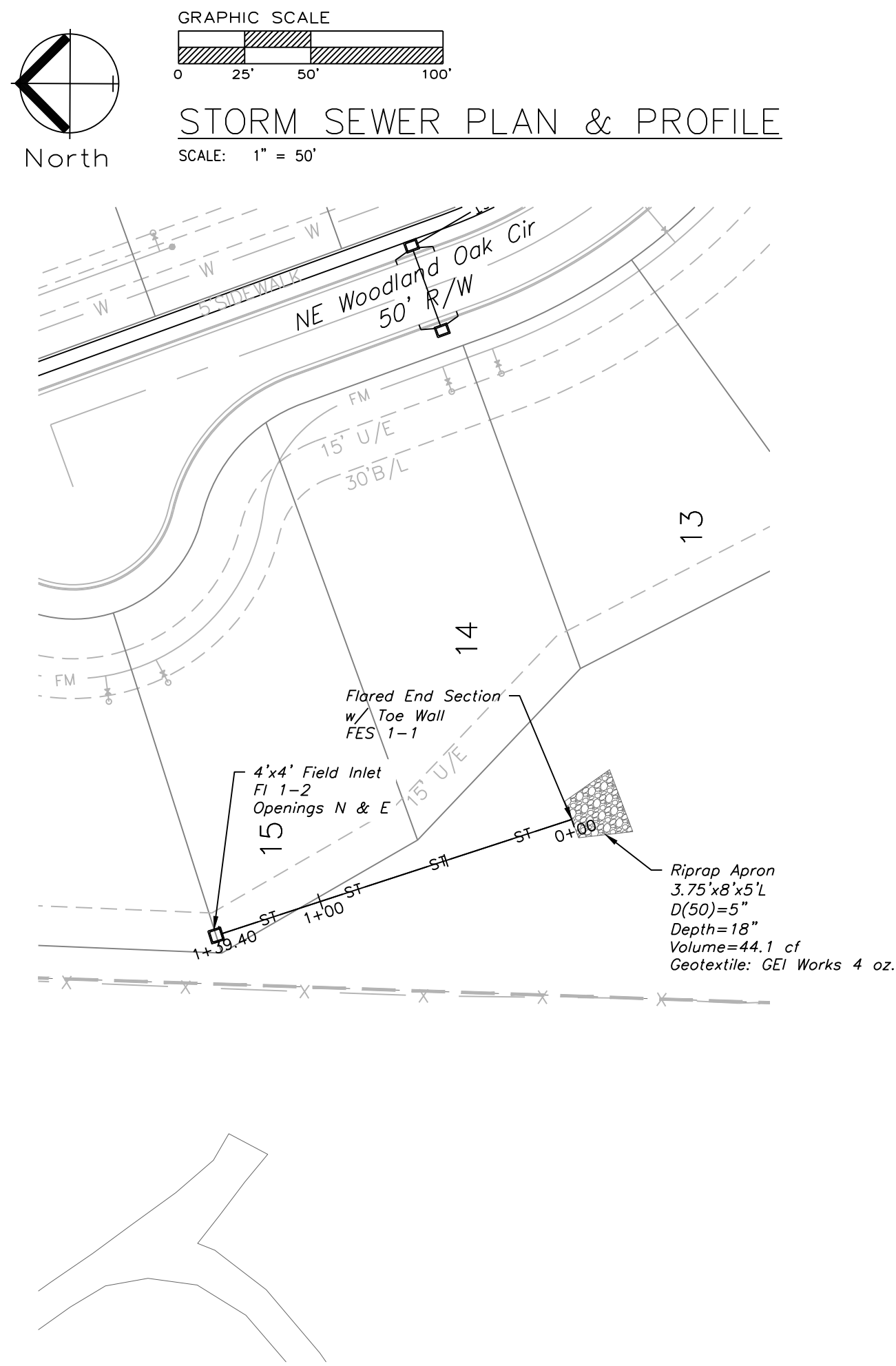
Project: WOODLAND OAKS
LSMO
Issue Date: February 25, 2021

Storm Sewer General Layout
Construction Plans for:
WOODLAND OAKS
Lots 1 thru 42
Lee's Summit, Jackson County, Missouri

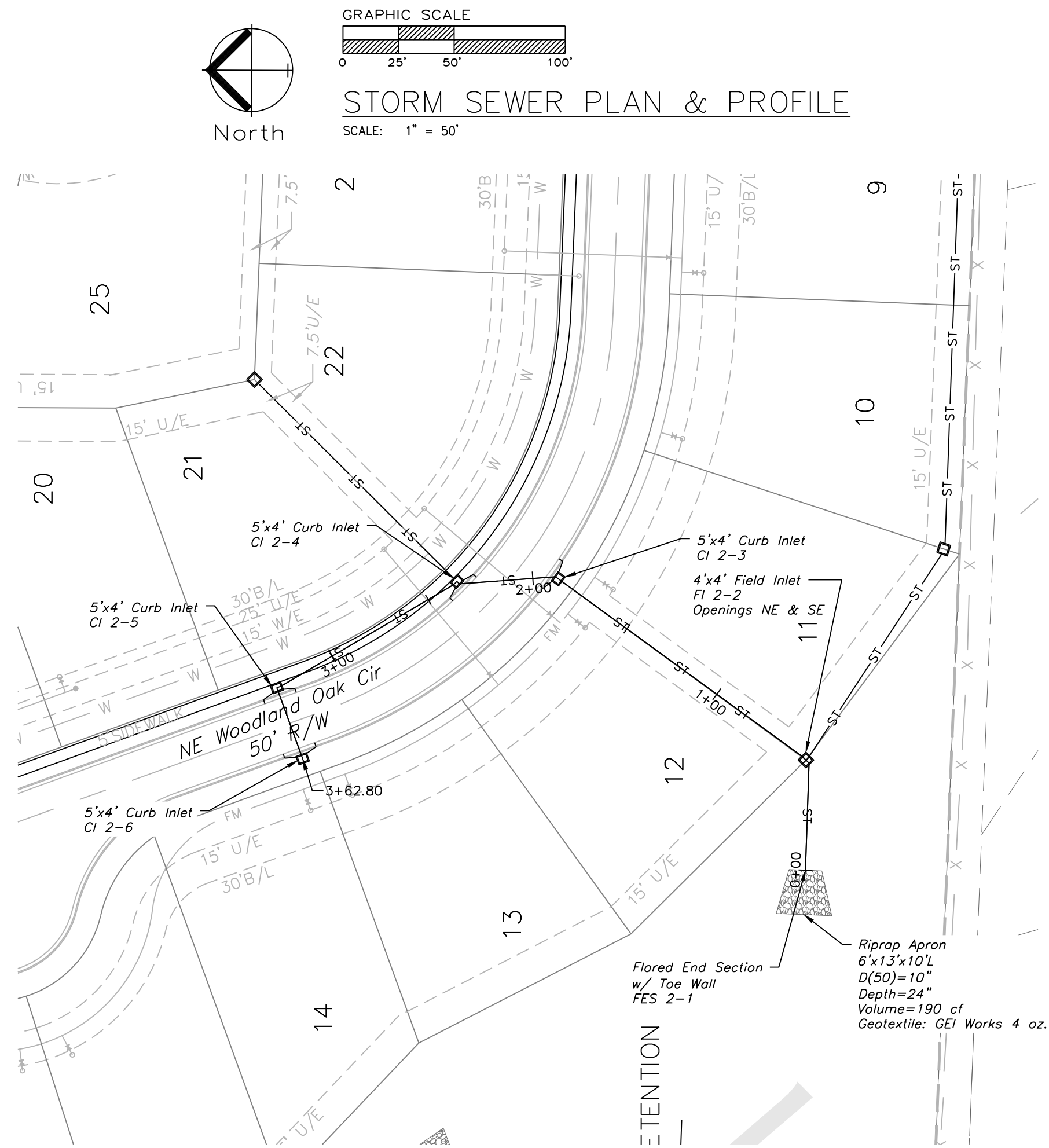
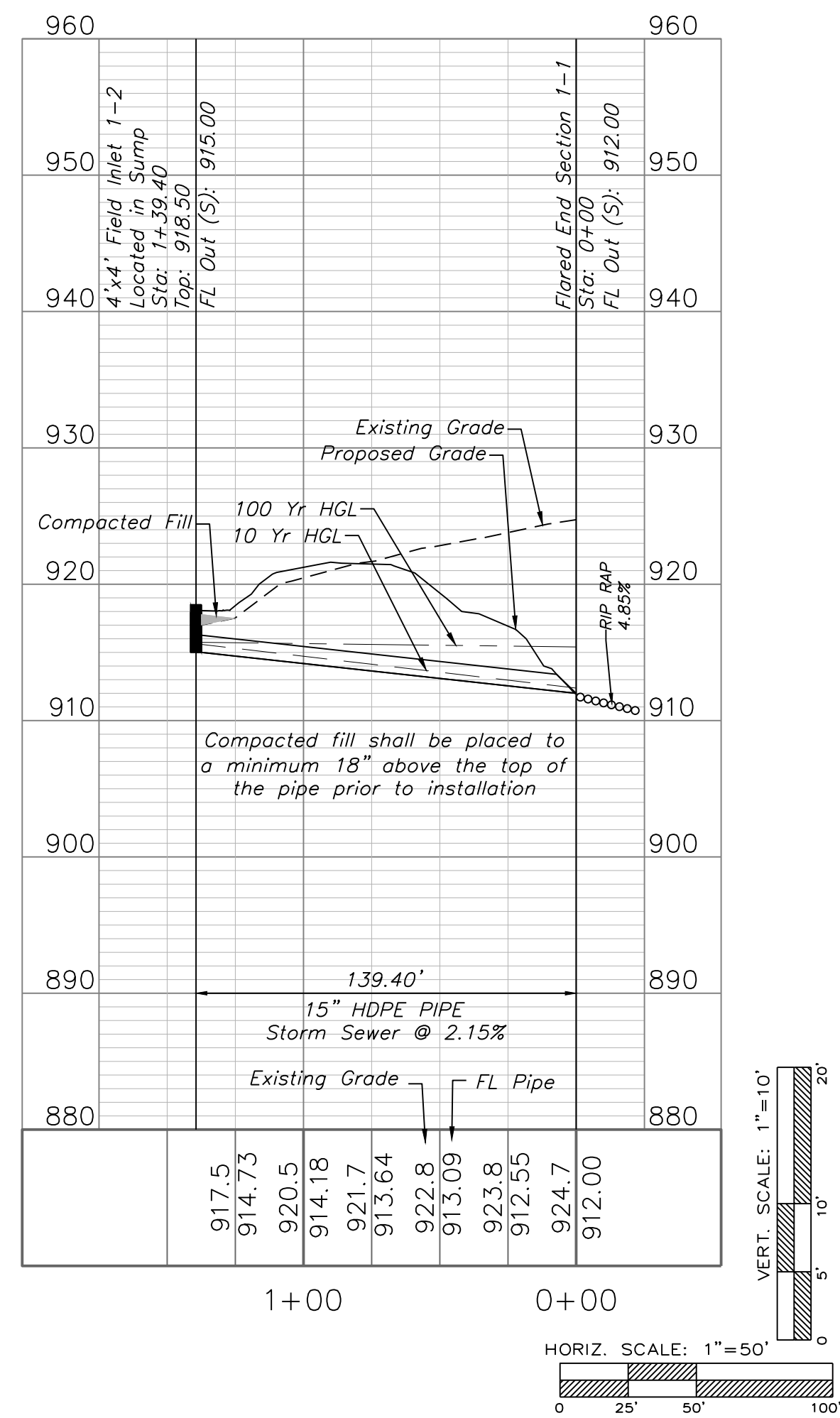


