

CITY OF SALEM, MASSACHUSETTS

DEPARTMENT OF PUBLIC WORKS

CONTRACT A

PHASE II

CANAL STREET FLOOD MITIGATION PROJECT



PROJECT LOCATION MAP

Mayor: **KIMBERLEY DRISCOLL**
 City Engineer: **DAVID K. KNOWLTON, P.E.**

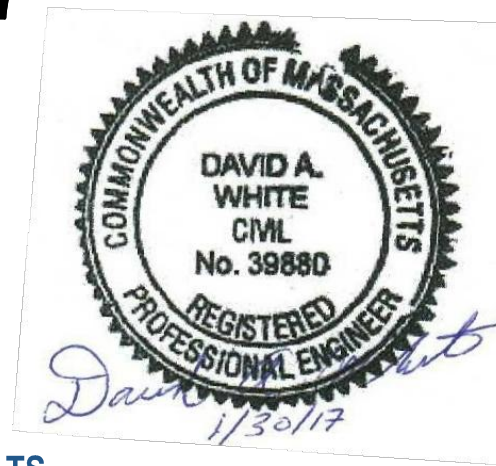


JANUARY 2017

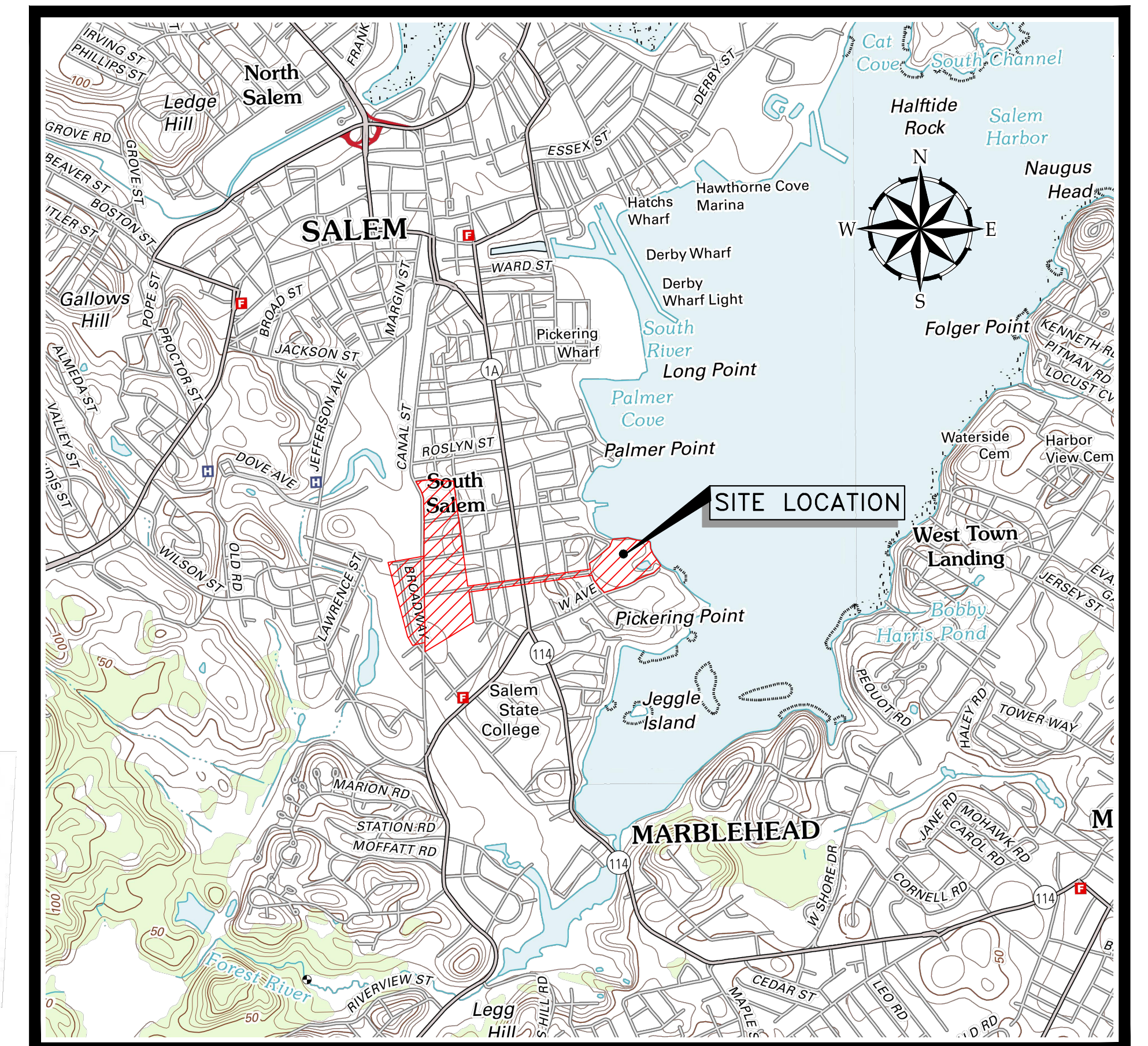
ISSUED FOR BID



40 SHATTUCK ROAD, SUITE 110
 ANDOVER, MASSACHUSETTS 01810
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 COMMITMENT & INTEGRITY DRIVE RESULTS



W&C PROJECT NO. 228340.04



SITE LOCATION MAP

SCALE: 1"=1,500'

SOURCE: USGS TOPOGRAPHIC MAP

GENERAL NOTES:

- 1. THESE PLANS WERE PREPARED FROM A COMBINATION OF AERIAL AND ON THE GROUND SURVEYING. AERIAL MAPPING WAS PERFORMED IN MAY 2008. ON THE GROUND SURVEY WAS CONDUCTED BY WSP SELLS BETWEEN OCTOBER 2008 AND NOV 2015.
2. THE HORIZONTAL DATUM SHOWN HEREON REFERENCES MASSACHUSETTS STATE PLANE COORDINATES (NAD 83).
3. THE VERTICAL DATUM SHOWN HEREON REFERENCES NAVD 1988. BENCHMARK LOCATIONS ARE SHOWN ON PLANS.
4. PROPERTY AND RIGHT OF WAY LOCATIONS SHOWN HEREON ARE APPROXIMATE AND DO NOT REPRESENT A PROPERTY SURVEY.
5. BUILDINGS SHOWN HEREON WERE LOCATED BY MEANS OF AERIAL MAPPING AND SHOULD BE CONSIDERED APPROXIMATE.
6. PLAN REFERENCES:
A. PLAN ENTITLED "PLAN OF LAND IN SALEM, MASS. PREPARED FOR THE JEFFERSON TRUST" DATED: MARCH 6, 1985, SCALE: 1" = 40', RECORDED AT THE ESSEX COUNTY REGISTRY OF DEEDS SOUTHERN DISTRICT IN PLAN BOOK 271 PLAN 3.
B. PLAN ENTITLED "PLAN OF LAND IN SALEM, MASS. OWNED BY HARRY KIMBALL" DATED: JULY, 1929, SCALE: 1" = 20', RECORDED AT THE E.C.R.D. AS PLAN 147 OF 1929.
C. PLAN ENTITLED "PLAN OF LAND IN SALEM PREPARED FOR DONALD J. MICHAUD" DATED: SEPT. 5, 1973, SCALE: 1" = 30', RECORDED AT THE E.C.R.D. AS PLAN 463 OF 1973.
D. PLAN ENTITLED "LAND OF PAUL N. CHAPUT SALEM" DATED: APRIL 13, 1911, SCALE: 1" = 40', RECORDED AT THE E.C.R.D. IN BOOK 2072 PAGE 368.
E. PLAN ENTITLED "LAND OF ROSILDA PELLETIER SALEM, MASS." DATED: OCTOBER 1945, SCALE: 1" = 20', RECORDED AT THE E.C.R.D. IN BOOK 3427 PAGE 317.
F. PLAN ENTITLED "PLAN OF LAND OF JAMES F. ALMY ON MEADOW, LAUREL AND CANAL STREETS" DATED: JANUARY 1895, SCALE: 1" = 100', RECORDED AT THE E.C.R.D. IN BOOK 1438 PAGE 1.
G. PLAN ENTITLED "PLAN OF LAND IN SALEM, MASS. FOR MCDONALD'S CORPORATION" DATED: FEB. 7, 1974, SCALE: 1" = 200', RECORDED AT THE E.C.R.D. IN PLAN BOOK 131 PLAN 17.
H. PLAN ENTITLED "PLAN OF LAND IN SALEM, MASS. OWNED BY HERBERT L. AND FLORENCE M. MACKAY" DATED: AUGUST 30, 2000, SCALE 1" = 10', RECORDED IN PLAN BOOK 348 PLAN 27.
I. PLAN ENTITLED "PLAN OF LAND IN SALEM, MASS. SHOWING EASEMENTS OVER LAND OF COMMONWEALTH OF MASSACHUSETTS" DATED: SEPT. 1975, SCALE: 1" = 40', RECORDED AT THE E.C.R.D. IN PLAN BOOK 139 PLAN 85.
J. PLAN ENTITLED "PREPARED FOR ZBIGNIEW KANTOROSINSKI 36 FOREST STREET AND 19 HERSEY STREET SALEM, MASSACHUSETTS" DATED: JULY, 17 2008, SCALE: 1" = 20', RECORDED AT THE E.C.R.D. IN PLAN BOOK 400 PLAN 81.
K. ASSESSORS PLANS ON FILE WITH THE SALEM MASSACHUSETTS GIS DEPARTMENT.
7. SOIL BORINGS PERFORMED BY GEOCOMP CORPORATION, ACTON, MASSACHUSETTS, AND WOODARD & CURRAN, ANDOVER, MASSACHUSETTS.
8. UTILITY LOCATIONS SHOWN IN THE PLANS AND PROFILES ARE APPROXIMATE BOTH AS TO SIZE AND LOCATION. CONTRACTOR TO INVESTIGATE EXISTING CONDITIONS AND FIELD VERIFY LOCATIONS OF UTILITIES AND SUB-SURFACE STRUCTURES PRIOR TO CONSTRUCTION. CONTACT THE ENGINEER IMMEDIATELY UPON DISCOVERING CONFLICTS WITH THE EXISTING AND PROPOSED UTILITY LOCATIONS. NOT ALL EXISTING UTILITIES ARE SHOWN ON THE DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL EXISTING UTILITIES.
9. EXCAVATE TEST PITS AT ALL PROPOSED UTILITY CROSSINGS OR LOCATIONS WHERE CONNECTIONS TO EXISTING FACILITIES ARE PROPOSED TO VERIFY FIELD CONDITIONS AND THE LOCATION, ELEVATION, SIZE, TYPE, MATERIAL, AND ORIENTATION OF EXISTING UTILITIES. NOTIFY ENGINEER AND OWNER IF CONFLICT EXISTS PRIOR TO CONSTRUCTION.
10. COORDINATE DIRECTLY WITH UTILITY COMPANIES PER THE GENERAL REQUIREMENTS. NOTIFY UTILITY COMPANIES PRIOR TO COMMENCING WORK TO ALLOW SUFFICIENT TIME TO LOCATE AND MARK THE LOCATION OF BURIED UTILITIES.
11. LOCATION AND DEPTH OF TELEPHONE AND ELECTRIC DUCT BANKS ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY DEPTH AND LOCATION WITH TEST PITS. COORDINATE WITH VERIZON TO VERIFY SEPARATION TO EXISTING AND PROPOSED UTILITIES, AND TO COORDINATE PROPOSED CONSTRUCTION ACTIVITIES. NOTIFY ENGINEER AND OWNER IF CONFLICT EXISTS PRIOR TO CONSTRUCTION.
12. CONTACT "DIG SAFE", TELEPHONE 888-344-7233, AT LEAST 72 HOURS PRIOR TO CONSTRUCTION. PROTECT, REPAIR DAMAGED UTILITIES.
13. COORDINATE WITH PROVIDERS OPERATING UTILITY POLES TO SUPPLY POLE SUPPORTS DURING CONSTRUCTION ACTIVITIES AS NECESSARY. PROVIDE BRACING/SUPPORT AS NEEDED.
14. OVERHEAD WIRES ARE LOCATED THROUGHOUT THE PROJECT CORRIDOR. COORDINATE WITH PROVIDERS/OWNERS OPERATING THE OVERHEAD WIRES TO PROTECT WIRES DURING CONSTRUCTION ACTIVITIES. CONTRACTOR IS RESPONSIBLE FOR ANY UTILITY CHARGES FOR PROTECTION.
15. SEWER AND WATER SERVICE LATERALS INDICATED ON THE DRAWINGS ARE FOR ESTIMATING PURPOSES. ACTUAL SERVICE LATERAL LOCATIONS, DEPTHS, AND LENGTHS ARE TO BE DETERMINED IN THE FIELD BY THE CONTRACTOR.
16. LINEAR FOOT (LF) SHOWN ON PROPOSED STORM DRAIN PROFILE IS APPROXIMATE. THE DIMENSION SHOWN IS MEASURED FROM THE INSIDE OF UPSTREAM MANHOLE WALL TO INSIDE OF DOWNSTREAM MANHOLE WALLS.
17. RESTRICT ACCESS TO SITE THROUGH THE USE OF APPROPRIATE SIGNAGE, BARRIERS, FENCES, ETC. IN ACCORDANCE WITH THE GENERAL REQUIREMENTS. SITE SHALL BE LEFT WITH APPROPRIATE SAFETY MEASURES IN PLACE DURING NON-WORKING HOURS. NO TRENCH SHALL BE LEFT OPEN DURING NON-WORKING HOURS. SITE SAFETY IS THE RESPONSIBILITY OF CONTRACTOR, DURING BOTH WORKING AND NON-WORKING HOURS, INCLUDING SNOW REMOVAL WHEN ROAD PLATES USED OR FINAL PAVEMENT HAS NOT BEEN COMPLETED.
18. REPLACEMENT OF WATER SERVICES, OR INSTALLATION OF NEW WATER AND SEWER SERVICES SHALL BE FROM THE MAIN TO THE PROPERTY LINE (INCLUDING CURB STOPS) EXCEPT FOR LOCATIONS WHERE WALLS, PLANTERS OR VEGETATION MUST BE PROTECTED. IN THAT CASE, THE SERVICE SHALL EXTEND AS CLOSE TO THE PROPERTY LINE AS PRACTICAL, AS DIRECTED BY THE ENGINEER.
19. PROVIDE 4-INCHES OF LOAM AND SEED IN ALL LAWN AREAS DISTURBED BY CONTRACTOR'S OPERATIONS, UNLESS OTHERWISE NOTED ON THE PLANS.
20. CONTRACTOR SHALL REPLACE EXISTING PAVEMENT MARKINGS/STRIPING AS NECESSARY WHERE IMPACTED BY CONSTRUCTION.
21. CONTRACTOR IS RESPONSIBLE FOR PROVIDING MATERIAL STORAGE AND STAGING AREA(S) PER THE GENERAL REQUIREMENTS.
22. DO NOT IMPEDE ACCESS TO OR STORE EQUIPMENT ON ADJACENT CITY OR PRIVATELY OWNED PROPERTY, UNLESS PERMISSION HAS BEEN GRANTED IN WRITING BY OWNER.
23. WORKERS' PERSONAL VEHICLES MAY NOT BE PARKED WITHIN THE PUBLIC RIGHT OF WAY OR ON PRIVATE OWNERS LOTS, UNLESS PERMISSION HAS BEEN GRANTED IN WRITING BY OWNER.
24. PERFORM WORK WITHIN THE RIGHTS OF WAY OF CITY OF SALEM STREETS IN ACCORDANCE WITH CITY ORDINANCES. PRIOR TO START OF WORK, SUBMIT TRAFFIC CONTROL PLAN PER GENERAL REQUIREMENTS.
25. COORDINATE CONSTRUCTION OF DRAINAGE, SEWER, AND WATER IMPROVEMENTS TO MINIMIZE DISRUPTION OF SERVICE TO RESIDENTS AND BUSINESSES. COORDINATE DISRUPTION OF PRIVATE UTILITY SERVICES WITH AFFECTED RESIDENTS AND BUSINESSES AT LEAST TWO DAYS (48 HOURS) PRIOR TO DISRUPTION. SEE THE GENERAL REQUIREMENTS.
26. PROTECT AND AVOID DISTURBING PROPERTY MARKERS AND BENCHMARKS. PROTECT EXISTING FACILITIES (E.G. CURB STOP BOXES, POLES, LIGHT POSTS, CATCH BASINS, ETC.) AND TREES DURING CONSTRUCTION.
27. OBTAIN REQUIRED PERMITS FOR TEMPORARY AND PERMANENT STOCKPILING OF ANY SURPLUS SOIL AND ROCK AND MEET APPLICABLE SETBACK REQUIREMENTS IN THE CITY ORDINANCES. PROVIDE PROPER STABILIZATION AND EROSION AND SEDIMENT CONTROL MEASURES PER THE GENERAL REQUIREMENTS.

- 28. PRIOR TO START OF WORK, DIGITALLY RECORD ON DVD PRE-CONSTRUCTION CONDITIONS IN ACCORDANCE WITH THE GENERAL REQUIREMENTS, INCLUDING SURFACE FEATURES (PAVEMENT, SIDEWALKS, CROSSWALKS, CURBING, PUBLIC PARK, SEAWALL AND RELATED ITEMS). PROVIDE COPIES OF DVD AND WRITTEN LOGS TO THE ENGINEER PRIOR TO COMMENCING WORK.
29. WHERE POSSIBLE MAINTAIN AT LEAST 10 HORIZONTAL FEET AND A MINIMUM OF 18 VERTICAL INCHES BETWEEN SEWER MAINS AND SERVICES AND WATER MAINS AND SERVICES.
30. ABANDON THOSE EXISTING MANHOLES AND CATCH BASINS SO DESIGNATED FOR ABANDONMENT IN PLACE BY REMOVING EXISTING FRAMES AND COVERS/GRATES. PLUG EXISTING STORM DRAIN LINES IN AND OUT WITH BRICK AND MORTAR, DEMOLISH TOP 3 FEET OF STRUCTURE, AND FILL WITH CONTROLLED DENSITY FILL. DELIVER FRAMES AND COVERS/GRATES TO THE DEPARTMENT OF PUBLIC WORKS YARD.
31. CAP ABANDONED STORM DRAIN PIPE WITH BRICK AND MORTAR AT EACH END TO PREVENT INFILTRATION.
32. REMOVE AND LEGALLY DISPOSE OF REMOVED AND DEMOLISHED FACILITIES INCLUDING EXISTING PIPE, MANHOLES, HYDRANT ASSEMBLIES, AND CONSTRUCTION DEBRIS.
33. RESTORE AREAS DISTURBED BY CONTRACTOR'S OPERATIONS TO ORIGINAL FINISH OR IN KIND (GRAVEL, PAVEMENT, CURBS, GRASS, ETC.). RESTORE PAVED SURFACES, ROADWAY STRIPING, GRAVEL SURFACES, DRIVEWAYS, AND LAWNS DAMAGED BY CONSTRUCTION ACTIVITIES OUTSIDE OF LIMITS OF WORK INDICATED ON THE DRAWINGS AT NO ADDITIONAL COST TO OWNER.
34. THE LIMITS OF WORK DEPICTED ON THE DRAWINGS REPRESENT THE LIMITS OF SURFACE AND SUBSURFACE DISTURBANCE AND REPLACEMENT OF EXISTING SURFACE FEATURES (SUCH AS PAVEMENTS, SIDEWALKS, CURBING AND PAVEMENT MARKINGS). NO ADDITIONAL COMPENSATION SHALL BE PROVIDED FOR WORK PERFORMED BEYOND THESE LIMITS. HOWEVER, TEMPORARY USE OF THE PUBLIC RIGHT-OF-WAY OUTSIDE THE LIMIT OF WORK WILL BE ALLOWED FOR LIMITED SPECIFICALLY ALLOWED ACTIVITIES SUCH AS EQUIPMENT AND MATERIAL STORAGE AND CONTRACTOR OPERATIONS IN ACCORDANCE WITH THE PROVISIONS OUTLINED IN DIVISION 1.
35. EXCESS GRANITE CURB DESIGNATED FOR REMOVAL SHALL BE DELIVERED TO THE DEPARTMENT OF PUBLIC WORKS YARD AT NO ADDITIONAL COST TO THE OWNER.
35. ALL SERVICES ON PLANS ARE SHOWN AS APPROXIMATE AND SHALL BE FIELD VERIFIED. RELOCATION OF SERVICES SHALL BE DONE AT DISCRETION OF THE ENGINEER.

SEDIMENTATION & EROSION CONTROL NOTES:

- 1. SOIL AND EROSION CONTROLS SHALL BE PLACED PRIOR TO CONSTRUCTION ACTIVITIES THROUGHOUT THE LIMIT OF WORK OF DISTURBED AREAS. CONTRACTOR TO NOTIFY THE ENGINEER AND THE OWNER AT LEAST 48 HOURS PRIOR TO CONSTRUCTION ACTIVITIES.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING ALL EROSION CONTROL MEASURES NECESSARY TO PREVENT OFF-SITE TRACKING OF EARTH, SEDIMENT AND DEBRIS.
3. EROSION CONTROL MEASURES SHALL BE INSPECTED AT A MINIMUM FREQUENCY OF ONCE EVERY WEEK, AND DURING AND AFTER EVERY RAIN EVENT GREATER THAN 0.5". ANY NECESSARY REPLACEMENT OR REPAIR SHALL BE PERFORMED PROMPTLY BY THE CONTRACTOR.
4. PROVIDE AND MAINTAIN SILT SACK INLET PROTECTION AT ALL CATCH BASINS WITHIN THE PROJECT LIMIT OF WORK AND DOWNSTREAM OF THE LIMIT OF WORK. REMOVE SILT SACKS PRIOR TO LARGE STORM EVENT AND REPLACE SILT SACKS AT END OF STORM EVENT TO PREVENT FLOODING. CONTRACTOR IS RESPONSIBLE FOR REMOVING/REPLACING SILT SACKS DURING BOTH WORK AND NON-WORK HOURS.

ABBREVIATIONS *

Table with 4 columns: Abbreviation, Description, Abbreviation, Description. Includes entries like ACR (ACCESSIBLE CURB RAMP), AD (AREA DRAIN), AGGR (AGGREGATE), ALT (ALTERNATE), ALUM (ALUMINUM), ANSI (AMERICAN NATIONAL STANDARDS INSTITUTE), APPROX/± (APPROXIMATELY), BC (BOTTOM OF CURB), BIT (BITUMINOUS), BLDG (BUILDING), BOT (BOTTOM), CL (CENTERLINE), CB (CATCHBASIN), CI (CAST IRON), CLR (CLEAR), CMP (CORRUGATED METAL PIPE), CLDI (CONCRETE LINED DUCTILE IRON), CMU (CONCRETE MASONRY UNIT), CO (CLEANOUT), CONC. (CONCRETE), CONST (CONSTRUCTION), CONT (CONTINUOUS), CRW (CURB RETAINING WALL), CU (COPPER), DCB (DOUBLE CATCH BASIN), DI (DUCTILE IRON), DIA/φ (DIAMETER), DMH (DRAIN MANHOLE), DW (DOMESTIC WATER), EA (EACH), EL (ELEVATION), ELEC COND (ELECTRICAL CONDUIT), EOP (EDGE OF PAVEMENT), EQUIP (EQUIPMENT), EXIST/EX. (EXISTING), FDN (FOUNDATION), FE (FIRE EXTINGUISHER), FF/FIN FLR (FINISH FLOOR), F.F.E./FFE (FINISHED FLOOR ELEVATION), FIN (FINISHED), FIN GR (FINISH GRADE), FM (FORCE MAIN), FND (FOUND), FT (FOOT), GAL (GALLON), GALV (GALVANIZED), HDPE (HIGH DENSITY POLYETHYLENE), HP (HIGH PRESSURE), HT (HEIGHT), ID (INSIDE DIAMETER), IN (INCHES), INSUL (INSULATION), INV (INVERT), LP (LOW PRESSURE), LW (LIMIT OF WORK), MAX (MAXIMUM), MECH (MECHANICAL), MFG (MANUFACTURER), MH (MANHOLE), MIN (MINIMUM), MTL (METAL), NO. (NUMBER), NTS (NOT TO SCALE), OCR (OPEN CUT REPAIR ON CENTER), OD (OUTSIDE DIAMETER), PPE (POLYPROPYLENE), PSF (POUNDS PER SQUARE FOOT), PSI (POUNDS PER SQUARE INCH), PVC (POLYVINYL CHLORIDE), UNK (UNKNOWN), R (RADIUS), RCP (REINFORCED CONCRETE PIPE), REINF (REINFORCED), REQ'D (REQUIRED), RET (RETAINING WALL), R/W (RIGHT OF WAY), SBG (SLOPED BITUMINOUS CURB), SECT (SECTION), SOG (SLOPED GRANITE CURB), SHET (SHEET), SMH (SEWER MANHOLE), SPEC'S (SPECIFICATIONS), SS (STAINLESS STEEL), STD (STANDARD), TBM (TEMPORARY BENCH MARK), TOC (TOP OF CURB), TYP./TYP (TYPICAL), UNK (UNKNOWN), UP (UTILITY POLE), VGC (VERTICAL GRANITE CURB), W/ (WITH), W.G./WG (WATER GATE VALVE).

LEGEND

Legend table with columns for EXISTING and PROPOSED symbols and their descriptions. Includes symbols for utility poles, fences, drains, sewers, manholes, catch basins, and various pavement and erosion control features.

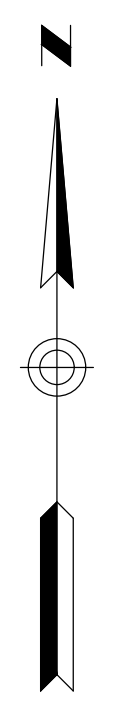
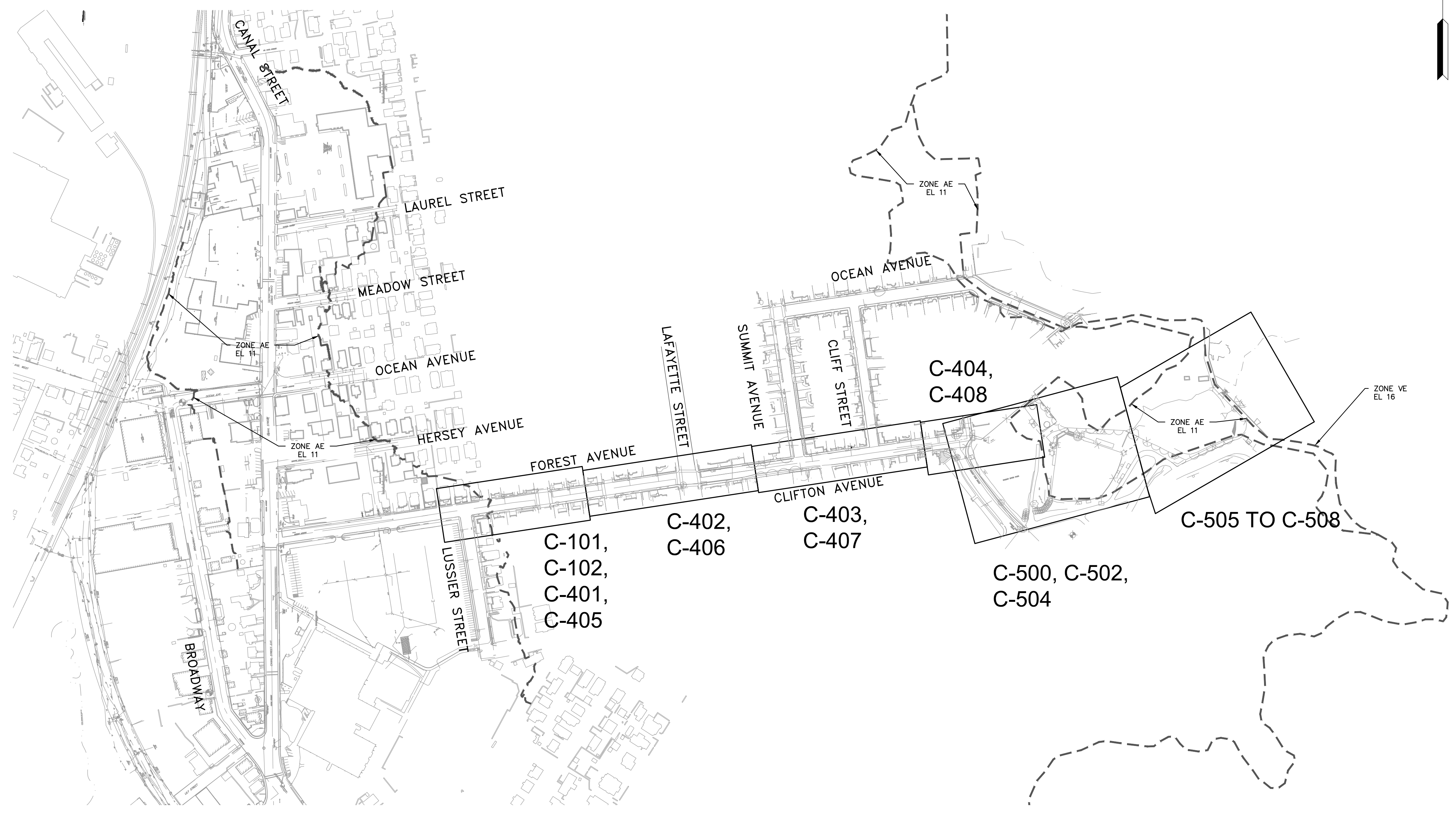
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Table with columns: REVISION, DESCRIPTION, DATE, DRAWN BY, CHECKED BY. Includes a row for 'DESIGNED BY: HCP, DRAWN BY: MB, CHECKED BY: DAW, 2/28/20-C-001.dwg'.

CIVIL GENERAL NOTES, LEGEND AND ABBREVIATIONS

Project information: CITY OF SALEM, MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS. CONTRACT A CANAL STREET FLOOD MITIGATION PROJECT SALEM, MASSACHUSETTS. JOB NO.: 228340.11, DATE: JANUARY 2017, SCALE: NOT TO SCALE, SHEET: 3 OF 46. Includes a large 'C-001' label.

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KEY PLAN
SCALE: 1"=200'

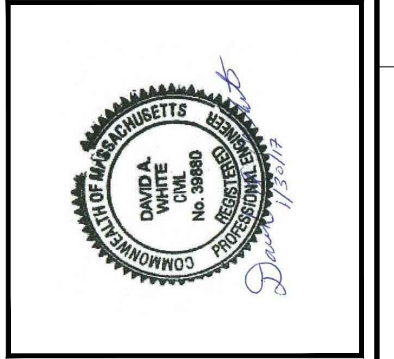
ZONE AE LINE FROM FLOOD INSURANCE RATE MAP
ESSEX COUNTY, MASSACHUSETTS
PANEL 419 OF 600 MAP NUMBER 25009C0419G
DATED JULY 16, 2014

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| REV. | DESCRIPTION | DATE |
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DESIGNED BY: HCP
CHECKED BY: DAW
DRAWN BY: MB
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KEY PLAN

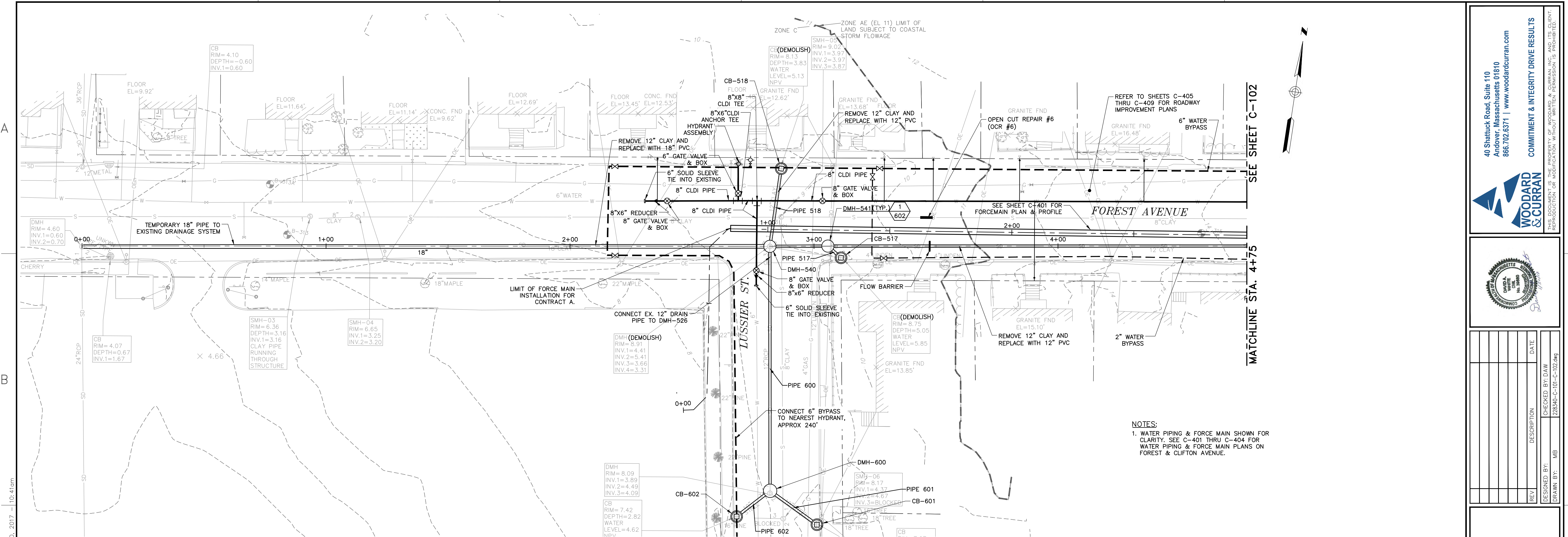
CITY OF SALEM, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

**CONTRACT A
CANAL STREET
FLOOD MITIGATION PROJECT
SALEM, MASSACHUSETTS**

JOB NO.: 228340.11
DATE: JANUARY 2017
SCALE: AS SHOWN
SHEET: 4 OF 46

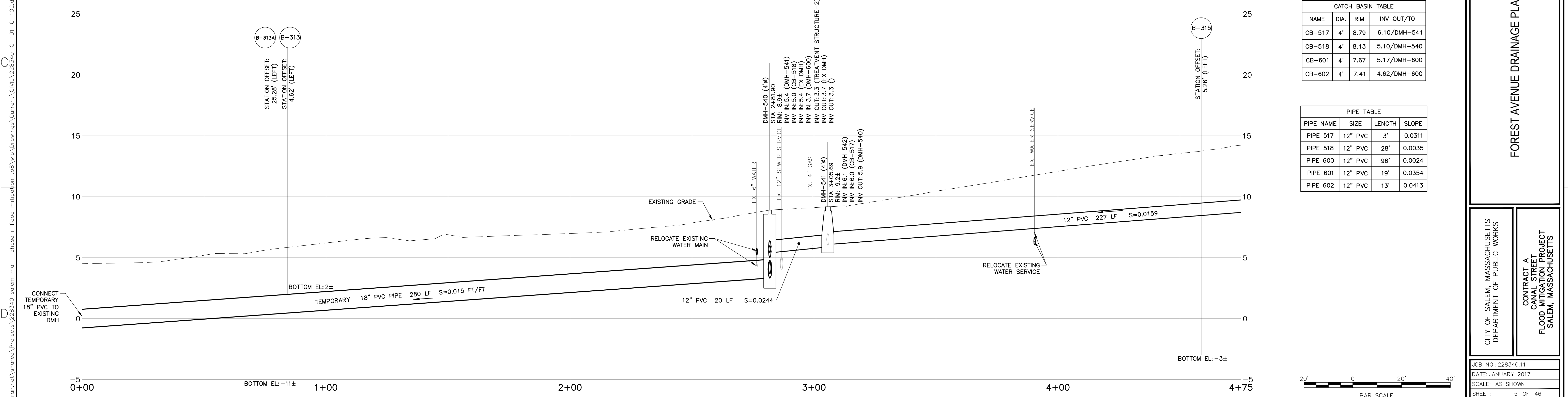
C-002

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FOREST AVENUE PLAN
SCALE: 1" = 20'

NOTES:
1. WATER PIPING & FORCE MAIN SHOWN FOR CLARITY. SEE C-401 THRU C-404 FOR WATER PIPING & FORCE MAIN PLANS ON FOREST & CLIFTON AVENUE.