Matthew J. Schlicht
MO PE 2006019708
KS PE 19071
OK PE 25226
NE PE E-14335

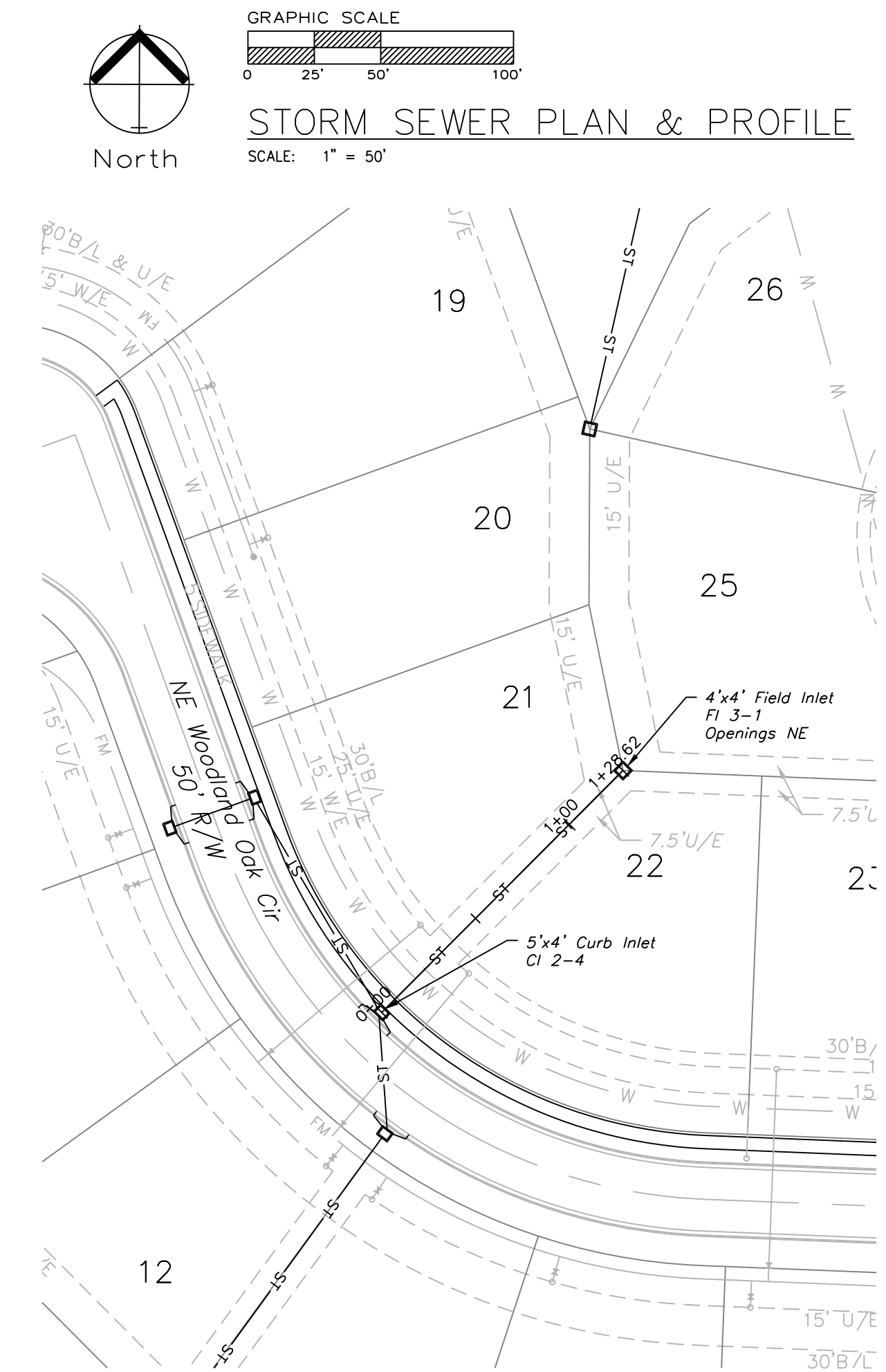
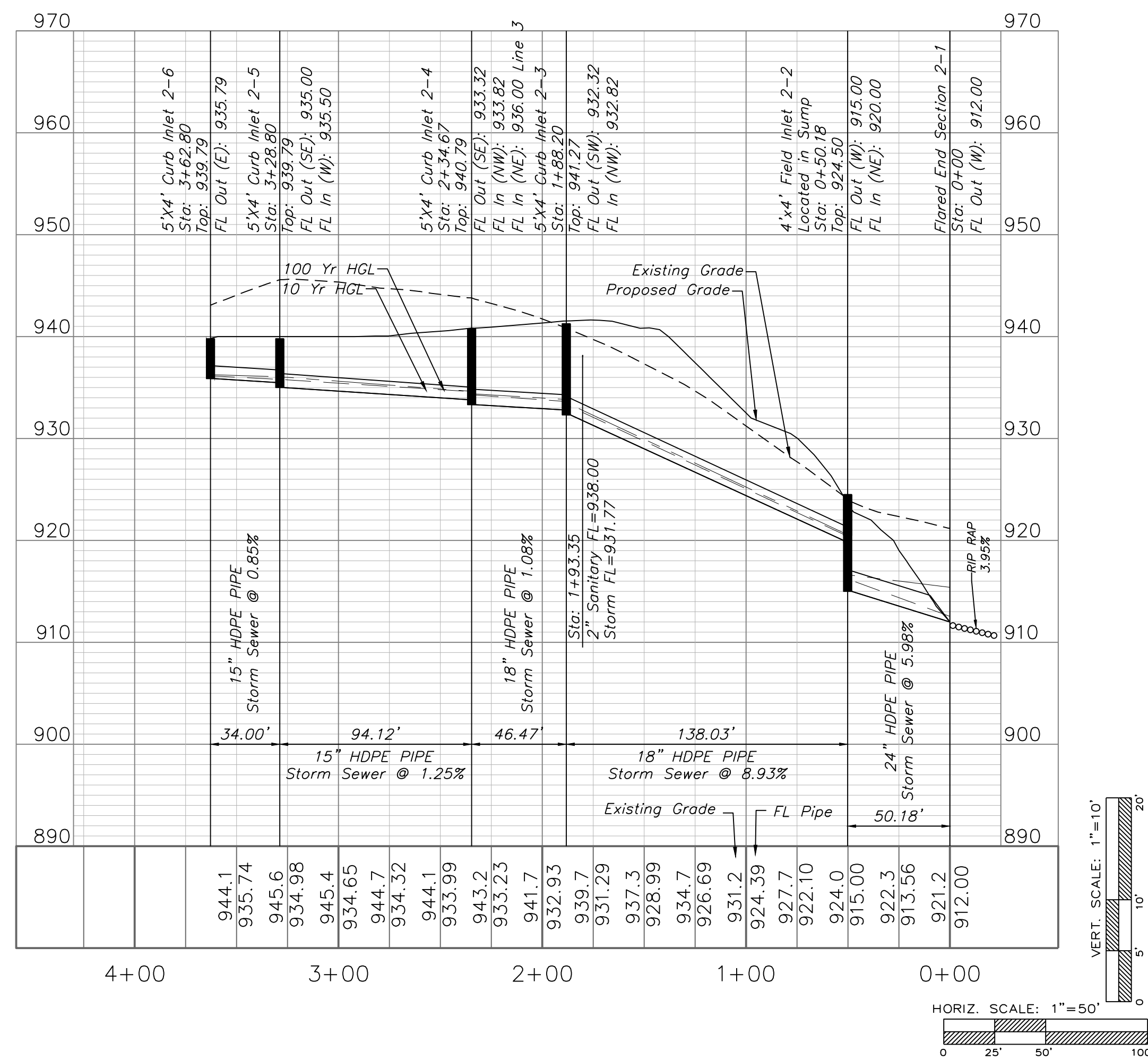
REVISIONS
REV. 5/5/2021
REV. 5/26/2021