FOREST AVE ALIGNMENT D PROFILE STA. 0+00 TO STA. 4+75

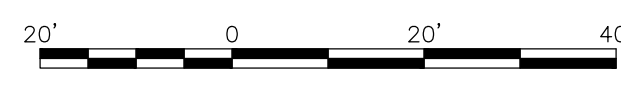
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 5'

CATCH BASIN TABLE

| NAME | DIA. | RIM | INV OUT/TO |
|--------|------|------|--------------|
| CB-517 | 4' | 8.79 | 6.10/DMH-541 |
| CB-518 | 4' | 8.13 | 5.10/DMH-540 |
| CB-601 | 4' | 7.67 | 5.17/DMH-600 |
| CB-602 | 4' | 7.41 | 4.62/DMH-600 |

PIPE TABLE

| PIPE NAME | SIZE | LENGTH | SLOPE |
|-----------|---------|--------|--------|
| PIPE 517 | 12" PVC | 3' | 0.0311 |
| PIPE 518 | 12" PVC | 28' | 0.0035 |
| PIPE 600 | 12" PVC | 96' | 0.0024 |
| PIPE 601 | 12" PVC | 19' | 0.0354 |
| PIPE 602 | 12" PVC | 13' | 0.0413 |

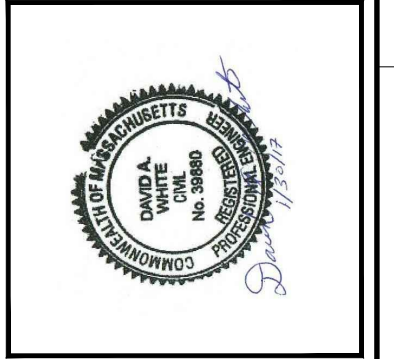


BAR SCALE
1" = 20'
CHECK GRAPHIC SCALE BEFORE USING

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| REV. | DESCRIPTION | DATE |
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CHECKED BY: DAW
DESIGNED BY: MB
DRAWN BY: MB

FOREST AVENUE DRAINAGE PLAN-1

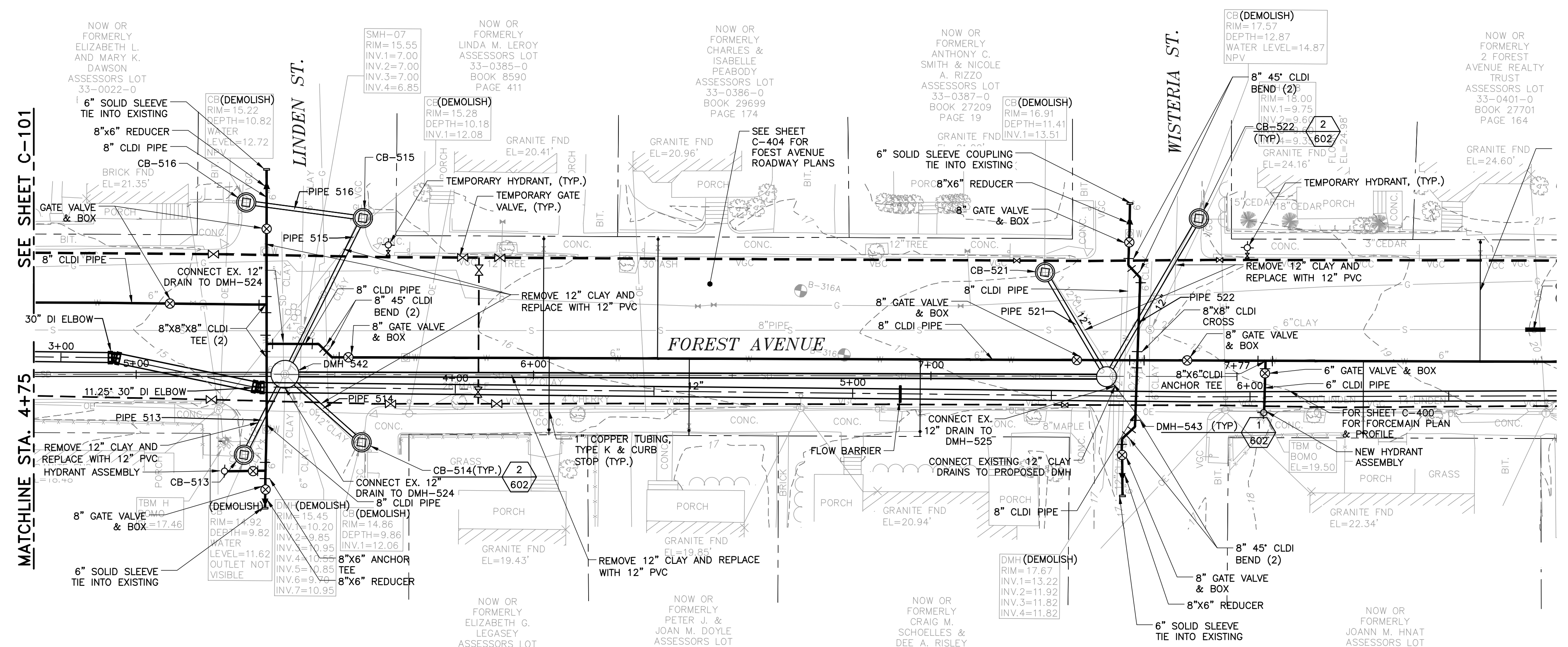
CITY OF SALEM, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

CONTRACT A
CANAL STREET PROJECT
FLOOD MITIGATION PROJECT
SALEM, MASSACHUSETTS

JOB NO.: 228340.11
DATE: JANUARY 2017
SCALE: AS SHOWN
SHEET: 5 OF 46

C-101

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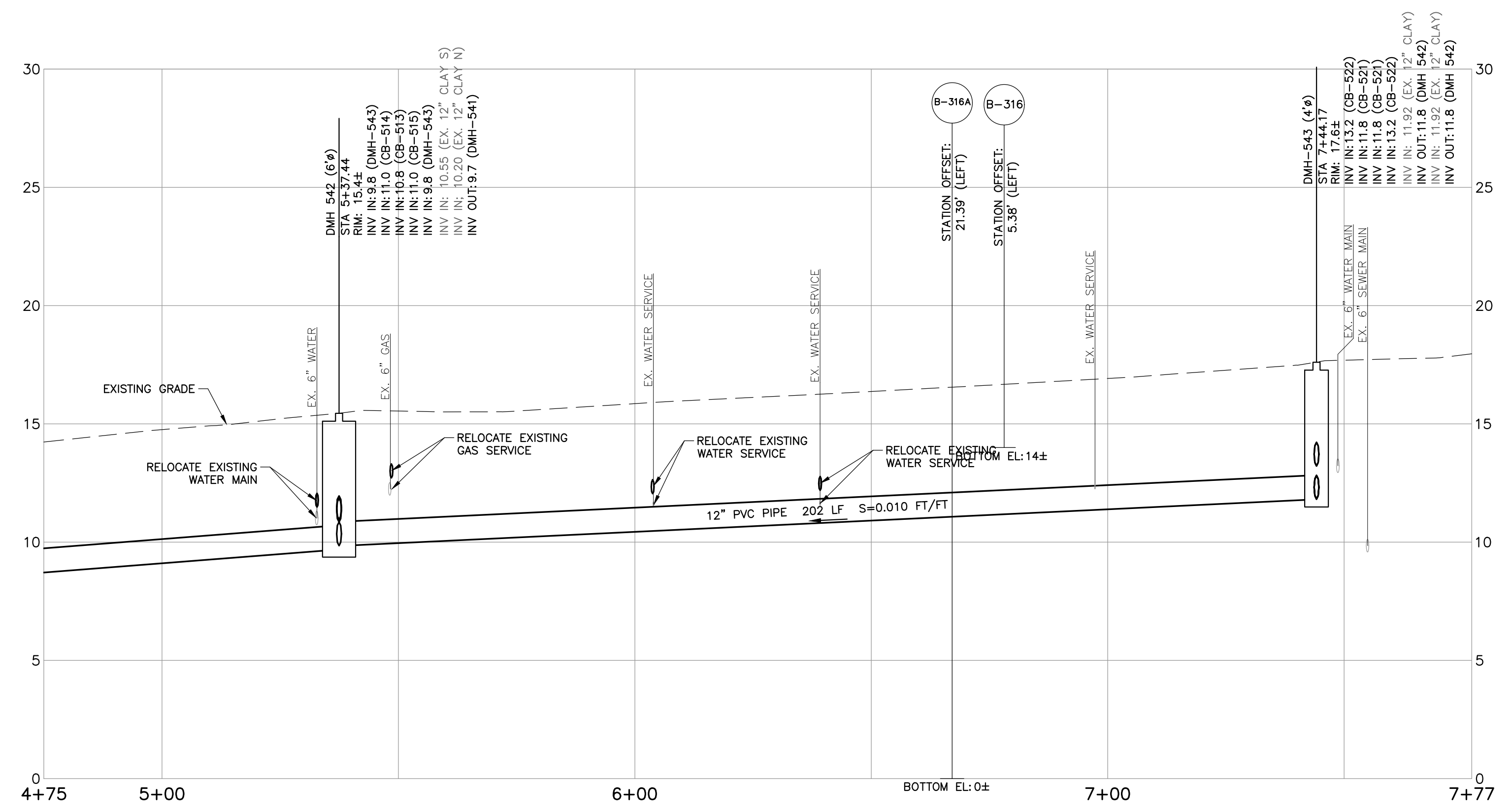


FOREST AVENUE PLAN
SCALE: 1" = 20'

- NOTES:**
1. WATER PIPING & FORCE MAIN SHOWN FOR CLARITY. SEE C-401 THRU C-404 FOR WATER PIPING & FORCE MAIN PLANS ON FOREST & CLIFTON AVENUE.
 2. FOREST AVE EASTERN LIMIT OF DRAINAGE SHOWN ON THIS SHEET

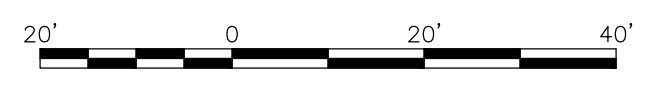
| CATCH BASIN TABLE | | | |
|-------------------|------|-------|---------------|
| NAME | DIA. | RIM | INV. OUT./TO |
| CB-513 | 4' | 14.90 | 11.40/DMH 542 |
| CB-514 | 4' | 14.80 | 11.30/DMH 542 |
| CB-515 | 4' | 15.25 | 11.65/DMH 542 |
| CB-516 | 4' | 15.23 | 11.72/CB-515 |
| CB-521 | 4' | 16.91 | 13.40/DMH-543 |
| CB-522 | 4' | 17.50 | 14.00/DMH-543 |

| PIPE TABLE | | | |
|------------|---------|--------|--------|
| PIPE NAME | SIZE | LENGTH | SLOPE |
| PIPE 513 | 12" PVC | 18' | 0.0310 |
| PIPE 514 | 12" PVC | 21' | 0.0168 |
| PIPE 515 | 12" PVC | 39' | 0.0180 |
| PIPE 516 | 12" PVC | 26' | 0.0047 |
| PIPE 521 | 12" PVC | 27' | 0.0596 |
| PIPE 522 | 12" PVC | 42' | 0.0185 |



FOREST AVE ALIGNMENT D PROFILE STA. 4+75 TO STA. 7+77

HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 5'



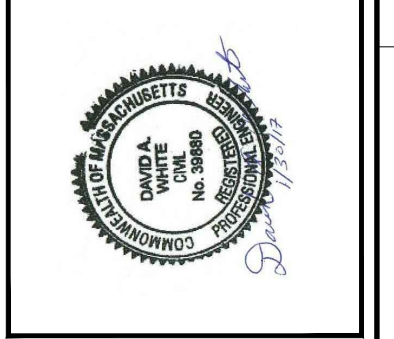
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CHECKED BY: DAW
DESIGNED BY: HCP
DRAWN BY: MB

FOREST AVENUE DRAINAGE PLAN-2

CITY OF SALEM, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

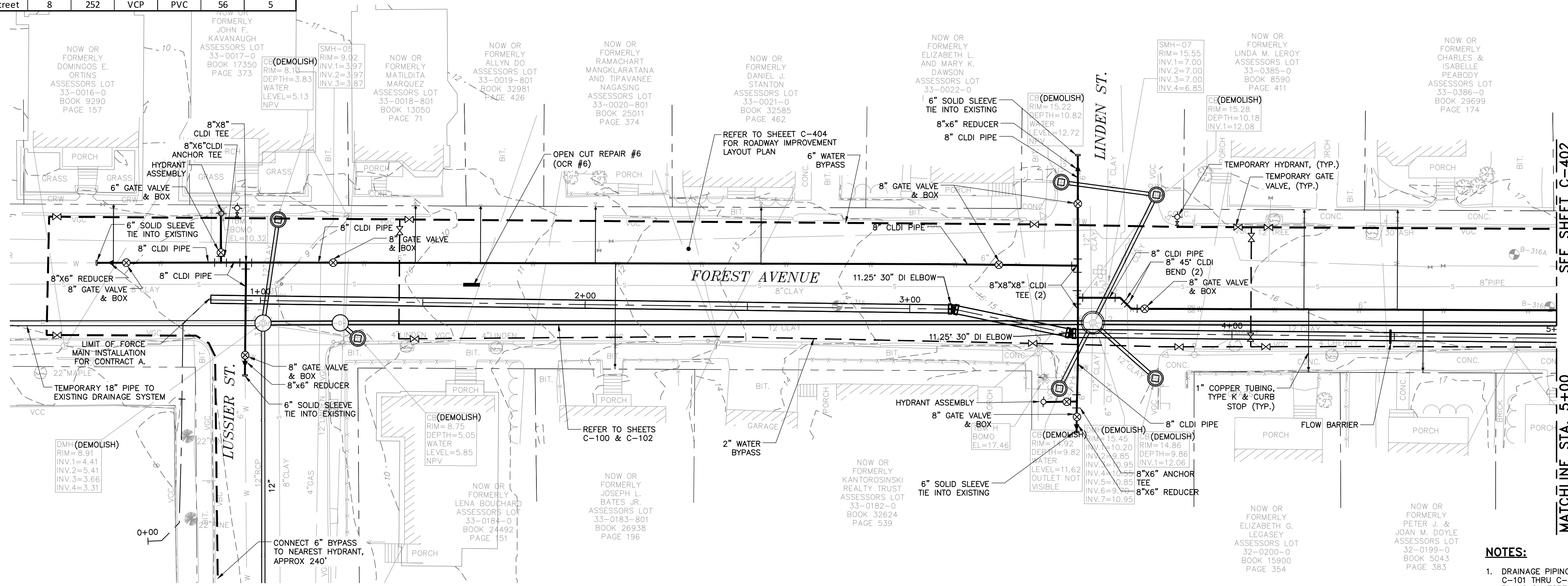
CONTRACT A
CANAL STREET PROJECT
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SALEM, MASSACHUSETTS

JOB NO.: 228340.11
DATE: JANUARY 2017
SCALE: AS SHOWN
SHEET: 6 OF 46

C-102

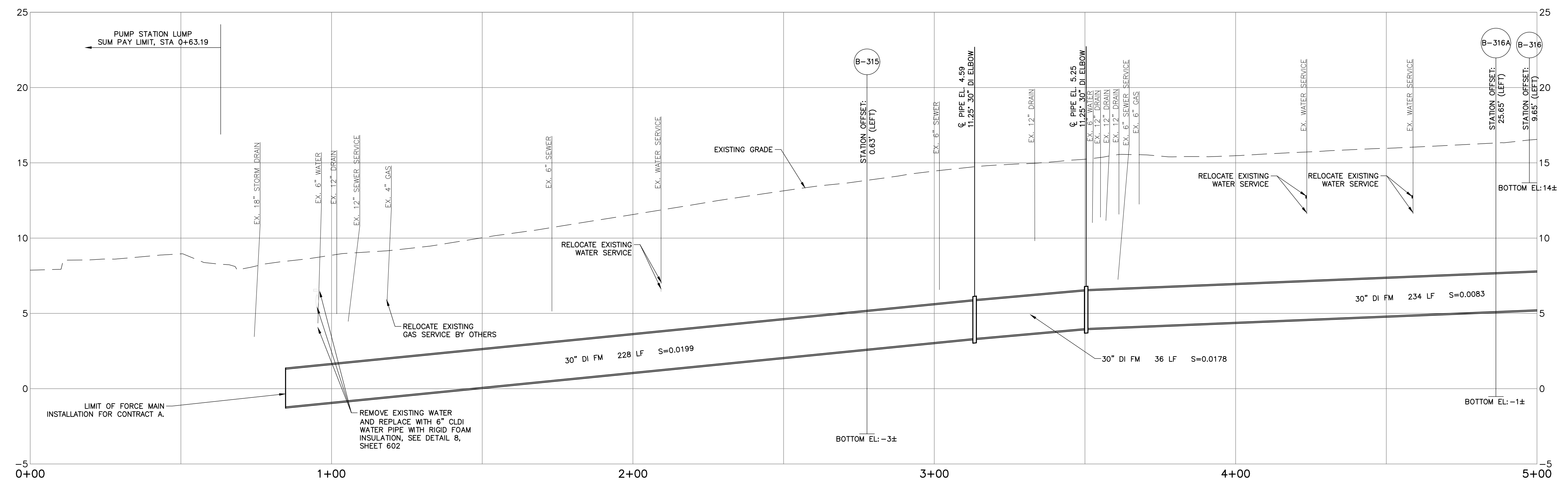
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| Open Cut Repairs | | | | | | | | | | |
|------------------|-----------------|-------------|-------------|--------|-----------------|-------------|------------------------|------------------------|-----------------------|--------------------------|
| OCR # | Start (From) MH | End (To) MH | Street | Cover | Pipe Dia. (in.) | Pipe Length | Existing Pipe Material | Proposed Pipe Material | Footage from start MH | Assumed Length of Repair |
| 6 | 05 | 07 | Forest Ave. | Street | 8 | 252 | VCP | PVC | 56 | 5 |



FOREST AVENUE PLAN
SCALE: 1" = 20'

- NOTES:**
- DRAINAGE PIPING SHOWN FOR CLARITY. SEE C-101 THRU C-102 FOR DRAINAGE PIPING PLANS ON FOREST AVENUE.
 - PROVIDE SOLID SLEEVE COUPLING TO CONNECT NEW WATER MAIN TO EXISTING WATER MAIN. IF REQUIRED PROVIDE BOLTED SLEEVE-TYPE COUPLING.



FOREST AVENUE FORCEMAIN PROFILE STA. 0+00 TO STA. 5+00

HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 5'



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DESIGNED BY: HCP
DRAWN BY: MB

FOREST AVENUE FORCEMAIN PLAN & PROFILE-1

CITY OF SALEM, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

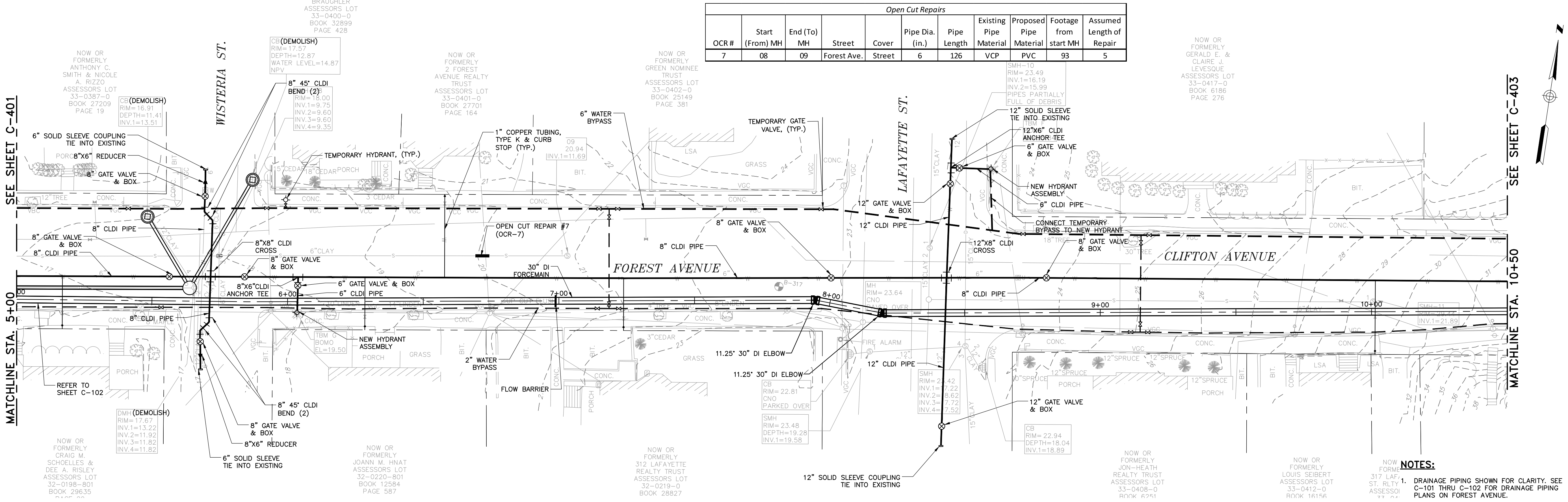
CONTRACT A
CANAL STREET
FLOOD MITIGATION PROJECT
SALEM, MASSACHUSETTS

JOB NO.: 228340.11
DATE: JANUARY 2017
SCALE: AS SHOWN
SHEET: 7 OF 46

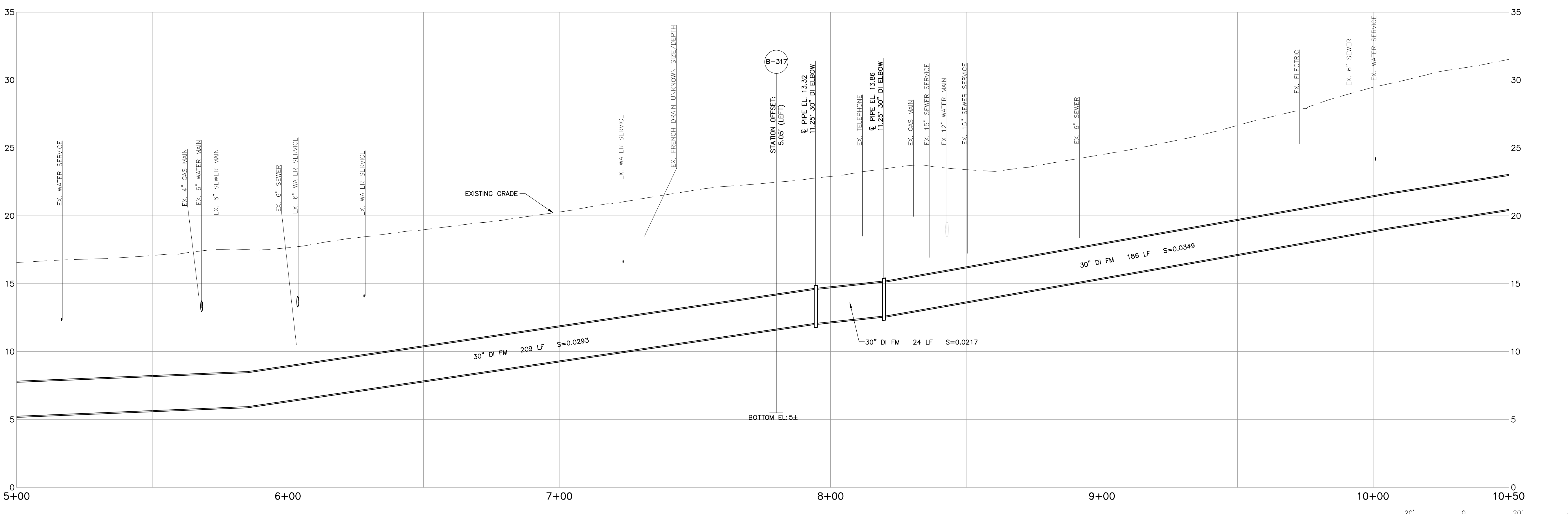
C-401

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| Open Cut Repairs | | | | | | | | | | |
|------------------|-----------------|-------------|-------------|--------|-----------------|-------------|------------------------|------------------------|-----------------------|--------------------------|
| OCR # | Start (From) MH | End (To) MH | Street | Cover | Pipe Dia. (in.) | Pipe Length | Existing Pipe Material | Proposed Pipe Material | Footage from start MH | Assumed Length of Repair |
| 7 | 08 | 09 | Forest Ave. | Street | 6 | 126 | VCP | PVC | 93 | 5 |



FOREST & CLIFTON AVENUE PLAN
SCALE: 1" = 20'



FOREST & CLIFTON AVENUE FORCEMAIN PROFILE STA. 5+00 TO STA. 10+50

HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 5'



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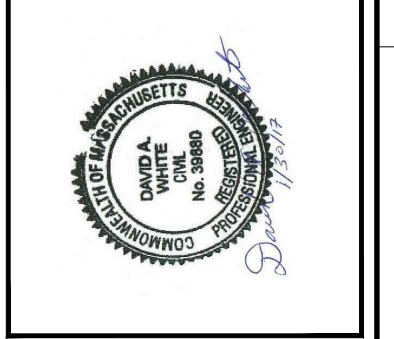
BAR SCALE
1" = 20'

8 OF 46

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CHECKED BY: DAW
DRAWN BY: MB
228340-C-01 - C-04 FM.dwg

FOREST AVENUE FORCEMAIN PLAN & PROFILE-2

CITY OF SALEM, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

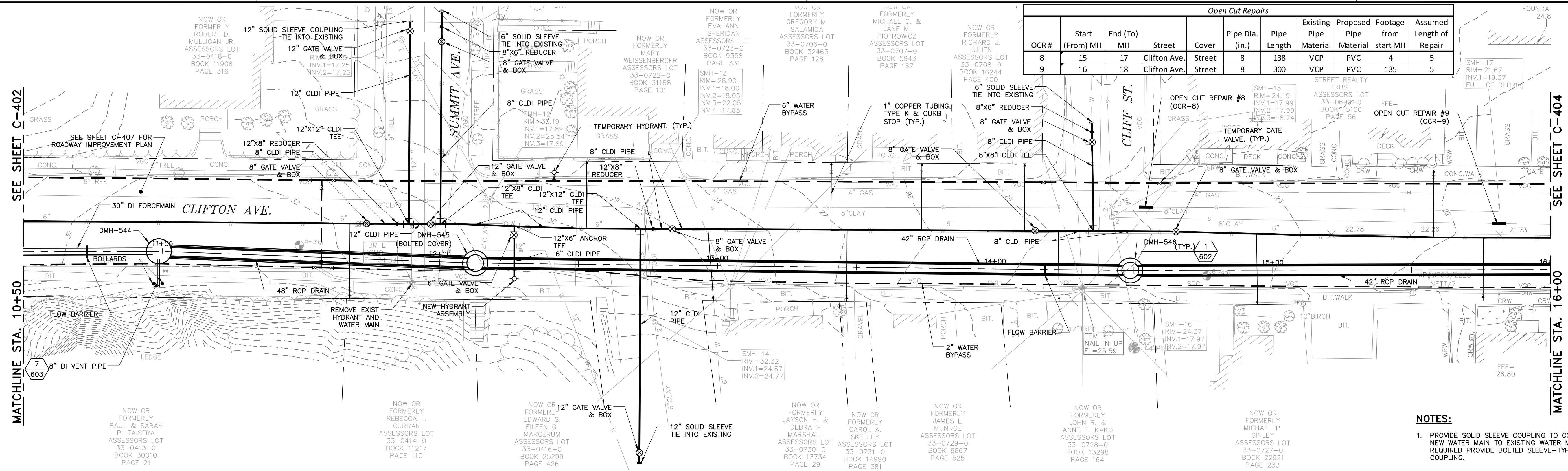
CONTRACT A
CANAL STREET
FLOOD MITIGATION PROJECT
SALEM, MASSACHUSETTS

JOB NO.: 228340.11
DATE: JANUARY 2017
SCALE: AS SHOWN
SHEET: 8 OF 46

C-402

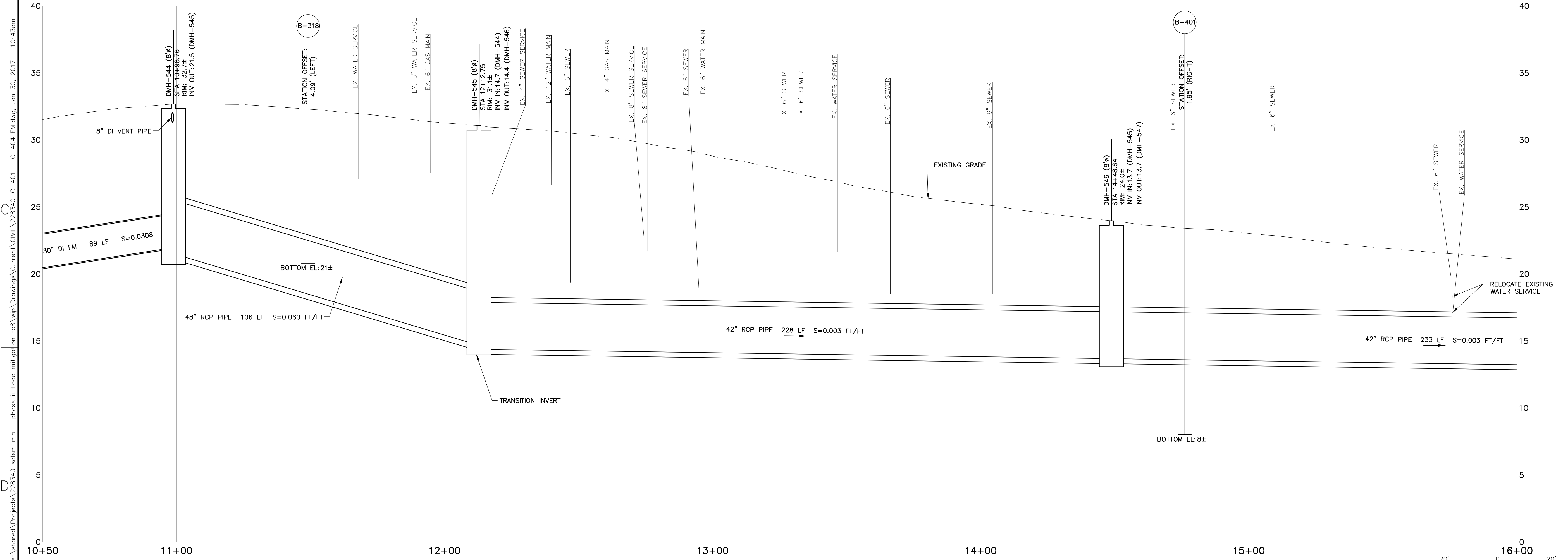
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| Open Cut Repairs | | | | | | | | | | |
|------------------|-----------------|-------------|--------------|--------|-----------------|-------------|------------------------|------------------------|-----------------------|--------------------------|
| OCR # | Start (From) MH | End (To) MH | Street | Cover | Pipe Dia. (in.) | Pipe Length | Existing Pipe Material | Proposed Pipe Material | Footage from start MH | Assumed Length of Repair |
| 8 | 15 | 17 | Clifton Ave. | Street | 8 | 138 | VCP | PVC | 4 | 5 |
| 9 | 16 | 18 | Clifton Ave. | Street | 8 | 300 | VCP | PVC | 135 | 5 |



NOTES:
 1. PROVIDE SOLID SLEEVE COUPLING TO CONNECT NEW WATER MAIN TO EXISTING WATER MAIN. IF REQUIRED PROVIDE BOLTED SLEEVE-TYPE COUPLING.

CLIFTON AVENUE PLAN
 SCALE: 1" = 20'



CLIFTON AVENUE FORCEMAIN & GRAVITY DRAINAGE PROFILE STA. 10+50 TO STA. 16+00

HORIZONTAL SCALE: 1" = 20'
 VERTICAL SCALE: 1" = 5'

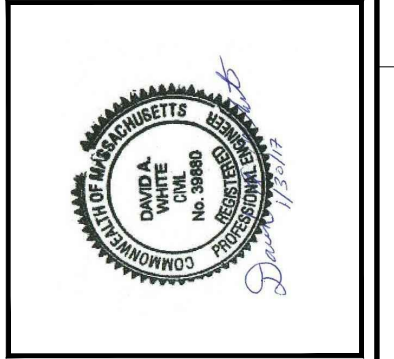


BAR SCALE
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 DRAWN BY: MB

CLIFTON AVENUE FORCEMAIN PLAN & PROFILE-1

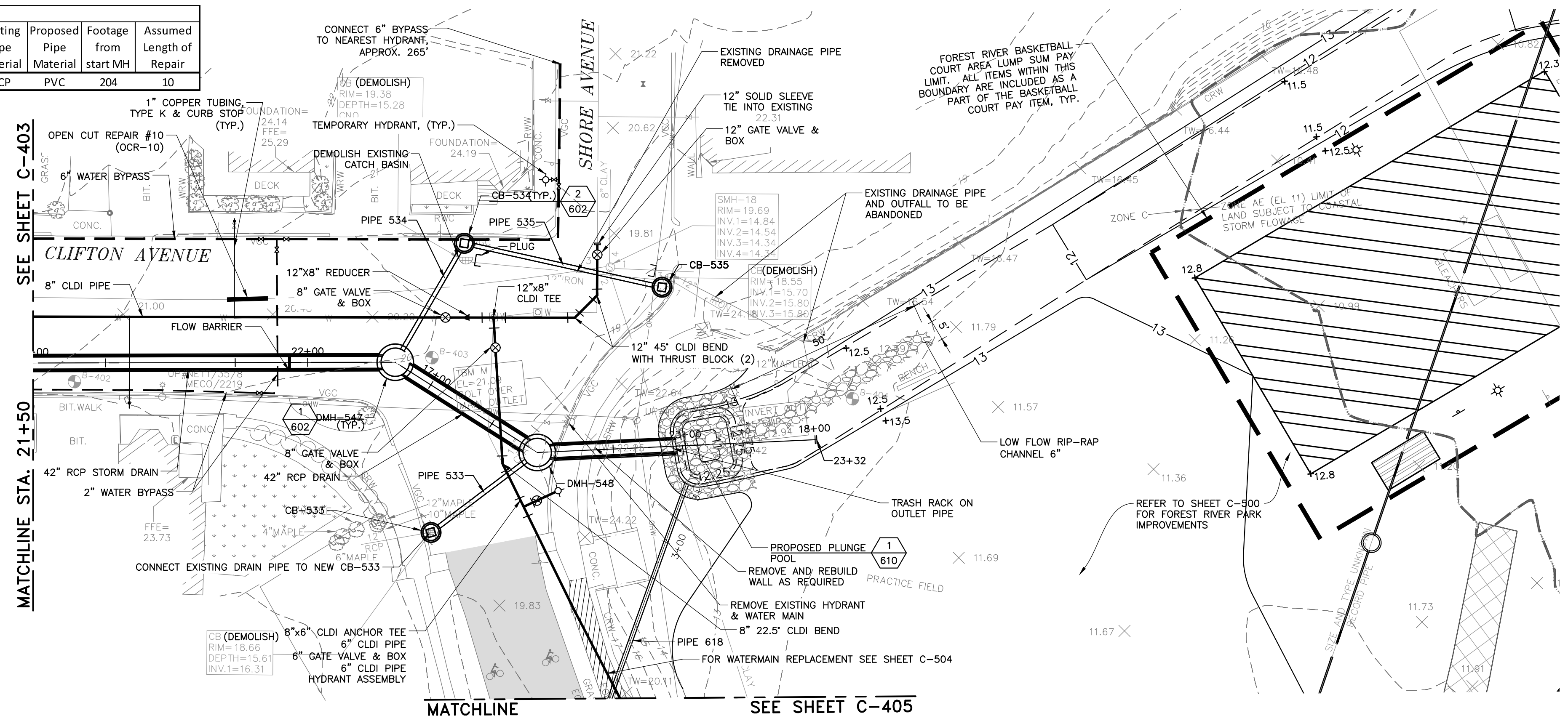
CITY OF SALEM, MASSACHUSETTS
 DEPARTMENT OF PUBLIC WORKS

CONTRACT A
 CANAL STREET
 FLOOD MITIGATION PROJECT
 SALEM, MASSACHUSETTS

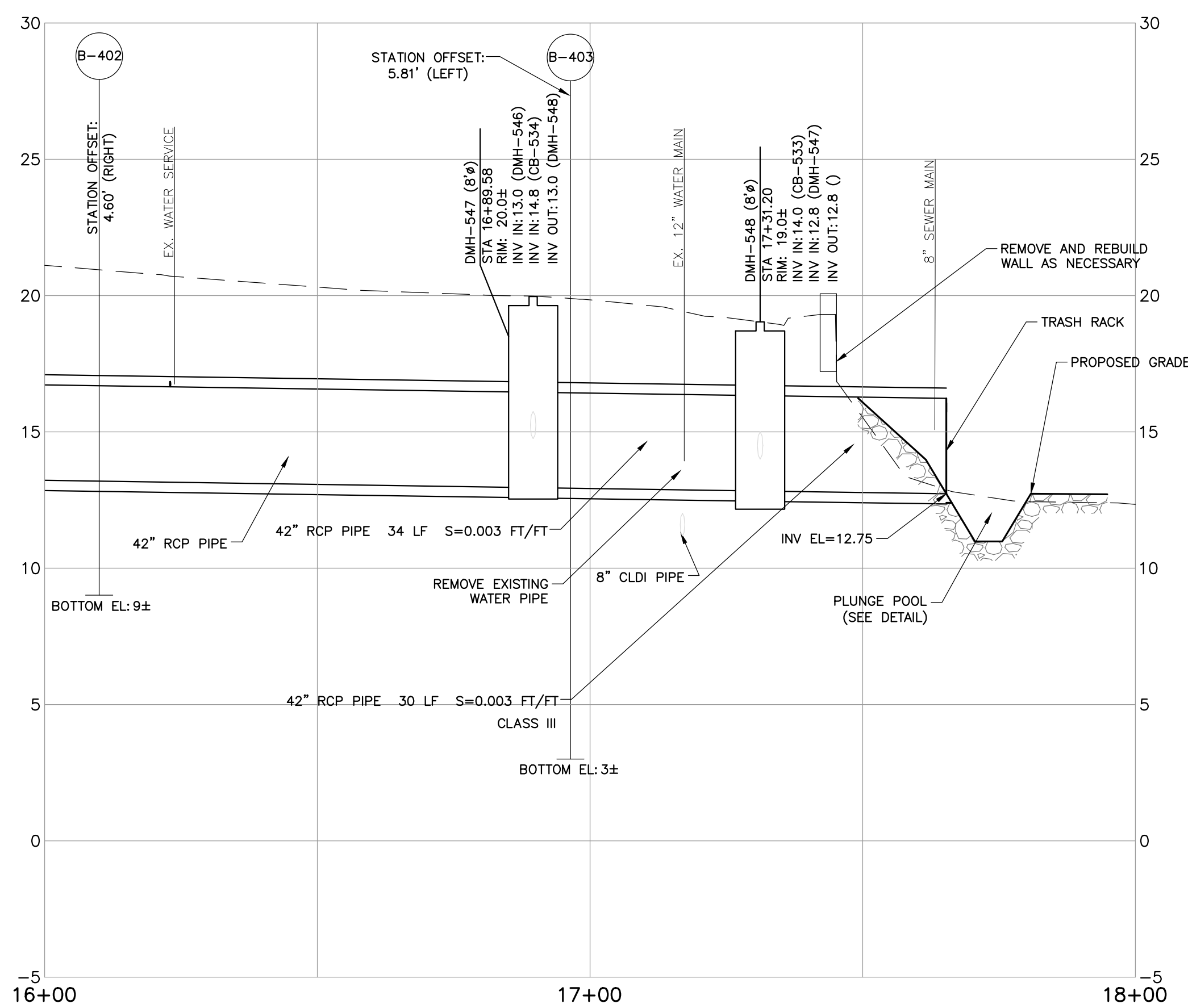
JOB NO.: 228340.11
 DATE: JANUARY 2017
 SCALE: AS SHOWN
 SHEET: 9 OF 46

C-403

| Open Cut Repairs | | | | | | | |
|------------------|-----------------|-------------|--------------|--------|-----------------|-------------|--------------------------|
| OCR# | Start (From) MH | End (To) MH | Street | Cover | Pipe Dia. (in.) | Pipe Length | Assumed Length of Repair |
| 10 | 16 | 18 | Clifton Ave. | Street | 8 | 300 | 204 |



CLIFTON AVENUE PLAN
SCALE: 1" = 20'



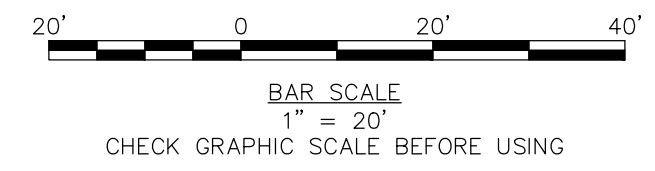
CLIFTON AVENUE GRAVITY DRAINAGE PROFILE STA. 16+00 TO STA. 18+00

HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 5'

| NAME | DIA. | RIM | INV OUT/TO |
|--------|------|-------|---------------|
| CB-533 | 4' | 18.70 | 14.43/DMH-548 |
| CB-534 | 4' | 19.47 | 15.15/DMH-547 |
| CB-535 | 4' | 18.67 | 16.00/CB-534 |

| PIPE NAME | SIZE | LENGTH | SLOPE |
|-----------|---------|--------|--------|
| PIPE 533 | 12" PVC | 27' | 0.0160 |
| PIPE 534 | 12" PVC | 28' | 0.0143 |
| PIPE 535 | 12" PVC | 46' | 0.0163 |

NOTES:
1. PROVIDE SOLID SLEEVE COUPLING TO CONNECT NEW WATER MAIN TO EXISTING WATER MAIN. IF REQUIRED PROVIDE BOLTED SLEEVE-TYPE COUPLING.

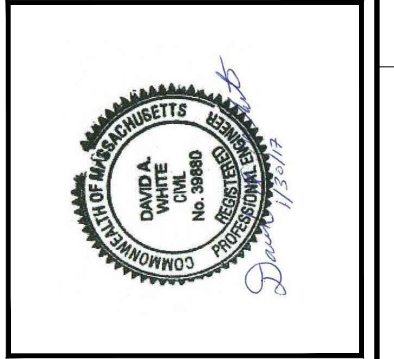


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CLIFTON AVENUE FORCEMAIN PLAN & PROFILE-2

CITY OF SALEM, MASSACHUSETTS
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CONTRACT A
CANAL STREET
FLOOD MITIGATION PROJECT
SALEM, MASSACHUSETTS

JOB NO.: 228340.11
DATE: JANUARY 2017
SCALE: AS SHOWN
SHEET: 10 OF 46

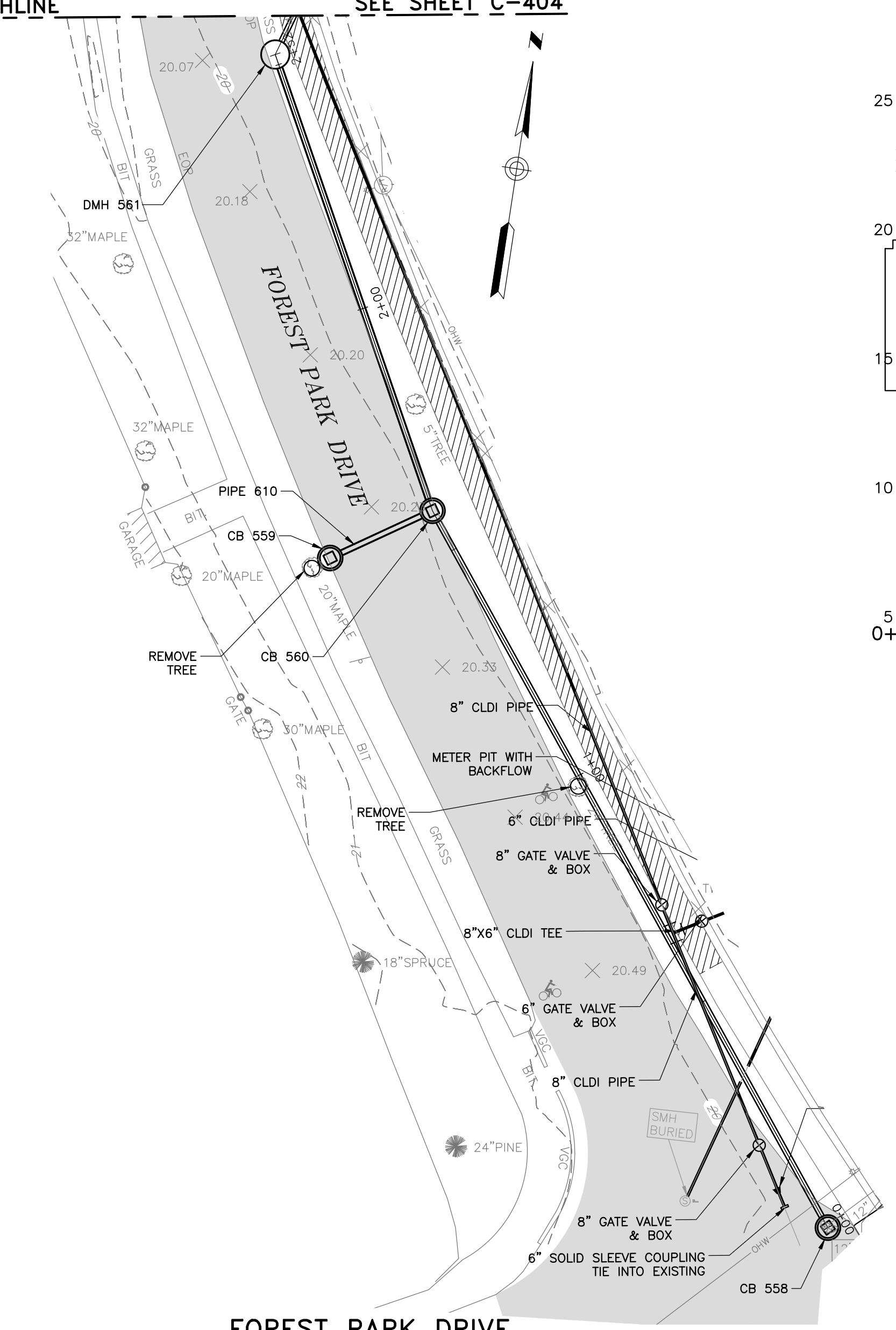
C-404

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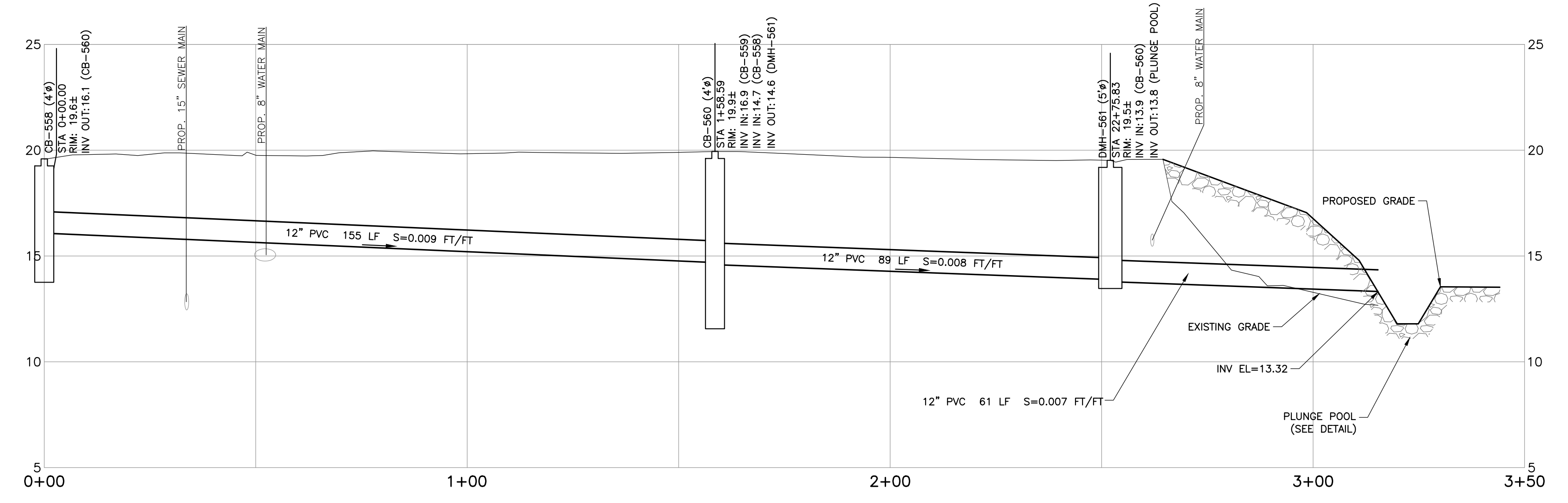
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\\woodardcurran.net\shared\Projects\228340 salem ma - phase ii flood mitigation to8.wp Drawings\Current\Civil\228340-C-405 - C-404 FM.dwg, Jan 30, 2017 - 10:44am

MATCHLINE SEE SHEET C-404



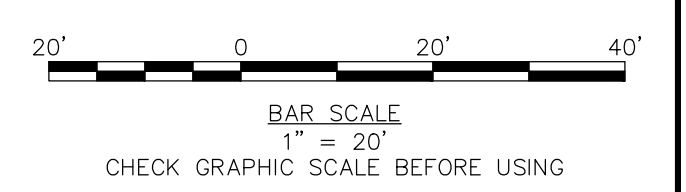
FOREST PARK DRIVE
SCALE: 1" = 20'



PROFILE STA. 0+00 TO STA. 3+50
HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 4'

| CATCH BASIN TABLE | | | |
|-------------------|------|-------|---------------------|
| NAME | DIA. | RIM | INV OUT/SIZE/TO |
| CB-559 | 4' | 20.59 | 17.09/12"PVC/CB-560 |

| PIPE TABLE | | | |
|--------------|---------|--------|--------|
| PIPE NAME | SIZE | LENGTH | SLOPE |
| Pipe - (610) | 12" PVC | 18' | 0.0100 |

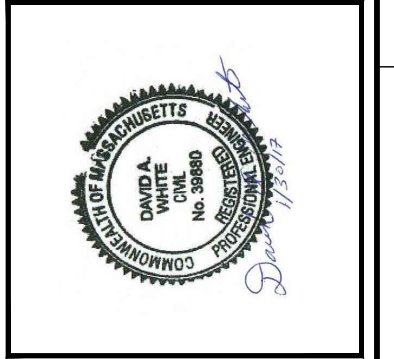


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FOREST PARK DRIVE PLAN & PROFILE

CITY OF SALEM, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

CONTRACT A
CANAL STREET
FLOOD MITIGATION PROJECT
SALEM, MASSACHUSETTS

JOB NO.: 228340.11
DATE: JANUARY 2017
SCALE: AS SHOWN
SHEET: 11 OF 46

C-405

A

B

C

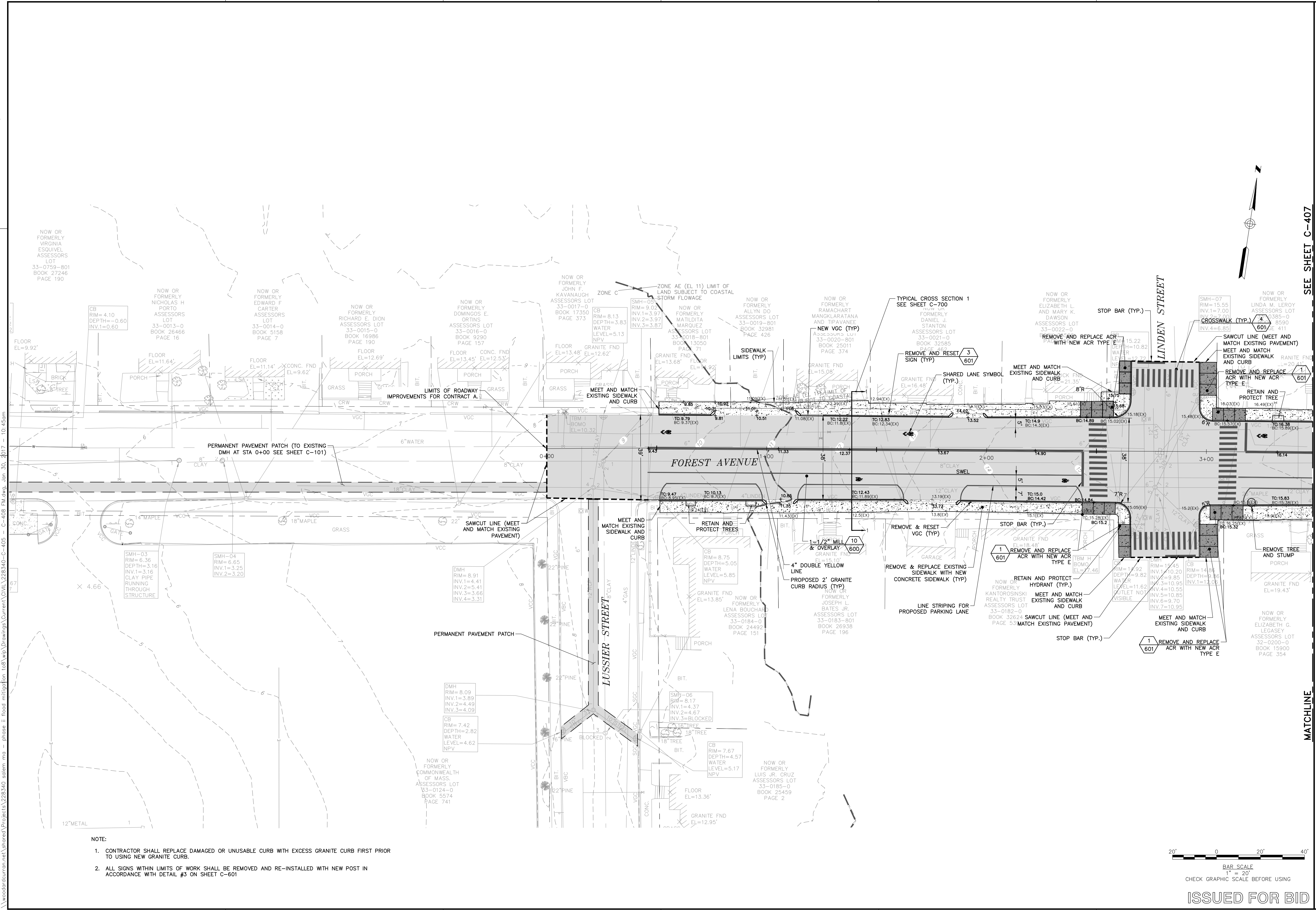
D

A

B

C

D



SEE SHEET C-407

MATCHLINE

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FOREST AVENUE ROADWAY IMPROVEMENT PLAN-1

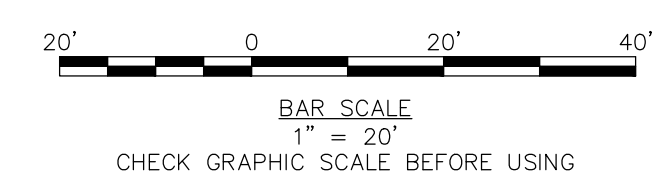
CITY OF SALEM, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

CONTRACT A
CANAL STREET PROJECT
SALEM, MASSACHUSETTS

JOB NO.: 228340.11
DATE: JANUARY 2017
SCALE: AS SHOWN
SHEET: 12 OF 46

C-406

- NOTE:
- CONTRACTOR SHALL REPLACE DAMAGED OR UNUSABLE CURB WITH EXCESS GRANITE CURB FIRST PRIOR TO USING NEW GRANITE CURB.
 - ALL SIGNS WITHIN LIMITS OF WORK SHALL BE REMOVED AND RE-INSTALLED WITH NEW POST IN ACCORDANCE WITH DETAIL #3 ON SHEET C-601



ISSUED FOR BID

A

B

C

D

A

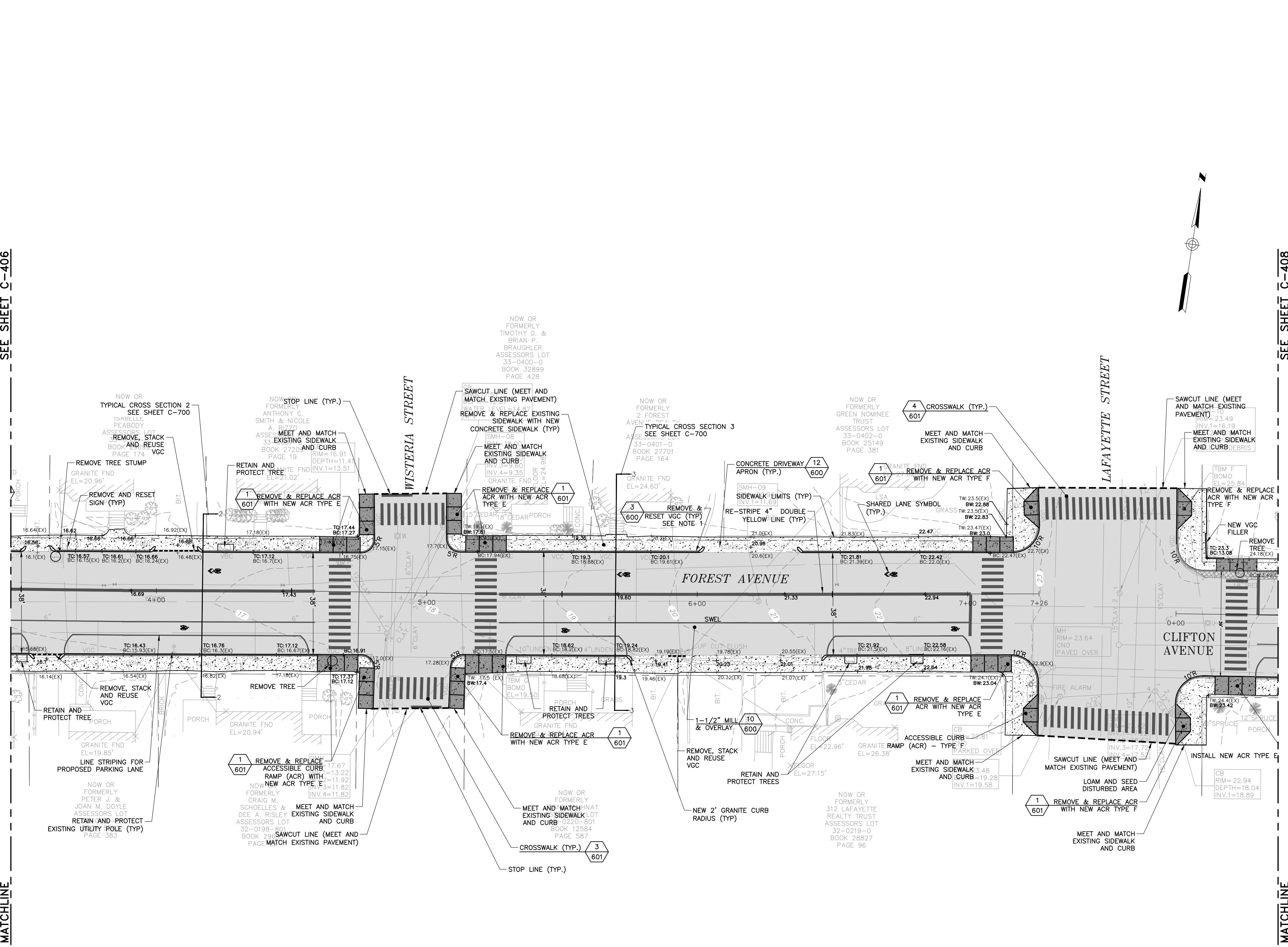
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C

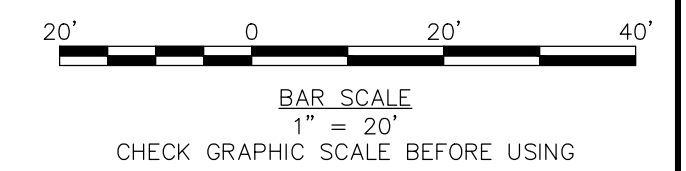
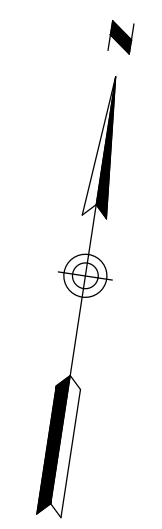
D

SEE SHEET C-406
MATCHLINE

SEE SHEET C-408
MATCHLINE



- NOTE:
- CONTRACTOR SHALL REPLACE DAMAGED OR UNUSABLE CURB WITH EXCESS GRANITE CURB FIRST PRIOR TO USING NEW GRANITE CURB.
 - ALL SIGNS WITHIN LIMITS OF WORK SHALL BE REMOVED AND RE-INSTALLED WITH NEW POST IN ACCORDANCE WITH DETAIL #3 ON SHEET C-601



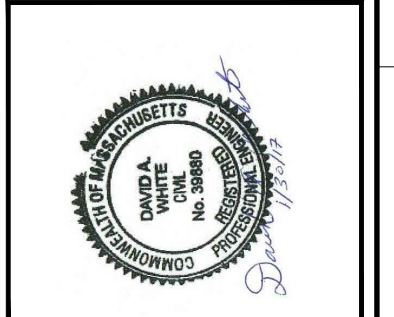
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DRAWN BY: MB

FOREST AVENUE ROADWAY IMPROVEMENT PLAN-2

CITY OF SALEM, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

CONTRACT A
CANAL STREET
FLOOD MITIGATION PROJECT
SALEM, MASSACHUSETTS

JOB NO.: 228340.11
DATE: JANUARY 2017
SCALE: AS SHOWN
SHEET: 13 OF 46

C-407

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A

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C

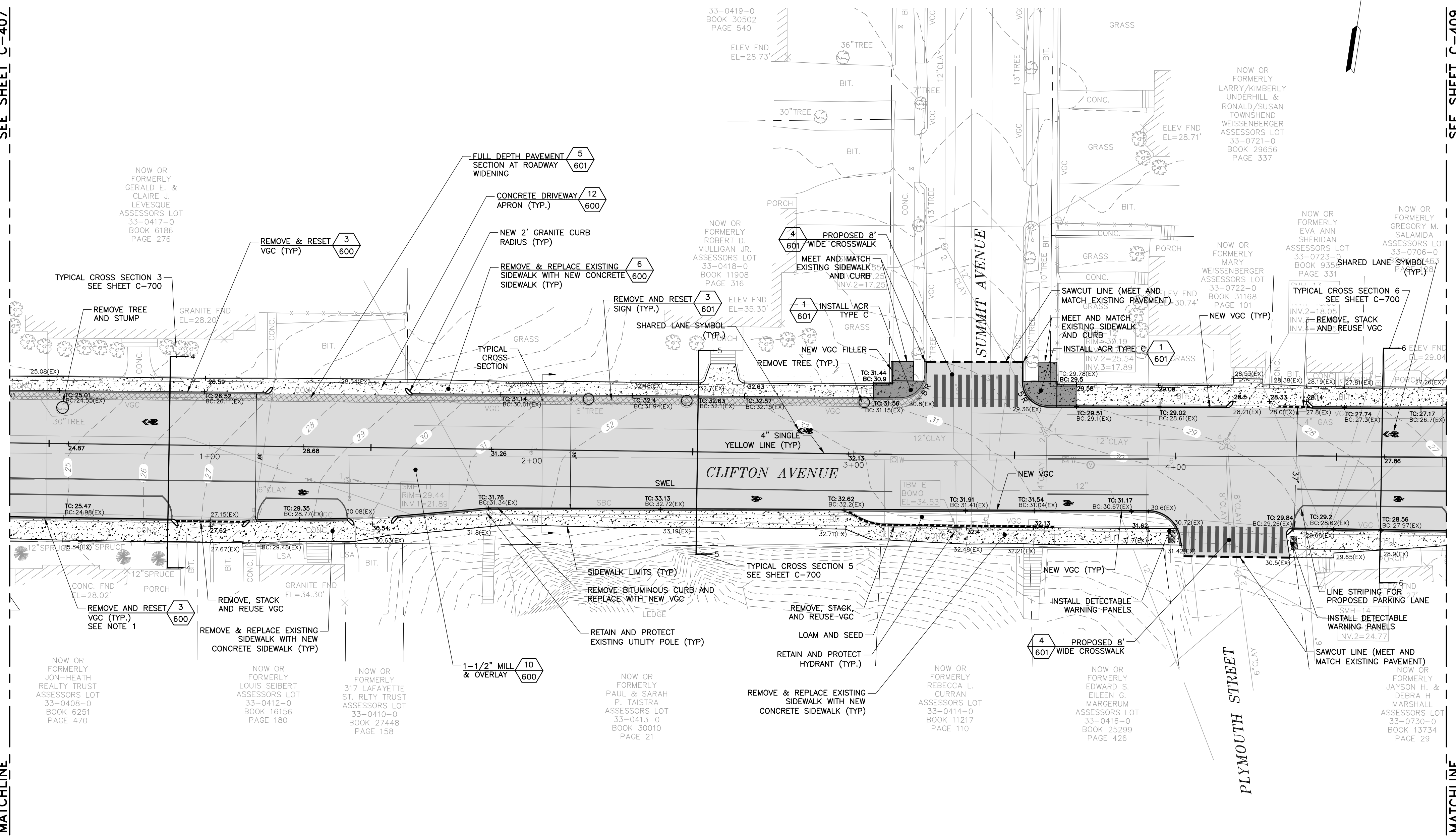
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SEE SHEET C-407

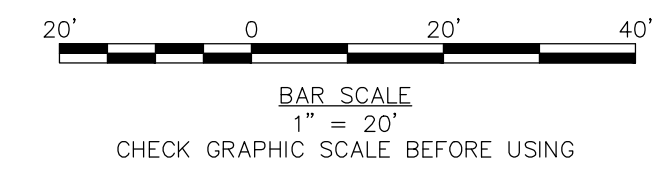
MATCHLINE

SEE SHEET C-409

MATCHLINE



- NOTE:
1. CONTRACTOR SHALL REPLACE DAMAGED OR UNUSABLE CURB WITH EXCESS GRANITE CURB FIRST PRIOR TO USING NEW GRANITE CURB.
 2. ALL SIGNS WITHIN LIMITS OF WORK SHALL BE REMOVED AND RE-INSTALLED WITH NEW POST IN ACCORDANCE WITH DETAIL #3 ON SHEET C-601



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CLIFTON AVENUE ROADWAY IMPROVEMENT PLAN-1

CITY OF SALEM, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

CONTRACT A
CANAL STREET
FLOOD MITIGATION PROJECT
SALEM, MASSACHUSETTS

JOB NO.: 228340.11
DATE: JANUARY 2017
SCALE: AS SHOWN
SHEET: 14 OF 46

C-408

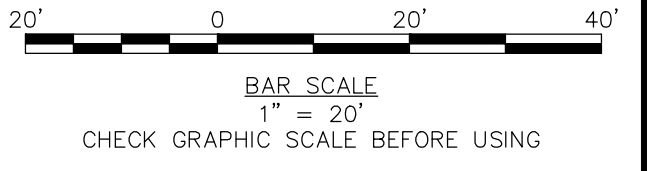
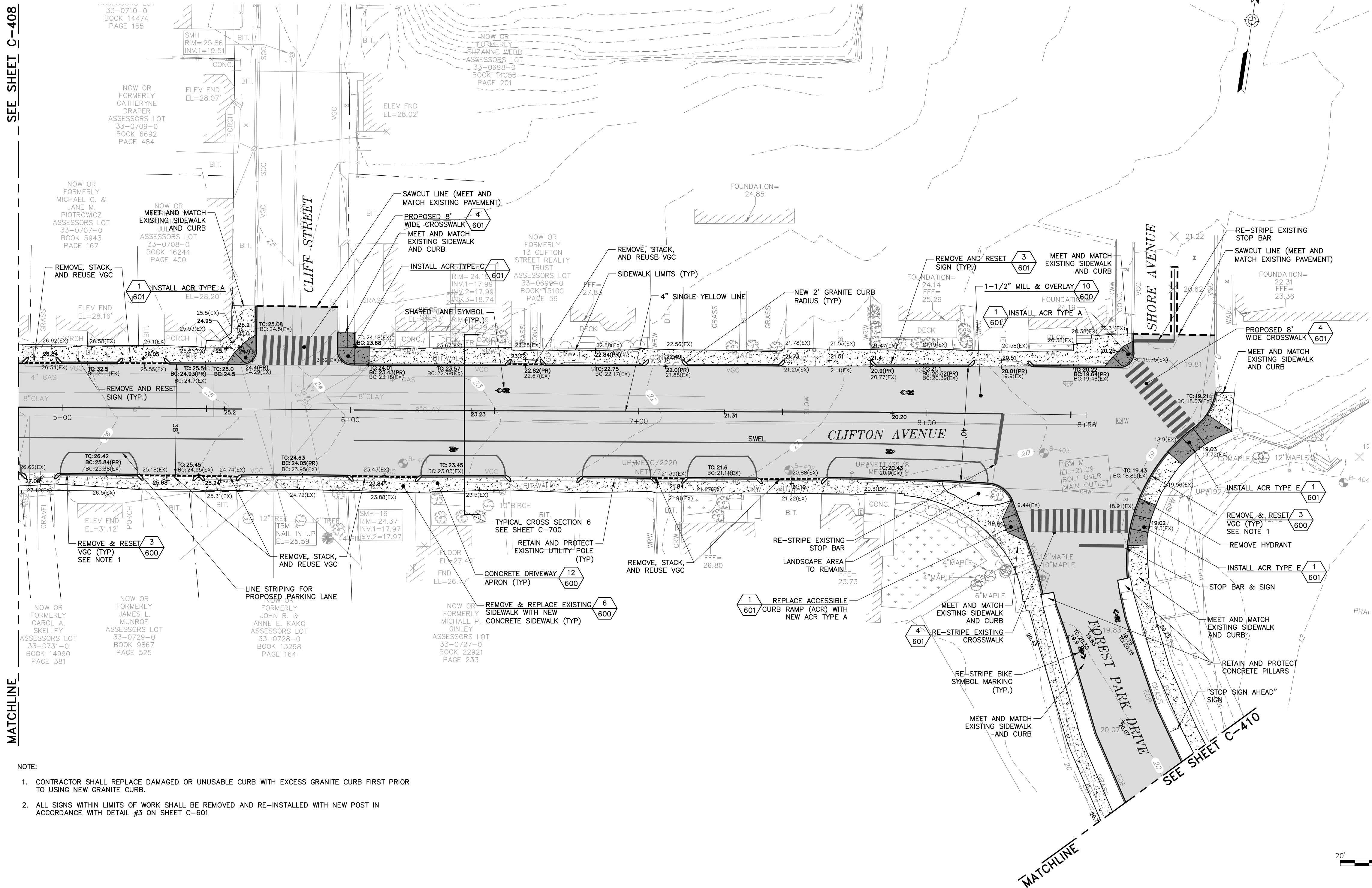
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SEE SHEET C-408

MATCHLINE

NOTE:

- 1. CONTRACTOR SHALL REPLACE DAMAGED OR UNUSABLE CURB WITH EXCESS GRANITE CURB FIRST PRIOR TO USING NEW GRANITE CURB.
- 2. ALL SIGNS WITHIN LIMITS OF WORK SHALL BE REMOVED AND RE-INSTALLED WITH NEW POST IN ACCORDANCE WITH DETAIL #3 ON SHEET C-601



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DRAWN BY: MB

CLIFTON AVENUE ROADWAY IMPROVEMENT PLAN-2

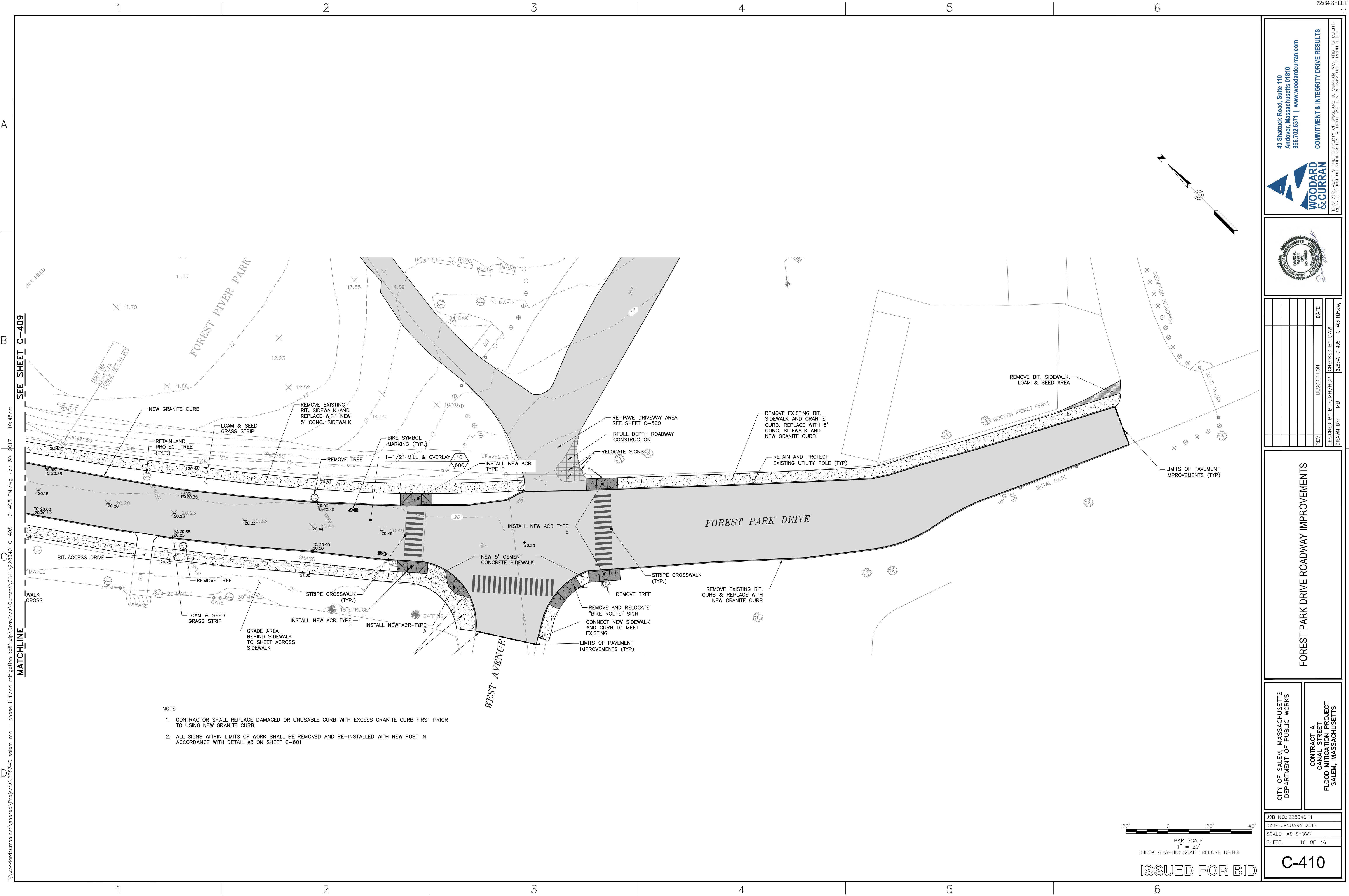
CITY OF SALEM, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

CONTRACT A
CANAL STREET
FLOOD MITIGATION PROJECT
SALEM, MASSACHUSETTS

JOB NO.: 228340.11
DATE: JANUARY 2017
SCALE: AS SHOWN
SHEET: 15 OF 46

C-409

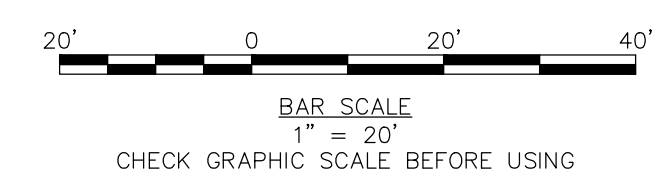
A
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SEE SHEET C-409

MATCHLINE

- NOTE:
- CONTRACTOR SHALL REPLACE DAMAGED OR UNUSABLE CURB WITH EXCESS GRANITE CURB FIRST PRIOR TO USING NEW GRANITE CURB.
 - ALL SIGNS WITHIN LIMITS OF WORK SHALL BE REMOVED AND RE-INSTALLED WITH NEW POST IN ACCORDANCE WITH DETAIL #3 ON SHEET C-601



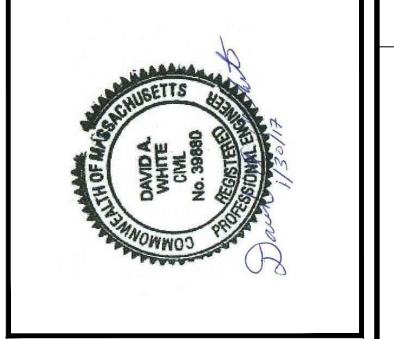
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DRAWN BY: MB
228340-C-405 - C-408 (M.dwg)

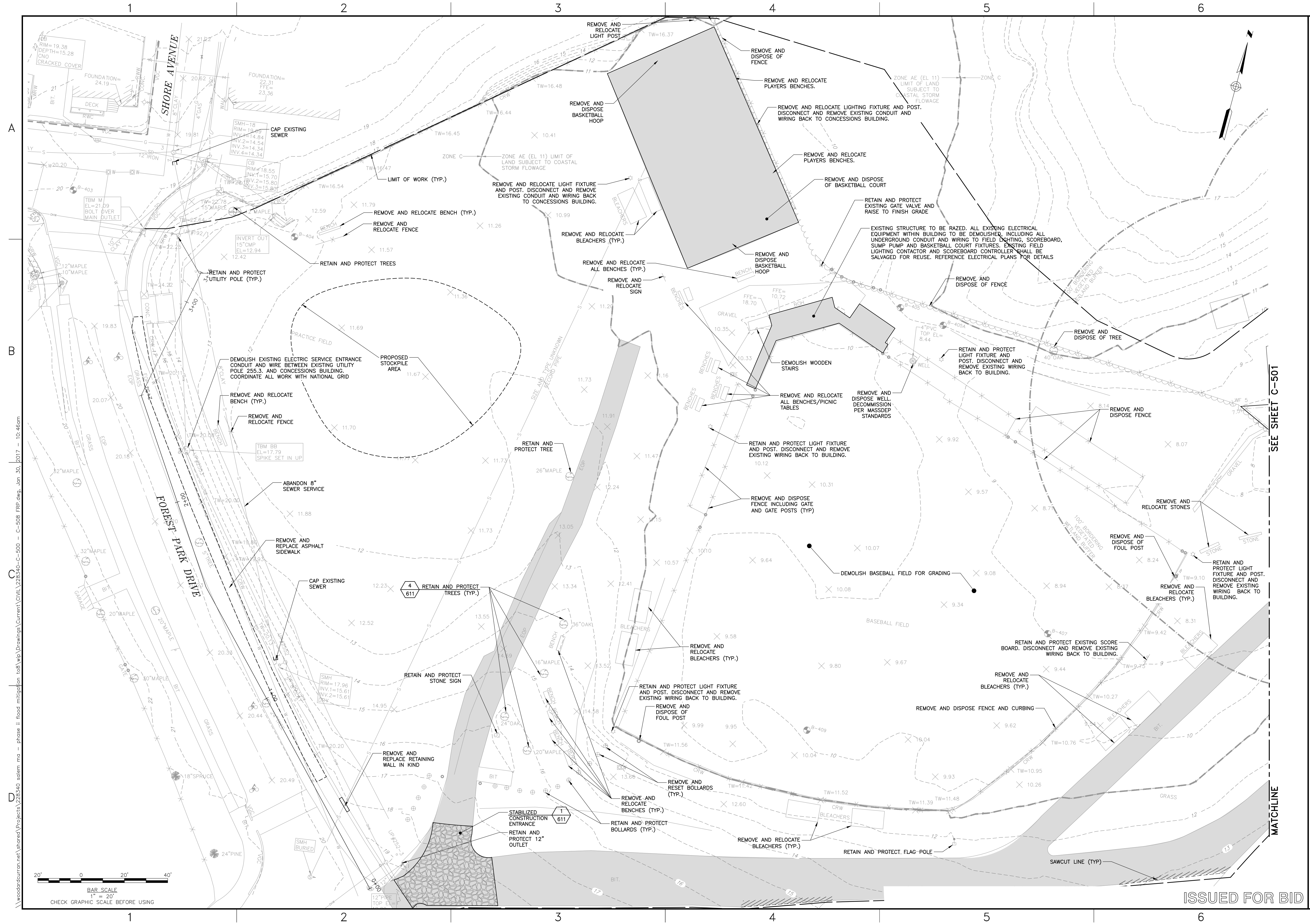
FOREST PARK DRIVE ROADWAY IMPROVEMENTS

CITY OF SALEM, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

CONTRACT A
CANAL STREET PROJECT
FLOOD MITIGATION PROJECT
SALEM, MASSACHUSETTS

JOB NO.: 228340.11
DATE: JANUARY 2017
SCALE: AS SHOWN
SHEET: 16 OF 46

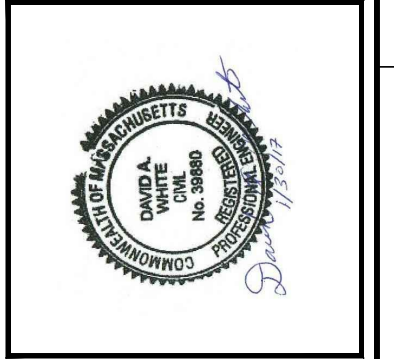
C-410



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DRAWN BY: ME 228340-C-500-C-508 (R-08)