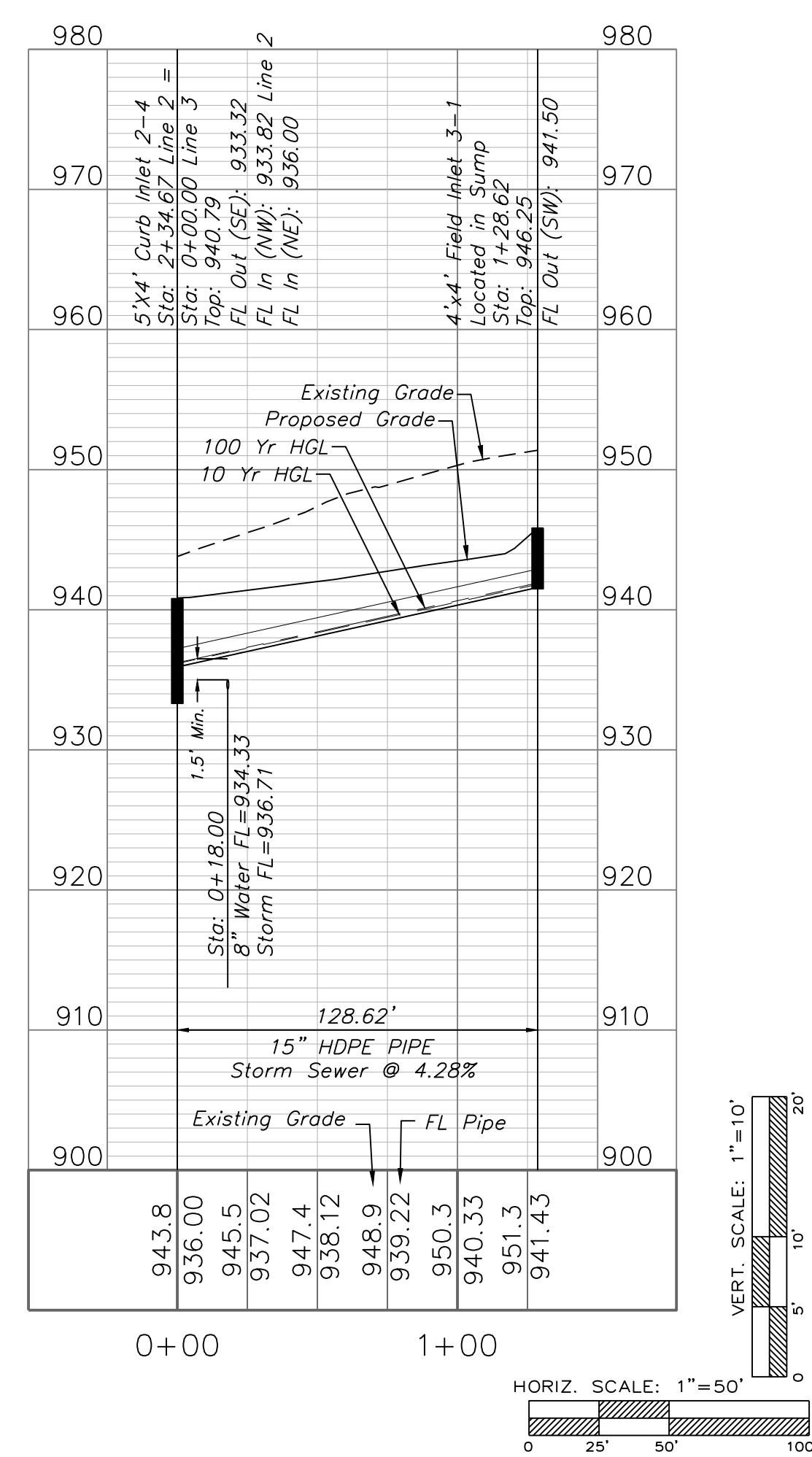
STORM LINE 1

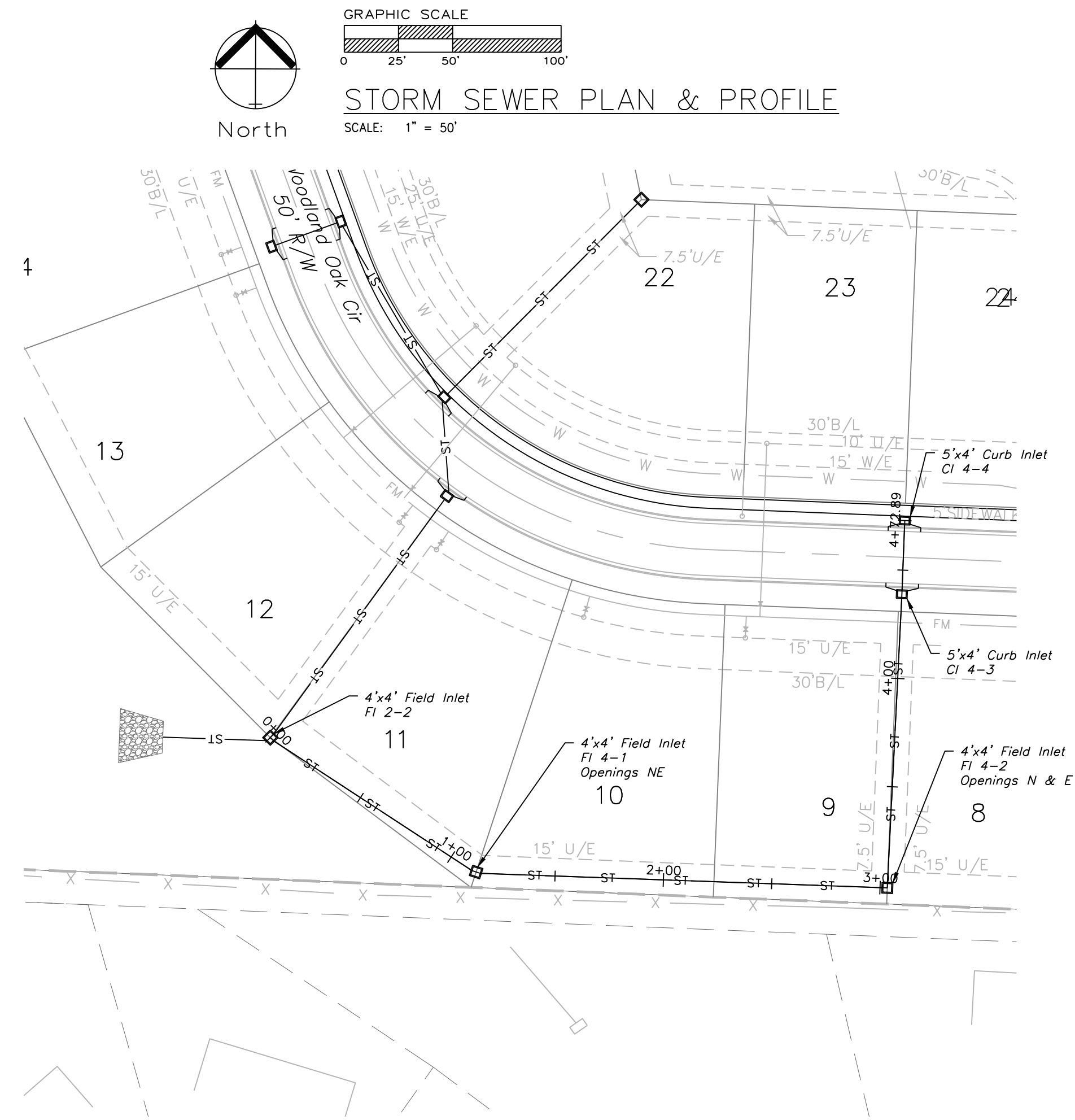


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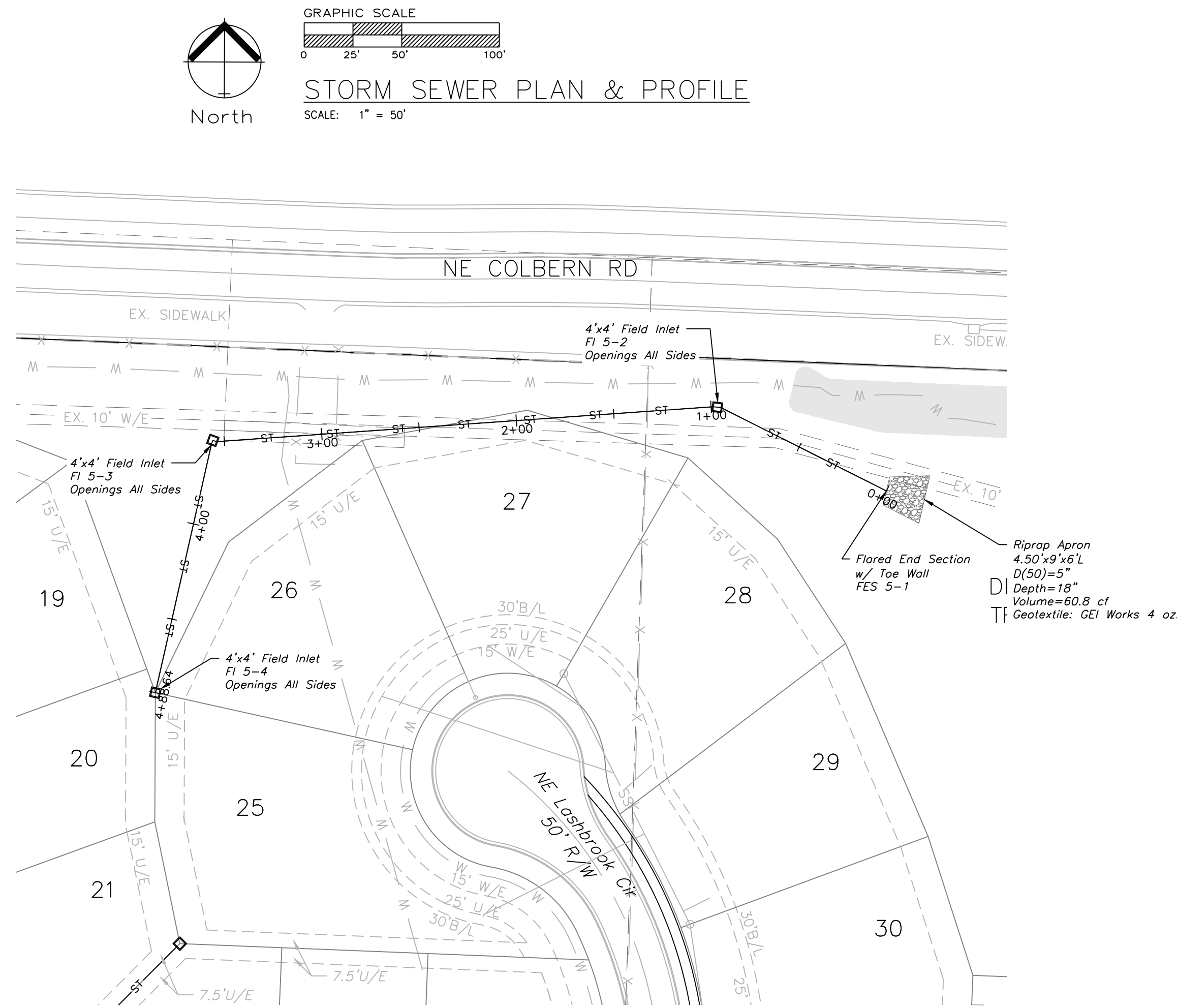
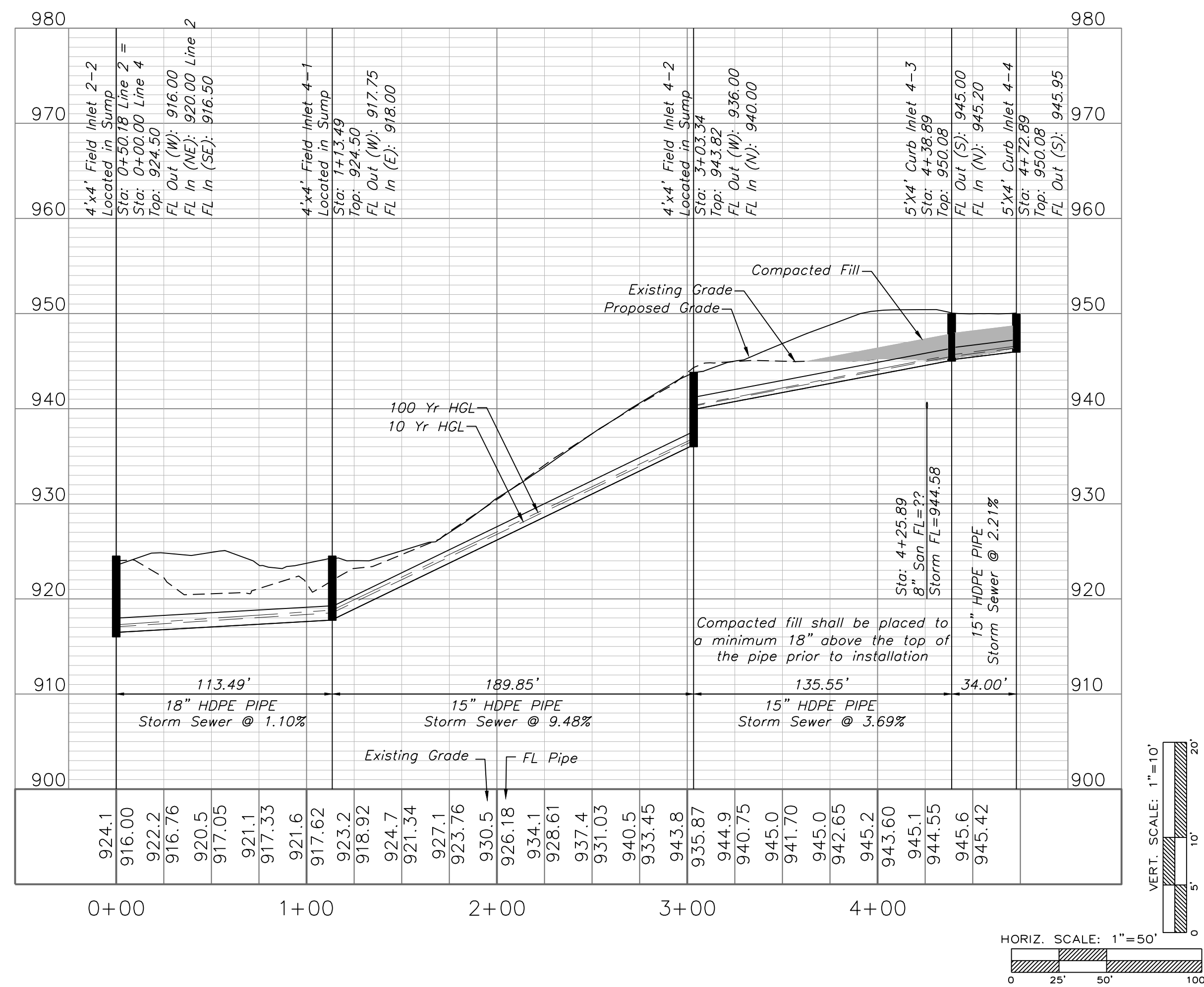


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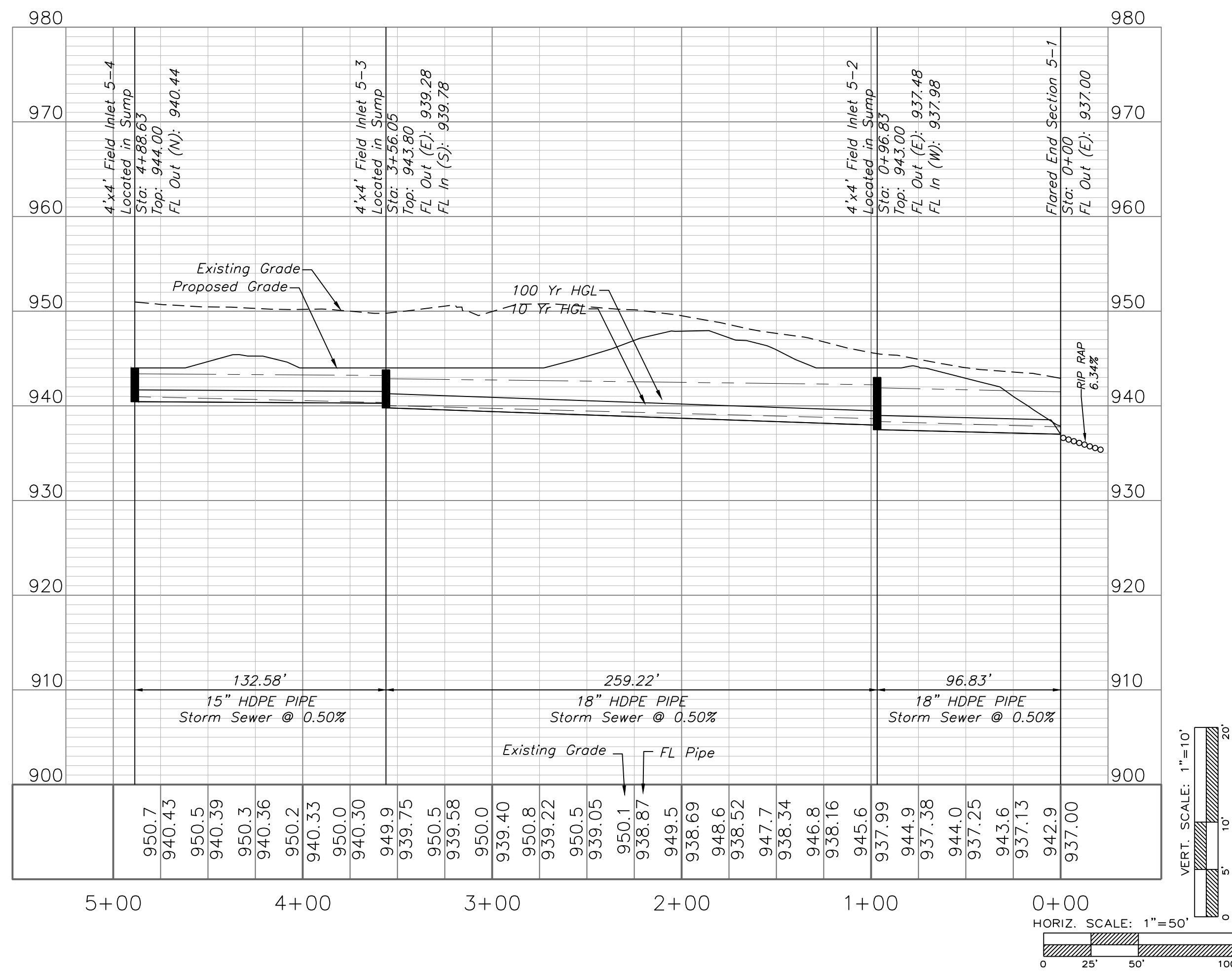


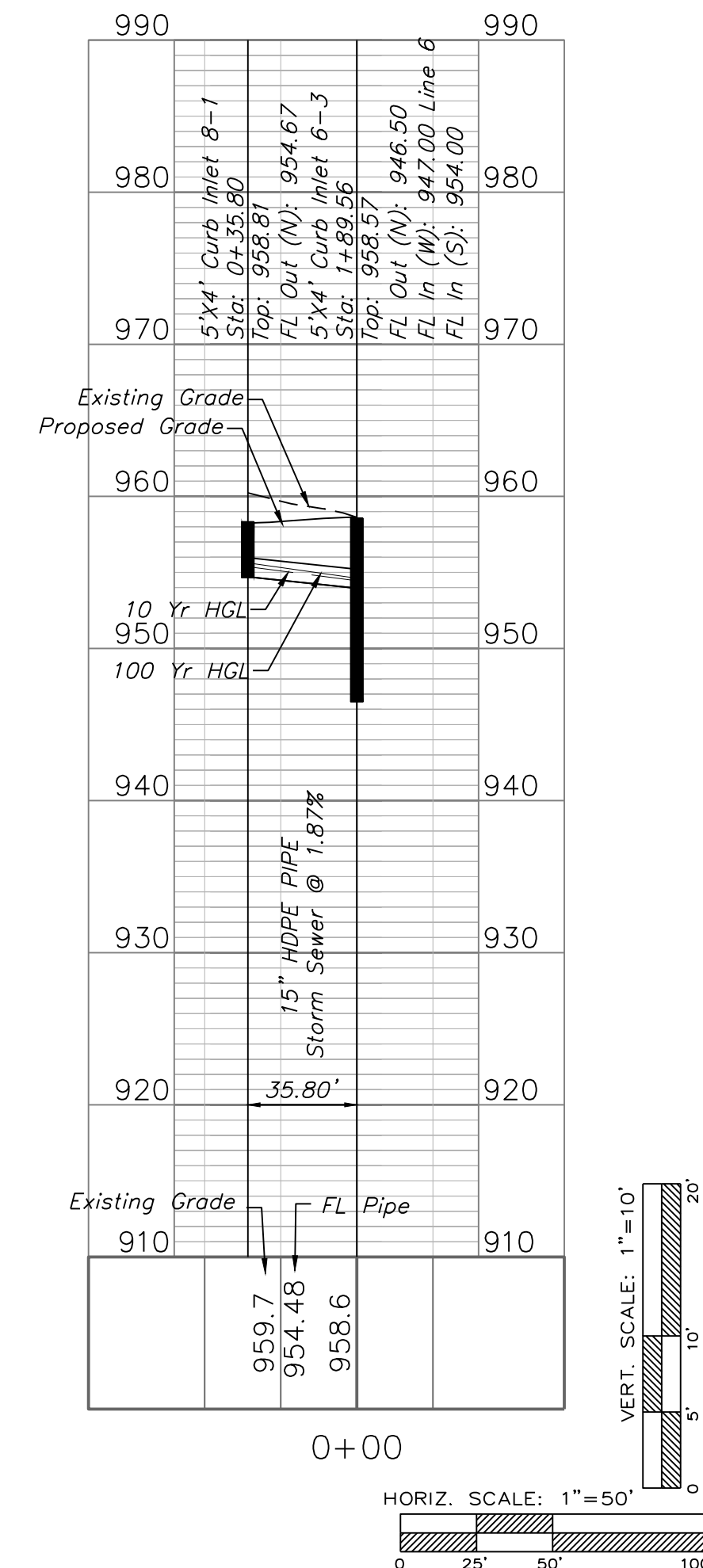
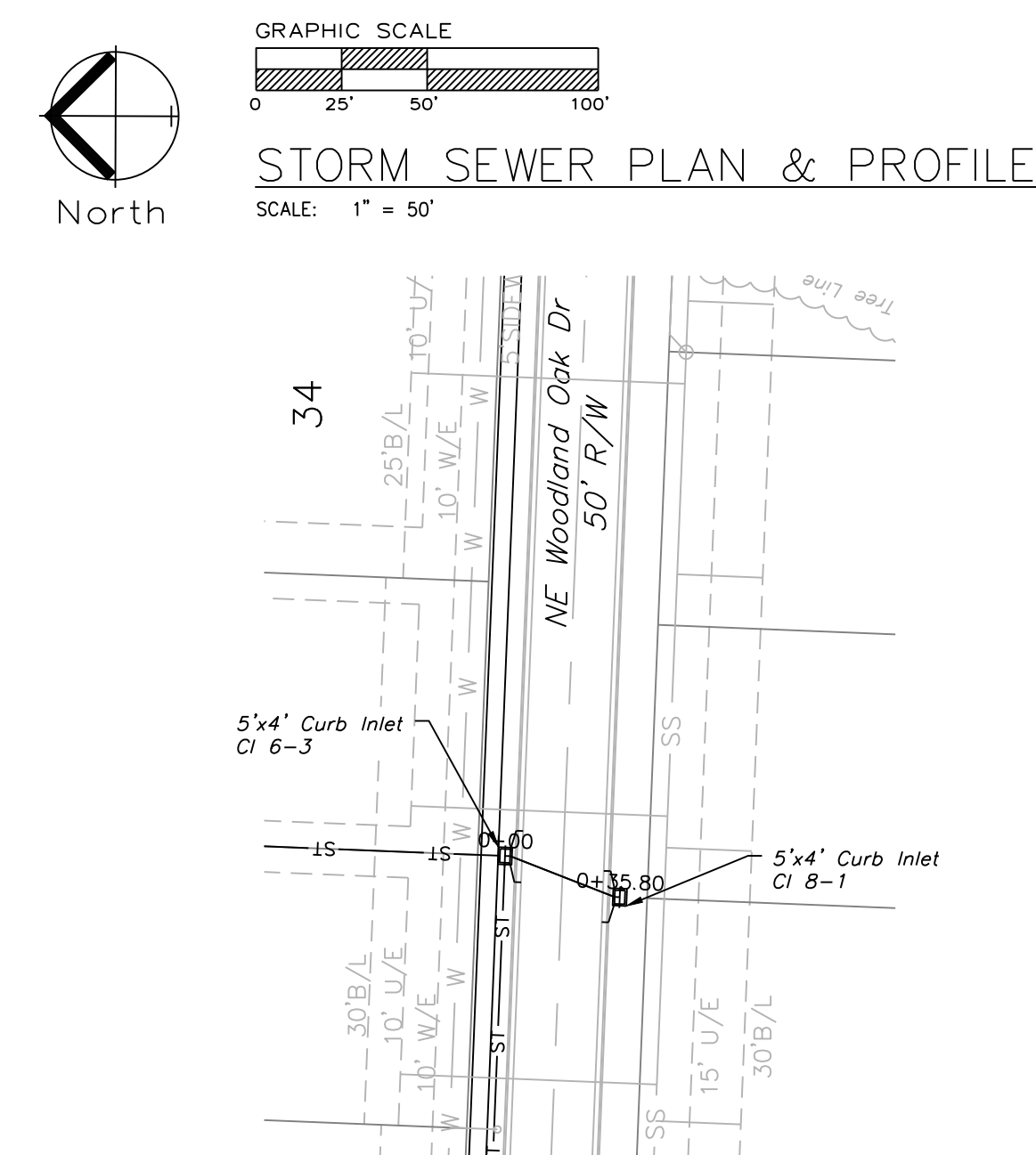
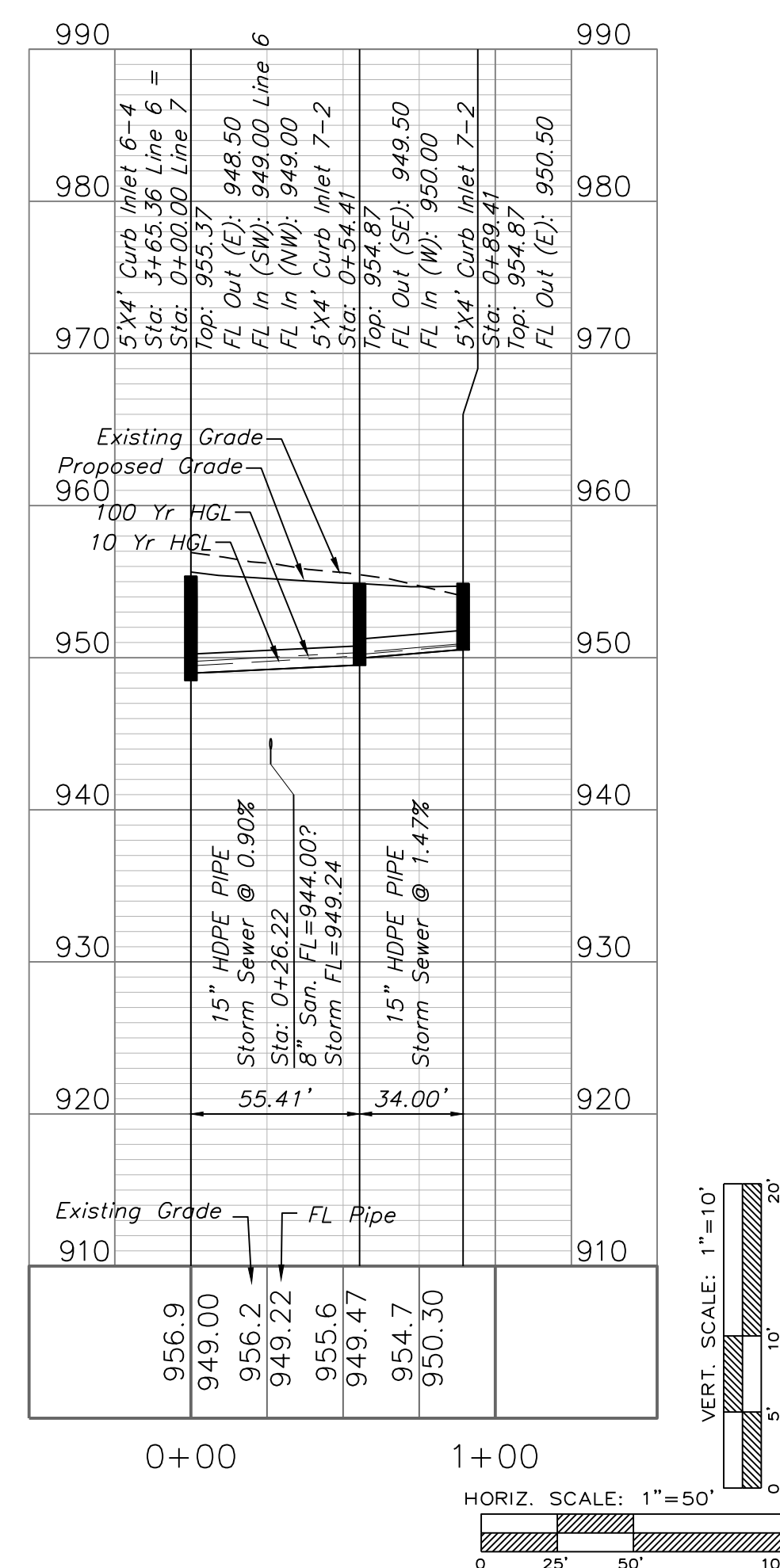
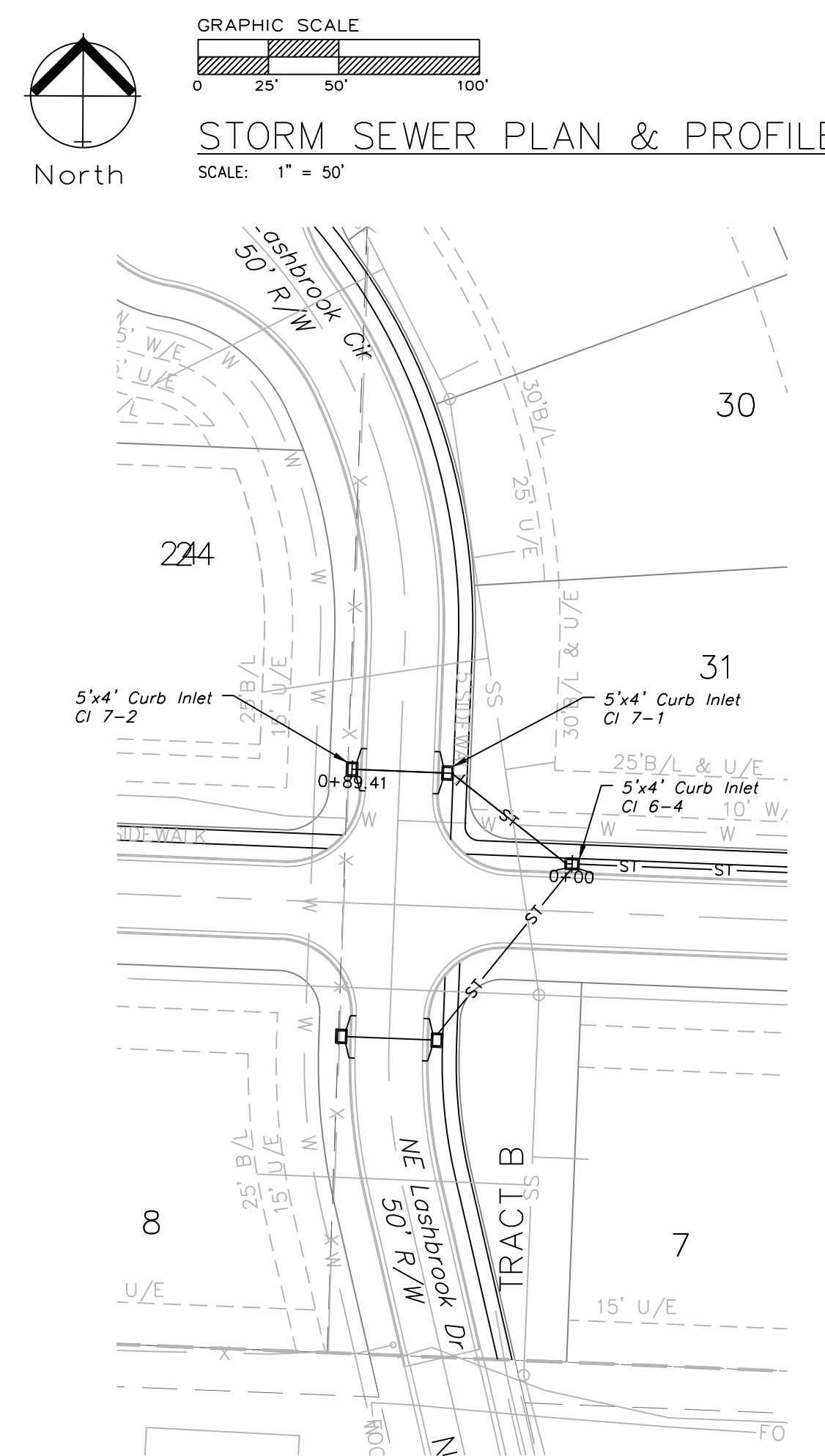
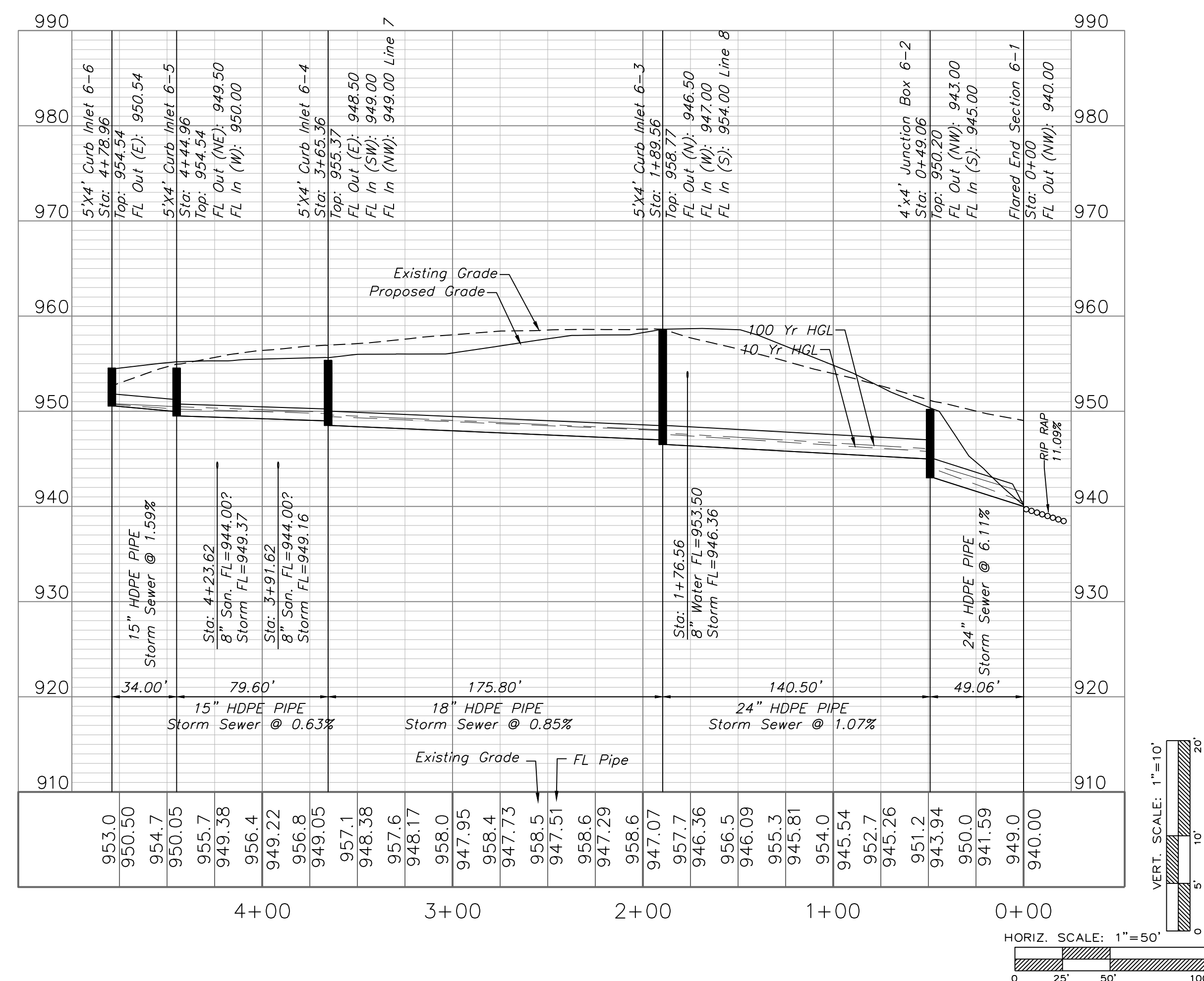
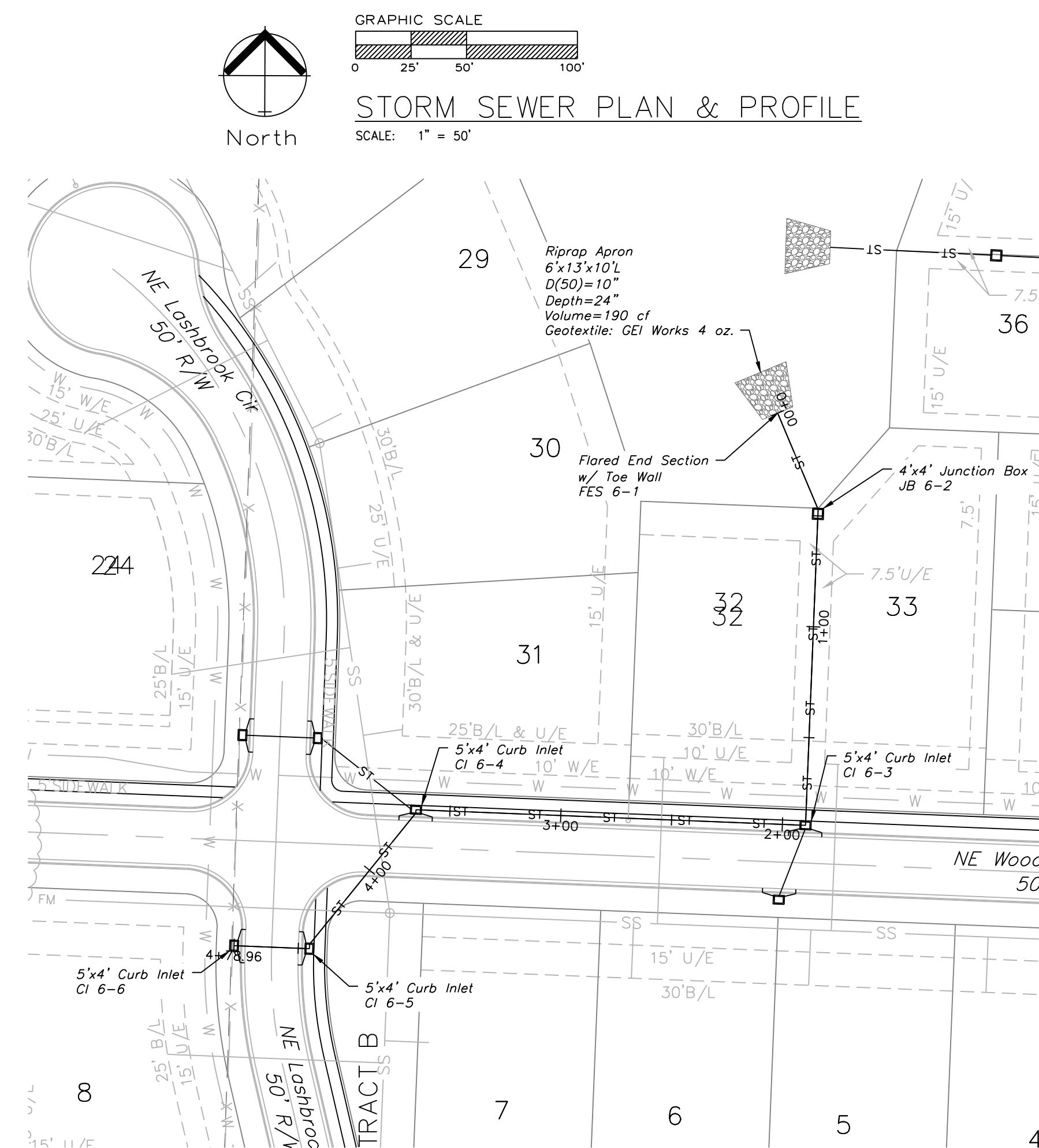