FOREST RIVER PARK SITE PREPARATION PLAN-1

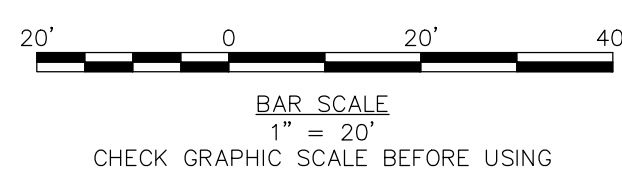
CITY OF SALEM, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

CONTRACT A
CANAL STREET AT
FLOOD MITIGATION PROJECT
SALEM, MASSACHUSETTS

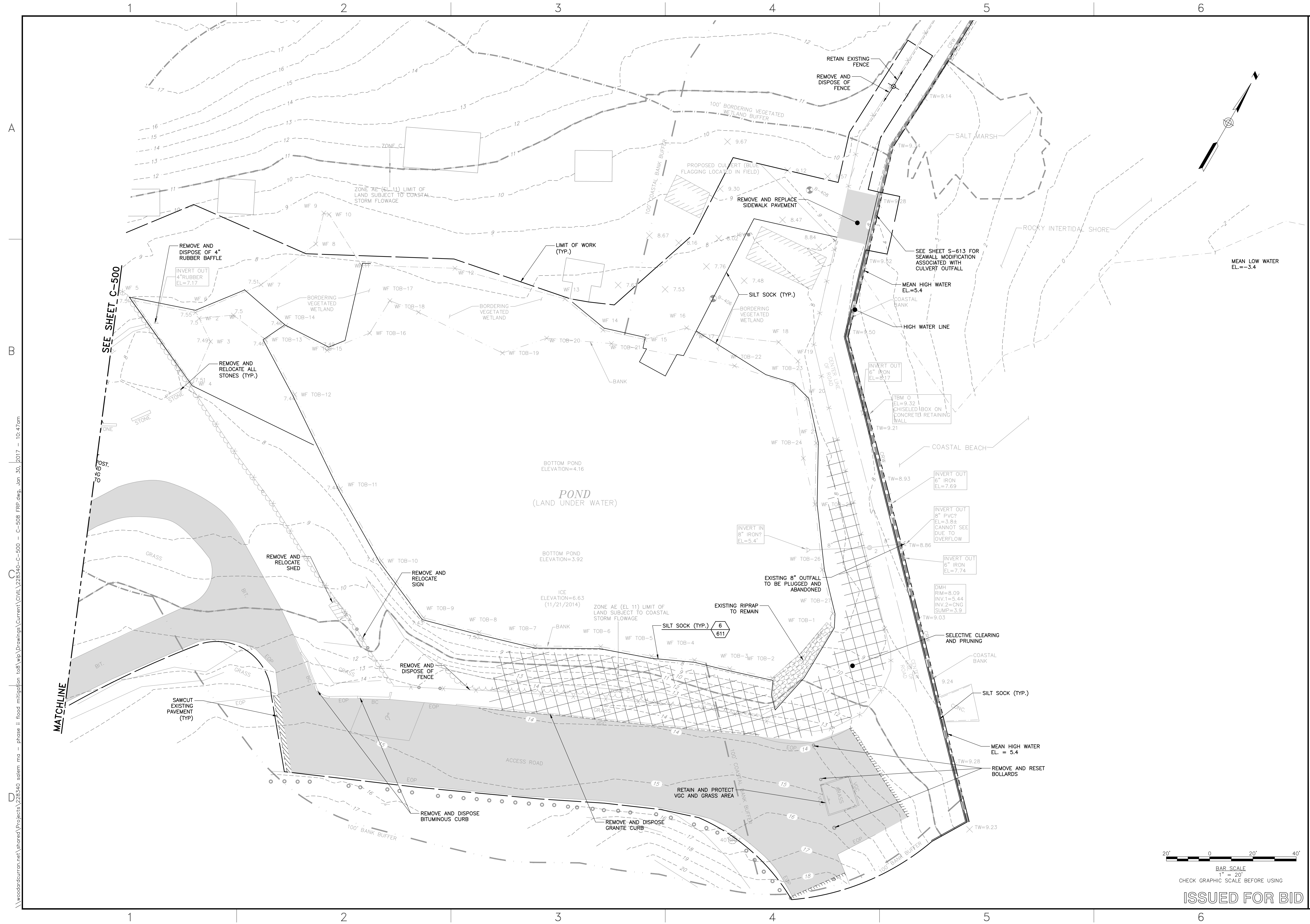
JOB NO.: 228340.11
DATE: JANUARY 2017
SCALE: AS SHOWN
SHEET: 17 OF 46

C-500

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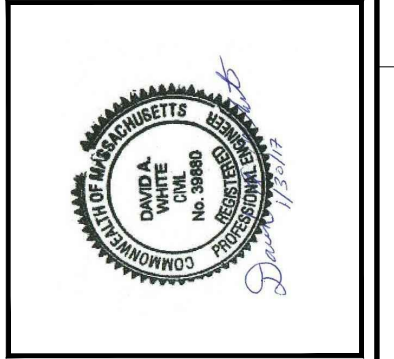
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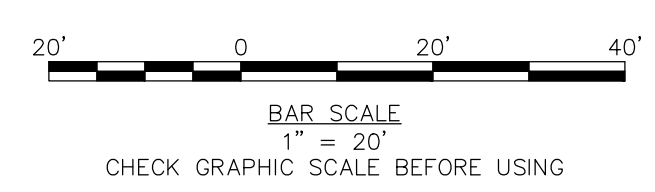
FOREST RIVER PARK SITE PREPARATION PLAN-2

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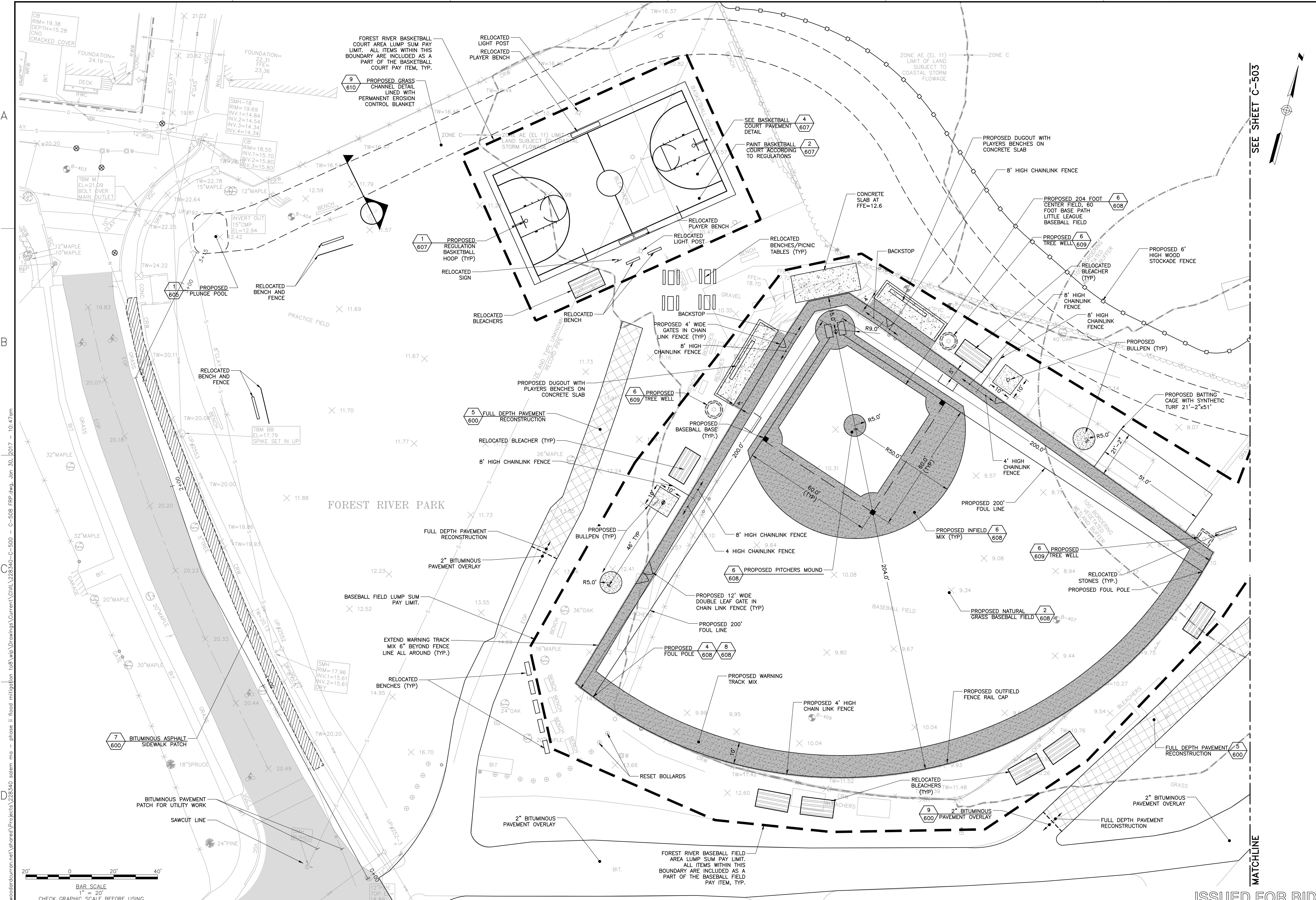
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MATCHLINE

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**FOREST RIVER PARK
 LAYOUT & MATERIALS
 PLAN-1**

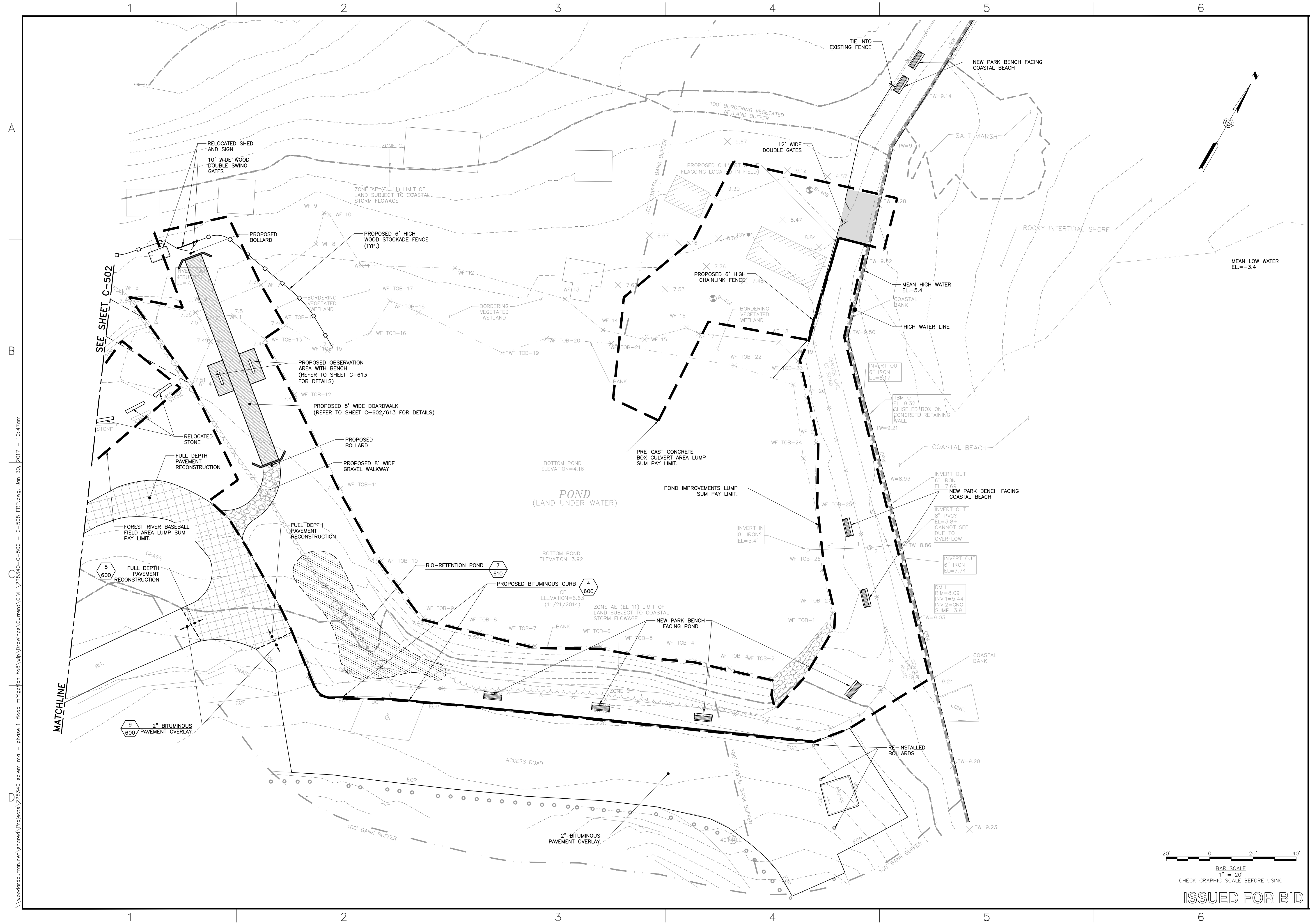
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 SHEET: 19 OF 46

C-502

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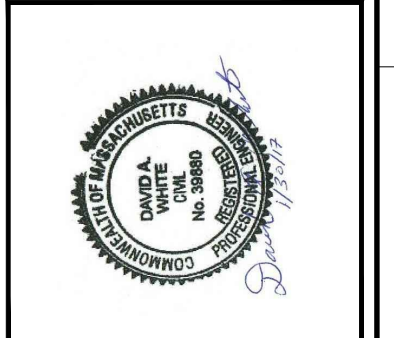


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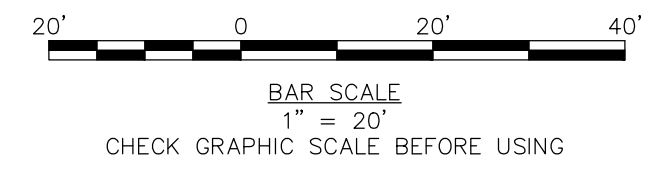
**FOREST RIVER PARK
LAYOUT & MATERIALS
PLAN-2**

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CANAL STREET PROJECT
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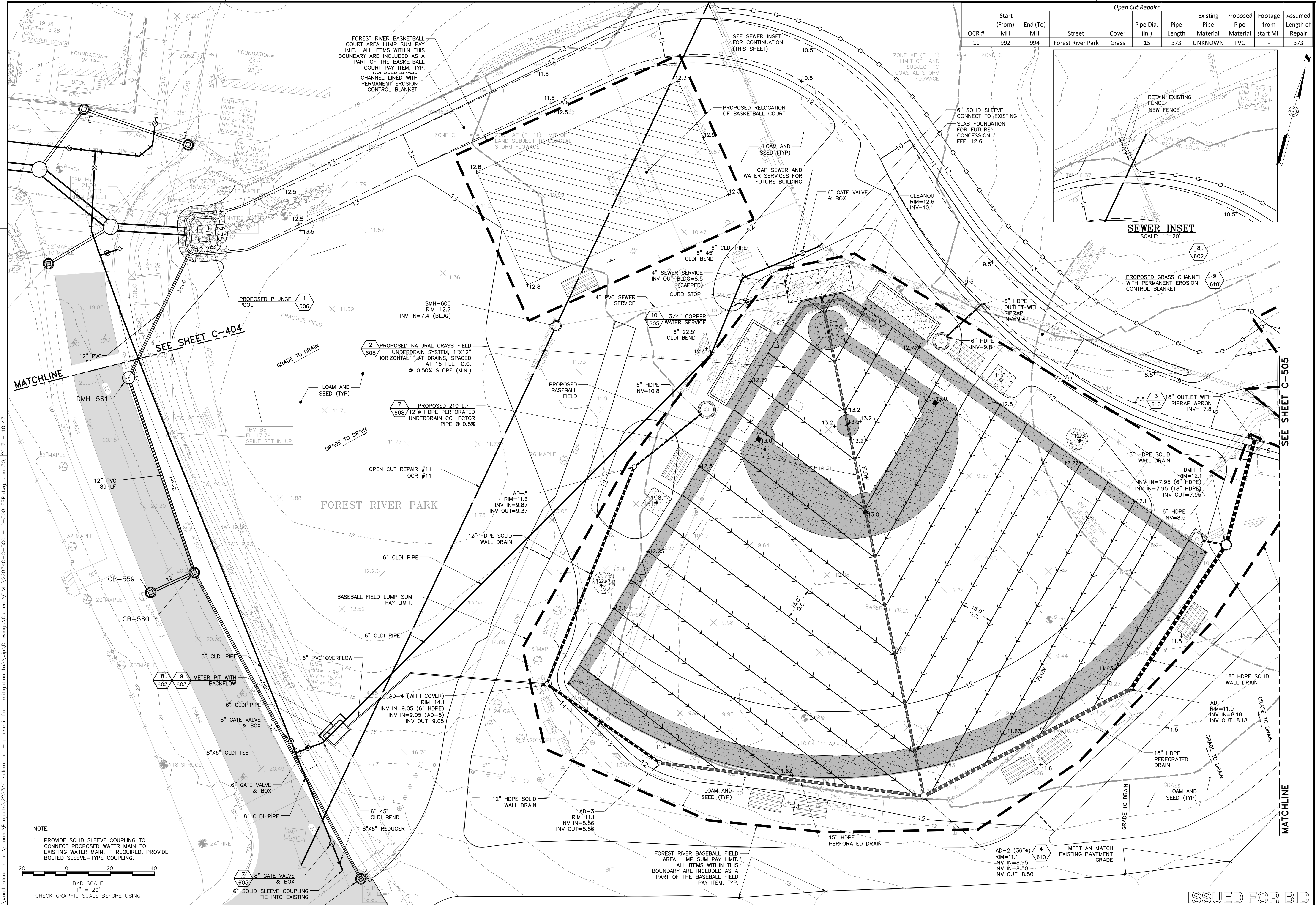
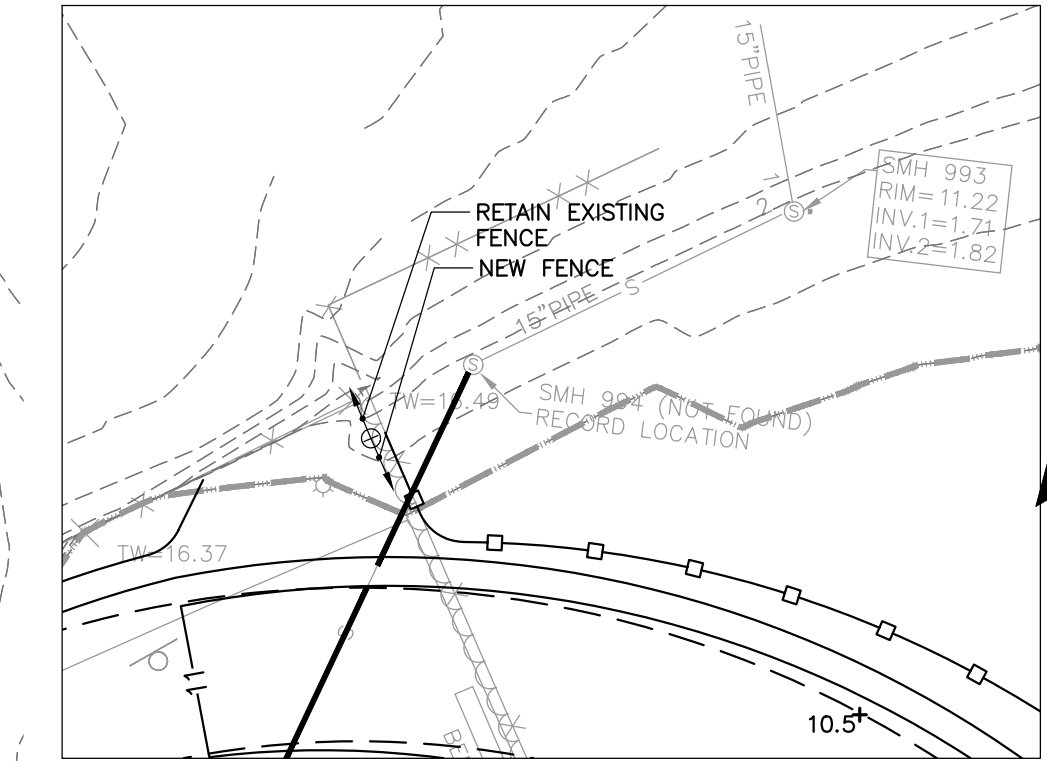
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| Open Cut Repairs | | | | | | | | | | |
|------------------|-----------------|-------------|-------------------|-------|-----------------|-------------|------------------------|------------------------|-----------------------|--------------------------|
| OCR # | Start (From) MH | End (To) MH | Street | Cover | Pipe Dia. (in.) | Pipe Length | Existing Pipe Material | Proposed Pipe Material | Footage from start MH | Assumed Length of Repair |
| 11 | 992 | 994 | Forest River Park | Grass | 15 | 373 | UNKNOWN | PVC | - | 373 |



NOTE:
 1. PROVIDE SOLID SLEEVE COUPLING TO CONNECT PROPOSED WATER MAIN TO EXISTING WATER MAIN. IF REQUIRED, PROVIDE BOLTED SLEEVE-TYPE COUPLING.

BAR SCALE
 1" = 20'
 CHECK GRAPHIC SCALE BEFORE USING

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**FOREST RIVER PARK
 GRADING, DRAINAGE &
 UTILITY PLAN-1**

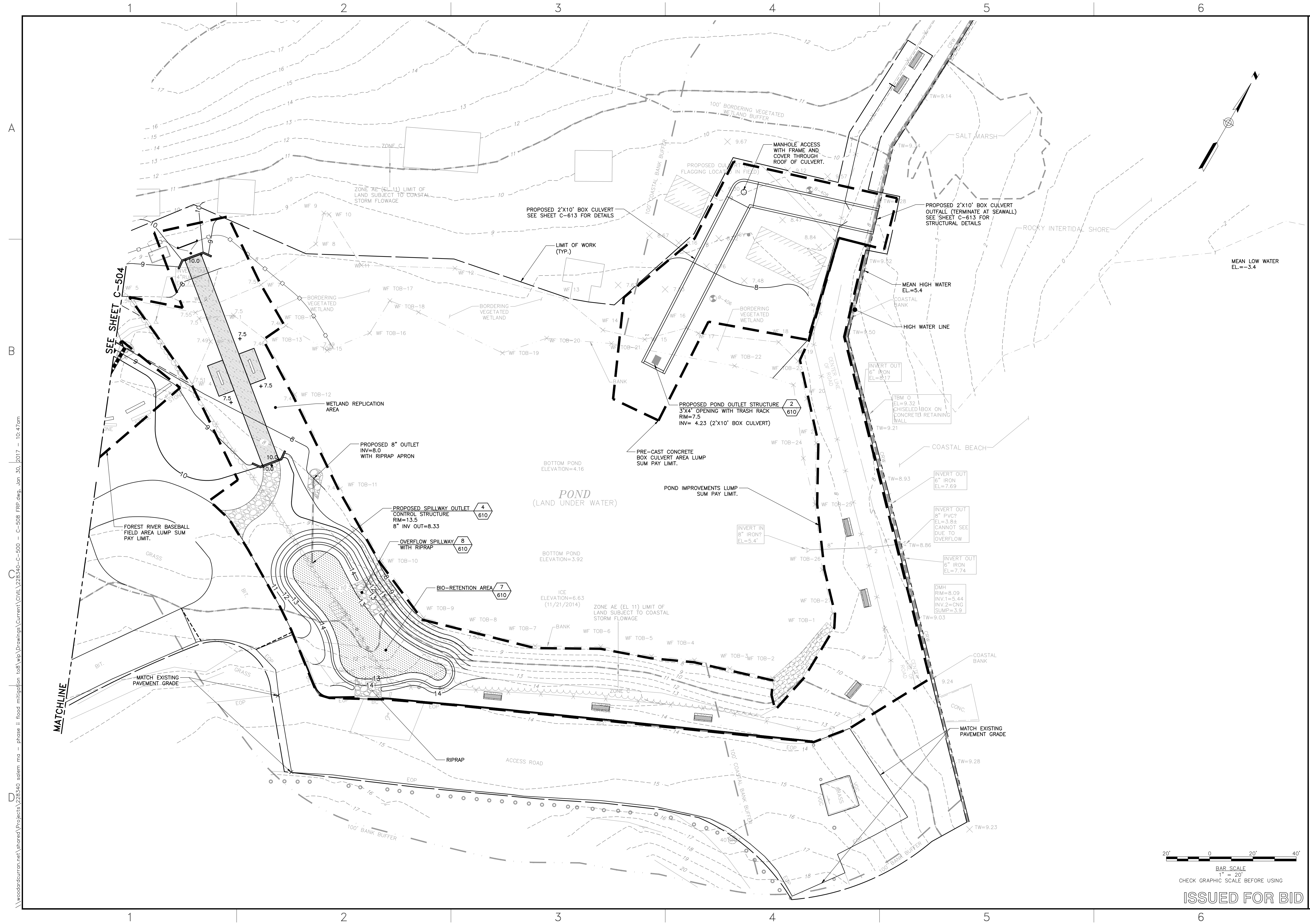
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C-504

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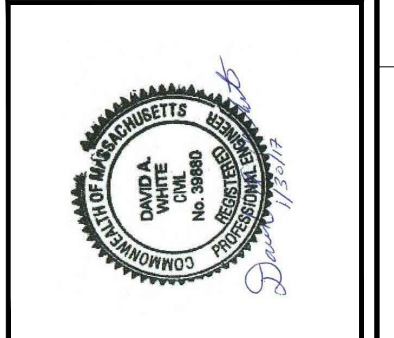
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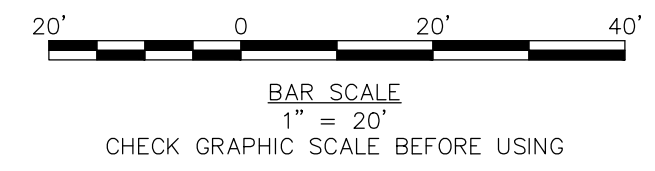
**FOREST RIVER PARK
 GRADING, DRAINAGE &
 UTILITY PLAN-2**

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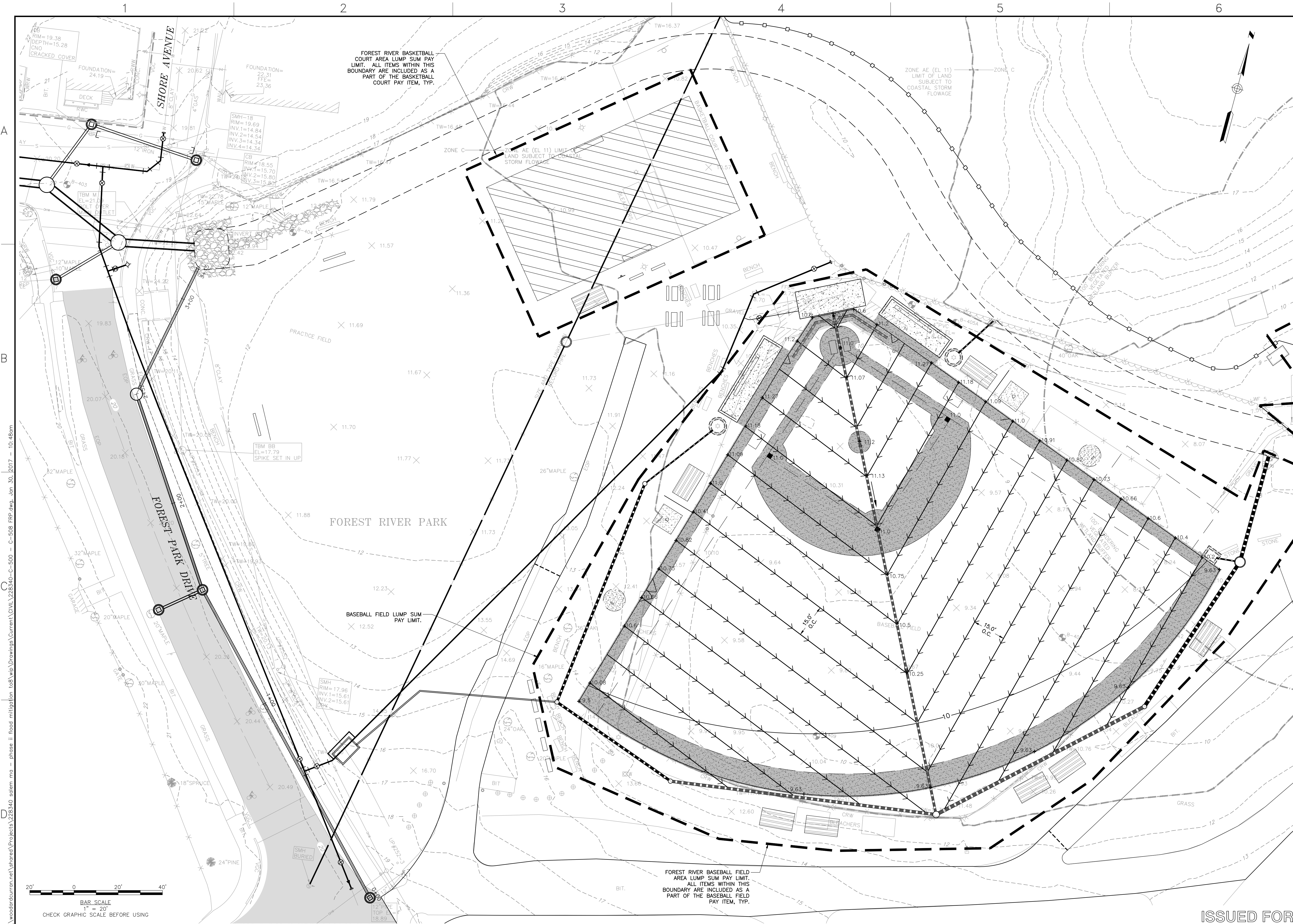
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 SALEM, MASSACHUSETTS

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 DATE: JANUARY 2017
 SCALE: 1" = 20'
 SHEET: 22 OF 46

C-505

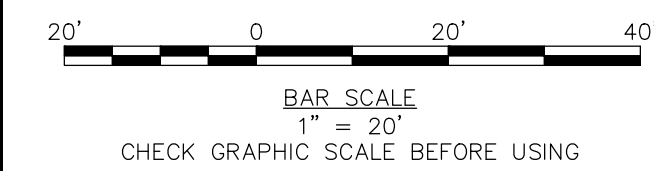


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FOREST RIVER BASKETBALL COURT AREA LUMP SUM PAY LIMIT. ALL ITEMS WITHIN THIS BOUNDARY ARE INCLUDED AS A PART OF THE BASKETBALL COURT PAY ITEM, TYP.

FOREST RIVER BASEBALL FIELD AREA LUMP SUM PAY LIMIT. ALL ITEMS WITHIN THIS BOUNDARY ARE INCLUDED AS A PART OF THE BASEBALL FIELD PAY ITEM, TYP.

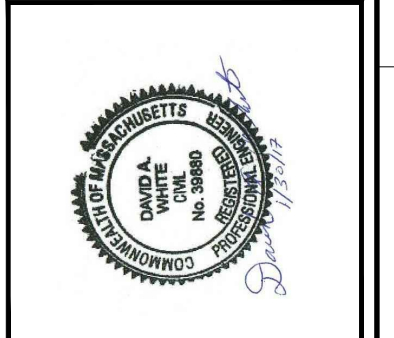


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**BASEBALL FIELD
SUBGRADE PLAN**

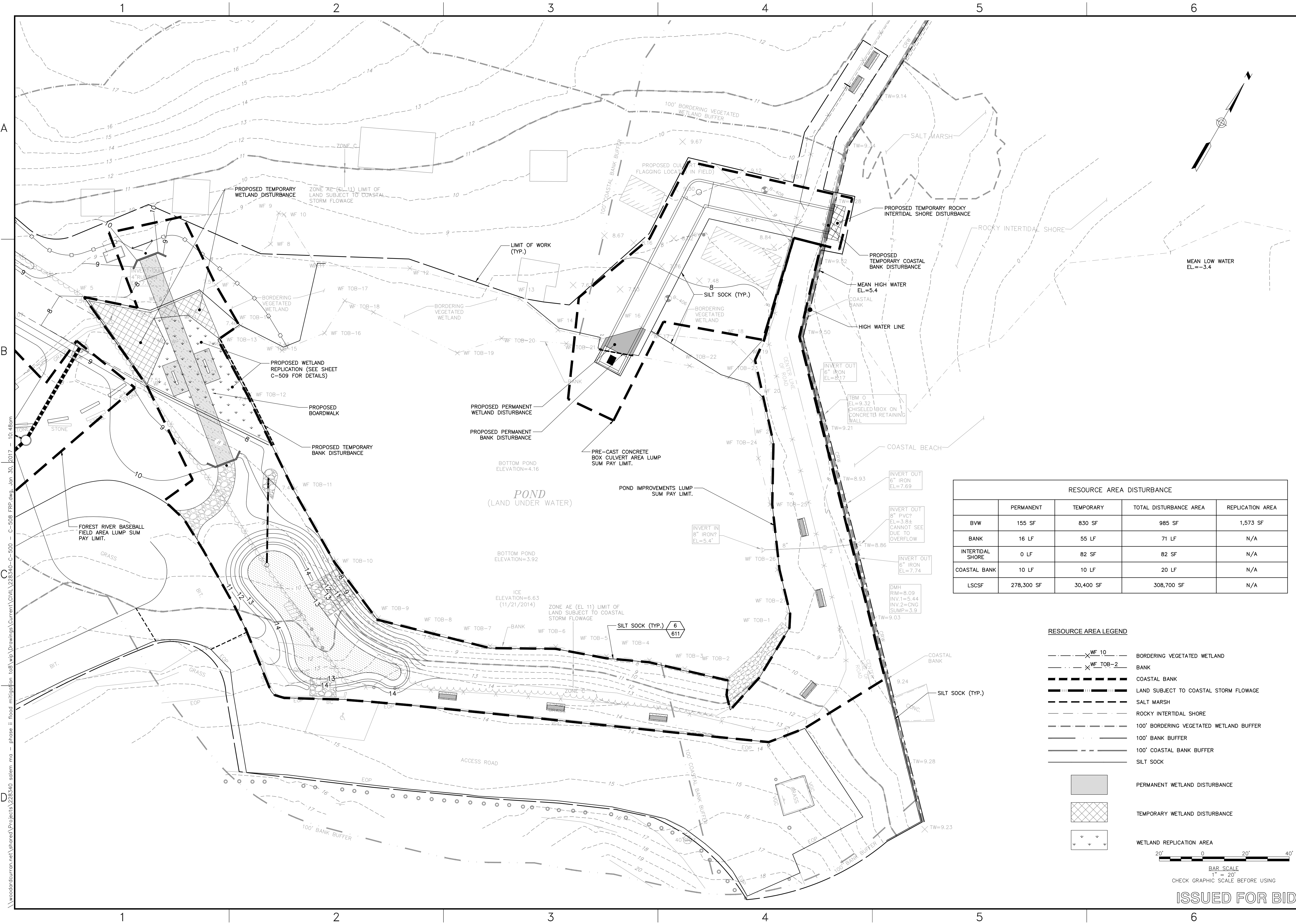
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DATE: JANUARY 2017
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SHEET: 23 OF 46

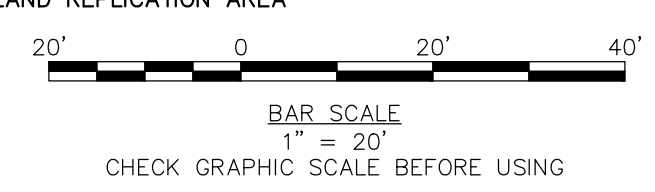
C-506

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| RESOURCE AREA DISTURBANCE | | | | |
|---------------------------|------------|-----------|------------------------|------------------|
| | PERMANENT | TEMPORARY | TOTAL DISTURBANCE AREA | REPLICATION AREA |
| BVW | 155 SF | 830 SF | 985 SF | 1,573 SF |
| BANK | 16 LF | 55 LF | 71 LF | N/A |
| INTERTIDAL SHORE | 0 LF | 82 SF | 82 SF | N/A |
| COASTAL BANK | 10 LF | 10 LF | 20 LF | N/A |
| LSCSF | 278,300 SF | 30,400 SF | 308,700 SF | N/A |

- RESOURCE AREA LEGEND**
- WF 10 BORDERING VEGETATED WETLAND
 - WF TOB-2 BANK
 - COASTAL BANK
 - LAND SUBJECT TO COASTAL STORM FLOWAGE
 - SALT MARSH
 - ROCKY INTERTIDAL SHORE
 - 100' BORDERING VEGETATED WETLAND BUFFER
 - 100' BANK BUFFER
 - 100' COASTAL BANK BUFFER
 - SILT SOCK
 - PERMANENT WETLAND DISTURBANCE
 - TEMPORARY WETLAND DISTURBANCE
 - WETLAND REPLICATION AREA

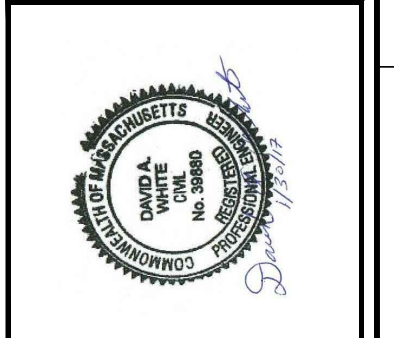


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DRAWN BY: ME 228340-C-508 FR.dwg

**WETLAND RESOURCE AREA
DISTURBANCE & MITIGATION PLAN**

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CANAL STREET PROJECT
FLOOD MITIGATION PROJECT
SALEM, MASSACHUSETTS

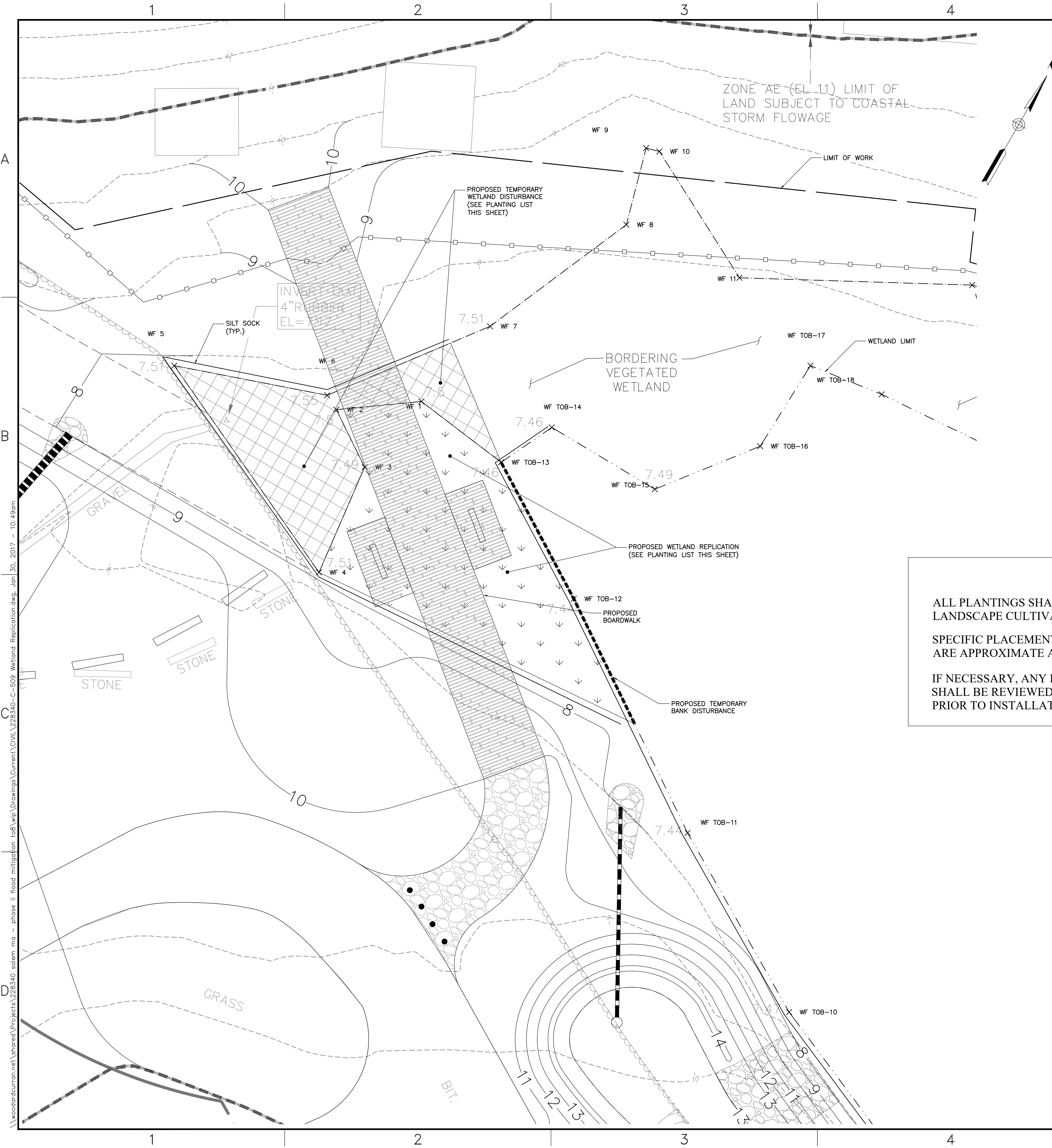
JOB NO.: 228340.11
DATE: JANUARY 2017
SCALE: AS SHOWN
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C-508

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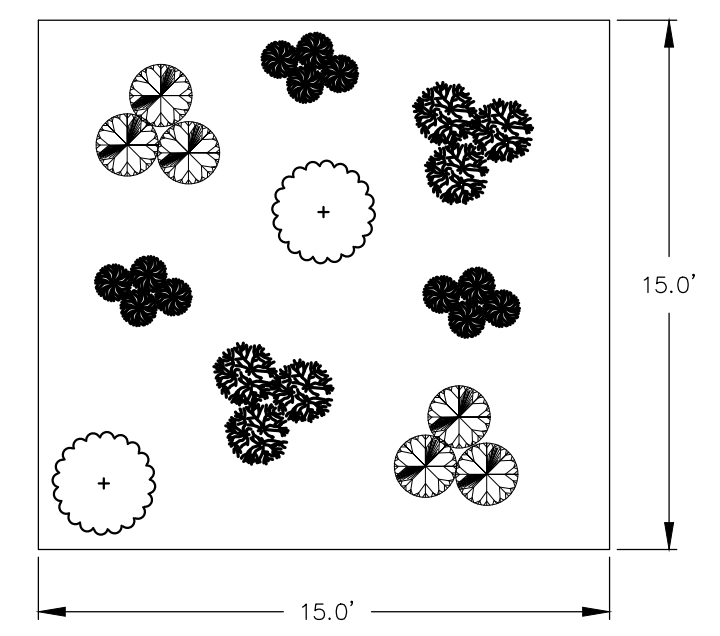
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| WETLAND REPLICATION PLANTING LIST | | | | |
|-----------------------------------|-------------------------------|-------------|--------------------------------------|-----|
| Common Name | Genus/Species | Size | Planting Specifications | No. |
| Trees | | | | |
| serviceberry | <i>Amelanchier canadensis</i> | 2 - 3' min. | singles, 10 feet o.c. | 14 |
| Shrubs | | | | |
| inkberry | <i>Ilex glabra</i> | 2 - 3' min. | in clusters of 2 to 4, 4-6 feet o.c. | 14 |
| arrowwood | <i>Viburnum dentatum</i> | 2 - 3' min. | in clusters of 2 to 4, 4-6 feet o.c. | 14 |
| Virginia rose | <i>Rosa virginiana</i> | 2 - 3' min. | in clusters of 2 to 4, 3-4 feet o.c. | 21 |

NOTE: THIS PLANTING LIST APPLIES TO BOTH WETLAND REPLICATION AREAS AND TEMPORARY WETLAND DISTURBANCE AREAS.