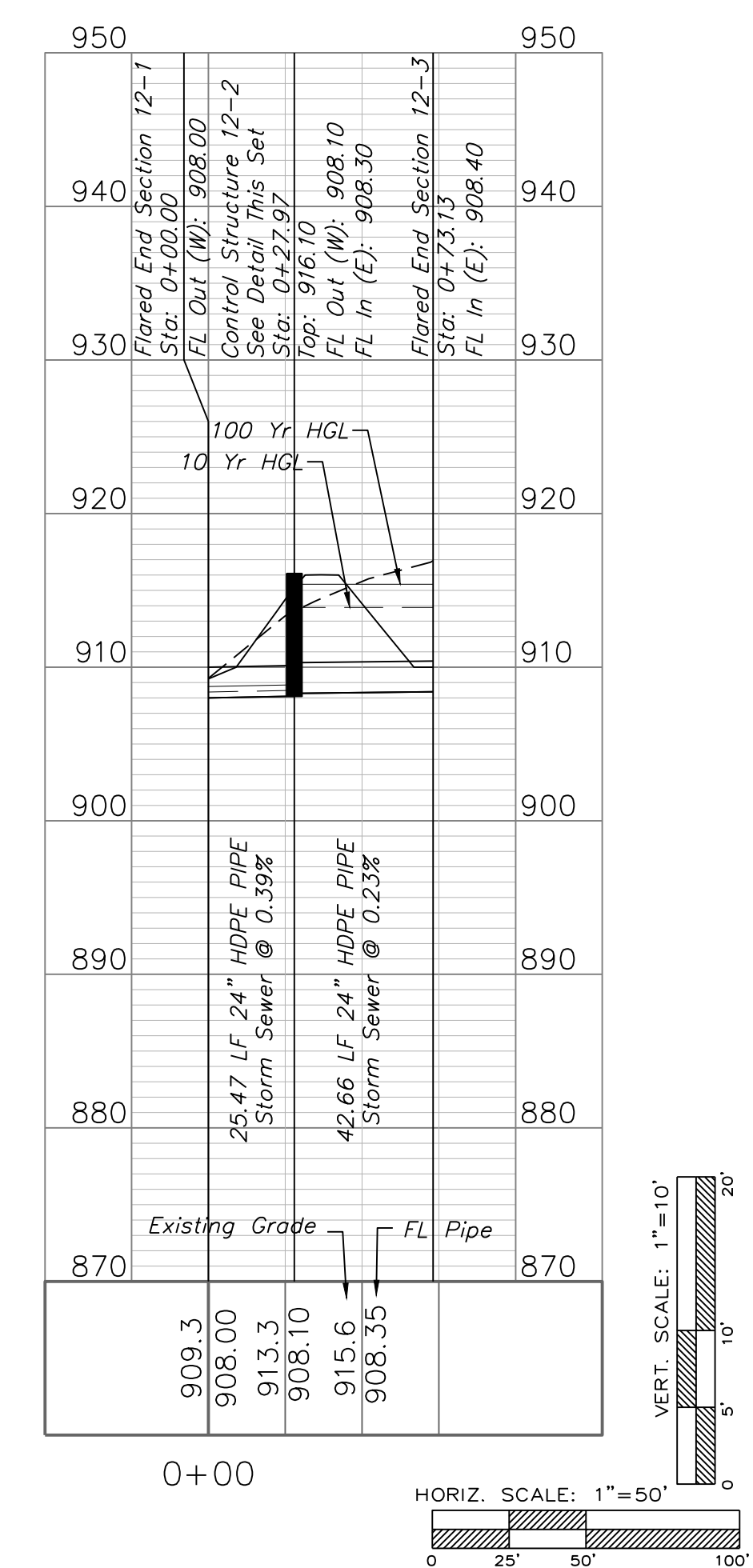
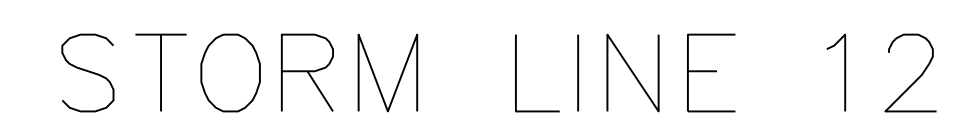
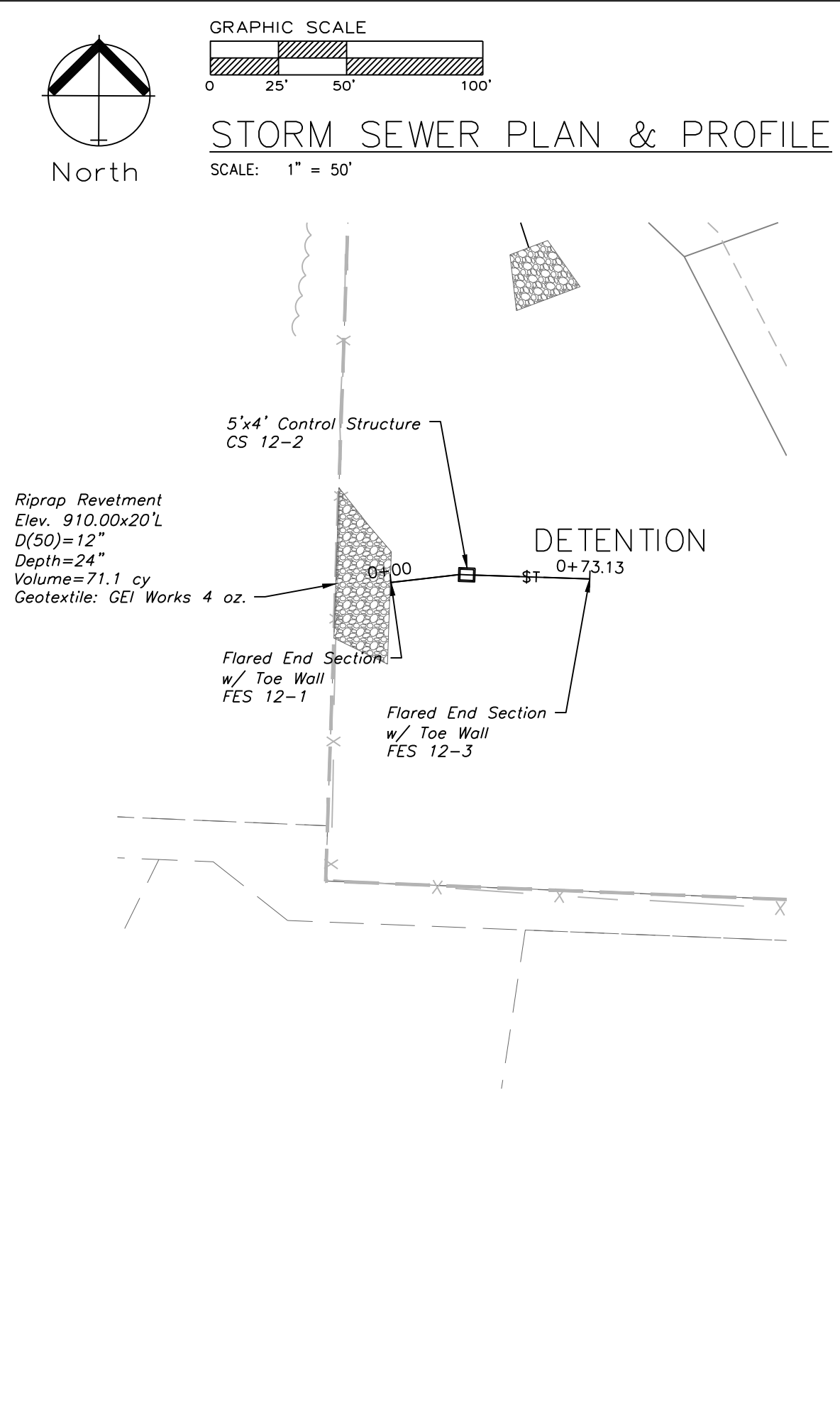
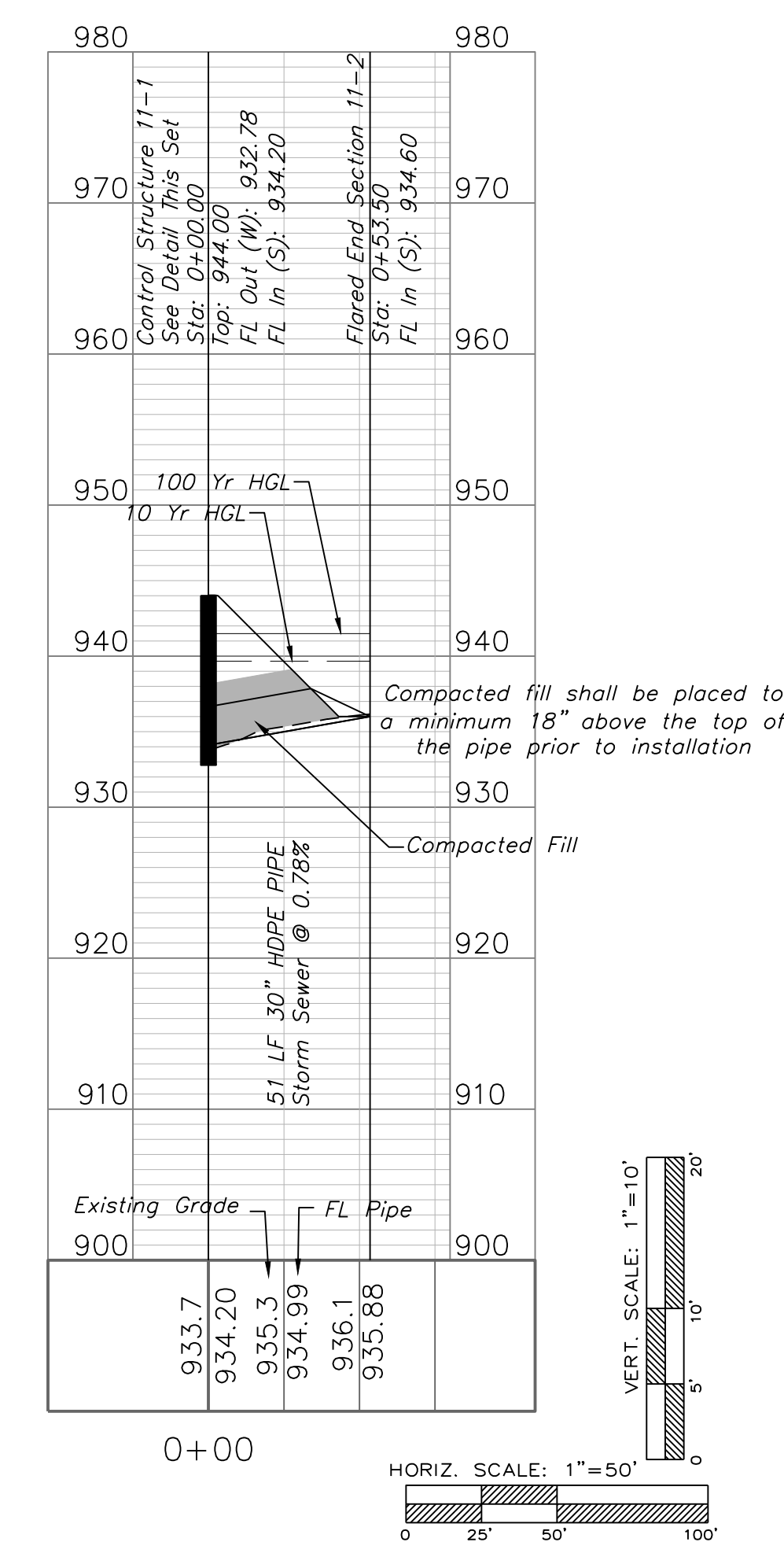
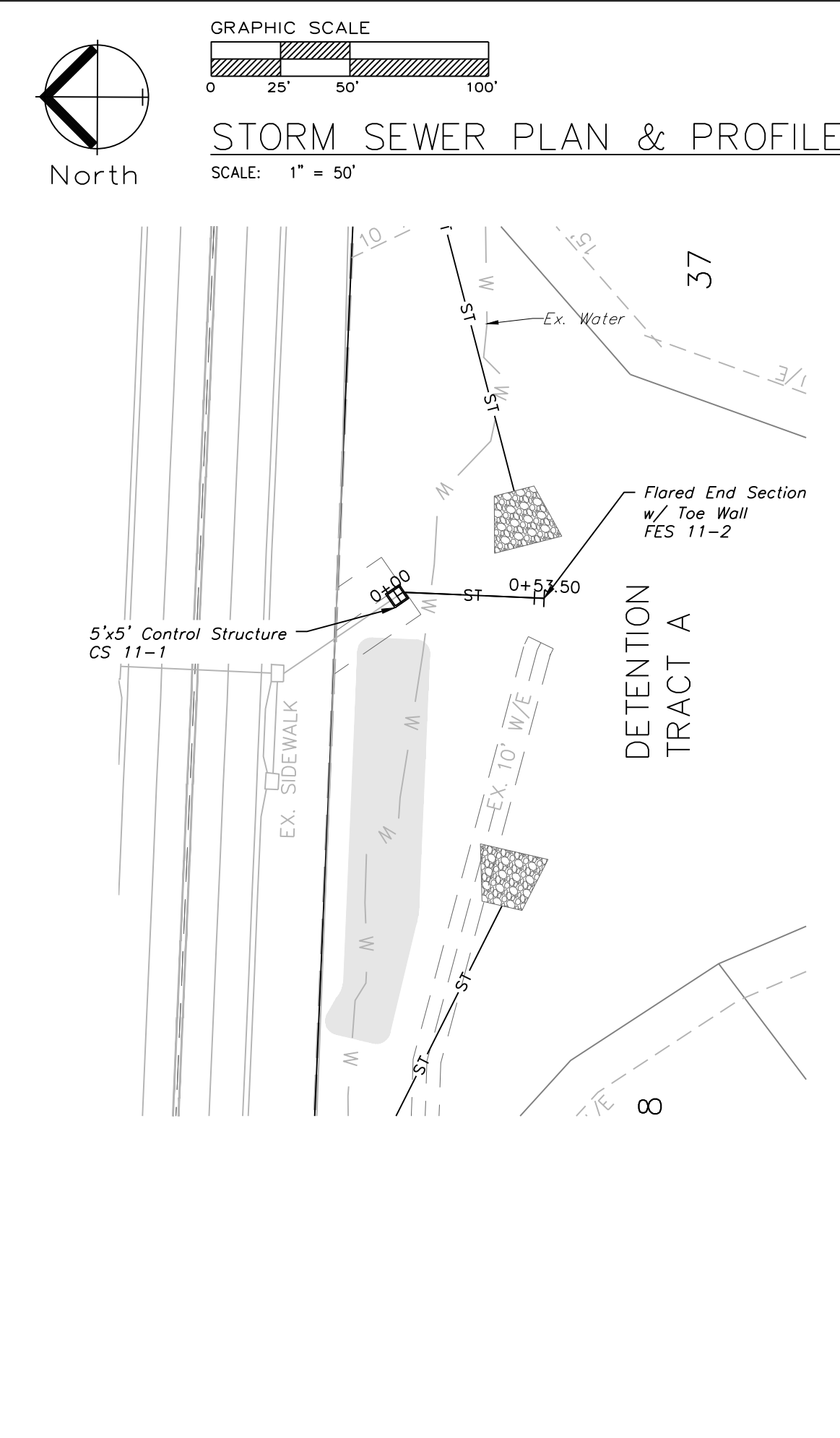
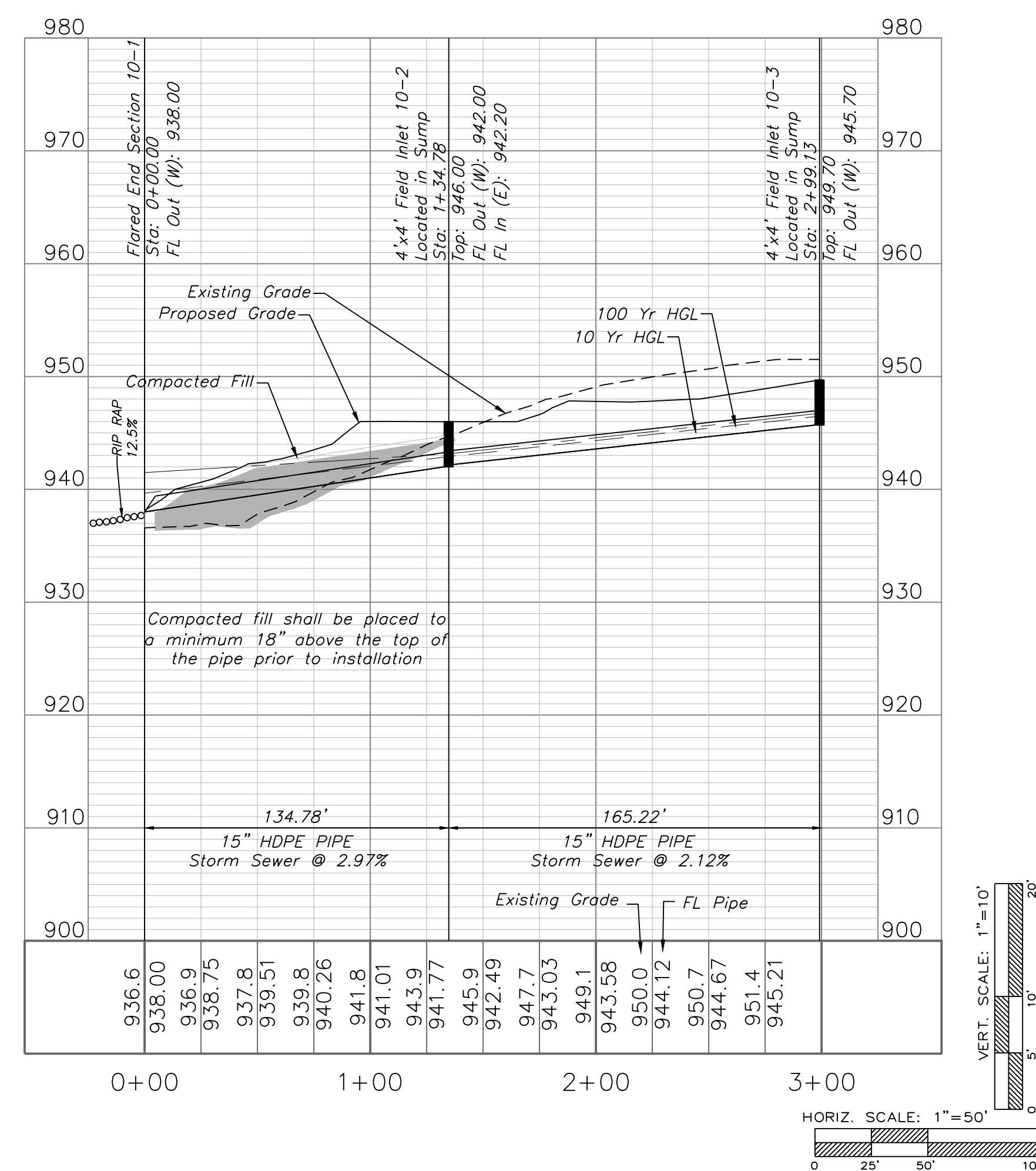
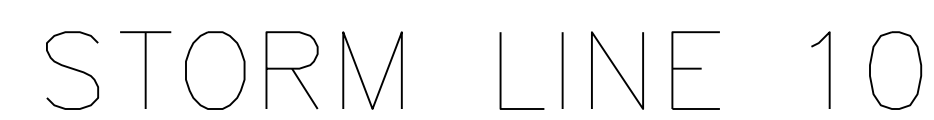
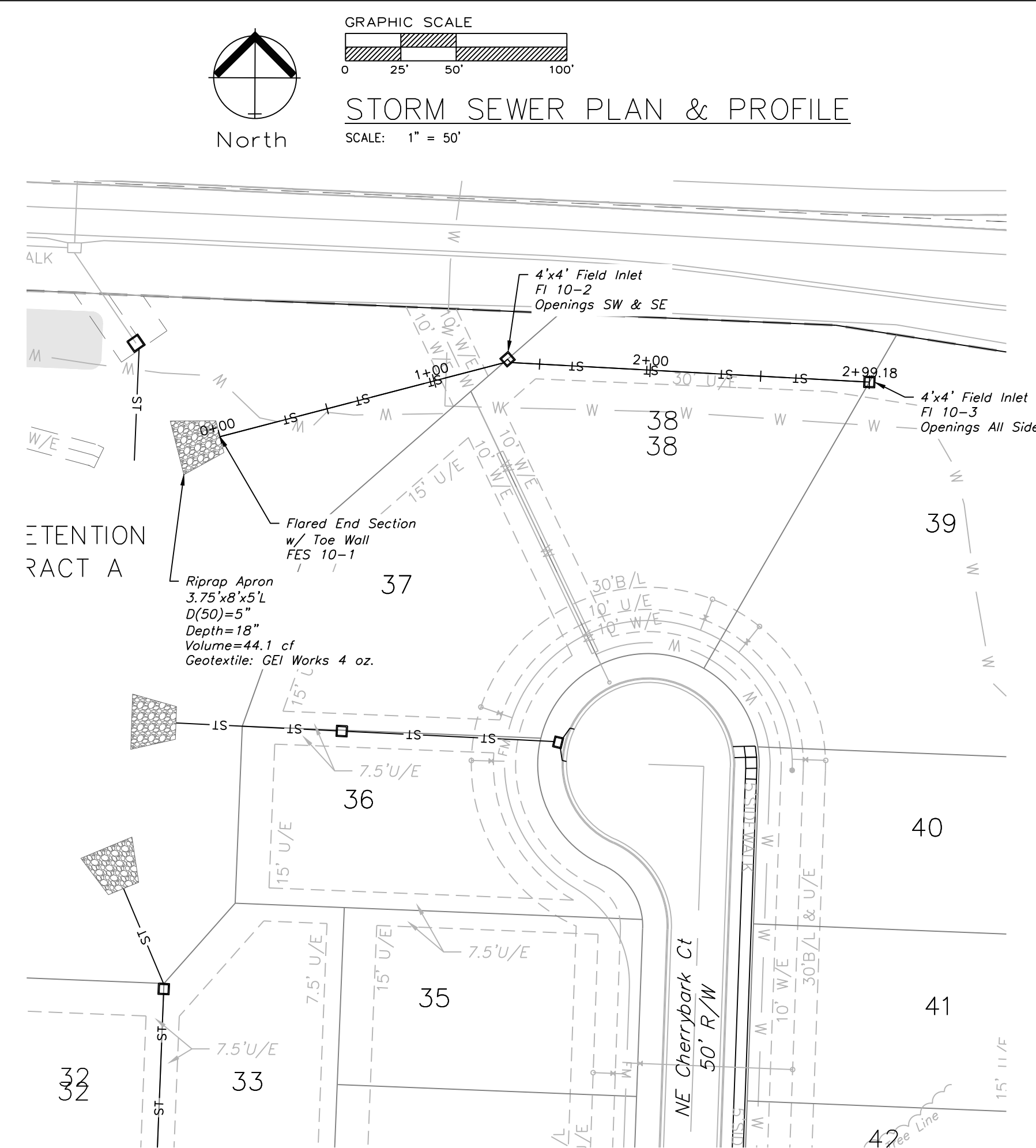
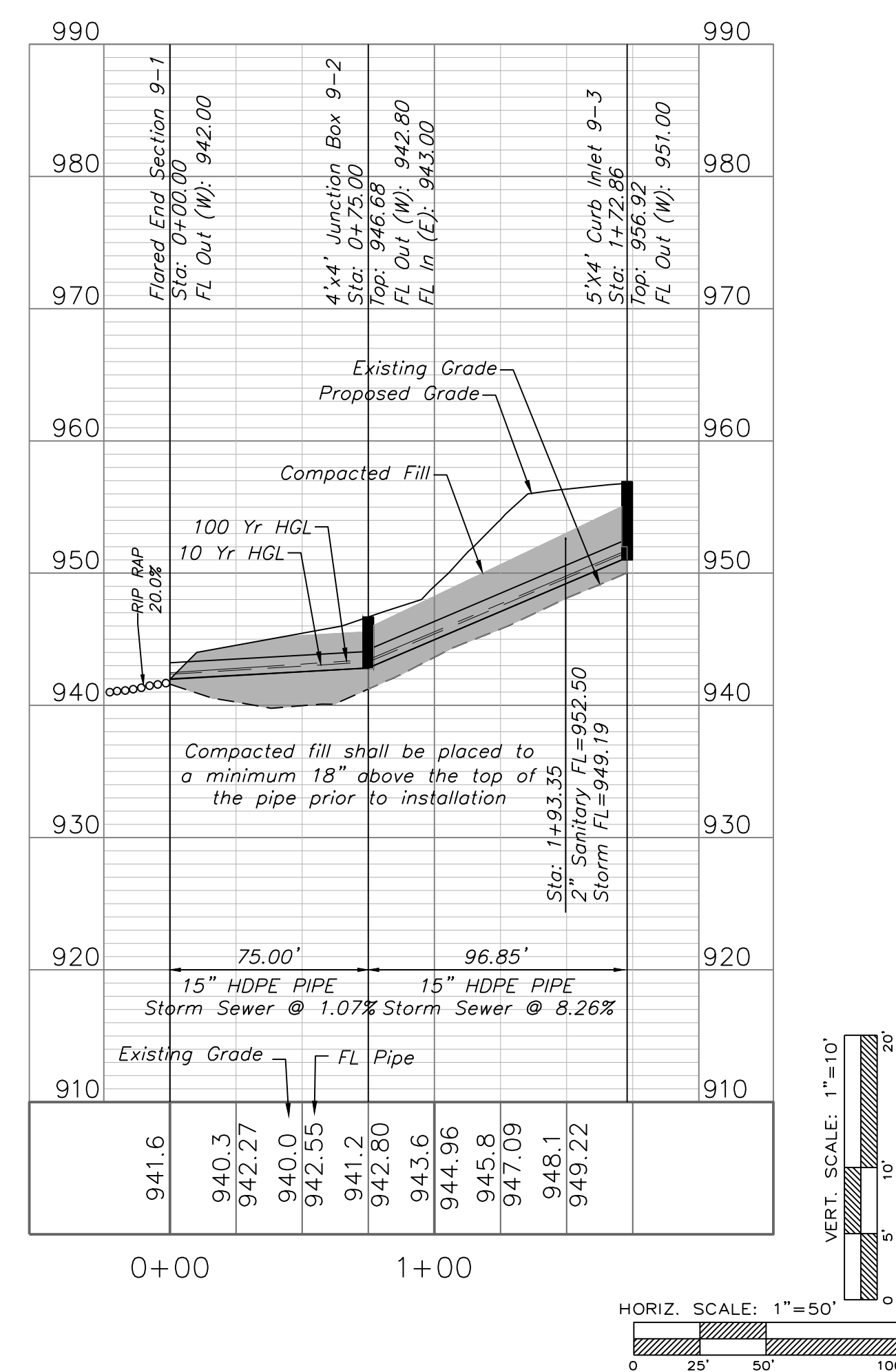
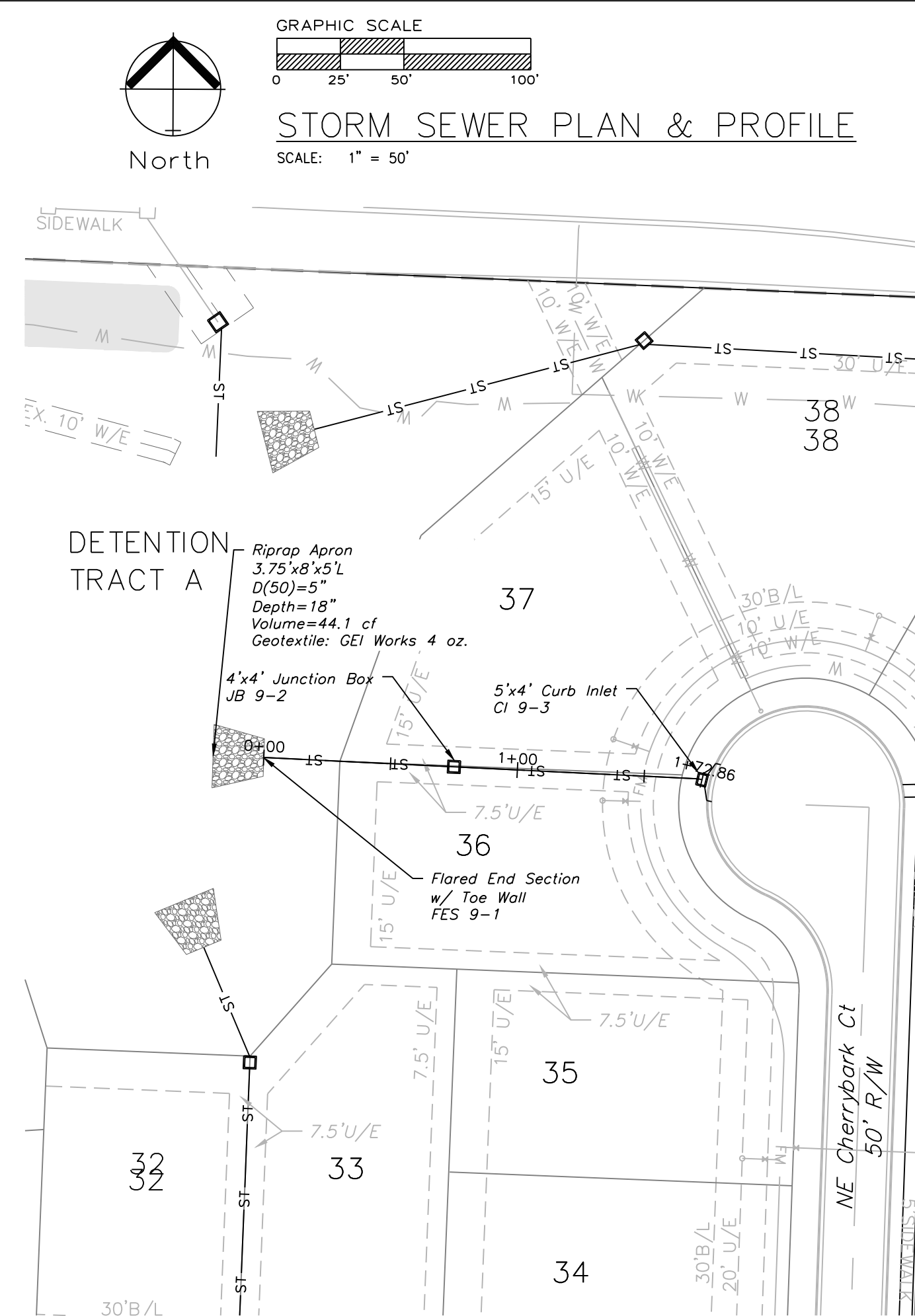
STORM LINE 4