TYPICAL PLANTING SECTION



NOTES:
 ALL PLANTINGS SHALL BE NATIVE VARIETIES WITH NO LANDSCAPE CULTIVARS PROPOSED.
 SPECIFIC PLACEMENT OF SHRUBS WITHIN THE PLANTING AREA ARE APPROXIMATE AND MAY BE ADJUSTED IN THE FIELD.
 IF NECESSARY, ANY REQUIRED SUBSTITUTE NATIVE SHRUBS SHALL BE REVIEWED BY THE SALEM CONSERVATION AGENT PRIOR TO INSTALLATION.

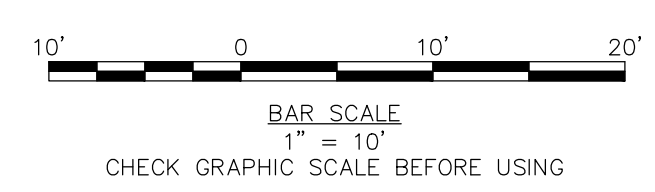
SEEDING SCHEDULE

| Northeast Wetland Diversity Mix <small>(1 pound will cover 21,750 sq. ft. @ 100' seeds per sq. ft.)</small> | | |
|--|---------------------------|------------------------|
| 28.82% | Scirpus atrovirens | green bulrush |
| 13.05% | Juncus effusus | soft rush |
| 12.01% | Mimulus ringens | monkey flower |
| 8.35% | Carex vulpinoidea | fox sedge |
| 7.83% | Penthorum sedoides | ditch stone crop |
| 6.68% | Glyceria grandis | reed meadow grass |
| 5.22% | Scirpus cyperinus | wool grass |
| 4.18% | Verbena hastata | blue vervain |
| 2.09% | Eupatorium perfoliatum | boneset |
| 1.57% | Leersia oryzoides | rice cut grass |
| 1.48% | Helenium autumnale | common sneezeweed |
| 1.36% | Glyceria canadensis | Canada mannagrass |
| 0.89% | Eupatorium maculatum | Joe pye weed |
| 0.73% | Aster novae-angliae | New England aster |
| 0.52% | Alisma plantago-aquatica | water plantain |
| 0.47% | Euthamia graminifolia | grassleaf goldenrod |
| 0.47% | Solidago rugosa | wrinkled goldenrod |
| 0.47% | Cyperus strigosus | straw stemmed aster |
| 0.42% | Aster puniceus | purple stemmed aster |
| 0.38% | Cephalanthus occidentalis | buttonbush |
| 0.36% | Scirpus tabernaemontani | soft stem bulrush |
| 0.35% | Aster umbellatus | flat-top white aster |
| 0.31% | Carex comosa | bearded sedge |
| 0.26% | Carex crinita | fringed sedge |
| 0.24% | Solidago gigantea | giant goldenrod |
| 0.24% | Bidens cernua | deertongue |
| 0.22% | Panicum clandestinum | water parsnip |
| 0.21% | Sium suave | small fruited bulrush |
| 0.18% | Scirpus microcarpus | nodding beggar-ticks |
| 0.16% | Cicuta maculata | water hemlock |
| 0.10% | Elymus canadensis | wild rye |
| 0.08% | Bidens frondosa | devil's beggar-ticks |
| 0.06% | Angelica atropurpurea | purple-stem angelica |
| 0.05% | Rumex verticillatus | water dock |
| 0.05% | Carex lurida | shallow sedge |
| 0.04% | Polygonum pensylvanicum | Pennsylvania smartweed |
| 0.04% | Asclepias incarnata | swamp milkweed |
| 0.03% | Elymus riparius | riverbank wild rye |
| 0.02% | Carex lupulina | hop sedge |
| 0.01% | Iris versicolor | blue flag |

NOTE: INSTALL SEED MIX ON ALL WETLAND DISTURBANCE AREA

RESOURCE AREA LEGEND

- WF 10 — BORDERING VEGETATED WETLAND
- WF TOB-2 — BANK
- LAND SUBJECT TO COASTAL STORM FLOWAGE
- 100' BORDERING VEGETATED WETLAND BUFFER
- 100' BANK BUFFER
- SILT SOCK
- TEMPORARY WETLAND DISTURBANCE
- WETLAND REPLICATION AREA



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DESIGNED BY: BT/AMH/HCP CHECKED BY: DAN/AB 228340-C-509 WETLAND REPLICATION PLAN
DRAWN BY: ME

WETLAND REPLICATION PLAN

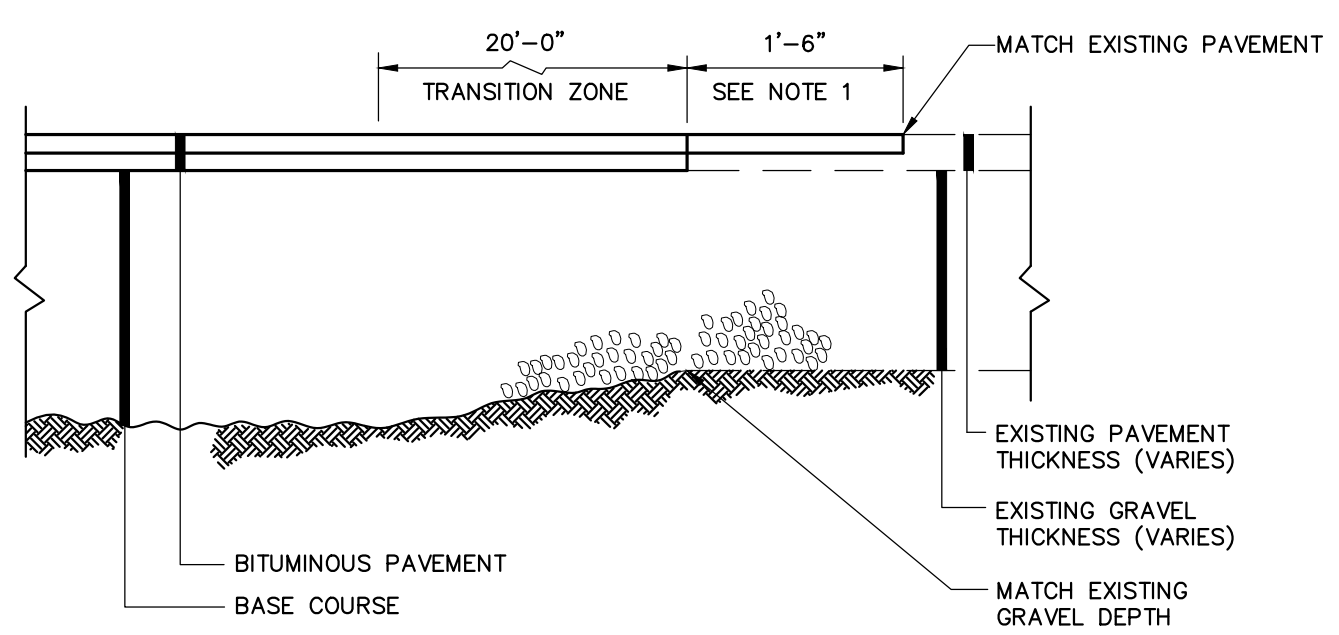
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SALEM, MASSACHUSETTS

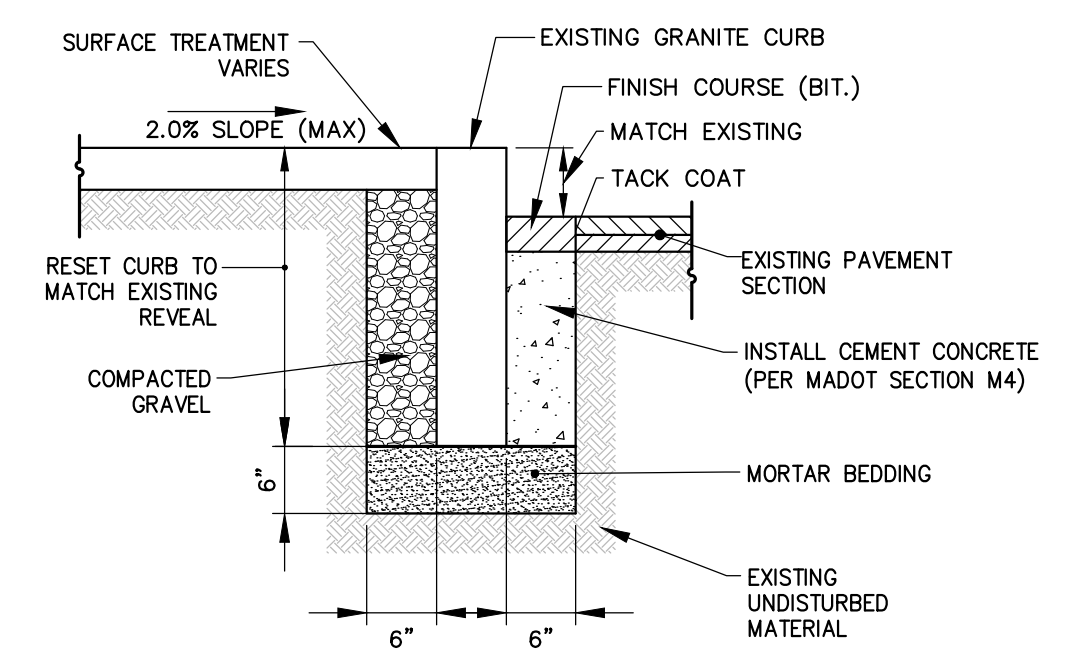
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C-509

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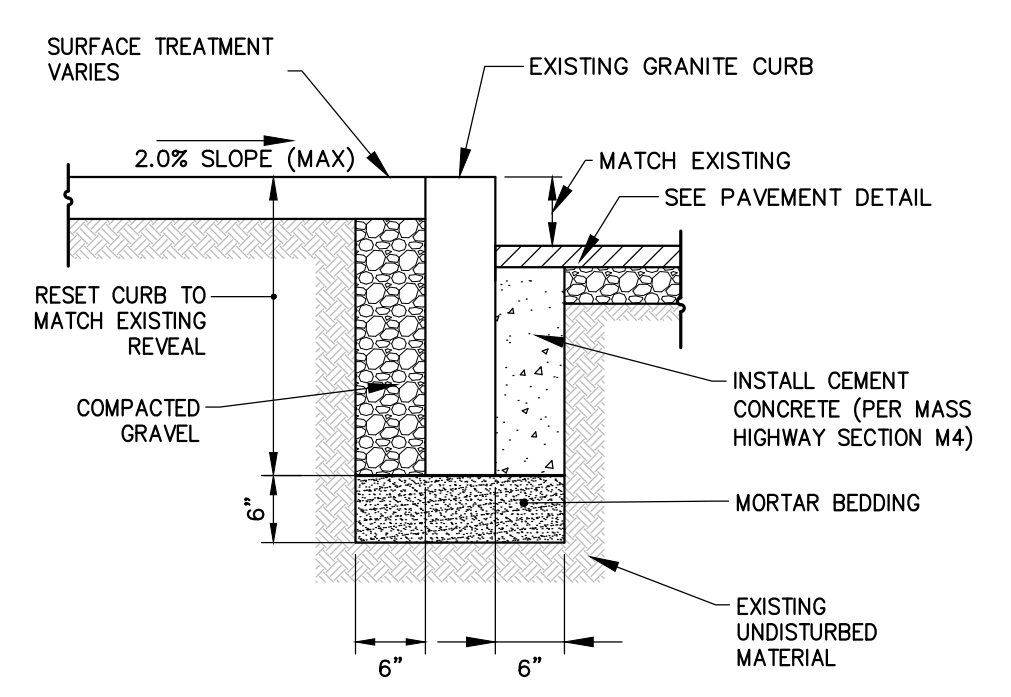


1 PAVEMENT BUTT JOINT DETAIL
NOT TO SCALE



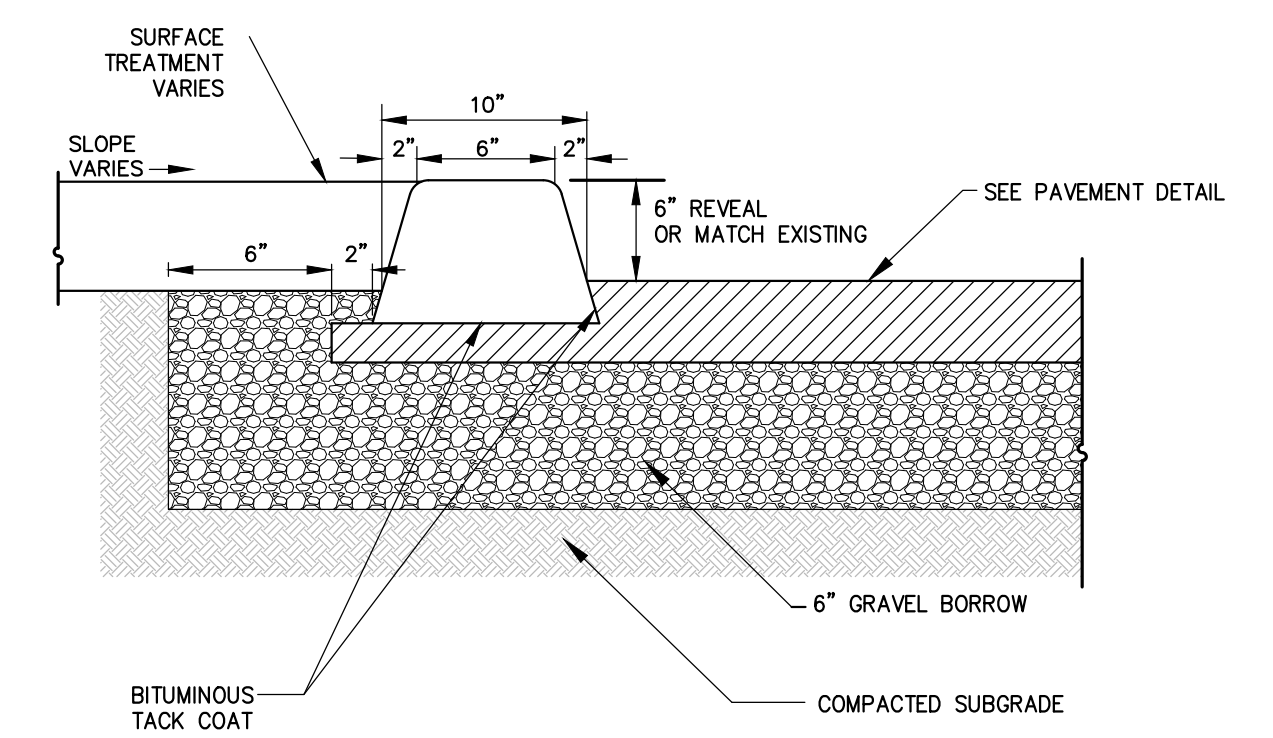
- NOTE:**
1. THIS PROCEDURE IS APPLICABLE ONLY IF CURB IS TO BE SET AFTER BASE AND/OR BINDER ARE IN PLACE, OR SET IN EXISTING PAVEMENT.
 2. SAWCUT NEAT LINE 6" FROM CURB LINE AND REMOVE BINDER, BASE AND GRAVEL, REPLACE WITH CEMENT CONCRETE.
 3. ANY DESIGNATED CEMENT CONCRETE THAT IS ACCEPTABLE UNDER SECTION M4 OF THE MASS HIGHWAY STANDARD SPECIFICATIONS MAY BE USED; ALL TEST REQUIREMENTS ARE WAVED. HOT MIX ASPHALT SHALL NOT BE USED AS A SUBSTITUTE.
 4. PAYMENT PER FOOT OF CURB IS INCLUSIVE OF ALL ITEMS OF WORK REQUIRED TO COMPLETE PROPER INSTALLATION OF THE CURB.

2 SET GRANITE CURB (INSTALLATION IN EXISTING PAVEMENT)
NOT TO SCALE

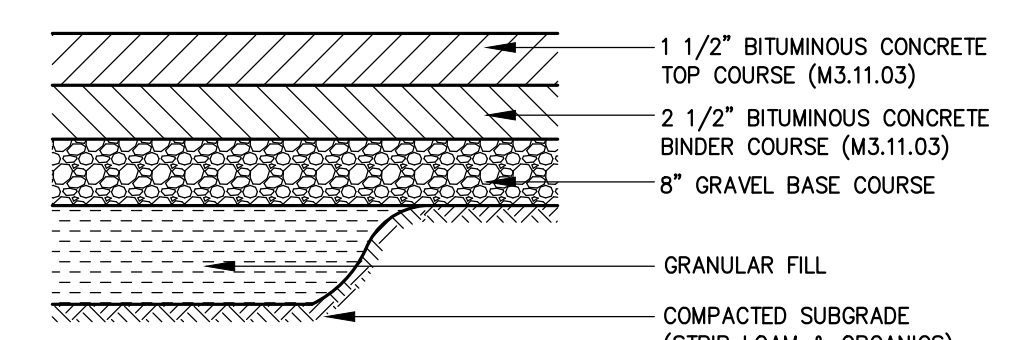


- NOTE:**
1. ANY DESIGNATED CEMENT CONCRETE THAT IS ACCEPTABLE UNDER SECTION M4 OF THE MASS HIGHWAY STANDARD SPECIFICATIONS MAY BE USED; ALL TEST REQUIREMENTS ARE WAVED. HOT MIX ASPHALT SHALL NOT BE USED AS A SUBSTITUTE.
 2. PAYMENT PER FOOT OF CURB IS INCLUSIVE OF ALL ITEMS OF WORK REQUIRED TO COMPLETE PROPER INSTALLATION OF THE CURB.

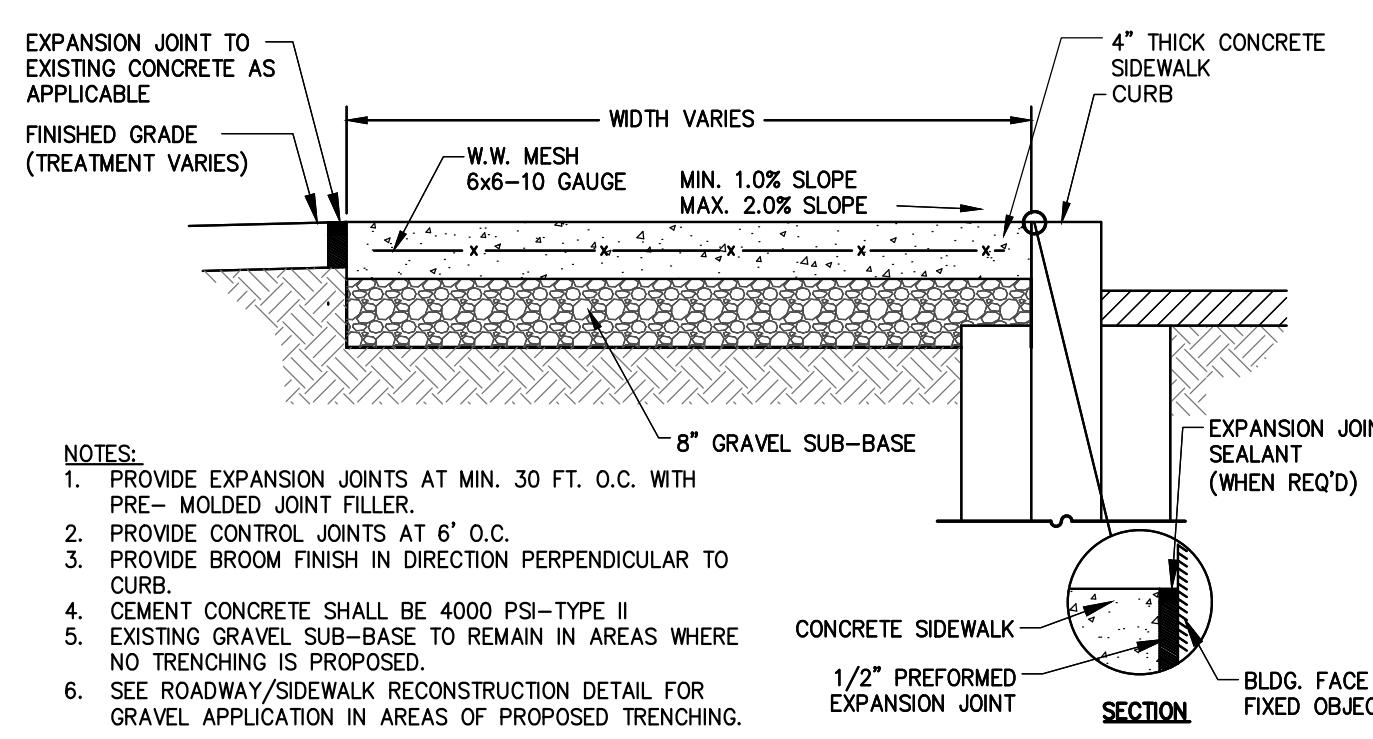
3 RESET EXISTING GRANITE CURB (INSTALLATION IN NEW PAVEMENT)
NOT TO SCALE



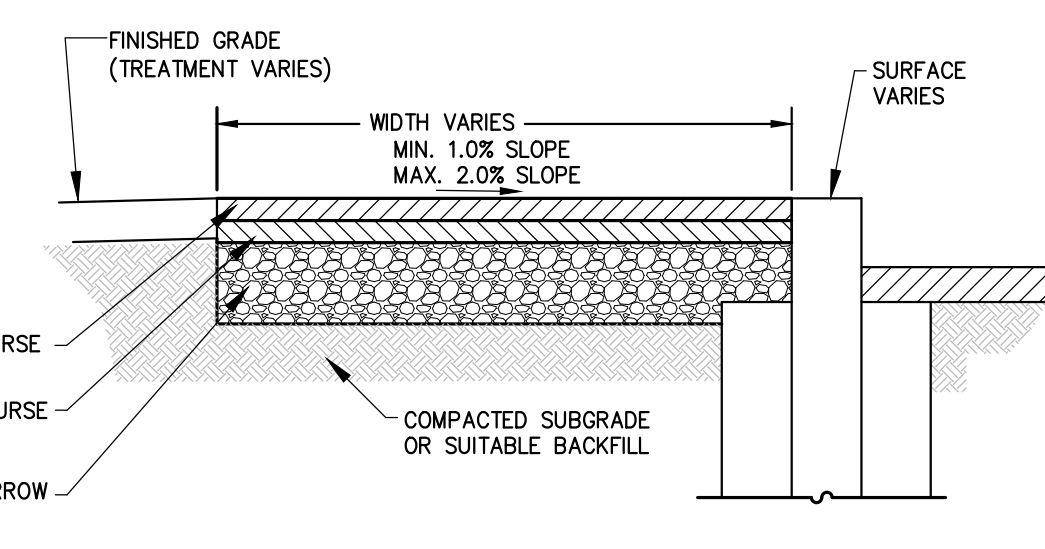
4 BITUMINOUS CURB
NOT TO SCALE



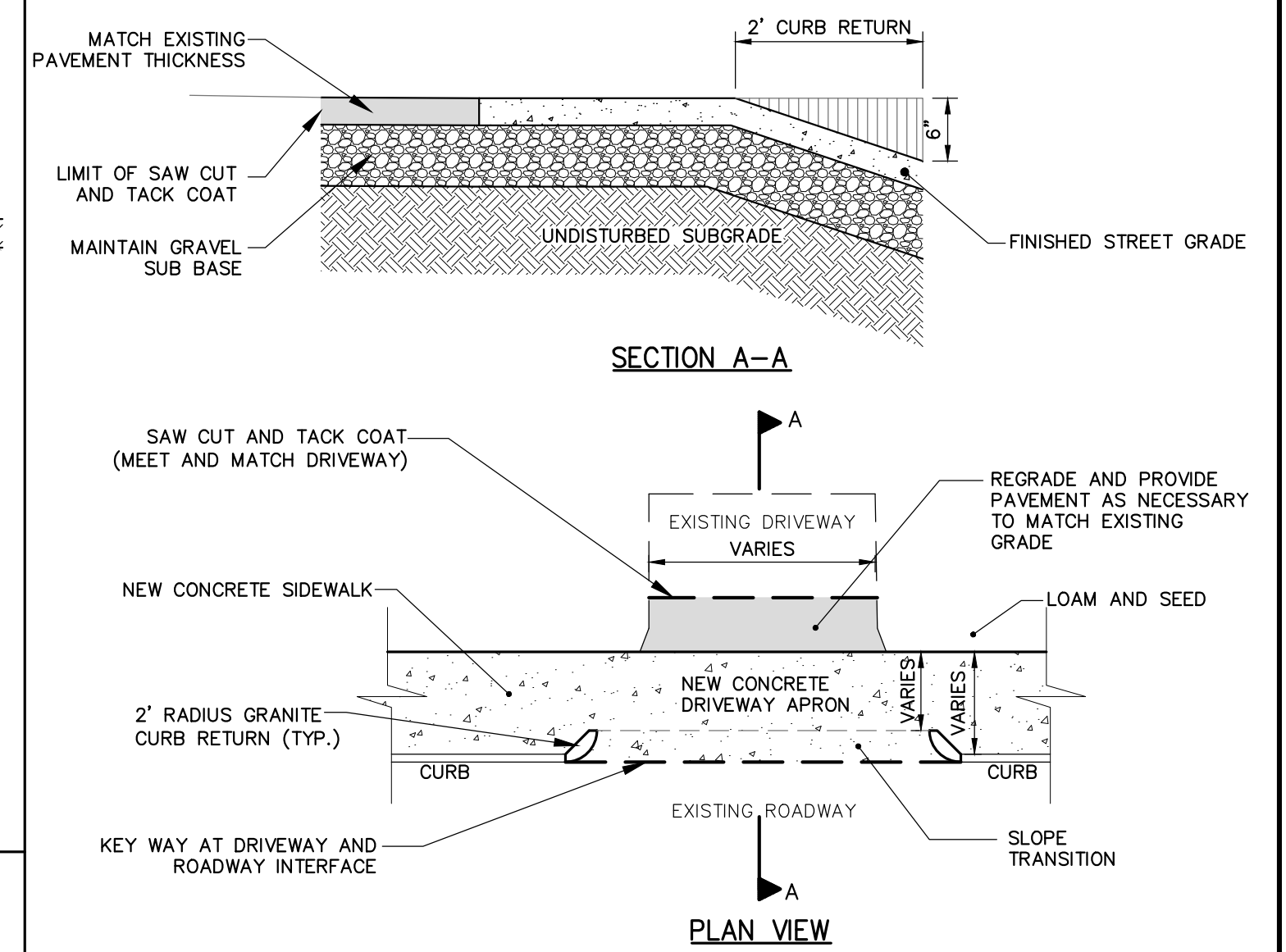
5 TYPICAL BITUMINOUS CONCRETE PAVEMENT PARKING LOT / ACCESS ROAD DETAIL
NOT TO SCALE



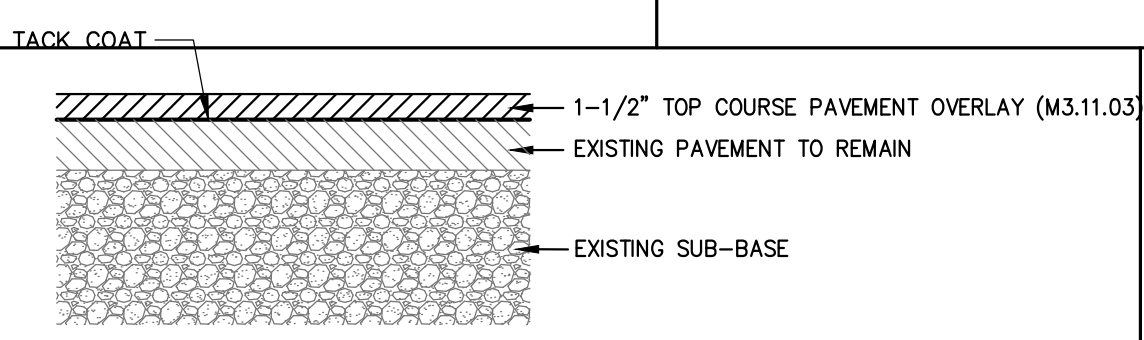
6 TYPICAL CEMENT CONCRETE SIDEWALK DETAIL
NOT TO SCALE



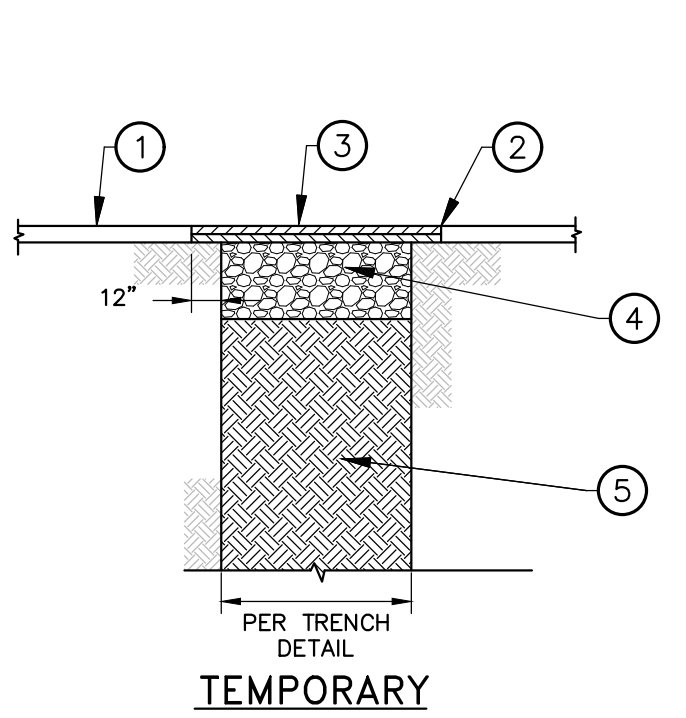
7 TYPICAL BITUMINOUS CONCRETE SIDEWALK
NOT TO SCALE



8 RECONSTRUCT PAVEMENT (DRIVEWAY)
NOT TO SCALE

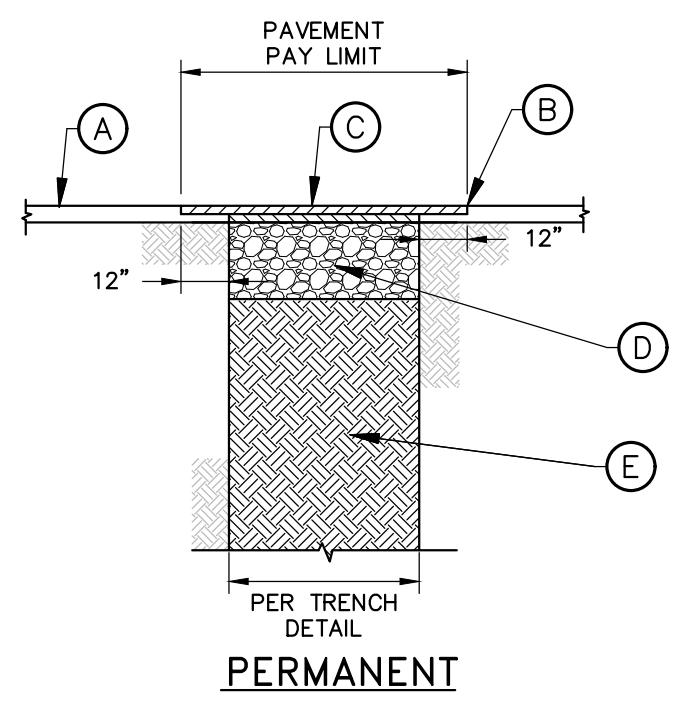


9 PAVEMENT OVERLAY SECTION
NOT TO SCALE

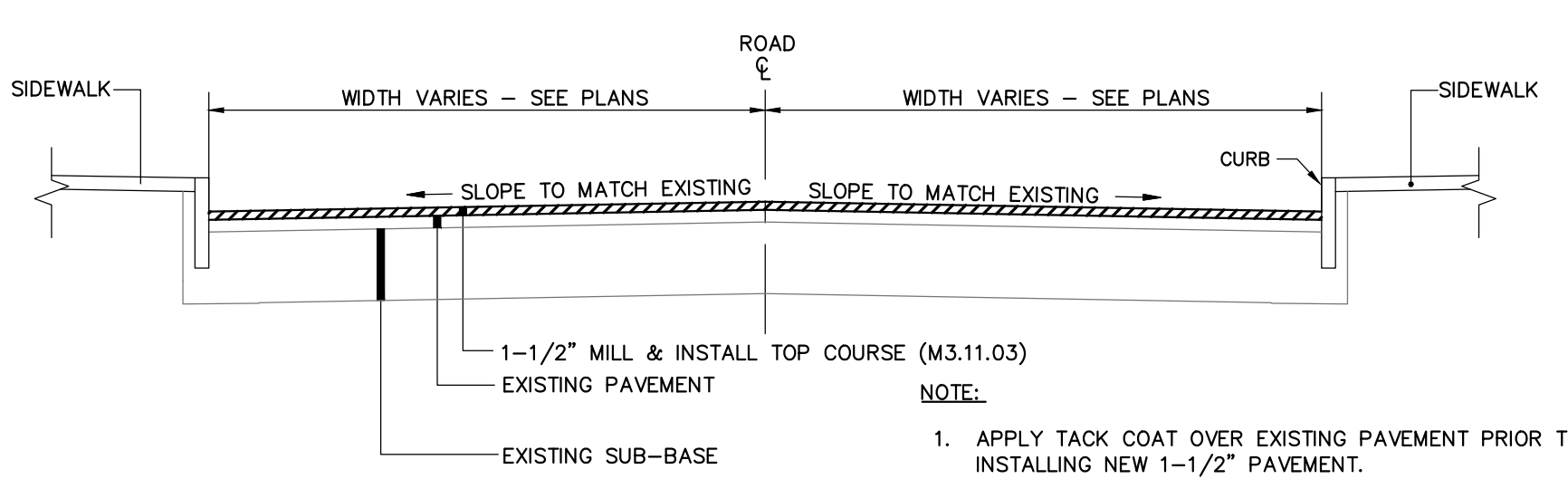


- NOTES:**
- 1 EXISTING PAVEMENT
 - 2 SAWCUT, TACK COAT EDGES (TYP)
 - 3 4" BINDER COURSE (2-1/2" AND 1-1/2" LIFTS)
 - 4 12" GRAVEL BORROW
 - 5 FINAL BACKFILL PER TRENCH DETAIL