STORM LINE 5





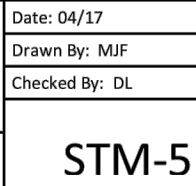


10-YEAR INLET																						
D.S. Str.	Str. No.	Area (ac)	InletTime (min)	Int. (in/hr)	RunoffCoeff. (C)	Q =CIA (cfs)	Q Carry-over (cfs)	QCaptured (cfs)	QBypassed (cfs)	JunctType	CurbHeight (in)	CurbLength (ft)	GutterSlope (ft/ft)	GutterWidth (ft)	CrossSlope, Sw (ft/ft)	CrossSlope, Sx (ft/ft)	InletDepth (ft)	BypassDepth (ft)	BypassSpread (ft)	GutterDepth (ft)	GutterSpread (ft)	Bypass Str.
1-1	1-2	0.77	8.8	6.37	0.51	2.5	0	2.5	0	Dp-Curb	6	8	Sag	.....	0.02	0.02	0.22	n/a	n/a	0.22	11.06	Sag
2-1	2-2	0.28	5.3	7.26	0.51	1.04	0	1.04	0	Dp-Curb	6	8	Sag	.....	0.02	0.02	0.12	n/a	n/a	0.12	6.15	Sag
2-2	2-3	0.12	5.9	7.08	0.51	0.43	0.12	0.3	0.26	Curb	10	5	0.038	2	0.05	0.02	0.12	0.09	1.77	0.12	2.87	2-6
2-3	2-4	0.6	6.2	7	0.51	2.14	1.91	0.89	3.16	Curb	10	5	0.038	2	0.05	0.02	0.22	0.21	7.35	0.22	8.19	2-5
2-4	2-5R	0.4	6.4	6.95	0.51	1.42	3.16	4.58	0	Curb	10	5	Sag	2	0.05	0.02	0.44	n/a	n/a	0.44	18.84	Sag
2-4	2-5L	0.55	8.1	6.53	0.51	1.83	0	1.83	0	Curb	10	5	Sag	2	0.05	0.02	0.26	n/a	n/a	0.26	10.22	Sag
2-5	2-6R	0.16	6.5	6.92	0.51	0.56	0.26	0.82	0	Curb	10	5	Sag	2	0.05	0.02	0.18	n/a	n/a	0.18	6.01	Sag
2-5	2-6L	0.08	6.2	7	0.51	0.29	0	0.29	0	Curb	10	5	Sag	2	0.05	0.02	0.12	n/a	n/a	0.12	2.96	Sag
2-4	3-1	0.19	8.8	6.37	0.51	0.62	0	0.62	0	Dp-Curb	6	4	Sag	.....	0.02	0.02	0.14	n/a	n/a	0.14	6.91	Sag
2-2	4-1	0.54	6.8	6.84	0.51	1.88	0	1.88	0	Dp-Curb	6	4	Sag	.....	0.02	0.02	0.29	n/a	n/a	0.29	14.55	Sag
4-1	4-2	0.32	7.6	6.65	0.51	1.08	0	1.08	0	Dp-Curb	6	4	Sag	.....	0.02	0.02	0.2	n/a	n/a	0.2	10.06	Sag
4-2	4-3	0.08	5.6	7.17	0.51	0.29	0.03	0.19	0.12	Curb	10	5	0.05	2	0.05	0.02	0.09	0.06	1.27	0.09	1.81	2-3
4-3	4-4	0.37	7	6.79	0.51	1.28	1.28	0.66	1.91	Curb	10	5	0.05	2	0.05	0.02	0.19	0.17	5.45	0.19	6.28	2-4
5-1	5-2	0.4	6.1	7.03	0.51	1.43	0	1.43	0	Dp-Curb	6	16	Sag	.....	0.02	0.02	0.1	n/a	n/a	0.1	4.81	Sag
5-2	5-3	0.61	6.3	6.98	0.51	2.17	0	2.17	0	Dp-Curb	6	16	Sag	.....	0.02	0.02	0.13	n/a	n/a	0.13	6.34	Sag
5-3	5-4	0.5	6.3	6.98	0.51	1.78	0	1.78	0	Dp-Curb	6	16	Sag	.....	0.02	0.02	0.11	n/a	n/a	0.11	5.55	Sag
6-1	6-2	0	0	0	0.51	0	.....	.....	.....	MH	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Sag
6-2	6-3	0.13	6.4	6.95	0.51	0.46	0	0.3	0.16	Curb	10	5	0.02	2	0.05	0.02	0.12	0.08	1.65	0.12	3.14	6-4
6-3	6-4	0.1	6.1	7.03	0.51	0.36	0.16	0.33	0.19	Curb	10	5	0.02	2	0.05	0.02	0.13	0.09	1.76	0.13	3.38	4-4
6-4	6-5R	0.7	7.6	6.65	0.51	2.37	2.26	4.63	0	Curb	10	5	Sag	2	0.05	0.02	0.44	n/a	n/a	0.44	18.99	Sag
6-4	6-5L	0.21	7	6.79	0.51	0.73	0	0.73	0	Curb	10	5	Sag	2	0.05	0.02	0.17	n/a	n/a	0.17	5.52	Sag
6-5	6-6	0.07	5.8	7.11	0.51	0.25	0	0.23	0.03	Curb	10	5	0.01	2	0.05	0.02	0.11	0.05	0.95	0.11	2.62	4-3
6-4	7-1R	0.17	8.2	6.5	0.51	0.56	0	0.37	0.19	Curb	10	5	0.014	2	0.05	0.02	0.14	0.09	1.9	0.14	3.99	4-4
6-4	7-1L	0.37	7.3	6.72	0.51	1.27	0	0.6	0.66	Curb	10	5	0.014	2	0.05	0.02	0.18	0.15	4.38	0.18	6.08	4-4
7-1	7-2	0.19	7.3	6.72	0.51	0.65	0	0.41	0.24	Curb	10	5	0.014	2	0.05	0.02	0.15	0.1	2.19	0.15	4.33	4-4
6-3	8-1	0.97	8.6	6.41	0.51	3.17	0	0.91	2.26	Curb	10	5	0.02	2	0.05	0.02	0.23	0.21	7.3	0.23	8.46	6-5
9-1	9-2	0	0	0	0.51	0	.....	.....	.....	MH	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Sag
9-2	9-3R	0.25	7.5	6.67	0.51	0.85	0	0.85	0	Curb	10	5	Sag	2	0.05	0.02	0.18	n/a	n/a	0.18	6.13	Sag
9-2	9-3L	0.19	6.7	6.87	0.51	0.67	0	0.67	0	Curb	10	5	Sag	2	0.05	0.02	0.16	n/a	n/a	0.16	5.21	Sag
10-1	10-2	0.35	6.3	6.98	0.51	1.25	0	1.25	0	Dp-Curb	6	8	Sag	.....	0.02	0.02	0.14	n/a	n/a	0.14	6.95	Sag
10-2	10-3	1.26	9.7	6.18	0.51	3.97	0	3.97	0	Dp-Curb	6	16	Sag	.....	0.02	0.02	0.19	n/a	n/a	0.19	9.48	Sag

10-YEAR PIPE																						
D.S. Str.	U.S. Str.	LineLength (ft)	Incr.Area (ac)	TotalArea (ac)	RunoffCoeff. (C)	IncrC x A	TotalC x A	InletTime (min)	TimeConc (min)	RnfallInt (in/hr)	TotalRunoff (cfs)	TotalFlow (cfs)	CapacFull (cfs)	Veloc (ft/s)	PipeSize (in)	PipeSlope (%)	Inv ElevDn (ft)	Inv ElevUp (ft)	HGLDn (ft)	HGLUp (ft)	Grnd/RimDn (ft)	Grnd/RimUp (ft)
1-1	1-2	139.4	0.77	0.77	0.51	0.39	0.39	8.8	8.8	6.4	2.5	2.5	12.32	5.94	15	2.15	912	915	912.38	915.63	0	918.5
2-1	2-2	50.18	0.28	3.69	0.51	0.14	1.88	5.3	9.6	6.2	11.67	11.67	71.89	11.31	24	5.98	912	915	912.55	916.23	0	924.5
2-2	2-3	138.03	0.12	2.1	0.51	0.06	1.07	5.9	9.4	6.2	6.69	6.69	40.78	11.18	18	8.93	920	932.32	920.41	933.32	924.5	941.27
2-3	2-4	46.47	0.6	1.98	0.51	0.31	1.01	6.2	9.3	6.3	6.33	6.33	14.16	6.51	18	1.08	932.82	933.32	932.51	934.29	941.27	940.79
2-4	2-5R	94.12	0.4	1.19	0.51	0.2	0.61	6.4	8.1	6.5	3.96	3.96	9.4	6.04	15	1.25	933.82	935	934.39	935.8	940.79	939.79
2-4	2-5L	1	0.55	0.55	0.51	0.28	0.28	8.1	8.1	6.5	1.83	1.83	26.54	2.91	15	10	935	935.1	935.8	935.64	939.79	939.79
2-5	2-6R	34	0.16	0.24	0.51	0.08	0.12	6.5	6.5	6.9	0.85	0.85	7.75	3.28	15	0.85	935.5	935.79	935.8	936.15	939.79	939.79
2-5	2-6L	1	0.08	0.08	0.51	0.04	0.04	6.2	6.2	7	0.29	0.29	26.55	1.56	15	10	935.79	935.89	936.15	936.1	939.79	939.79
2-4	3-1	128.62	0.19	0.19	0.51	0.1	0.1	8.8	8.8	6.4	0.62	0.62	17.36	4.65	15	4.28	936	941.5	936.16	941.81	940.79	946.25
2-2	4-1	113.49	0.54	1.31	0.51	0.28	0.67	6.8	8.3	6.5	4.33	4.33	14.33	5.82	18	1.1	916.5	917.75	917.07	918.55	924.5	924.5
4-1	4-2	189.85	0.32	0.77	0.51	0.16	0.39	7.6	7.6	6.6	2.61	2.61	25.85	4.56	15	9.48	918	936	918.55	936.65	924.5	944.33
4-2	4-3	135.55	0.08	0.45	0.51	0.04	0.23	5.6	7.1	6.8	1.55	1.55	16.12	5.87	15	3.69	940	945	940.26	945.49	944.33	950.08
4-3	4-4	34	0.37	0.37	0.51	0.19	0.19	7	7	6.8	1.28	1.28	12.47	4.55	15	2.21	945.2	945.95	945.49	946.4	950.08	950.08
5-1	5-2	96.83	0.4	1.51	0.51	0.2	0.77	6.1	7.8	6.6	5.09	5.09	9.61	5.16	18	0.5	937	937.48	937.78	938.35	0	944
5-2	5-3	259.22	0.61	1.11	0.51	0.31	0.57	6.3	6.9	6.8	3.87	3.87	9.67	4.76	18	0.5	937.98	939.28	938.64	940.03	944	944
5-3	5-4	132.58	0.5	0.5	0.51	0.26	0.26	6.3	6.3	7	1.78	1.78	5.92	3.91	15	0.5	939.78	940.44	940.25	940.97	944	944
6-1	6-2	49.06	0	2.91	0.51	0	1.48	0	9.2	6.3	9.33	9.33	72.71	10.62	24	6.11	940	943	940.48	944.09	0	950.2
6-2	6-3	140.5	0.13	2.91	0.51	0.07	1.48	6.4	8.9	6.4	9.44	9.44	30.38	6.94	24	1.07	945	946.5	945.77	947.6	950.2	958.57
6-3	6-4	175.8	0.1	1.81	0.51	0.05	0.92	6.1	8.4	6.5	5.97	5.97	12.61	6.07	18	0.85	947	948.5	947.73	949.44	958.57	955.36
6-4	6-5R	79.6	0.7	0.98	0.51	0.36	0.5	7.6	7.6	6.6	3.32	3.32	6.65	4.93	15	0.63	949	949.5	949.62	950.23	955.36	954.54
6-4	6-5L	1	0.21	0.21	0.51	0.11	0.11	7	7	6.8	0.73	0.73	26.54	1.87	15	10	949.5	949.6	950.23	949.93	954.54	954.54
6-5	6-6	34	0.07	0.07	0.51	0.04	0.04	5.8	5.8	7.1	0.25	0.25	10.58	1.84	15	1.59	950	950.54	950.23	950.73	954.54	954.54
6-4	7-1R	50	0.17	0.73	0.51	0.09	0.37	8.2	8.2	6.5	2.42	2.42	8.39	4.94	15	1	949	949.5	949.46	950.12	955.36	954.87
6-4	7-1L	1	0.37	0.56	0.51	0.19	0.29	7.3	7.5	6.7	1.91	1.91	26.54	3.4	15	10	949.5	949.6	950.12	950.15	954.87	954.87
7-1	7-2	34	0.19	0.19	0.51	0.1	0.1	7.3	7.3	6.7	0.65	0.65	10.18	3.67	15	1.47	950	950.5	950.21	950.81	954.87	954.87
6-3	8-1	35.8	0.97	0.97	0.51	0.49	0.49	8.6	8.6	6.4	3.17	3.17	11.48	6.18	15	1.87	954	954.67	954.45	955.39	958.57	958.33
9-1	9-2	75	0	0.44	0.51	0	0.22	0	7.8	6.6	1.48	1.48	8.67	4.34	15	1.07	942	942.8	942.35	943.28	0	950.86
9-2	9-3R	96.85	0.25	0.44	0.51	0.13	0.22	7.5	7.5	6.7	1.5	1.5	24.13	5.33	15	8.26	943	951	943.28	951.48	950.86	956.92
9-2	9-3L	1	0.19	0.19	0.51	0.1	0.1	6.7	6.7	6.9	0.67	0.67	26.54	5.93	15	10	952	952.1	952.14	952.42	956.92	956.92
10-1	10-2	134.78	0.35	1.61	0.51	0.18	0.82	6.3	10.2	6.1	4.98	4.98	14.46	7.97	15	2.97	938	942	938.51	942.9	0	946
10-2	10-3	165.22	1.26	1.26	0.51	0.64	0.64	9.7	9.7	6.2	3.97	3.97	12.22	5.16	15	2.12	942.2	942.8	942.9	946.51	946	949.7

100-YEAR INLET																						
D.S. Str.	Str. No.	Area (ac)	InletTime (min)	Int. (in/hr)	RunoffCoeff. (C)	Q=CIA (cfs)	Q Carry-over (cfs)	QCaptured (cfs)	QBypassed (cfs)	JunctType	CurbHeight (in)	CurbLength (ft)	GutterSlope (ft/ft)	GutterWidth (ft)	CrossSlope, Sw (ft/ft)	CrossSlope, Sx (ft/ft)	InletDepth (ft)	BypassDepth (ft)	BypassSpread (ft)	GutterDepth (ft)	GutterSpread (ft)	Bypass Str.
1-1	1-2	0.77	8.8	11.31	0.51	4.44	0	4.44	0	Dp-Curb	6	8	Sag	....	0.02	0.02	0.32	n/a	n/a	0.32	16.22	Sag
2-1	2-2	0.28	5.3	12.75	0.51	1.82	0	1.82	0	Dp-Curb	6	8	Sag	....	0.02	0.02	0.18	n/a	n/a	0.18	8.95	Sag
2-2	2-3	0.12	5.9	12.48	0.51	0.76	0.32	0.44	0.64	Curb	10	5	0.038	2	0.05	0.02	0.15	0.12	3.17	0.15	4.36	7
2-3	2-4	0.6	6.2	12.34	0.51	3.78	4.31	1.27	6.82	Curb	10	5	0.038	2	0.05	0.02	0.28	0.26	10.19	0.28	10.92	5
2-4	2-5R	0.4	6.4	12.26	0.51	2.5	6.82	9.32	0	Curb	10	5	Sag	2	0.05	0.02	0.67	n/a	n/a	0.67	30.26	Sag
2-4	2-5L	0.55	8.1	11.57	0.51	3.24	0	3.24	0	Curb	10	5	Sag	2	0.05	0.02	0.36	n/a	n/a	0.36	14.97	Sag
2-5	2-6R	0.16	6.5	12.21	0.51	1	0.64	1.64	0	Curb	10	5	Sag	2	0.05	0.02	0.25	n/a	n/a	0.25	9.5	Sag
2-5	2-6L	0.08	6.2	12.34	0.51	0.5	0	0.5	0	Curb	10	5	Sag	2	0.05	0.02	0.15	n/a	n/a	0.15	4.32	Sag
2-4	3-1	0.19	8.8	11.31	0.51	1.1	0	1.1	0	Dp-Curb	6	4	Sag	....	0.02	0.02	0.2	n/a	n/a	0.2	10.13	Sag
2-2	4-1	0.54	6.8	12.08	0.51	3.33	0	3.33	0	Dp-Curb	6	4	Sag	....	0.02	0.02	0.43	n/a	n/a	0.43	21.26	Sag
4-1	4-2	0.32	7.6	11.76	0.51	1.92	0	1.92	0	Dp-Curb	6	4	Sag	....	0.02	0.02	0.29	n/a	n/a	0.29	14.72	Sag
4-2	4-3	0.08	5.6	12.61	0.51	0.51	0.1	0.3	0.32	Curb	10	5	0.05	2	0.05	0.02	0.12	0.09	1.82	0.12	2.8	3
4-3	4-4	0.37	7	12	0.51	2.26	2.99	0.95	4.31	Curb	10	5	0.05	2	0.05	0.02	0.23	0.22	7.92	0.23	8.63	4
5-1	5-2	0.4	6.1	12.39	0.51	2.53	0	2.53	0	Dp-Curb	6	16	Sag	....	0.02	0.02	0.14	n/a	n/a	0.14	7.02	Sag
5-2	5-3	0.61	6.3	12.3	0.51	3.83	0	3.83	0	Dp-Curb	6	16	Sag	....	0.02	0.02	0.19	n/a	n/a	0.19	9.25	Sag
5-3	5-4	0.5	6.3	12.3	0.51	3.14	0	3.14	0	Dp-Curb	6	16	Sag	....	0.02	0.02	0.16	n/a	n/a	0.16	8.1	Sag
6-1	6-2	0	0	0	0.51	0	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....	....
6-2	6-3	0.13	6.4	12.26	0.51	0.81	0	0.43	0.38	Curb	10	5	0.02	2	0.05	0.02	0.15	0.11	2.74	0.15	4.44	19
6-3	6-4	0.1	6.1	12.39	0.51	0.63	0.38	0.49	0.52	Curb	10	5	0.02	2	0.05	0.02	0.16	0.13	3.41	0.16	4.98	13
6-4	6-5R	0.7	7.6	11.76	0.51	4.2	4.4	8.6	0	Curb	10	5	Sag	2	0.05	0.02	0.63	n/a	n/a	0.63	28.69	Sag
6-4	6-5L	0.21	7	12	0.51	1.29	0	1.29	0	Curb	10	5	Sag	2	0.05	0.02	0.22	n/a	n/a	0.22	8.07	Sag
6-5	6-6	0.07	5.8	12.52	0.51	0.45	0	0.34	0.1	Curb	10	5	0.01	2	0.05	0.02	0.14	0.08	1.61	0.14	3.84	12
6-4	7-1R	0.17	8.2	11.53	0.51	1	0	0.53	0.47	Curb	10	5	0.014	2	0.05	0.02	0.17	0.13	3.59	0.17	5.42	13
6-4	7-1L	0.37	7.3	11.88	0.51	2.24	0	0.82	1.42	Curb	10	5	0.014	2	0.05	0.02	0.22	0.19	6.41	0.22	7.87	13
7-1	7-2	0.19	7.3	11.88	0.51	1.15	0	0.57	0.58	Curb	10	5	0.014	2	0.05	0.02	0.18	0.14	4.06	0.18	5.81	13
6-3	8-1	0.97	8.6	11.38	0.51	5.63	0	1.23	4.4	Curb	10	5	0.02	2	0.05	0.02	0.27	0.25	9.71	0.27	10.74	20
9-1	9-2	0	0	0	0.51	0	....	....	....	MH	....	....	....	....	....	....	....	....	....	....	....	....
9-2	9-3R	0.25	7.5	11.8	0.51	1.5	0	1.5	0	Curb	10	5	Sag	2	0.05	0.02	0.24	n/a	n/a	0.24	8.97	Sag
9-2	9-3L	0.19	6.7	12.13	0.51	1.18	0	1.18	0	Curb	10	5	Sag	2	0.05	0.02	0.21	n/a	n/a	0.21	7.61	Sag
10-1	10-2	0.35	6.3	12.3	0.51	2.2	0	2.2	0	Dp-Curb	6	8	Sag	....	0.02	0.02	0.2	n/a	n/a	0.2	10.14	Sag
10-2	10-3	1.26	9.7	10.99	0.51	7.06	0	7.06	0	Dp-Curb	6	16	Sag	....	0.02	0.02	0.28	n/a	n/a	0.28	13.93	Sag

100-YEAR PIPE																						
D.S. Str.	U.S. Str.	LineLength (ft)	Incr.Area (ac)	TotalArea (ac)	RunoffCoeff. (C)	IncrC x A	TotalC x A	InletTime (min)	TimeConc (min)	RnfalInt (in/hr)	TotalRunoff (cfs)	TotalFlow (cfs)	CapacFull (cfs)	Veloc (ft/s)	PipeSize (in)	PipeSlope (%)	Inv ElevDn (ft)	Inv ElevUp (ft)	HGLDn (ft)	HGLUp (ft)	Grnd/RimDn (ft)	Grnd/RimUp (ft)
1-1	1-2	139.4	0.77	0.77	0.51	0.39	0.39	8.8	8.8	11.3	4.44	4.44	12.32	4.3	15	2.15	912	915	915.4	915.85	0	918.5
2-1	2-2	50.18	0.28	3.69	0.51	0.14	1.88	5.3	9.5	11.1	20.84	20.84	71.89	7.11	24	5.98	912	915	915.4	916.63	0	924.5
2-2	2-3	138.03	0.12	2.1	0.51	0.06	1.07	5.9	9.3	11.1	11.92	11.92	40.78	13.65	18	8.93	920	932.32	920.56	933.63	924.5	941.27
2-3	2-4	46.47	0.6	1.98	0.51	0.31	1.01	6.2	9.2	11.2	11.28	11.28	14.16	7.95	18	1.08	932.82	933.32	933.83	934.6	941.27	940.79
2-4	2-5R	94.12	0.4	1.19	0.51	0.2	0.61	6.4	8.1	11.6	7.02	7.02	9.4	7.36	15	1.25	933.82	935	934.63	936.06	940.79	939.79
2-4	2-5L	1	0.55	0.55	0.51	0.28	0.28	8.1	8.1	11.6	3.24	3.24	26.54	3.66	15	10	935	935.1	936.06	935.83	939.79	939.79
2-5	2-6R	34	0.16	0.24	0.51	0.08	0.12	6.5	6.5	12.2	1.49	1.49	7.75	3.11	15	0.85	935.5	935.79	936.06	936.27	939.79	939.79
2-5	2-6L	1	0.08	0.08	0.51	0.04	0.04	6.2	6.2	12.3	0.5	0.5	26.55	1.83	15	10	935.79	935.89	936.27	936.17	939.79	939.79
2-4	3-1	128.62	0.19	0.19	0.51	0.1	0.1	8.8	8.8	11.3	1.1	1.1	17.36	5.5	15	4.28	936	941.5	936.21	941.91	940.79	946.25
2-2	4-1	113.49	0.54	1.31	0.51	0.28	0.67	6.8	8.2	11.5	7.7	7.7	14.33	6.97	18	1.1	916.5	917.75	917.28	918.82	924.5	924.5
4-1	4-2	189.85	0.32	0.77	0.51	0.16	0.39	7.6	7.6	11.8	4.62	4.62	25.85	5.22	15	9.48	918	936	918.82	936.87	924.5	944.33
4-2	4-3	135.55	0.08	0.45	0.51	0.04	0.23	5.6	7.1	12	2.74	2.74	16.12	6.96	15	3.69	940	945	940.35	945.66	944.33	950.08
4-3	4-4	34	0.37	0.37	0.51	0.19	0.19	7	7	12	2.26	2.26	12.47	4.67	15	2.21	945.2	945.95	945.66	946.55	950.08	950.08
5-1	5-2	96.83	0.4	1.51	0.51	0.2	0.77	6.1	8.3	11.5	8.85	8.85	9.61	5.01	18	0.5	937	937.48	941.49	941.9	0	944
5-2	5-3	259.22	0.61	1.11	0.51	0.31	0.57	6.3	7.2	11.9	6.76	6.76	9.67	3.82	18	0.5	937.98	939.28	942.23	942.87	944	944
5-3	5-4	132.58	0.5	0.5	0.51	0.26	0.26	6.3	6.3	12.3	3.14	3.14	5.92	2.56	15	0.5	939.78	940.44	943.21	943.39	944	944
6-1	6-2	49.06	0	2.91	0.51	0	1.48	0	9	11.2	16.65	16.65	72.71	6.68	24	6.11	940	943	941.49	944.47	0	950.2
6-2	6-3	140.5	0.13	2.91	0.51	0.07	1.48	6.4	8.8	11.3	16.8	16.8	30.38	8.34	24	1.07	945	946.5	946.06	947.98	950.2	958.57
6-3	6-4	175.8	0.1	1.81	0.51	0.05	0.92	6.1	8.4	11.5	10.59	10.59	12.61	7.36	18	0.85	947	948.5	948.05	949.75	958.57	955.36
6-4	6-5R	79.6	0.7	0.98	0.51	0.36	0.5	7.6	7.6	11.8	5.88	5.88	6.65	5.91	15	0.63	949	949.5	949.91	950.48	955.36	954.54
6-4	6-5L	1	0.21	0.21	0.51	0.11	0.11	7	7	12	1.29	1.29	26.54	2.25	15	10	949.5	949.6	950.48	950.05	954.54	954.54
6-5	6-6	34	0.07	0.07	0.51	0.04	0.04	5.8	5.8	12.5	0.45	0.45	10.58	1.73	15	1.59	950	950.54	950.48	950.8	954.54	954.54
6-4	7-1R	50	0.17	0.73	0.51	0.09	0.37	8.2	8.2	11.5	4.29	4.29	8.39	5.25	15	1	949	949.5	949.75	950.34	955.36	954.87
6-4	7-1L	1	0.37	0.56	0.51	0.19	0.29	7.3	7.5	11.8	3.38	3.38	26.54	4.16	15	10	949.5	949.6	950.34	950.34	954.87	954.87
7-1	7-2	34	0.19	0.19	0.51	0.1	0.1	7.3	7.3	11.9	1.15	1.15	10.18	3.71	15	1.47	950	950.5	950.34	950.92	954.87	954.87
6-3	8-1	35.8	0.97	0.97	0.51	0.49	0.49	8.6	8.6	11.4	5.63	5.63	11.48	7.44	15	1.87	954	954.67	954.62	955.63	958.57	958.33
9-1	9-2	75	0	0.44	0.51	0	0.22	0	7.8	11.7	2.62	2.62	8.67	5.13	15	1.07	942	942.8	942.47	943.45	0	950.86
9-2	9-3R	96.85	0.25	0.44	0.51	0.13	0.22	7.5	7.5	11.8	2.65	2.65	24.13	5.39	15	8.26	943	951	943.45	951.65	950.86	956.92
9-2	9-3L	1	0.19	0.19	0.51	0.1	0.1	6.7	6.7	12.1	1.18	1.18	26.54	7.02	15	10	952	952.1	952.18	952.53	956.92	956.92
10-1	10-2	134.78	0.35	1.61	0.51	0.18	0.82	6.3	10.1	10.9	8.91	8.91	14.46	7.4	15	2.97	938	942	941.49	943.15	0	946
10-2	10-3	165.22	1.26	1.26	0.51	0.64	0.64	9.7	9.7	11	7.06	7.06	12.22	6.7	15	2.12	942.2	945.7	943.15	946.76	946	949.7



BLANKET UNDERDRAIN A - A(PIPE)
SCALE: 1" = 1'-0"

BLANKET UNDERDRAIN A - A(EDGE)
SCALE: 1" = 1'-0"

PIPE UNDERDRAIN B - B
SCALE: 1" = 1'-0"

EDGE UNDERDRAIN B - B
SCALE: 1" = 1'-0"

OUTLET PIPE C - C
SCALE: 1" = 1'-0"

UNDERDRAIN AT MEDIAN NOSE
SCALE: 1/2" = 1'-0"

PIPE UNDERDRAIN BEHIND CURB D - D
SCALE: 1" = 1'-0"

EDGE UNDERDRAIN BEHIND CURB D - D
SCALE: 1" = 1'-0"

UNDERDRAIN LAYOUT
SCALE: 1" = 5'

Notes:

- At roadway excavation, rock will be underdrain no less than 15" for the full width of the roadway on slope.
- At areas where underdrains are not required, underdrain and overtopping in limestone and shale shall be brought to within 4" of the subgrade line with compacted crushed stone, shot rock, and/or rock rubble. The remaining 6" shall conform to Standard Specifications Section 2202.
- Layers of earth or shale shall not be permitted for backfill up to the bottom of the crushed stone.
- A minimum of 12" of select soil (topsoil) shall be placed on exposed rock cut or fill slopes outside the limits of the footings. All rock and shale slopes shall be benchcut to maximum 2" vertical intervals prior to placement of select soil.
- Proposed underdrain pipe layout, baseline elevations, inlet connection points, and details shall be approved prior to construction by the City Engineer.
- Where pipe underdrains are used, all underdrain outlet pipes shall be sealed with waterproof joints. All outlet pipes shall be tied into the nearest storm sewer, that is approved. Where edge underdrains are used, all underdrain outlet pipes shall be sealed with manufacturer pipe joints approved by the City Engineer. All connections between pipes and edge connections or curb inlets shall be made with 2" minimum length of pipe.
- All underdrain pipes shall be installed at a minimum slope of 1% Underdrain pipe shall be installed with the perforations placed down.
- Blanket underdrains shall be placed on bedrock unless otherwise directed by the City Engineer. Underdrain and overtopping in limestone and shale shall be brought to within 4" of the subgrade line with properly compacted crushed stone, shot rock, and/or rock rubble.
- All flow inlets used for pipe underdrain construction shall conform to Standard Specifications Section 2203.6.
- The Contractor may, at his option, use either pipe underdrain or edge underdrain, but shall not mix underdrain types within any underdrain system.
- All edge underdrains shall be held in the center of the trench by mechanical methods while placing granular backfill. See detail for sheet. Alternate methods may be used with prior approval by the City Engineer.
- Blanket underdrain aggregate, pipe underdrain aggregate, pipe underdrain, edge underdrain and outlet pipe shall conform to Standard Specifications Section 2203.6.

AMERICAN PUBLIC WORKS ASSOCIATION
KANSAS CITY
METROPOLITAN CHAPTER
UNDERDRAIN DETAILS
STANDARD DRAWING
UD-1
ADOPTED
MAY 23, 2001