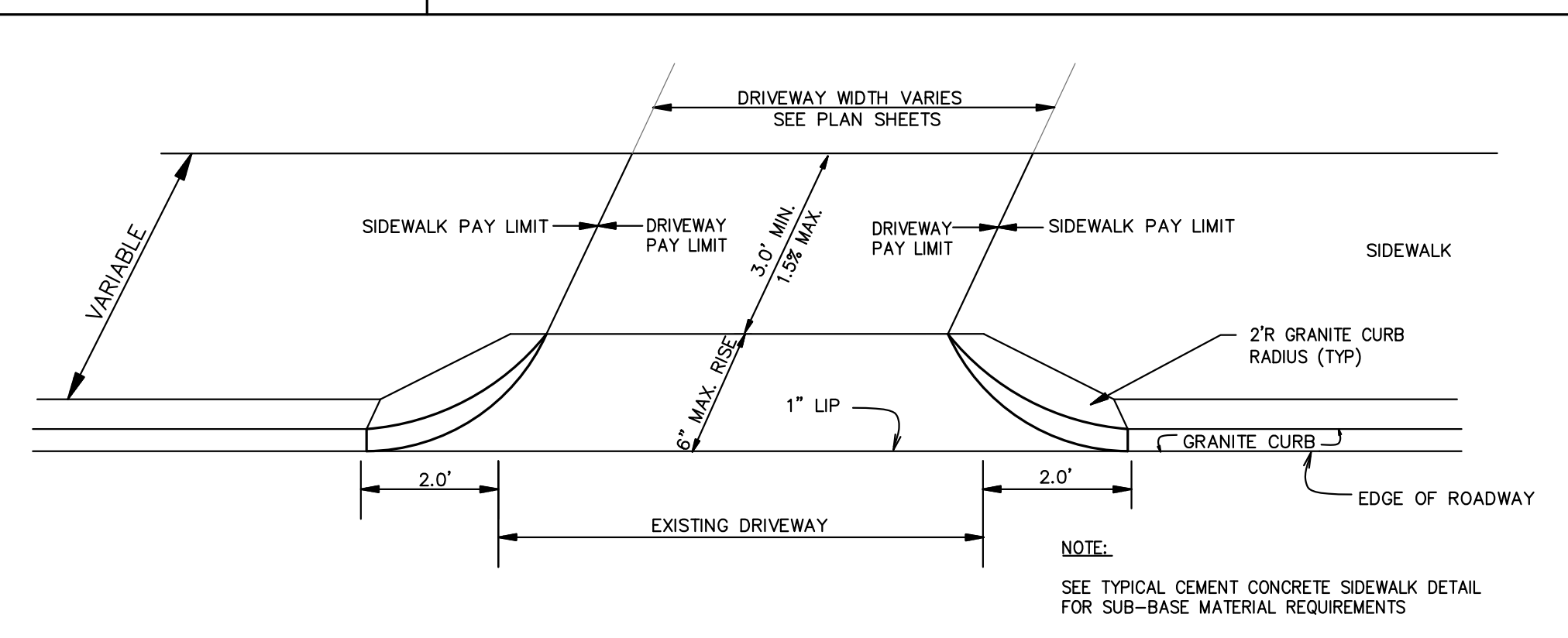
11 PAVEMENT DETAIL
NOT TO SCALE



- NOTES:**
- A EXISTING PAVEMENT
 - B SAWCUT, TACK COAT EDGES (TYP) SEAL JOINTS BY INFRARED TECHNIQUES
 - C 1 1/2" BIT. CONC. TOP COURSE
 - D 2 1/2" BIT. CONC. BINDER COURSE OR MATCH EXISTING PAVEMENT SECTION IF > 4".
 - E FINAL BACKFILL PER TRENCH DETAIL



10 MILL AND OVERLAY SECTION
NOT TO SCALE



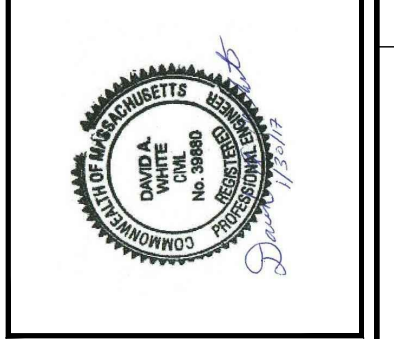
12 TYPICAL CONCRETE DRIVEWAY DETAIL
NOT TO SCALE

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DRAWN BY: ME

CIVIL DETAILS - 1

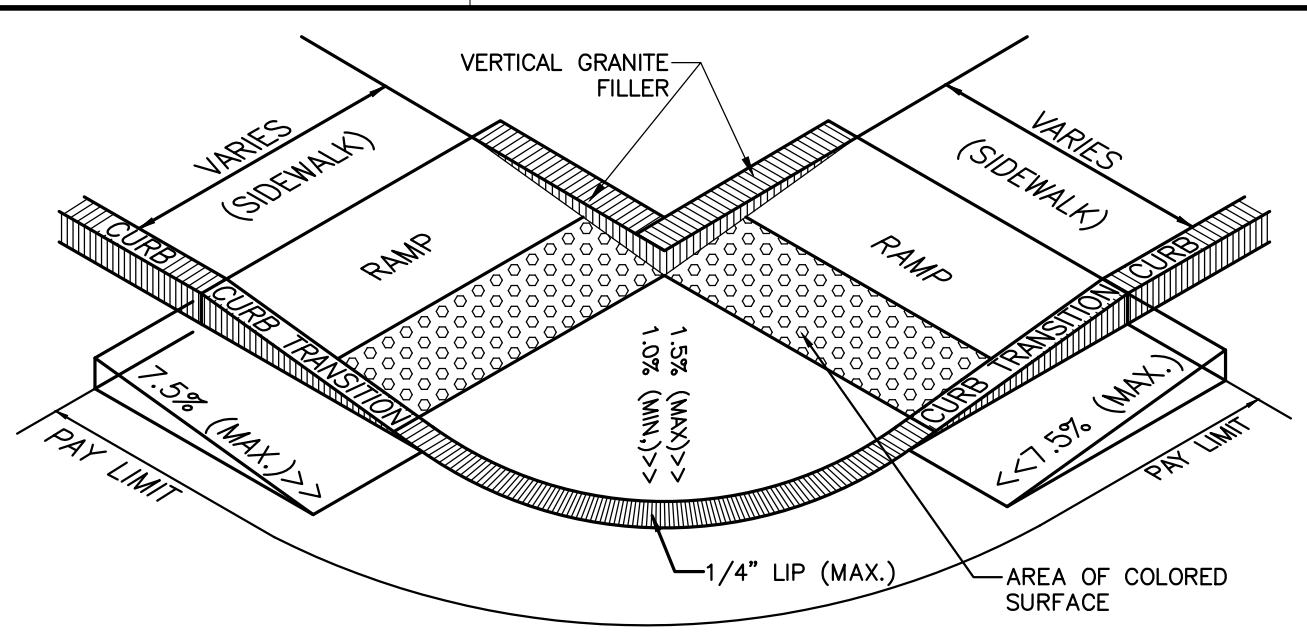
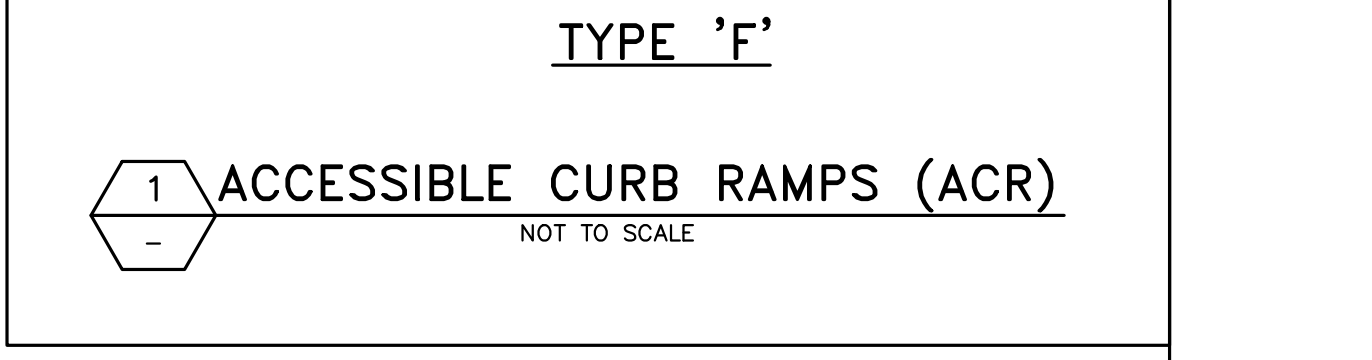
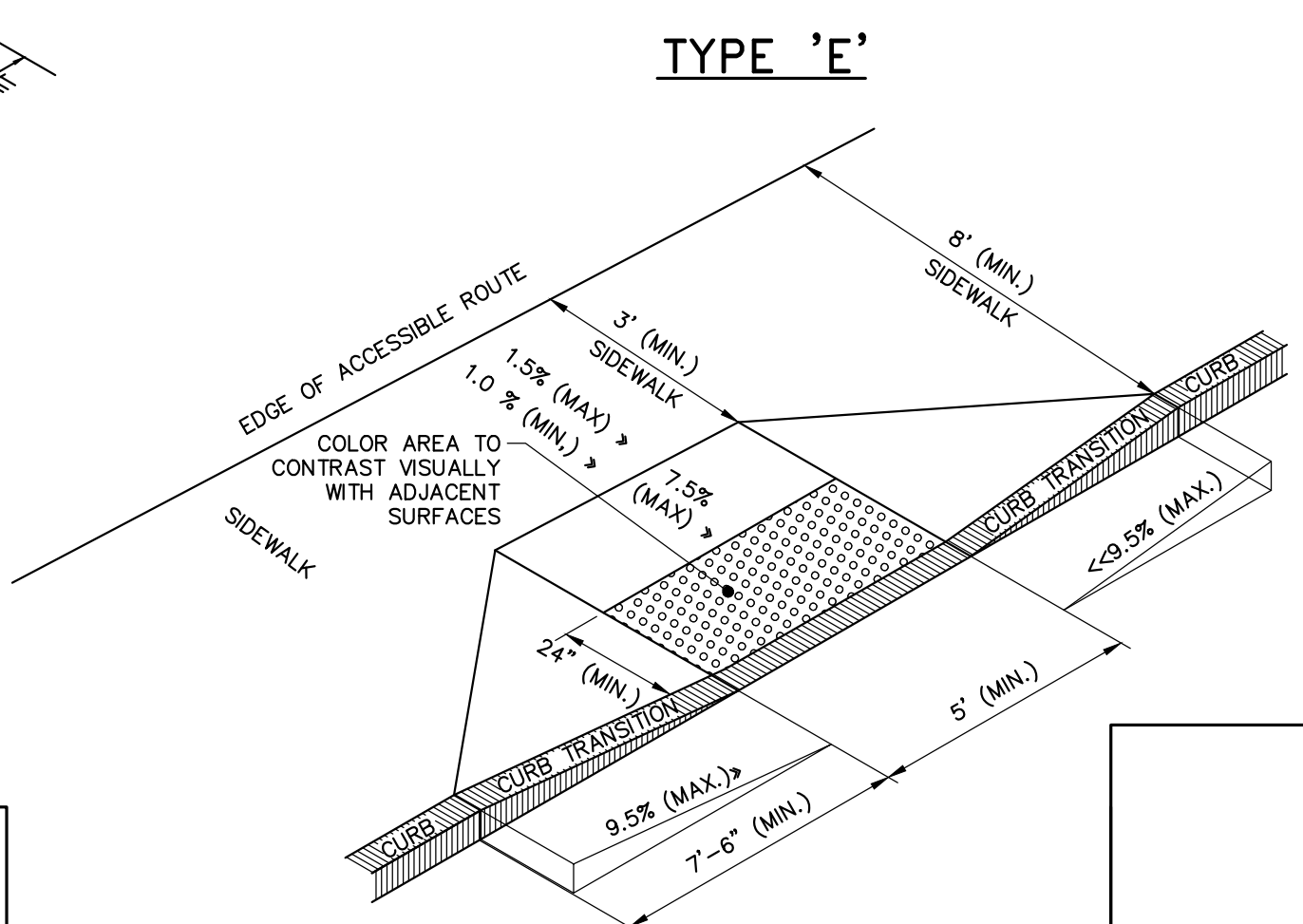
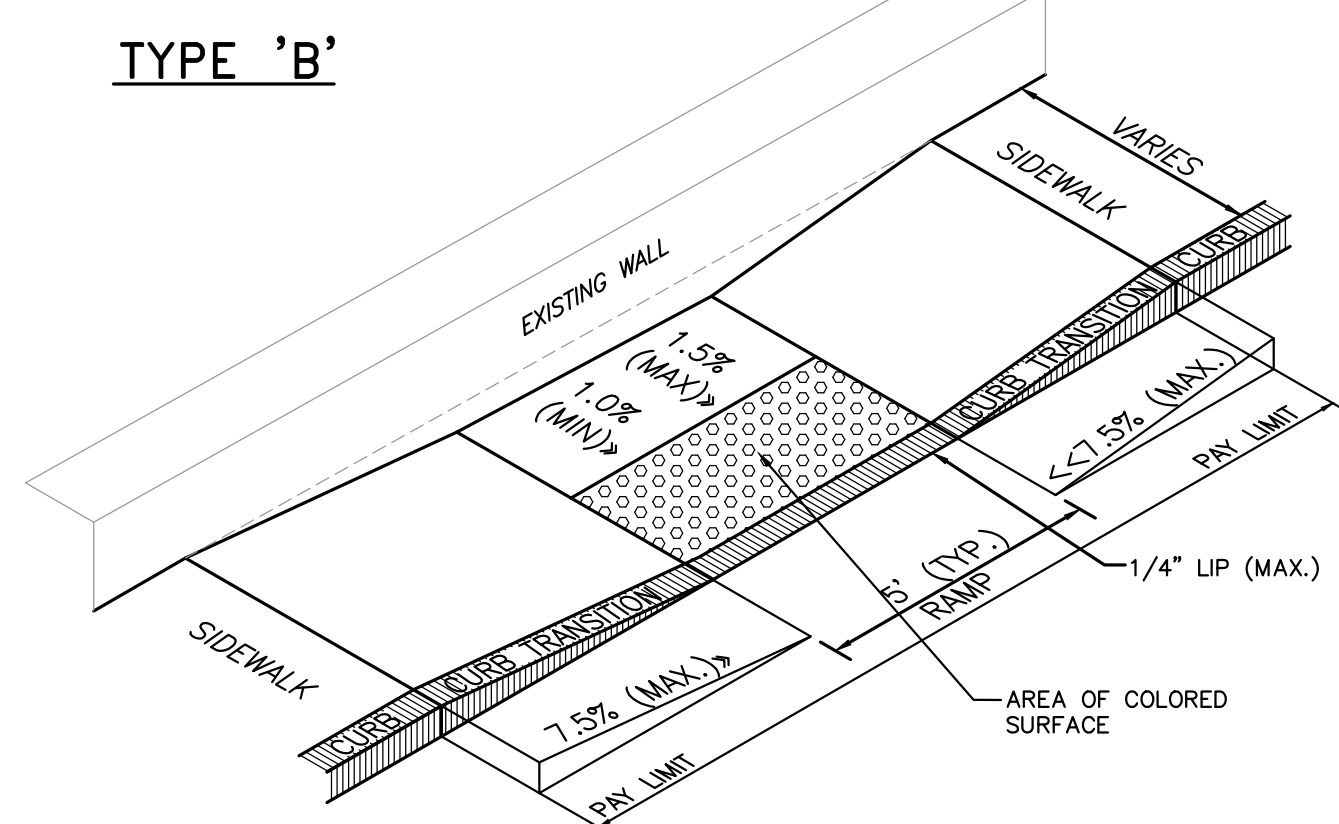
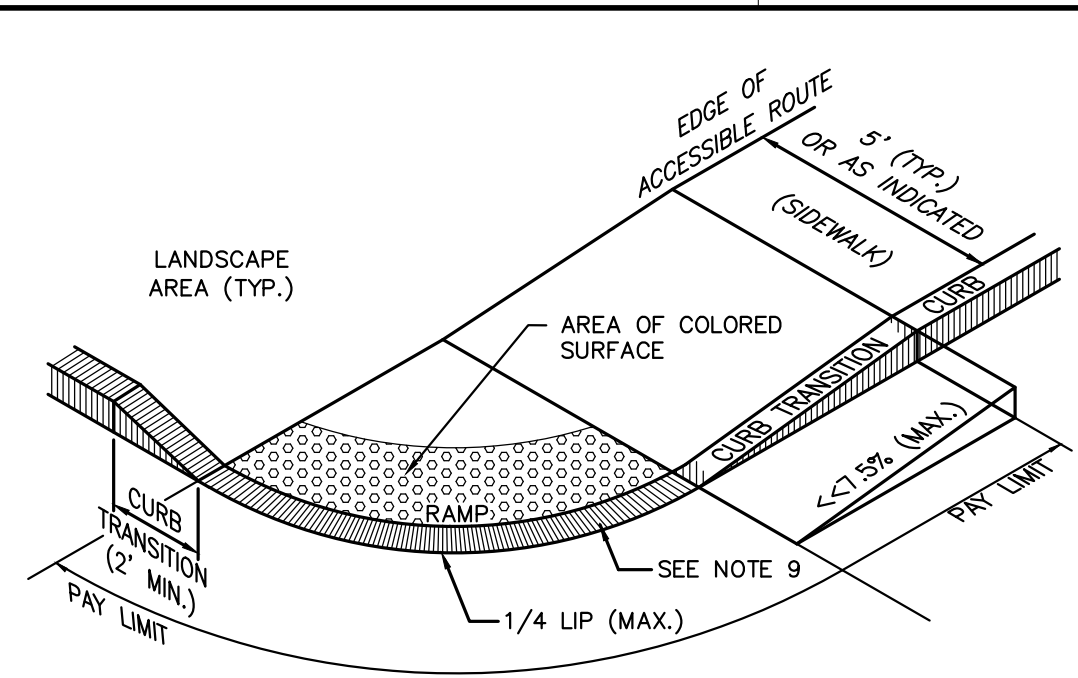
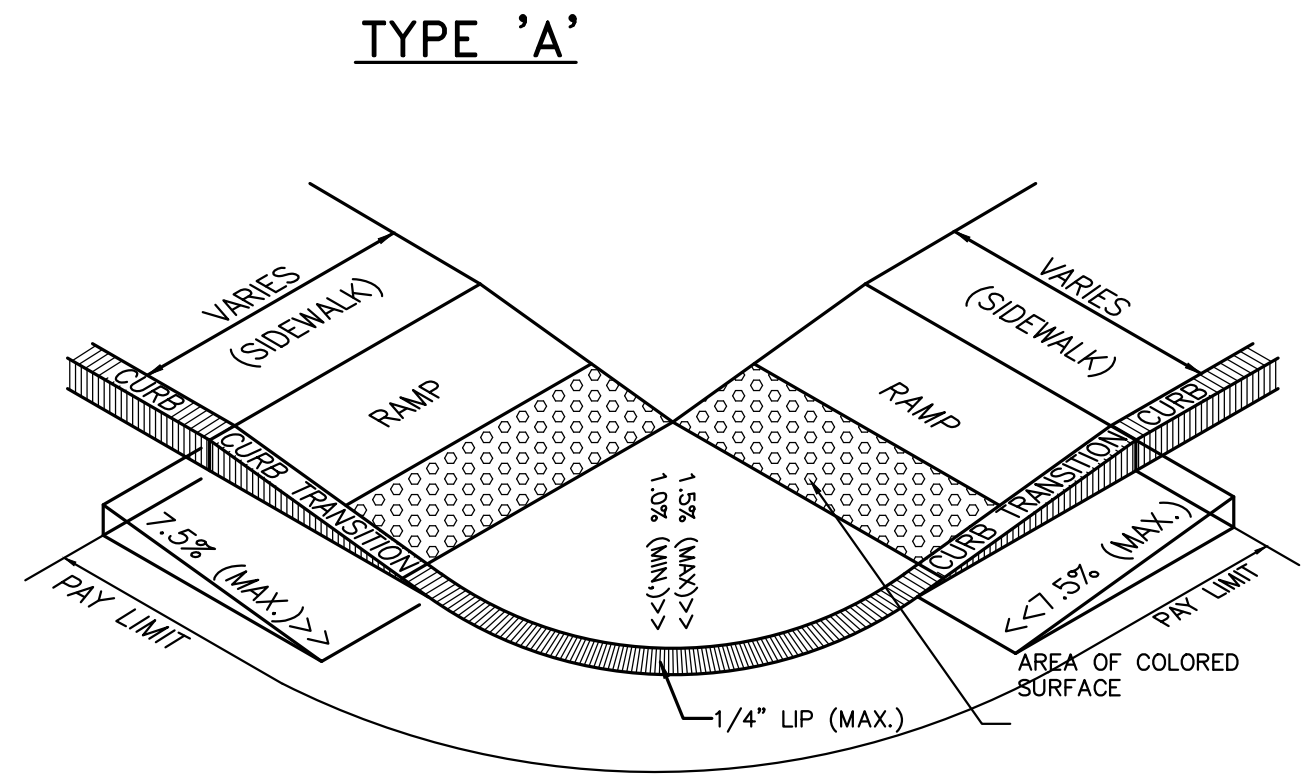
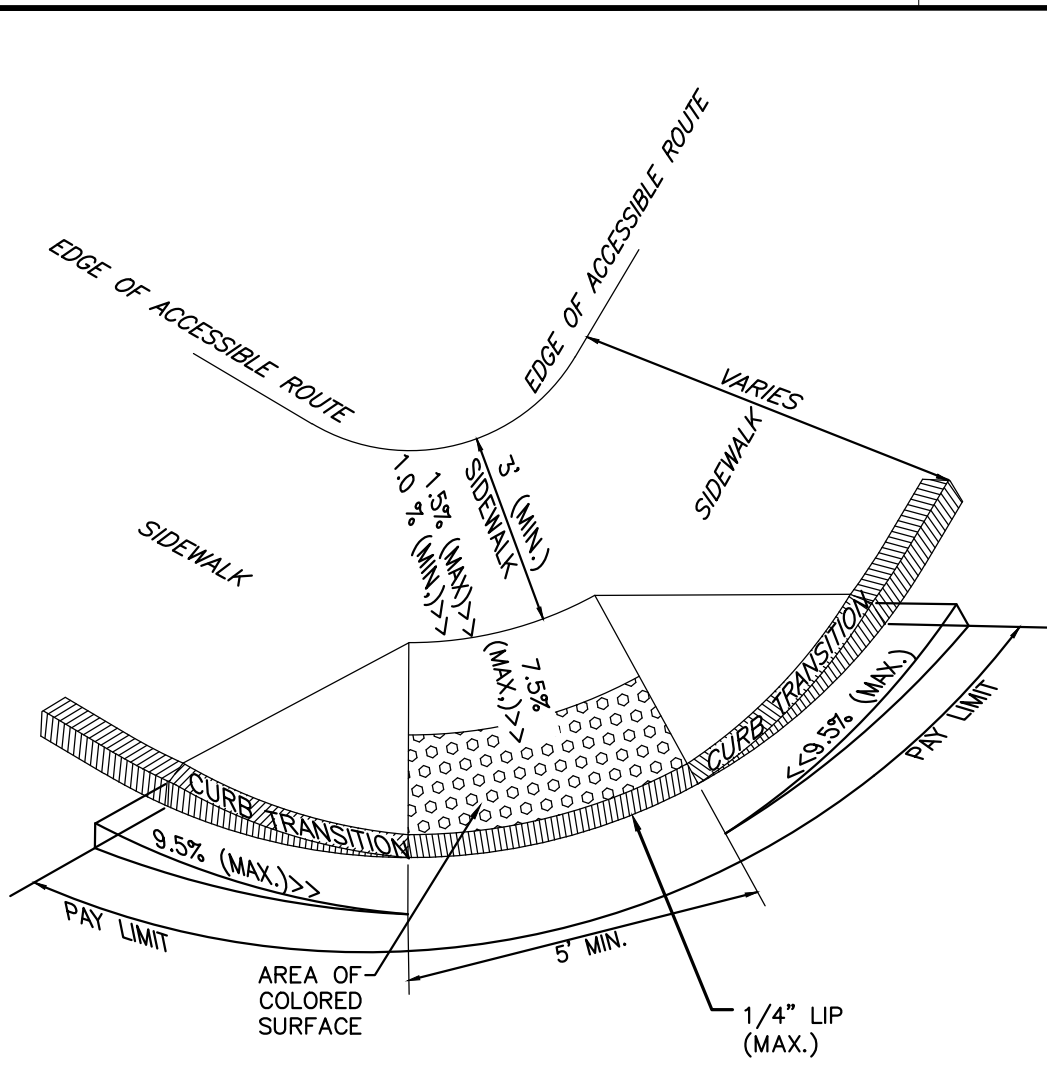
CITY OF SALEM, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

CONTRACT A
CANAL STREET
FLOOD MITIGATION PROJECT
SALEM, MASSACHUSETTS

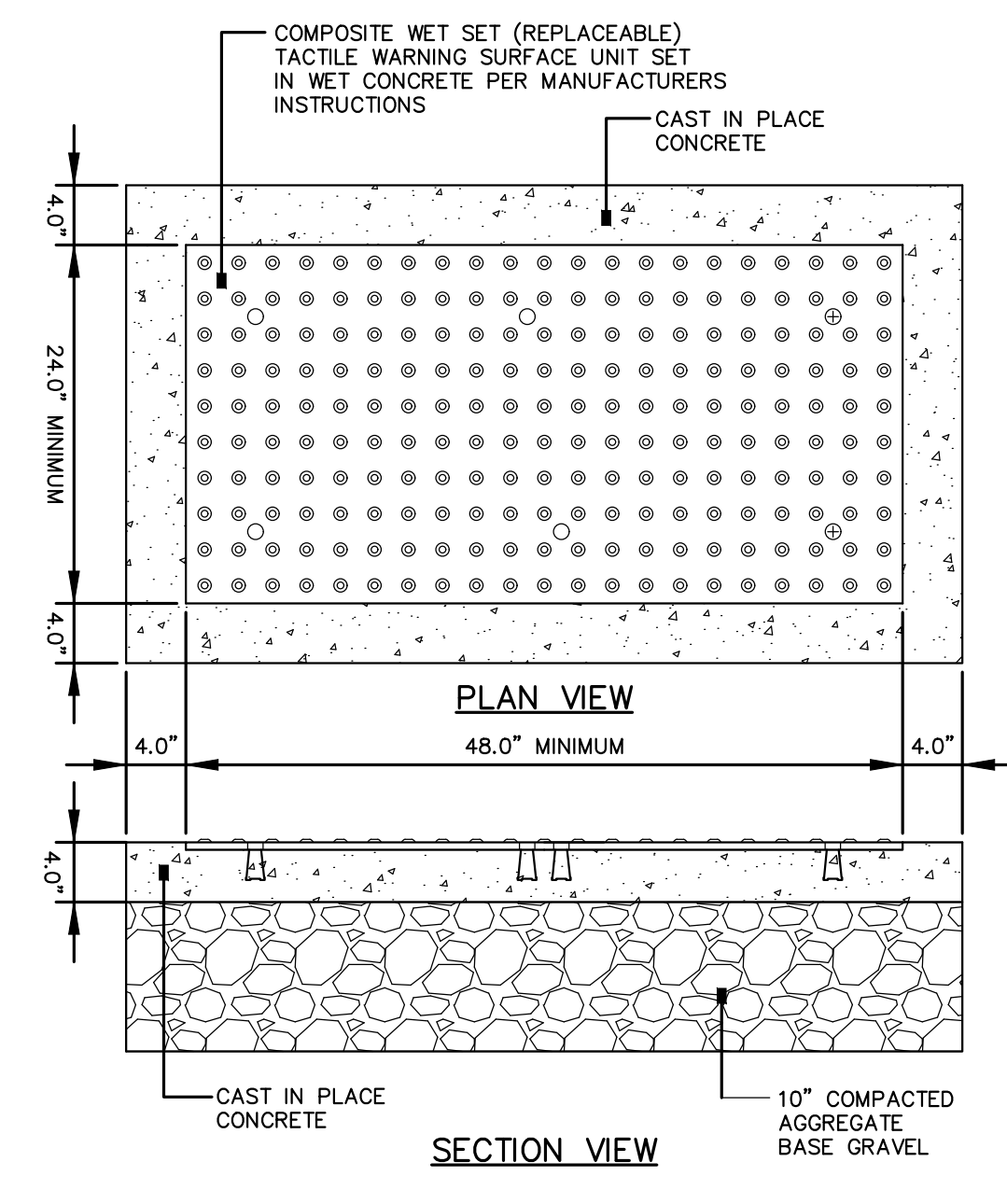
JOB NO.: 228340.11
DATE: JANUARY 2017
SCALE: NOT TO SCALE
SHEET: 27 OF 46

C-600

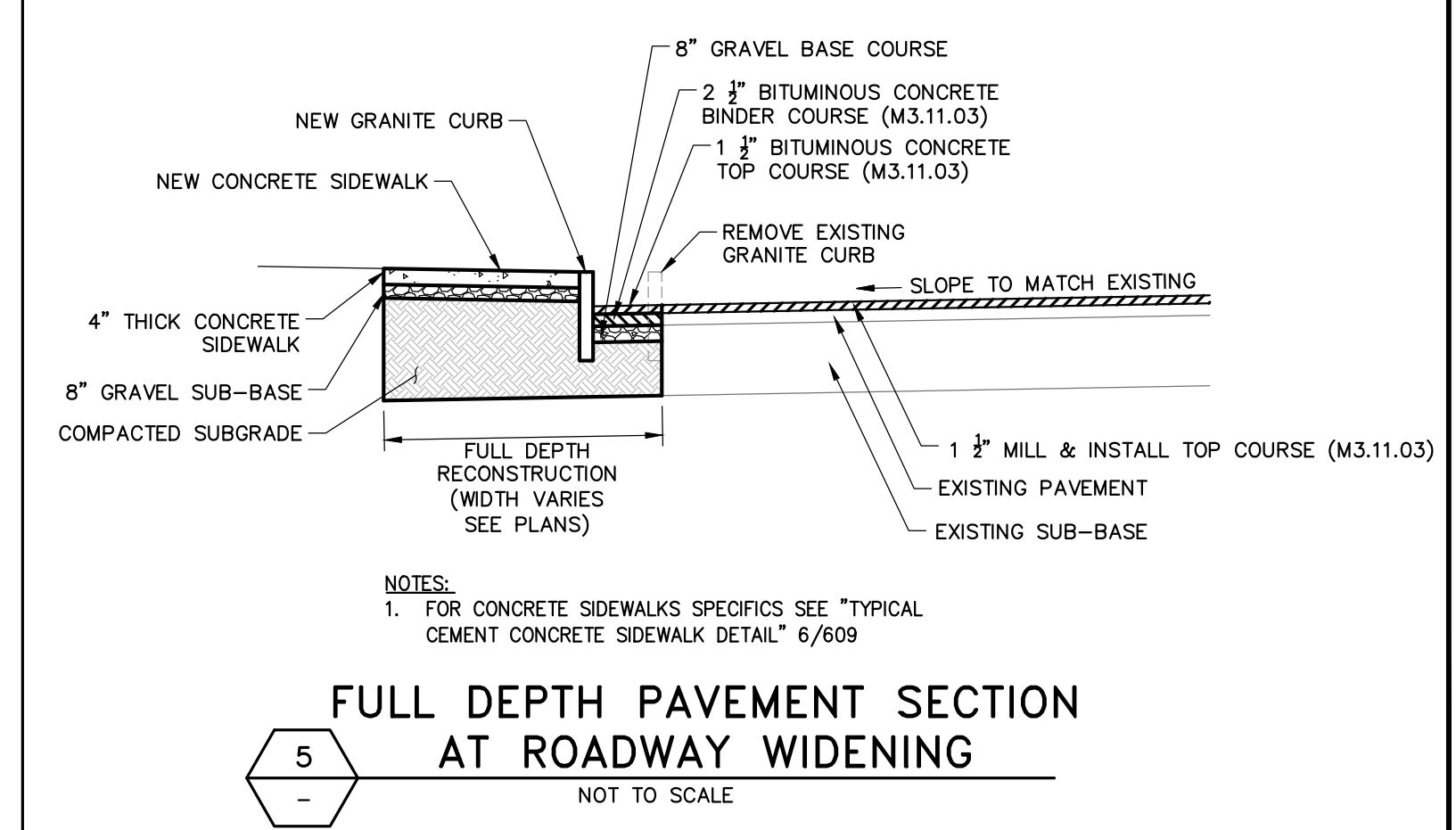
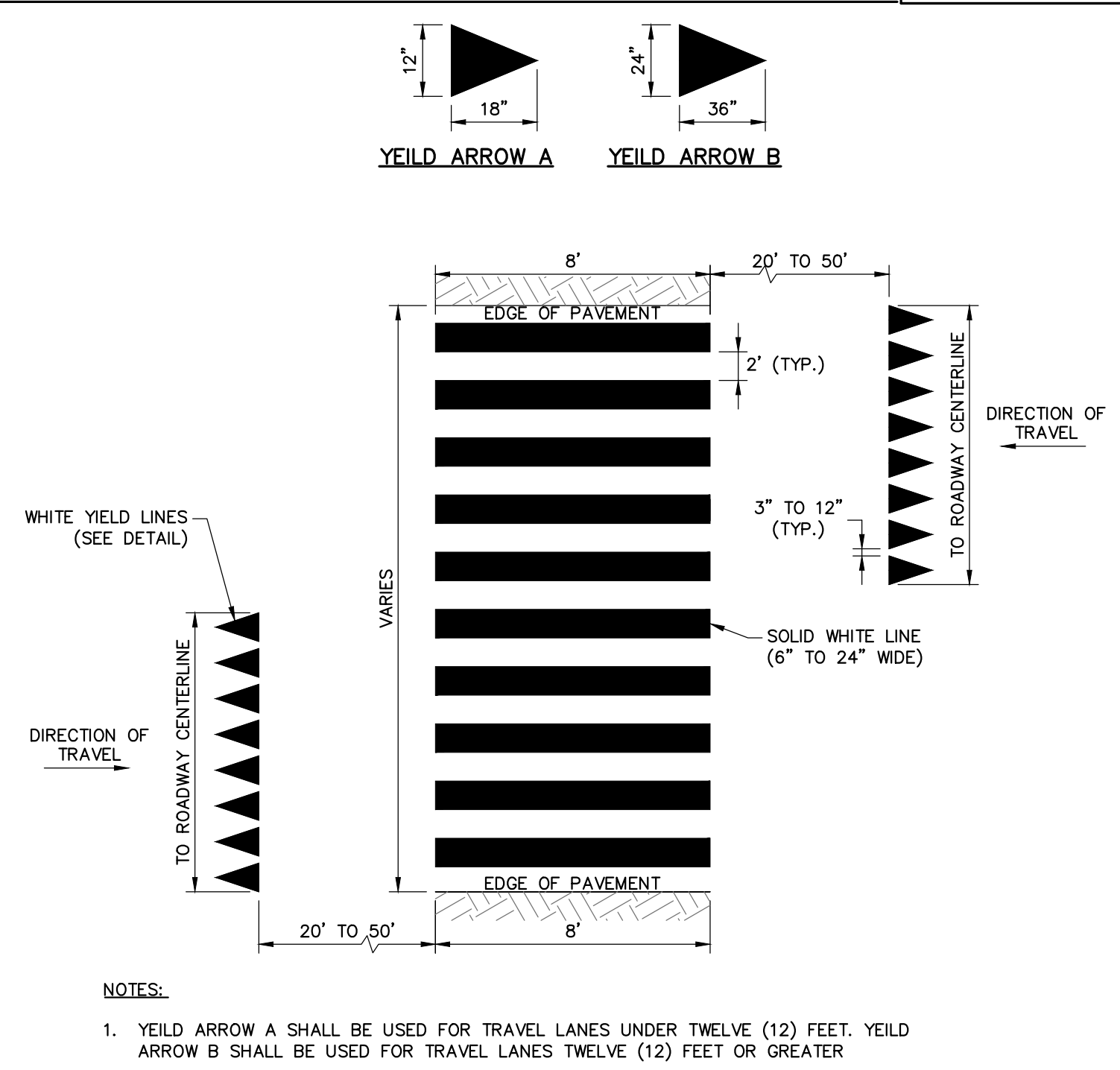
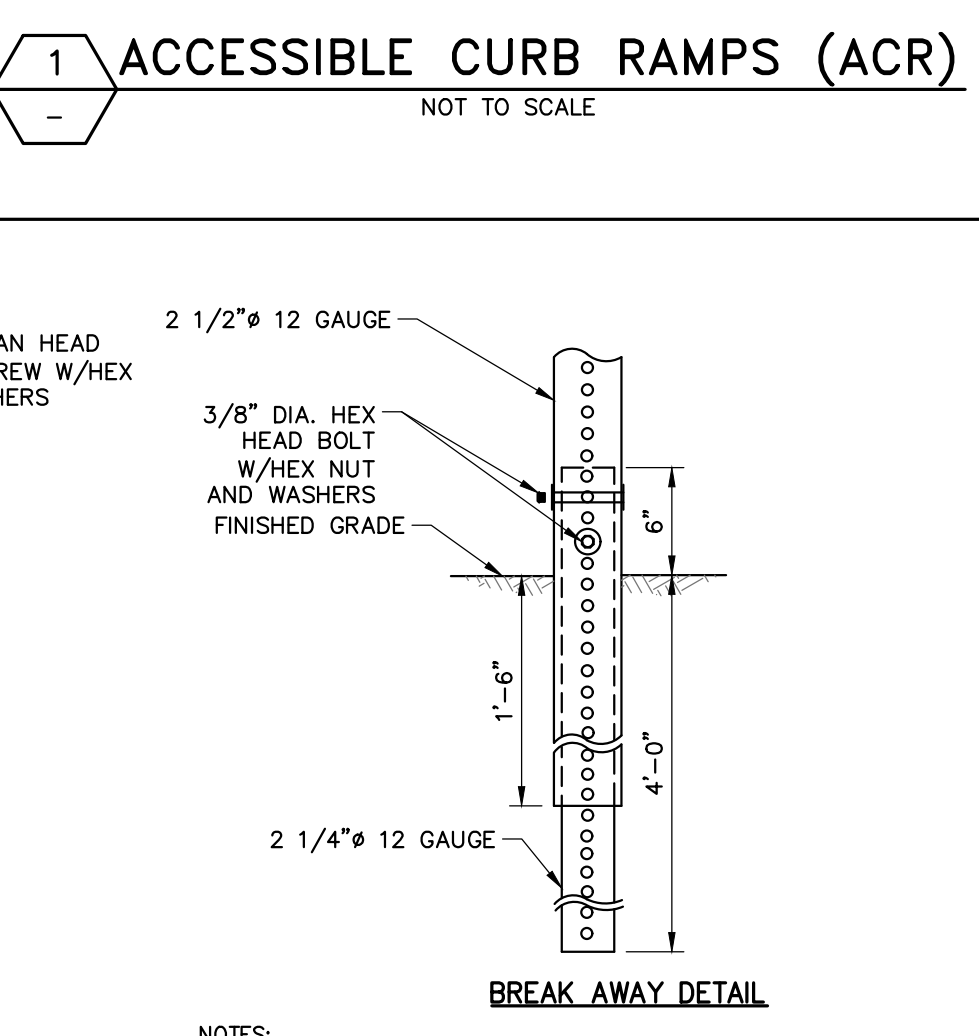
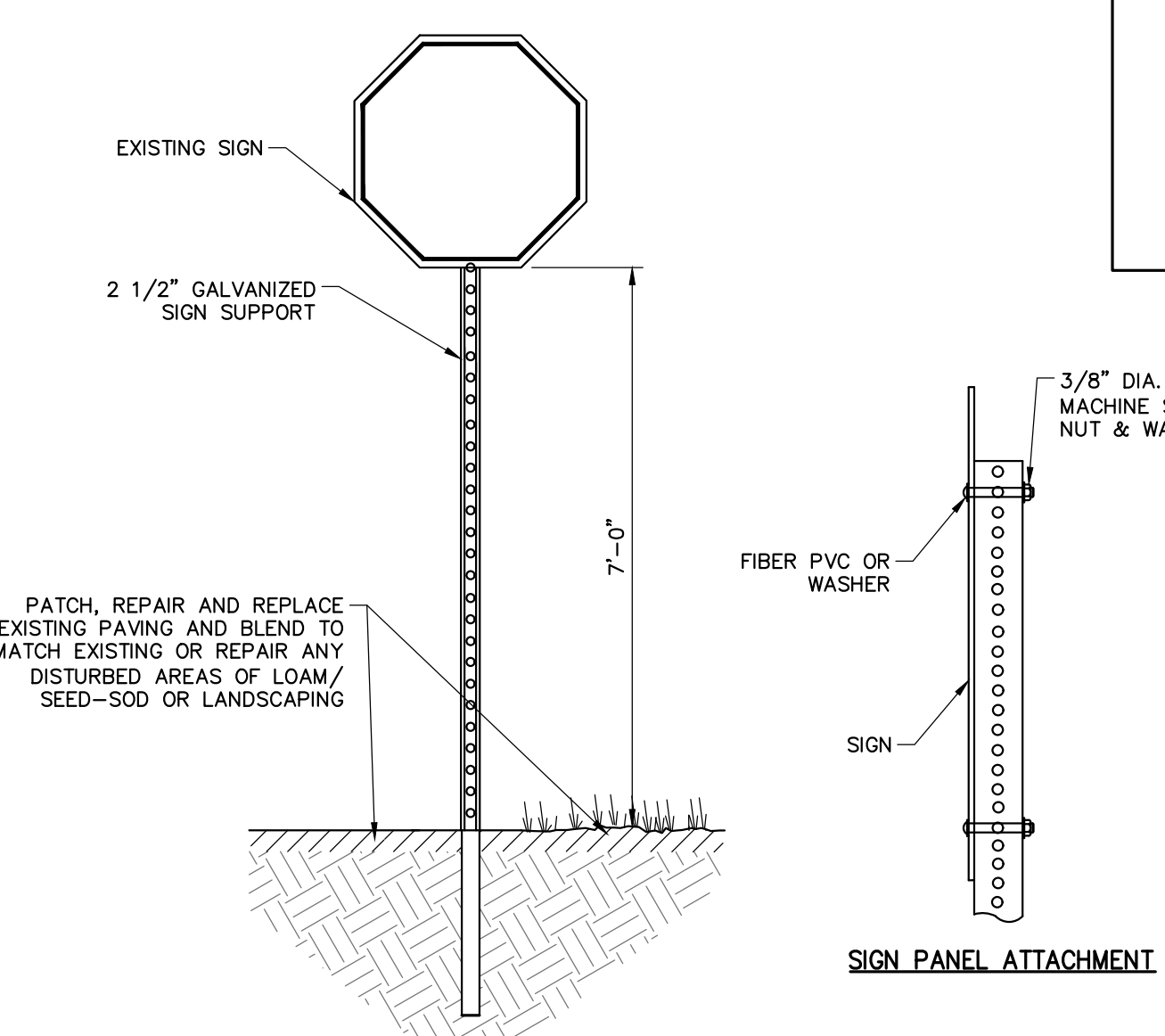
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- NOTES:**
1. THE MAXIMUM ALLOWABLE SIDEWALK AND CURB RAMP CROSS SLOPES SHALL BE 1.5% (1% MIN).
 2. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE EXCLUDING CURB RAMP SHALL BE 5%.
 3. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE CURB RAMP SHALL BE 7.5%.
 4. A MINIMUM OF 3 FEET CLEAR SHALL BE MAINTAINED AT ANY PERMANENT OBSTACLE IN ACCESSIBLE ROUTE (I.E. HYDRANTS, UTILITY POLES, TREE, SIGNS, ETC.).
 5. BASE OF RAMP SHALL BE GRADED TO PREVENT PONDING.
 6. SEE TYPICAL SIDEWALK SECTION FOR RAMP CONSTRUCTION.
 7. WHERE ACCESSIBLE ROUTES ARE LESS THAN 5' IN WIDTH (EXCLUDING CURBING) A 5'x5' PASSING AREA SHALL BE PROVIDED AT INTERVALS NOT TO EXCEED 200 FEET.
 8. ELIMINATE ALL CURBING AT RAMP (OTHER THAN VERTICAL CURBING, WHICH SHALL BE SET FLUSH) WHERE IT ABUTS ROADWAY OR OTHERWISE INDICATED.
 9. DETECTABLE WARNING SHALL CONTRAST VISUALLY WITH ADJOINING SURFACES.
 10. TRUNCATED DOMES AND ALL RELATED INSTALLED SURFACES TO BE INSTALLED ACCORDING TO MANUFACTURER'S SPECIFICATIONS. ALL DETECTABLE WARNING SURFACE INSTALLATIONS SHALL BE AT A MINIMUM AT LEAST AS NON SKID AS THE SURROUNDING PEDESTRIAN SURFACES.
 11. ACR PAY LIMIT INCLUDES VGC.



- NOTES:**
1. COMPOSITE WET SET (REPLACEABLE) TACTILE WARNING SURFACE UNITS SHALL BE AS MANUFACTURED BY ADA SOLUTIONS, INC. (WWW.ADATILE.COM), OR APPROVED EQUAL.
 2. CAST IN PLACE CONCRETE SHALL MEET SPECIFICATIONS FOR M40 CLASS A STRUCTURAL CONCRETE, MINIMUM COMPRESSIVE STRENGTH 4,000 PSI. THE CONCRETE SHALL BE SEALED PRIOR TO SETTING PANELS. THE EXPOSED CONCRETE BORDER SHALL RECEIVE A GROOVED EDGE BETWEEN THE TILE AND CONCRETE, ALONG WITH A UNIFORM BROOM FINISH PERPENDICULAR TO THE FLOW OF PEDESTRIAN TRAFFIC.
 3. TRUNCATED DOMES SHALL BE ALIGNED IN ROWS, PARALLEL AND PERPENDICULAR TO THE PREDOMINANT DIRECTION OF TRAVEL. TRUNCATED DOME BRICKS AND GRANITE PAVERS ARE NOT ALLOWED.
 4. FOR ALL SIDEWALK RAMP MADE OF CONCRETE OR ASPHALT, BRICK RED COLORED TILES SHALL BE USED. FOLLOW MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION.



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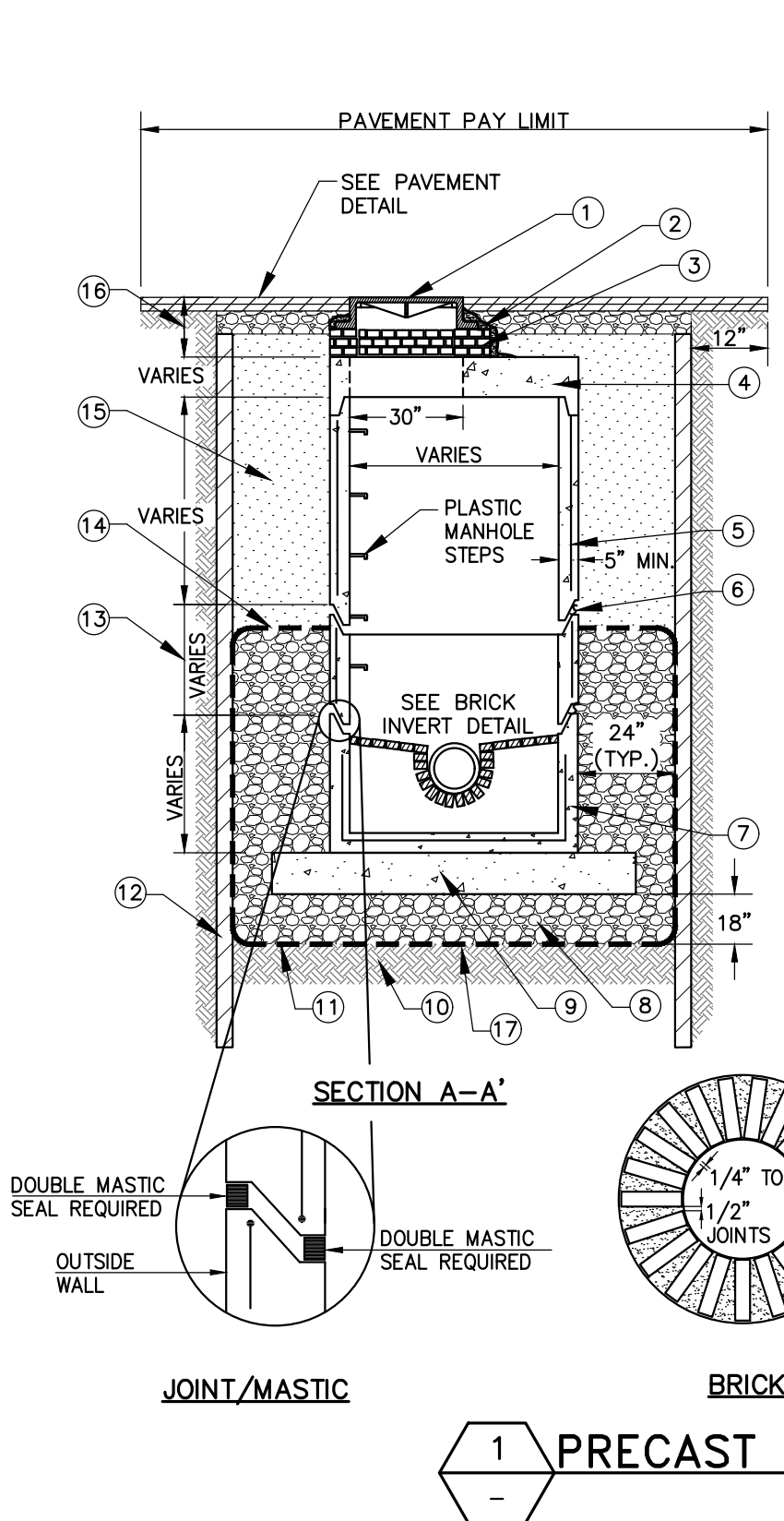
CIVIL DETAILS - 2

CITY OF SALEM, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

CONTRACT A
CANAL STREET
FLOOD MITIGATION PROJECT
SALEM, MASSACHUSETTS

JOB NO.: 228340.11
DATE: JANUARY 2017
SCALE: NOT TO SCALE
SHEET: 28 OF 46

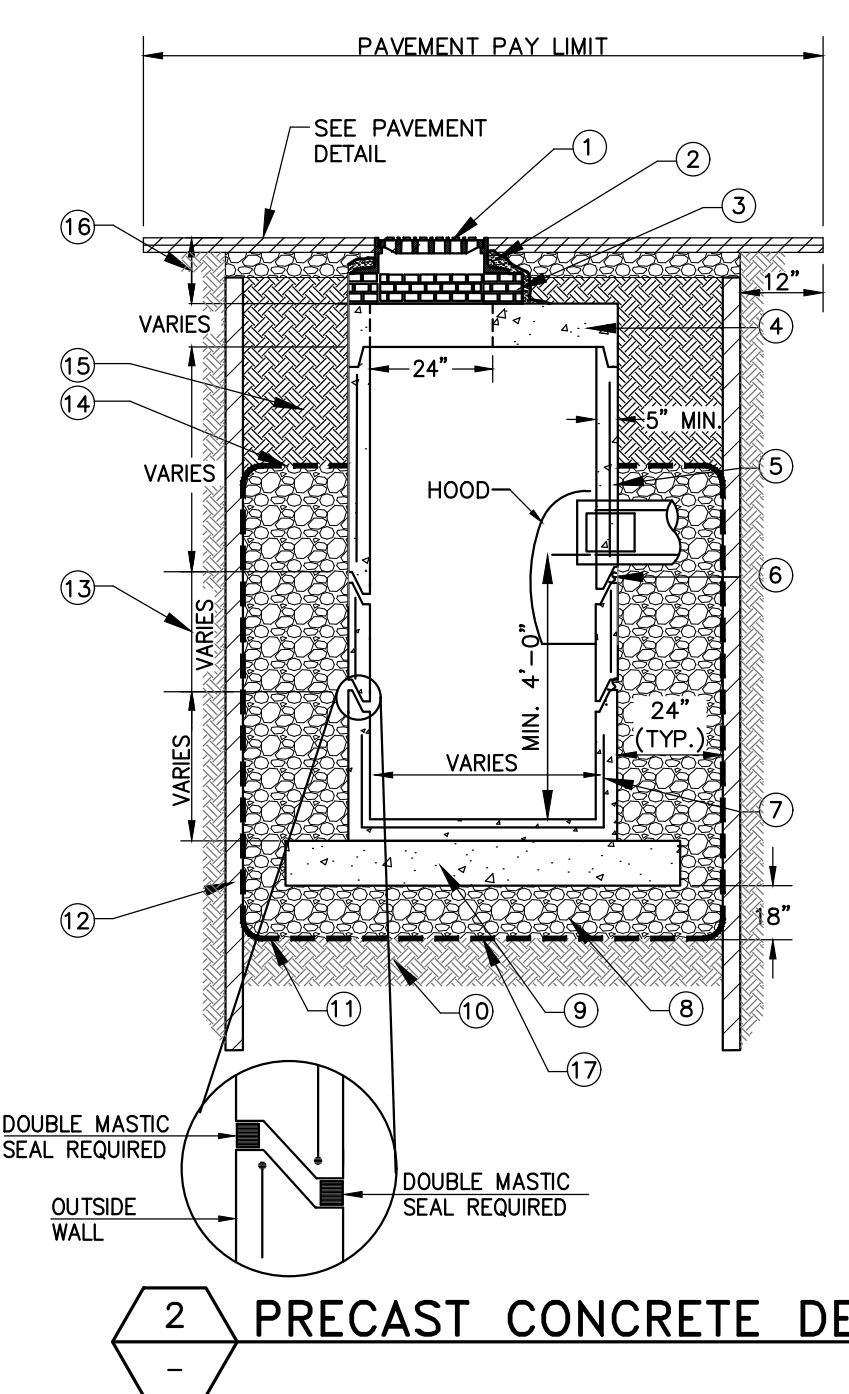
C-601



- 1 CAST IRON MANHOLE FRAME AND COVER (AS SPECIFIED)
- 2 PORTLAND CEMENT MORTAR PARGING
- 3 ADJUST TO GRADE WITH BRICK
- 4 TOP SLAB
- 5 PRECAST REINFORCED CONCRETE MANHOLE TOP SECTION
- 6 PRE-MOLDED JOINT FILLER OR BIT. MASTIC SEAL
- 7 PRECAST CONCRETE BOTTOM SECTION WITH PIPE OPENINGS PROVIDED AS REQUIRED
- 8 COMPACTED 3/4" CRUSHED STONE
- 9 ANTI-FLOATATION SLAB
- 10 COMPACTED SUBGRADE OR SUITABLE BACKFILL
- 11 WRAP BEDDING IN STABILIZATION FABRIC. STABILIZATION FABRIC MAY BE OMITTED, AS DIRECTED BY ENGINEER, IN INSTANCE WHERE EXISTING SOILS AT THE TRENCH BOTTOM AND SIDEWALLS ARE SUITABLE GRANULAR MATERIAL.
- 12 SUPPORT EXCAVATION (CONTRACTOR DESIGNED)
- 13 PRECAST REINFORCED CONCRETE BARREL SECTION. MATCH 1'-" TO 4'-0" LENGTH TO MEET FIELD CONDITIONS
- 14 COMPACTED 3/4" CRUSHED STONE TO EXTEND TO 6" ABOVE TOP OF PIPE
- 15 COMPACTED PIPE AND STRUCTURE BACKFILL MATERIAL
- 16 24" UNLESS OTHERWISE DIRECTED BY ENGINEER
- 17 EXCAVATION PAY LIMIT

| EXCAVATION PAY LIMITS | |
|-----------------------|-----------|
| MANHOLE SIZE (FEET) | MAXIMUM |
| 4' | 8' x 8' |
| 5' | 9' x 9' |
| 6' | 10' x 10' |
| 7' | 11' x 11' |
| 8' | 12' x 12' |
| 9' | 13' x 13' |

1 PRECAST CONCRETE MANHOLE
NOT TO SCALE

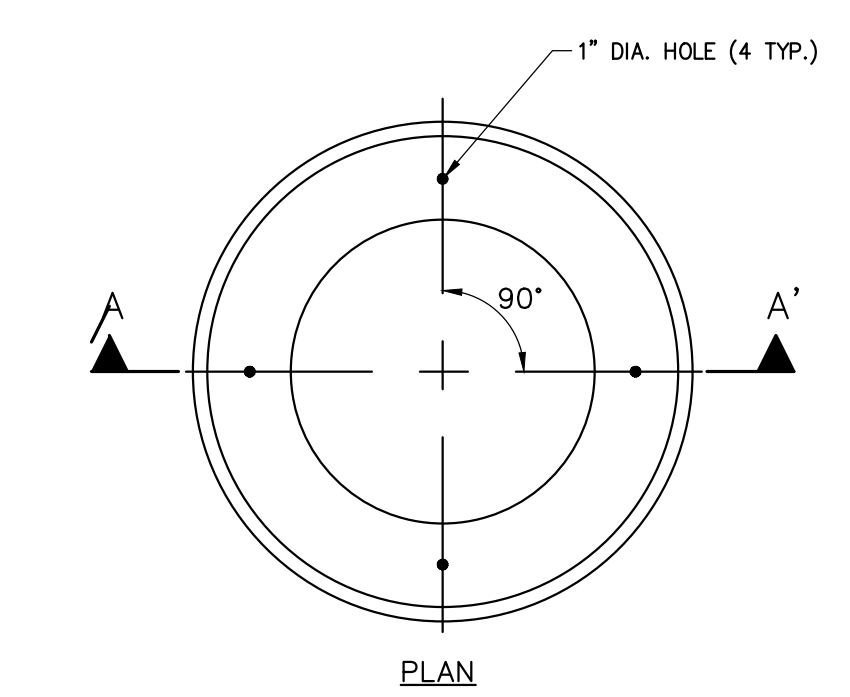


- 1 CAST IRON FRAME AND GRATE (AS SPECIFIED)
- 2 PORTLAND CEMENT MORTAR PARGING
- 3 ADJUST TO GRADE WITH BRICK
- 4 TOP SLAB
- 5 PRECAST REINFORCED CONCRETE MANHOLE TOP SECTION WITH PIPE OPENING AS REQUIRED
- 6 PRE-MOLDED JOINT FILLER OR BIT. MASTIC SEAL
- 7 PRECAST CONCRETE BOTTOM SECTION WITH PIPE OPENINGS PROVIDED AS REQUIRED
- 8 COMPACTED 3/4" CRUSHED STONE
- 9 ANTI-FLOATATION SLAB
- 10 COMPACTED SUBGRADE OR SUITABLE BACKFILL
- 11 WRAP BEDDING IN STABILIZATION FABRIC. STABILIZATION FABRIC MAY BE OMITTED, AS DIRECTED BY ENGINEER, IN INSTANCE WHERE EXISTING SOILS AT THE TRENCH BOTTOM AND SIDEWALLS ARE SUITABLE GRANULAR MATERIAL.
- 12 SUPPORT EXCAVATION (CONTRACTOR DESIGNED)
- 13 PRECAST REINFORCED CONCRETE BARREL SECTION. MATCH 1'-" TO 4'-0" LENGTH TO MEET FIELD CONDITIONS
- 14 COMPACTED 3/4" CRUSHED STONE TO EXTEND 6" ABOVE TOP OF PIPE
- 15 COMPACTED PIPE AND STRUCTURE BACKFILL MATERIAL
- 16 24" UNLESS OTHERWISE DIRECTED BY ENGINEER
- 17 EXCAVATION PAY LIMIT

2 PRECAST CONCRETE DEEP SUMP CATCH BASIN
NOT TO SCALE

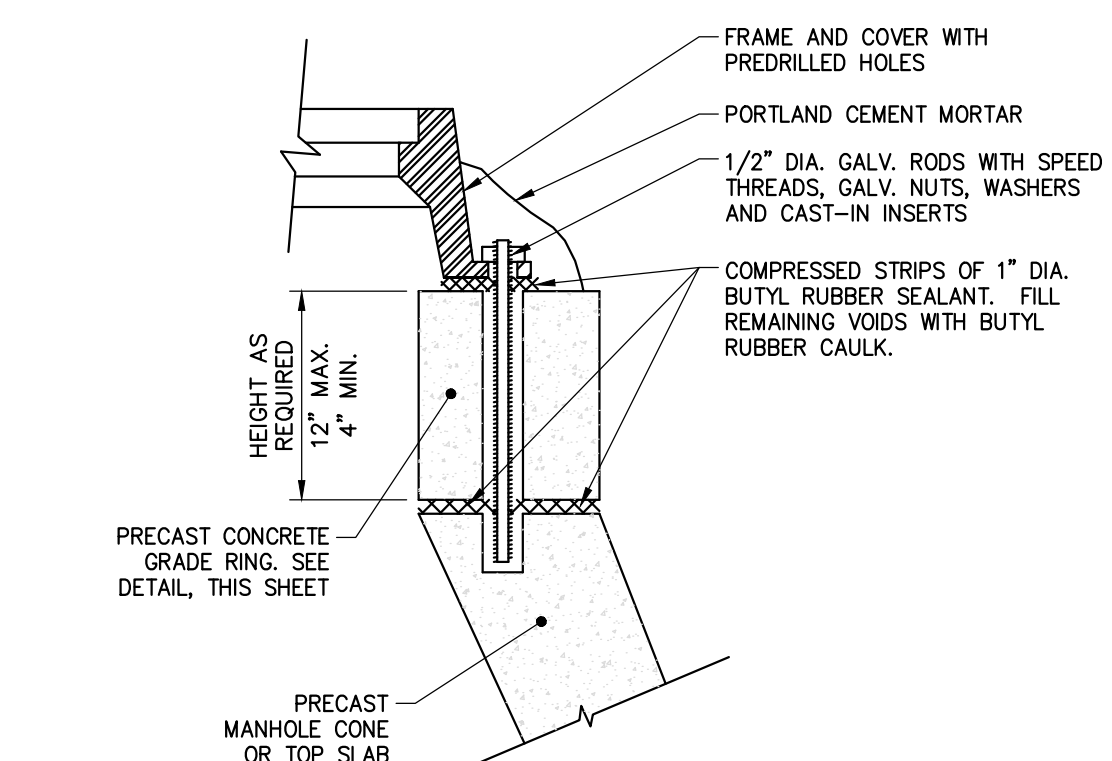
GENERAL NOTES FOR MANHOLES AND CATCH BASINS

1. ALL CONCRETE SHALL BE CLASS "A" AND HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH OF 4000 PSI AT THE END OF 28 DAYS, UNLESS OTHERWISE NOTED.
2. CASTINGS SHALL CONFORM TO ASTM DESIGNATION A48-CLASS 35. ALL PARTS OF CASTINGS, EXCEPT FINISHED SURFACE, SHALL RECEIVE A COAT OF COAL TAR PITCH VARNISH OR ASPHALTUM PAINT WHICH SHALL BE SMOOTH AND TOUGH BUT NOT BRITTLE, AND APPLIED AT THE SHOP. FIELD COATING WILL BE REJECTED.
3. MANHOLES SHALL BE CONSTRUCTED OF PRECAST REINFORCED CONCRETE.
4. PRECAST REINFORCED BARREL MANUFACTURED PER ASTM SPEC. C-478-67
5. CONTRACTOR SHALL SUBMIT ANTI-FLOATATION CALCULATIONS FOR ALL MANHOLE, CATCH BASIN, AND T-BASE STRUCTURES.
6. ALL PRECAST MANHOLES AND CATCH BASINS SHALL BE IDENTIFIED BY STATION, OFFSET, AND STRUCTURE ID PAINTED ON THE SIDE OF THE STRUCTURE BY THE MANUFACTURER.
7. STORM MANHOLES SHALL HAVE SOLID COVERS WITH ONE DRILLED PICK HOLE, AND MARKED DRAIN.
8. EXISTING MANHOLES, CATCH BASINS, FRAMES, AND COVERS SHALL BE SALVAGED BY THE CONTRACTOR, AND SHALL REMAIN THE PROPERTY OF THE CITY OF SALEM.
9. WHEN THE FLOW CHANGES DIRECTION IN A MANHOLE, THE CHANNEL ALIGNMENT SHALL FOLLOW A SMOOTH RADIUS. CHANNELS SHALL BE FORMED TO ACCEPT ALL INLET PIPES.
10. ON STORM DRAIN MANHOLES, THE SHELF AND CHANNEL SHALL BE FORMED BY BRICK SET IN CEMENT MORTAR OR BY FACTORY PRE-CAST CONCRETE. SUCH PRE-CAST CONCRETE SHALL BE EPOXY COATED AND THE SHELF SHALL HAVE A PERMANENT NON-SKID SURFACE.
11. UNLESS OTHERWISE STATED BY MANUFACTURER. INSTALL STORMWATER TREATMENT DEVICES IN ACCORDANCE WITH STANDARD MANHOLE DETAIL.

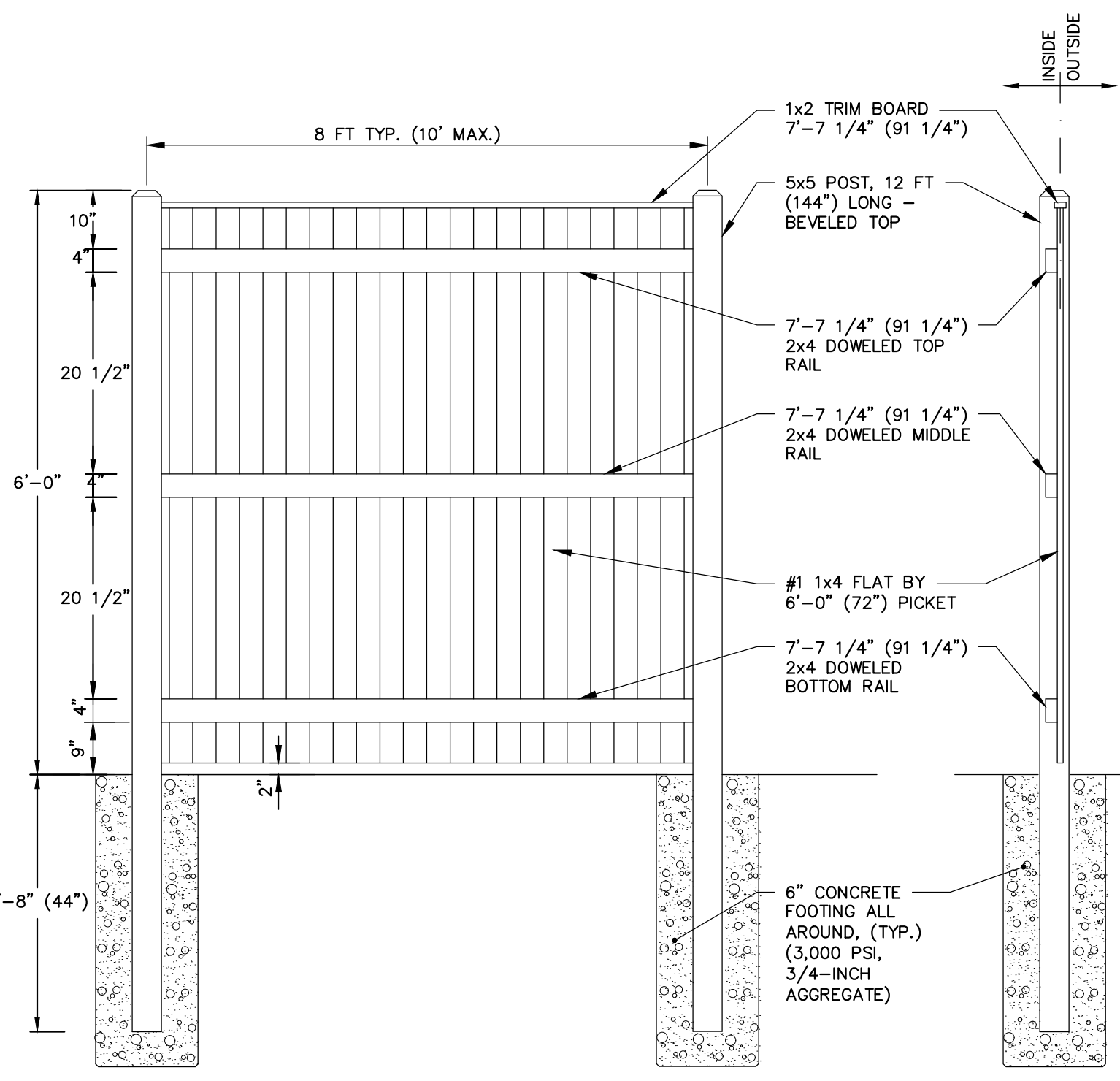


- NOTES:**
1. PROVIDE CAST-IN INSERTS IN PRECAST MANHOLE CONES AND FLAT TOPS. LOCATIONS TO MATCH HOLES IN GRADE RING.
 2. PROVIDE H OF 4" MIN. TO 12" MAX. AS REQUIRED TO BRING FRAME TO FINAL GRADE.
 3. FOR FRAME ADJUSTMENTS OF LESS THAN 4" USE APPROVED ALTERNATE MANHOLE FRAME AND/OR ATTACH FRAME DIRECTLY TO PRECAST MANHOLE CONE.
 4. CONTRACTOR MAY USE BRICKS TO BRING MANHOLE TO GRADE.

4 PRECAST CONCRETE GRADE RING
NOT TO SCALE

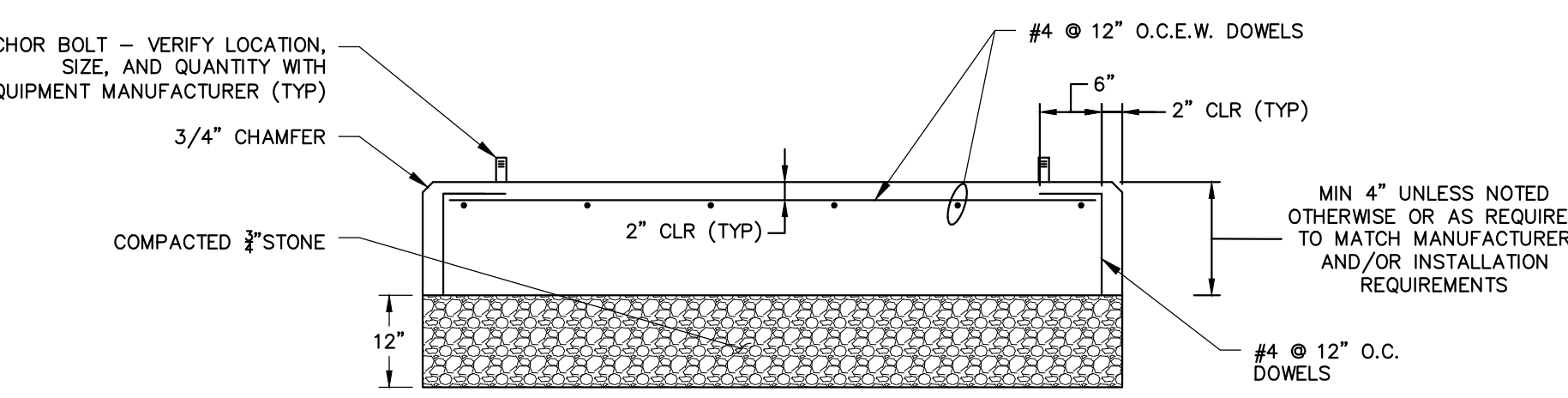


5 MANHOLE FRAME FASTENING DETAIL
NOT TO SCALE



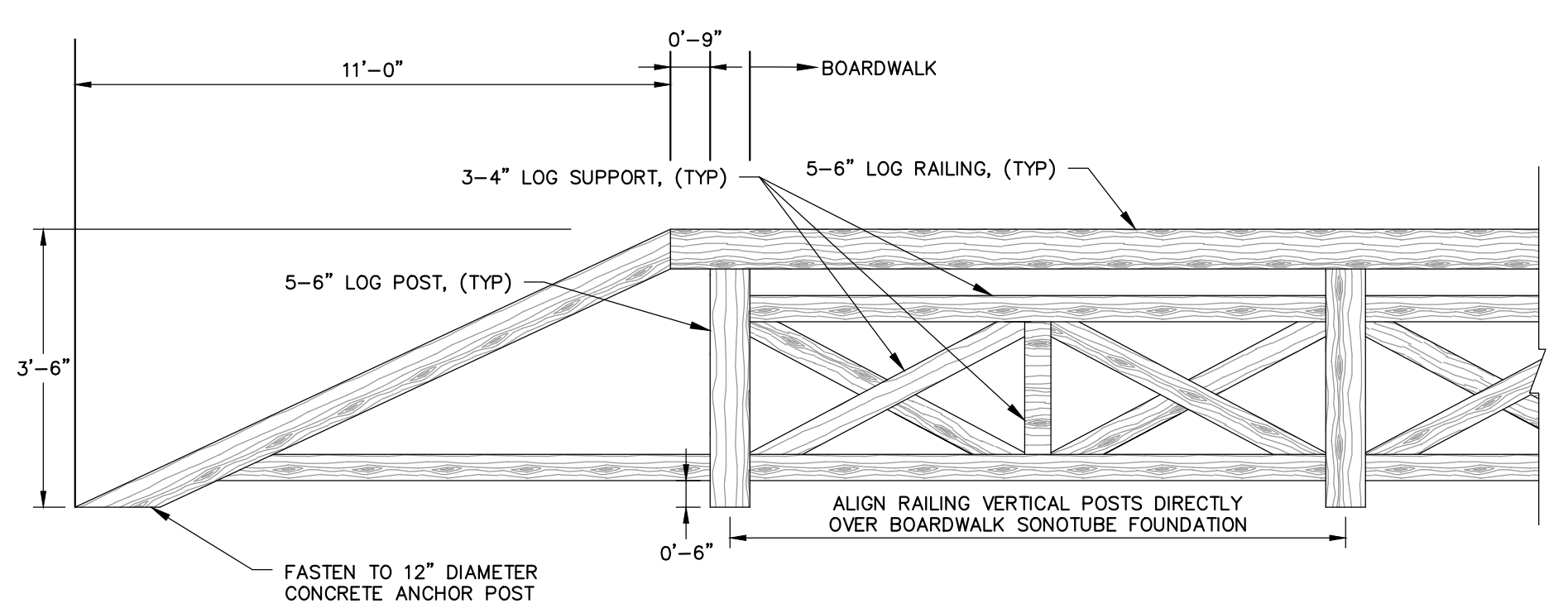
- NOTES:**
1. ALL WOOD FENCE MATERIAL AS SPECIFIED.
 2. ALL MATERIAL TO BE 100 PERCENT NORTHERN WHITE CEDAR.
 3. FENCE HARDWARE AS SPECIFIED
 4. EXTEND CONCRETE POST FOOTINGS TO 4'-0" BELOW GRADE FOR FROST PROTECTION

8 WOOD STOCKADE FENCE
N.T.S.



- NOTES:**
1. SEE ELECTRICAL DRAWINGS FOR EQUIPMENT LOCATIONS AND LAYOUT.
 2. PAD SHALL PROJECT A MIN. OF 4" BEYOND EQUIPMENT FOOTPRINT (U.N.O.)

6 EQUIPMENT PAD DETAIL
N.T.S.



1. ALL HARDWARE USED SHALL BE 316 SS.
2. RAILING MATERIAL TO BE WHITE CEDAR OR BLACK LOCUST WITH BARK IN TACT.
3. CONTRACTOR TO DESIGN AND SUBMIT CONNECTION BETWEEN RAILING SEGMENTS AS WELL AS THE ATTACHMENT OF THE RAILING TO BOARDWALK.
4. RAILING TO BE CONSTRUCTED IN ACCORDANCE WITH INTERNATIONAL BUILDING CODE 1013.

7 BOARDWALK GUARD
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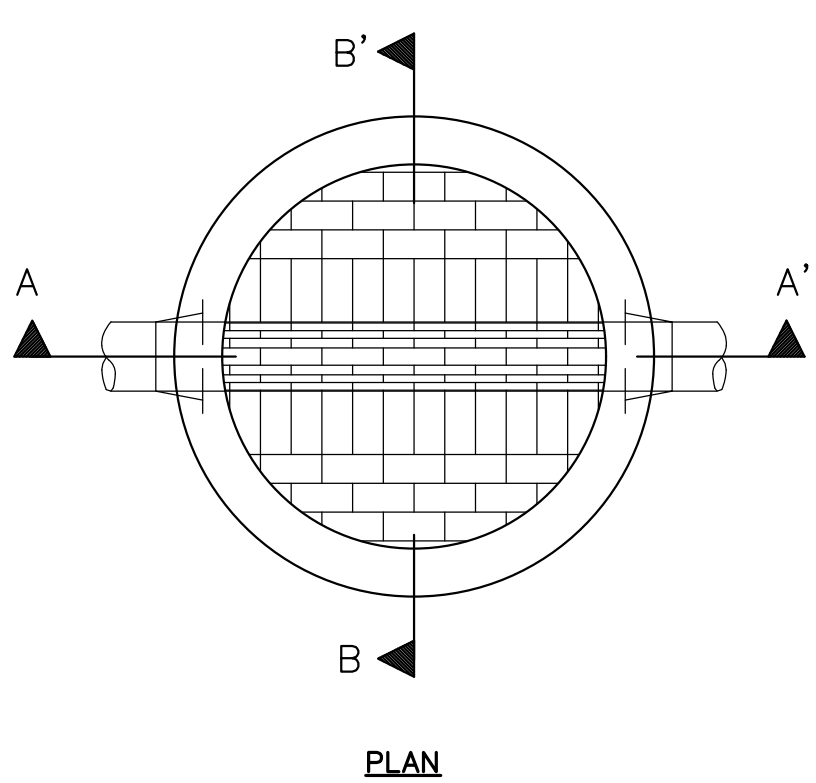
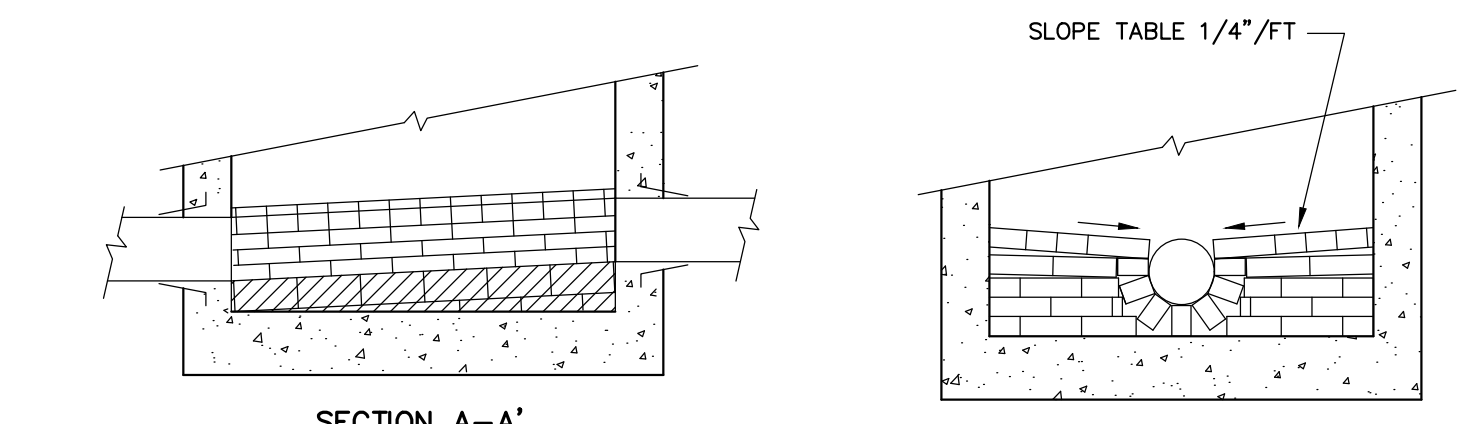
CIVIL DETAILS - 3

CITY OF SALEM, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

CONTRACT A
CANAL STREET
FLOOD MITIGATION PROJECT
SALEM, MASSACHUSETTS

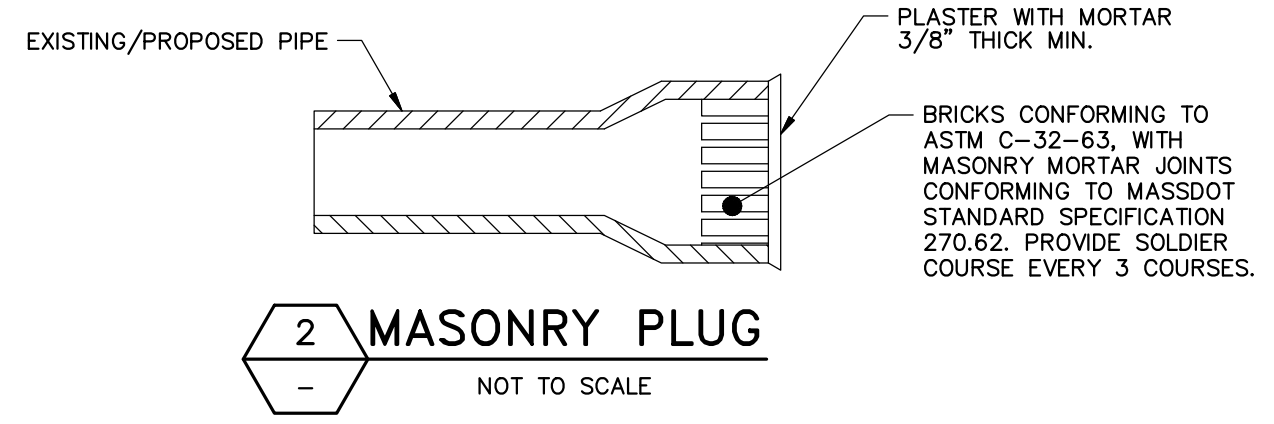
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DATE: JANUARY 2017
SCALE: NOT TO SCALE
SHEET: 29 OF 46

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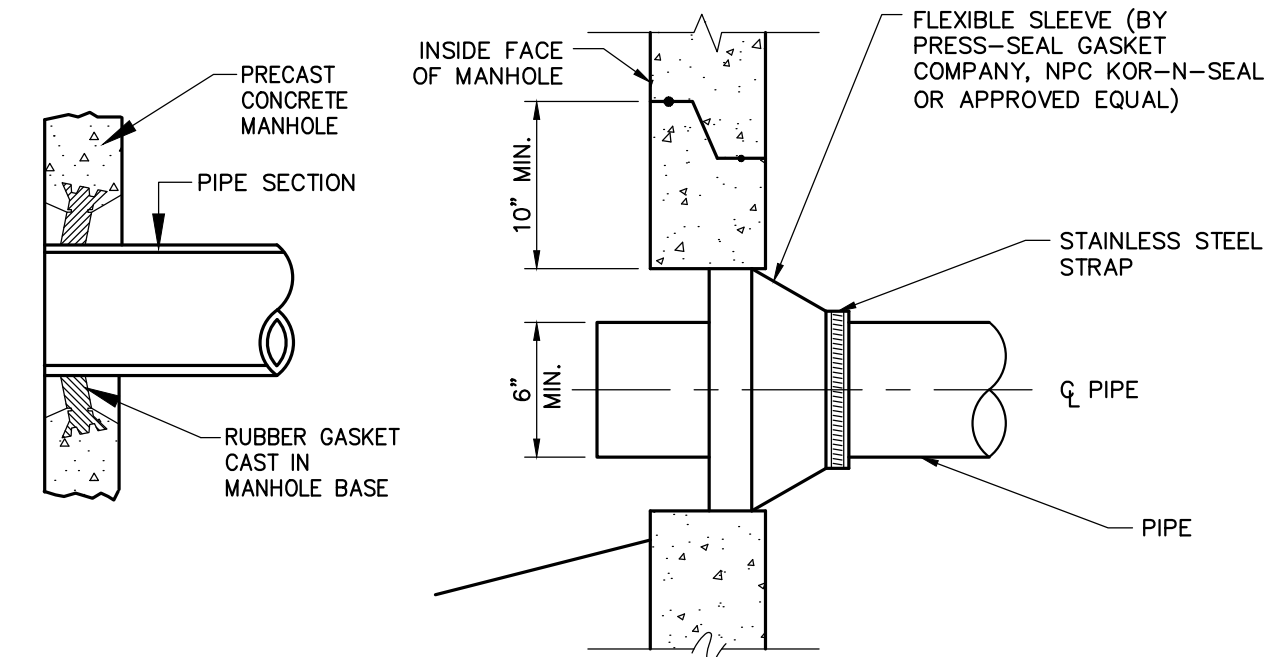


1 BRICK INVERT
NOT TO SCALE

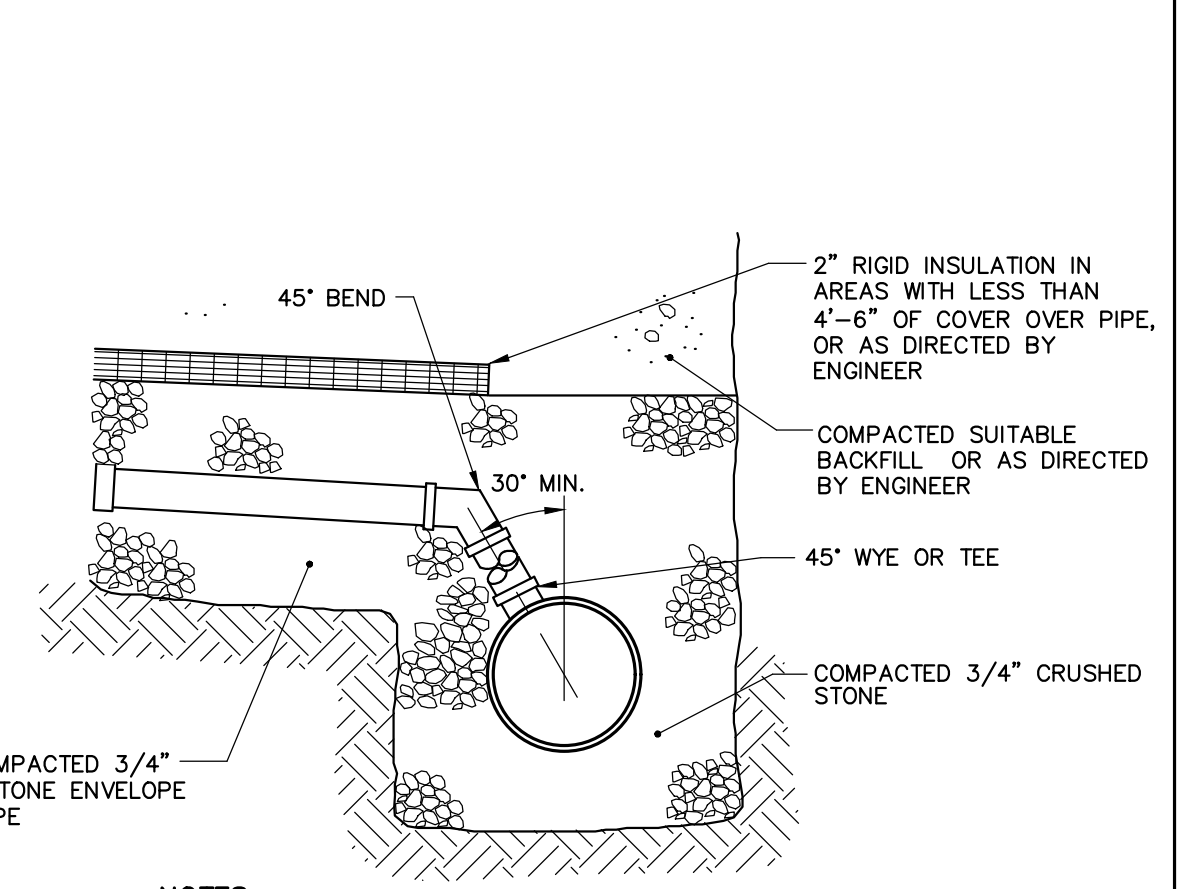
- NOTES:**
1. TOOL ALL JOINTS IN CHANNEL AND ON TABLES.
 2. FILL UNDER TABLE WITH MORTAR-BEDDED BRICK.
 3. SLOPE CHANNEL DOWN FROM INLET TO OUTLET.
 4. MAKE CHANGES IN FLOW DIRECTION BY CIRCULAR CHANNEL CONSTRUCTION WITH MAXIMUM RADIUS POSSIBLE.
 5. FOR DEAD-END MANHOLES, BUILD CHANNEL AS DIRECTED BY ENGINEER.
 6. OMIT BRICK INVERT AT STRUCTURES WHERE PVC PLUG IS SPECIFIED.



2 MASONRY PLUG
NOT TO SCALE

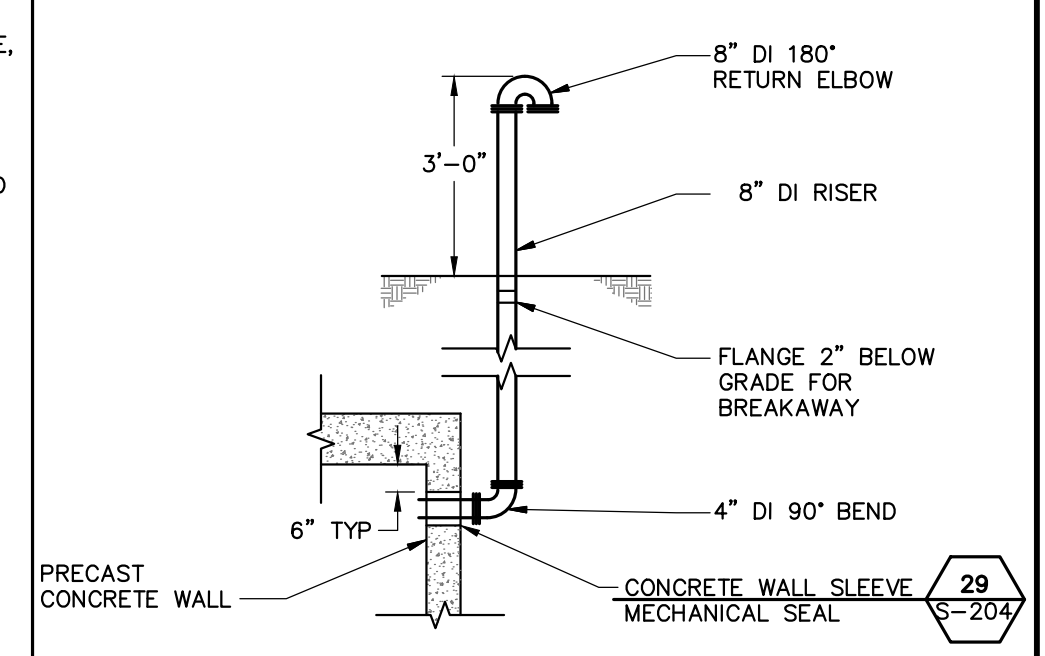


3 MH, CB, AND TREATMENT DEVICE SEALS
NOT TO SCALE

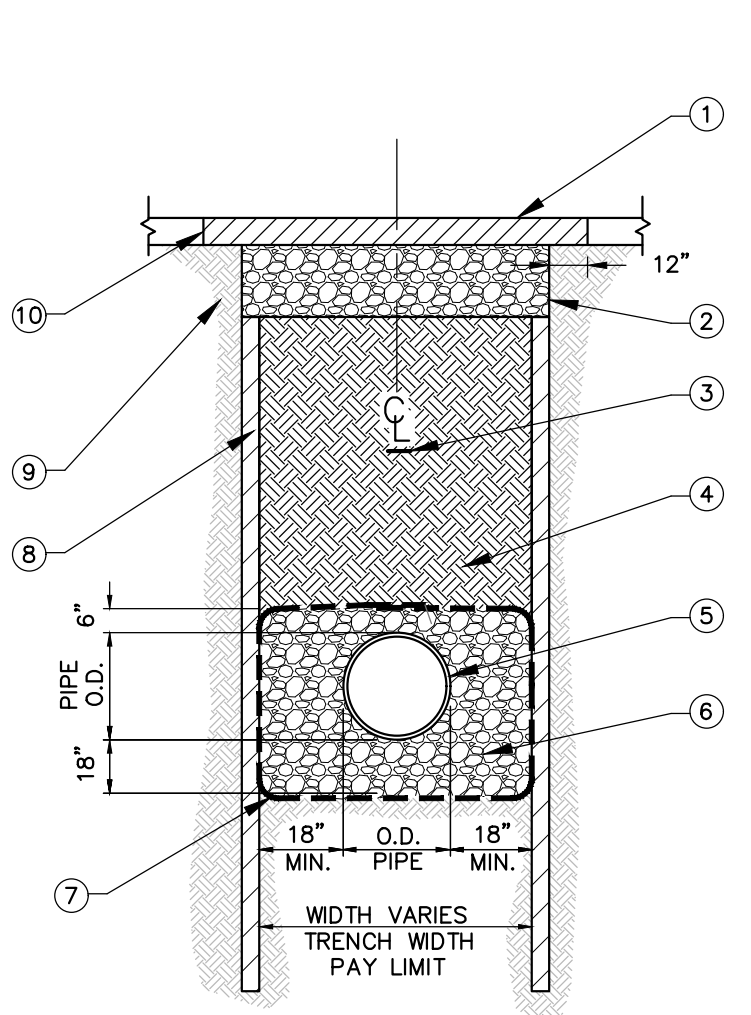


- NOTES:**
- PIPE DIAMETERS MAY VARY, SEE TYPICAL PIPE TRENCH DETAIL, THIS SHEET.
 - WHERE 30° MINIMUM ANGLE BETWEEN SEWER CONNECTION AT THE SEWER MAIN AND THE VERTICAL CANNOT BE MAINTAINED, PROVIDE A PRECAST SEWER CHIMNEY.
 - IF STAKE IS CUT OFF FLUSH OR SLIGHTLY BELOW GRADE, PROVIDE MIN. OF TWO 16G. GALV. SPIKES DRIVEN INTO TOP OF 2' x 4' TO PROVIDE METAL DETECTABILITY.

4 HORIZONTAL SEWER CONNECTION
N.T.S.

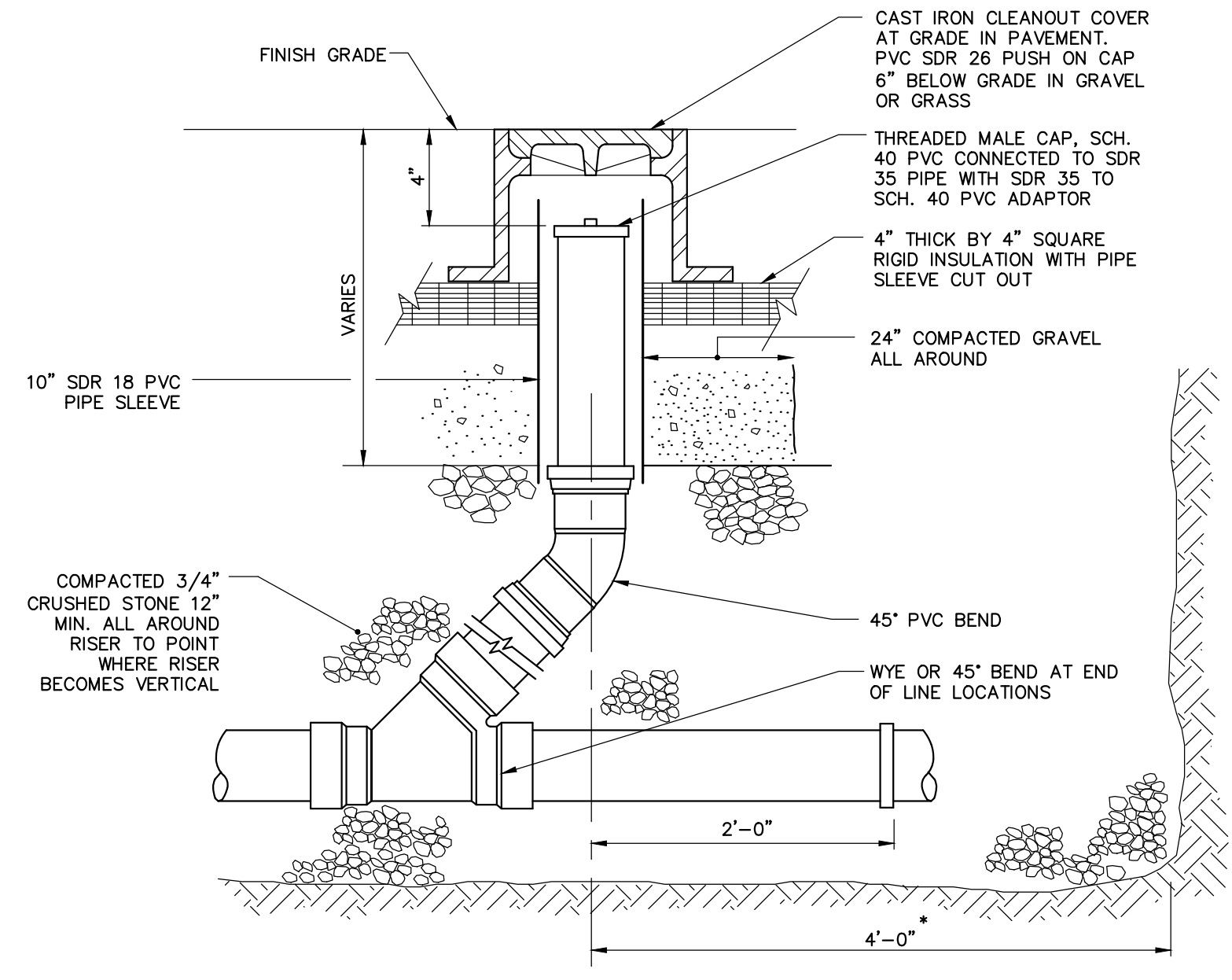


5 STRUCTURE VENT
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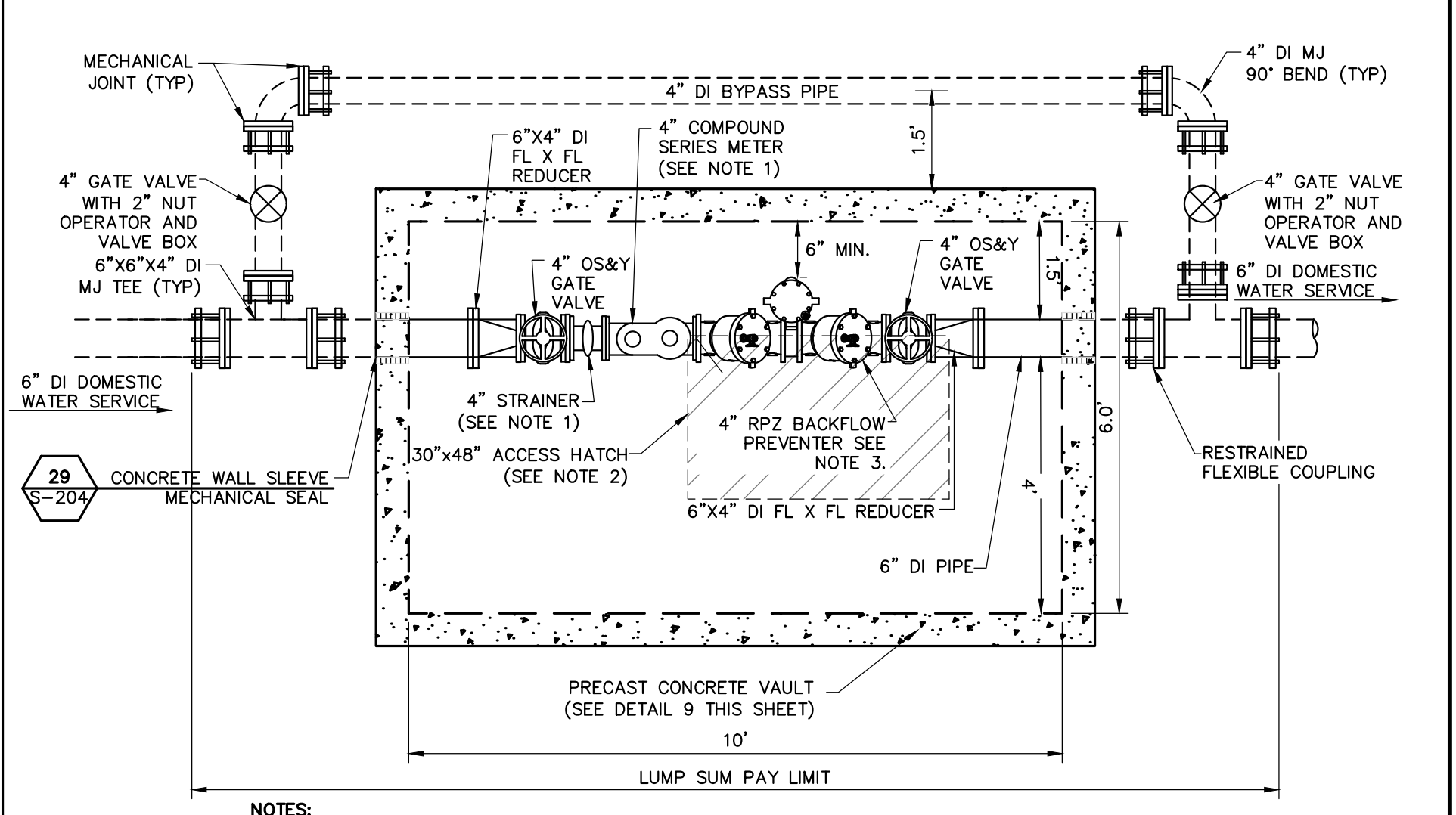


- NOTES:**
1. WRAP BEDDING IN STABILIZATION FABRIC. STABILIZATION FABRIC MAY BE OMITTED, AS DIRECTED BY ENGINEER, IN INSTANCE WHERE EXISTING SOILS AT THE TRENCH BOTTOM AND SIDEWALLS ARE SUITABLE GRANULAR MATERIAL.
 2. MAINTAIN UNIFORM TRENCH WIDTH TO 6" ABOVE TOP OF PIPE.
 3. BRACING AND SHEETING OR OTHER TRENCH PROTECTION TO BE PROVIDED TO MEET APPLICABLE O.S.H.A. SAFETY REGULATIONS. ALL SUCH TRENCH PROTECTION TO BE RESPONSIBILITY OF CONTRACTOR. CONTRACTOR TO PROVIDE SHOP DRAWINGS OF TRENCH SUPPORT SYSTEMS ENDORSED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF MASSACHUSETTS.
- | TRENCH WIDTHS (a) | |
|--------------------|---------------------|
| PIPE SIZE (INCHES) | MAX. (ONE PIPE) (b) |
| 6" | 4.0' |
| 8" | 4.0' |
| 10" | 4.0' |
| 12" | 4.0' |
| 15" | 4.0' |
| 18" | 5.0' |
| 24" | 5.5' |
| 30" | 6.0' |
| 36" | 7.0' |
| 48" | 8.0' |
| 60" | 10.0' |
- a. REPRESENTS TRENCH WIDTH PAY LIMIT
b. FOR ROCK EXCAVATION SUBTRACT 1'-0"

6 SEWER AND STORM DRAIN TRENCH
NOT TO SCALE

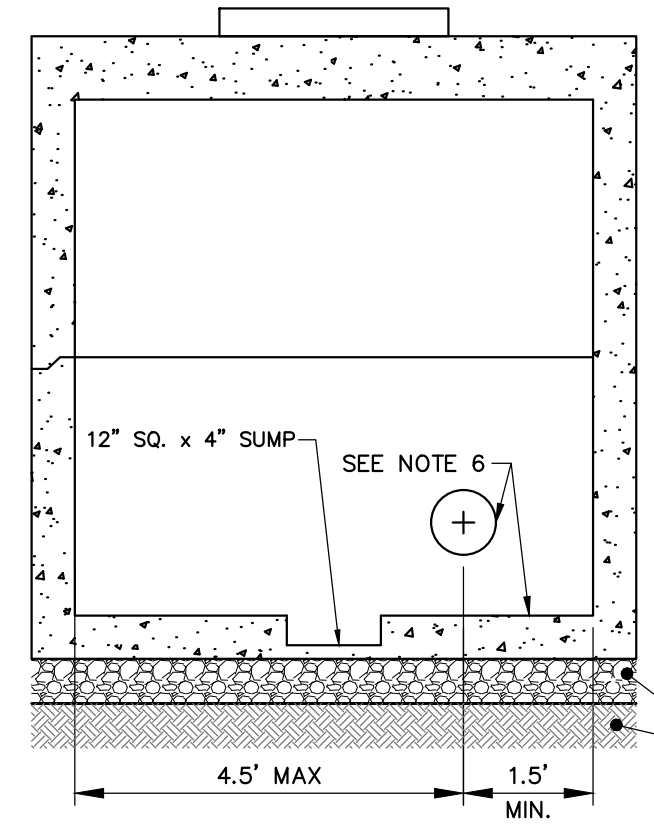
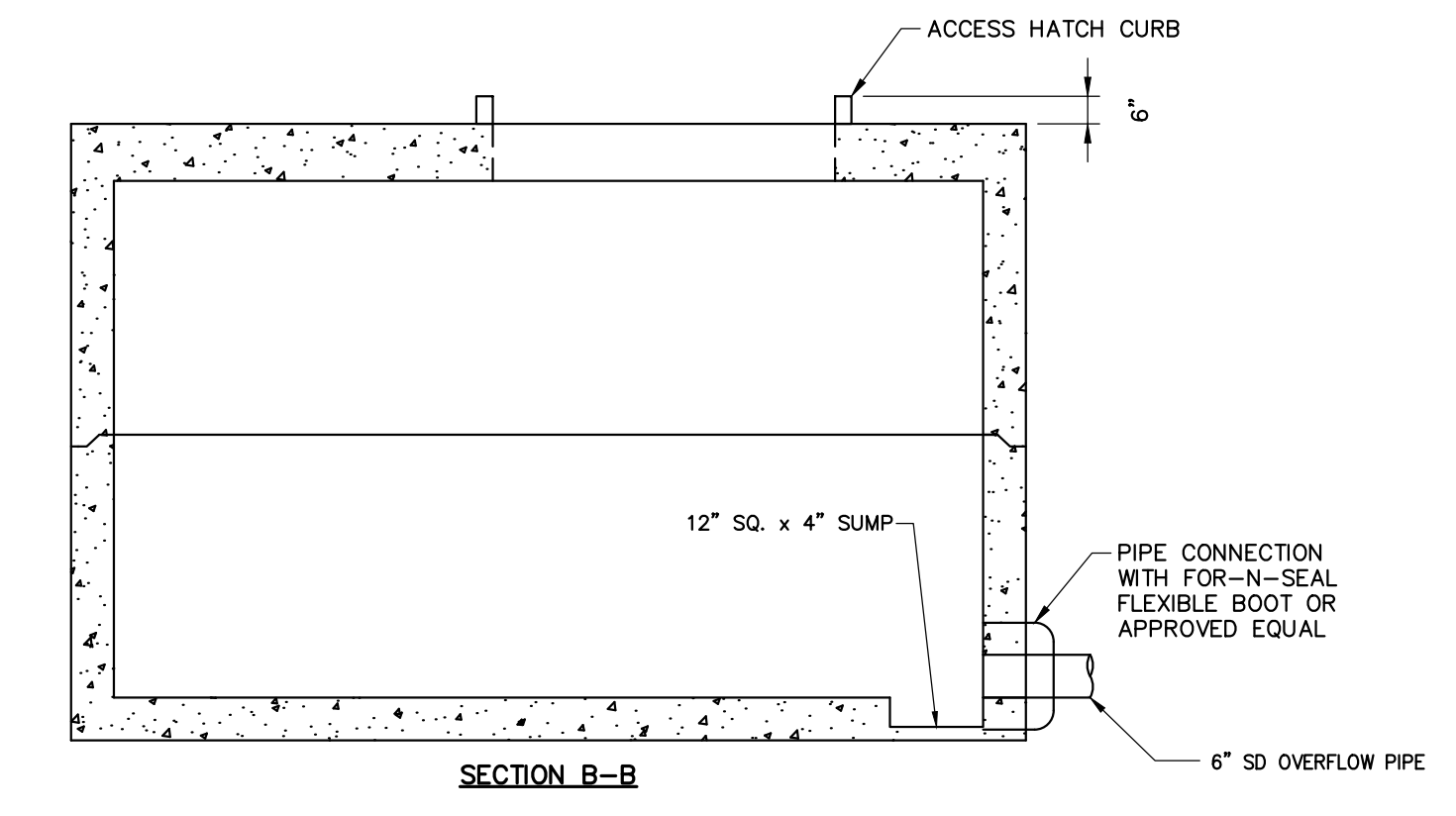
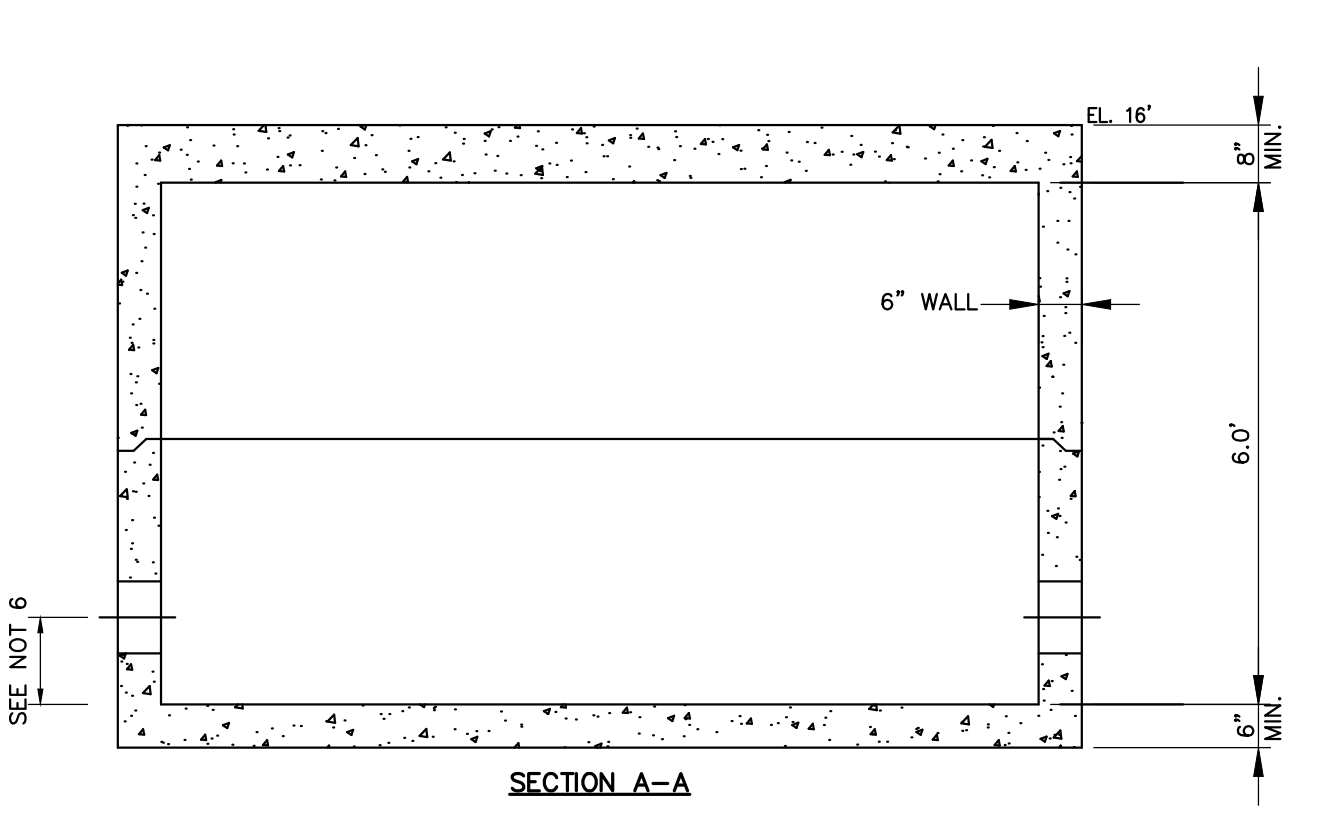
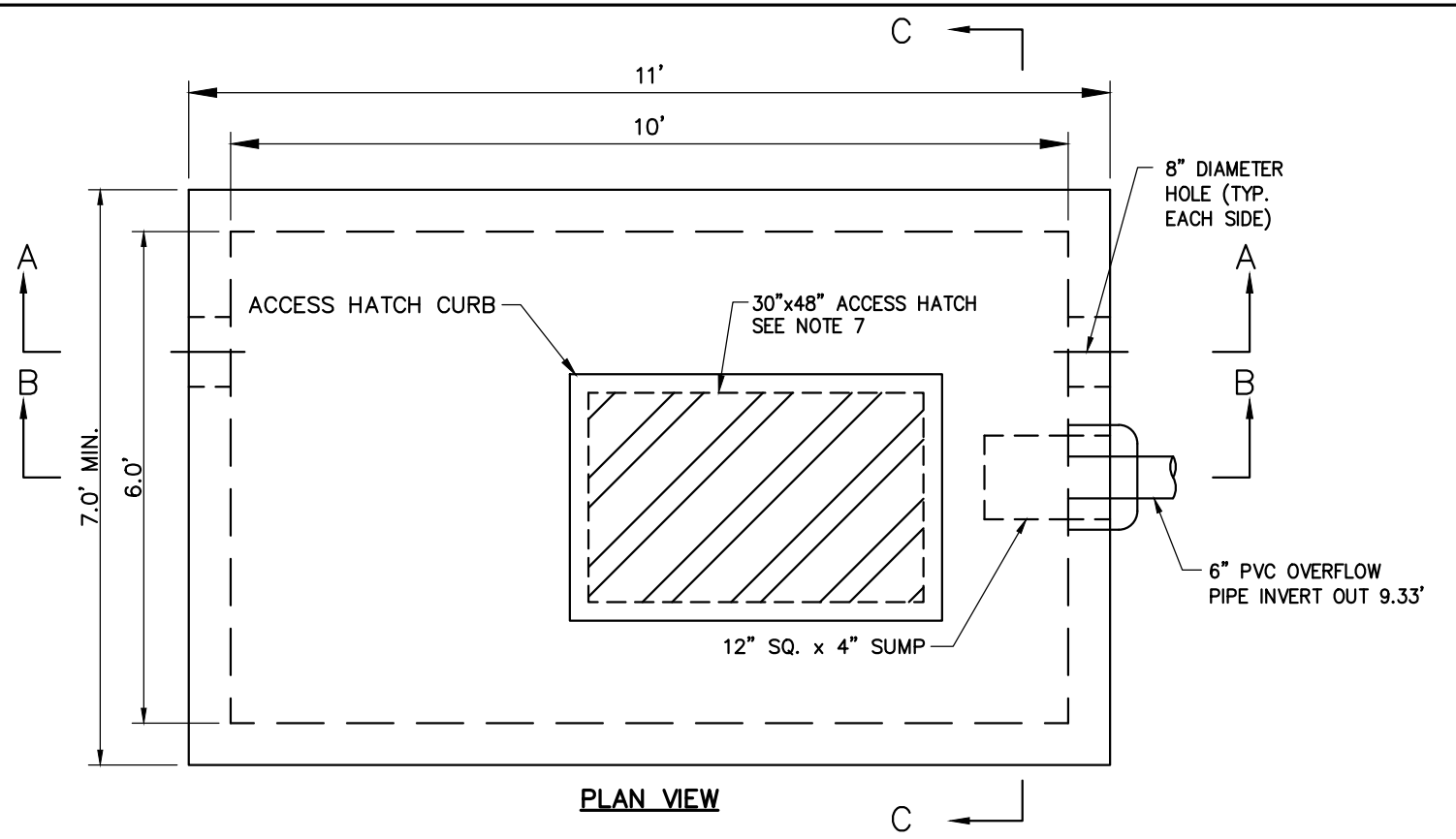


7 CLEANOUT DETAIL
NOT TO SCALE



- NOTES:**
1. METER AND STRAINER TO BE FURNISHED BY CITY OF SALEM WATER DEPARTMENT AND INSTALLED BY CONTRACTOR.
 2. PROVIDE THROUGH-HATCH MOUNTING KIT FOR METER TRANSMITTERS.
 3. PROVIDE REDUCED PRESSURE ZONE ASSEMBLY BACKFLOW PREVENTER AS SPECIFIED IN SECTION 33 12 16.
 4. MECHANICAL JOINTS SHALL BE RESTRAINED JOINT TYPE.
 5. PAY LIMIT TO INCLUDE ALL ITEMS BETWEEN 6"x6"x4" TEES.

8 FOREST RIVER PARK METER VAULT PIPING PLAN
NOT TO SCALE



- NOTES:**
1. CONCRETE: 5,000 P.S.I., MINIMUM STRENGTH @ 28 DAYS
 2. STEEL REINFORCING - ASTM A-615, GRADE 60.
 3. COVER TO STEEL - 1" MINIMUM
 4. VAULT SHALL MEET ASTM C858 AND ACI 318 WITH AASHTO AND HS-20 LOADING
 5. CONSTRUCTION JOINT-SEALED WITH BUTYL RUBBER RESIN OR EQUIVALENT
 6. PIPE AND FLOOR ELEVATION AS REQUIRED TO MEET MINIMUM COVER AND MINIMUM RPZ BACKFLOW CLEARANCE REQUIREMENT.
 7. ACCESS HATCH SHALL BE ALUMINUM WITH STAINLESS STEEL HARDWARE. SLAM LOCK COVER, FLUSH LIFT HANDLE, AND H2O RATHER FOR LOW VOLUME, LOW SPEED TRAFFIC. ACCESS HATCH SHALL BE EQUAL TO EAST JORDAN IRON WORKS MODEL H30481806.
 8. VAULT TO BE INSTALLED IN ACCORDANCE WITH SECTION 33 49 00. FOR BEDDING AND BACKFILL REFER TO DETAIL 1 PRECAST CONCRETE MANHOLE ON SHEET C-602

9 FOREST RIVER PARK PRECAST CONCRETE METER VAULT
NOT TO SCALE

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DRAWN BY: MB

CIVIL DETAILS 4

CITY OF SALEM, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

CONTRACT A
CANAL STREET
FLOOD MITIGATION PROJECT
SALEM, MASSACHUSETTS

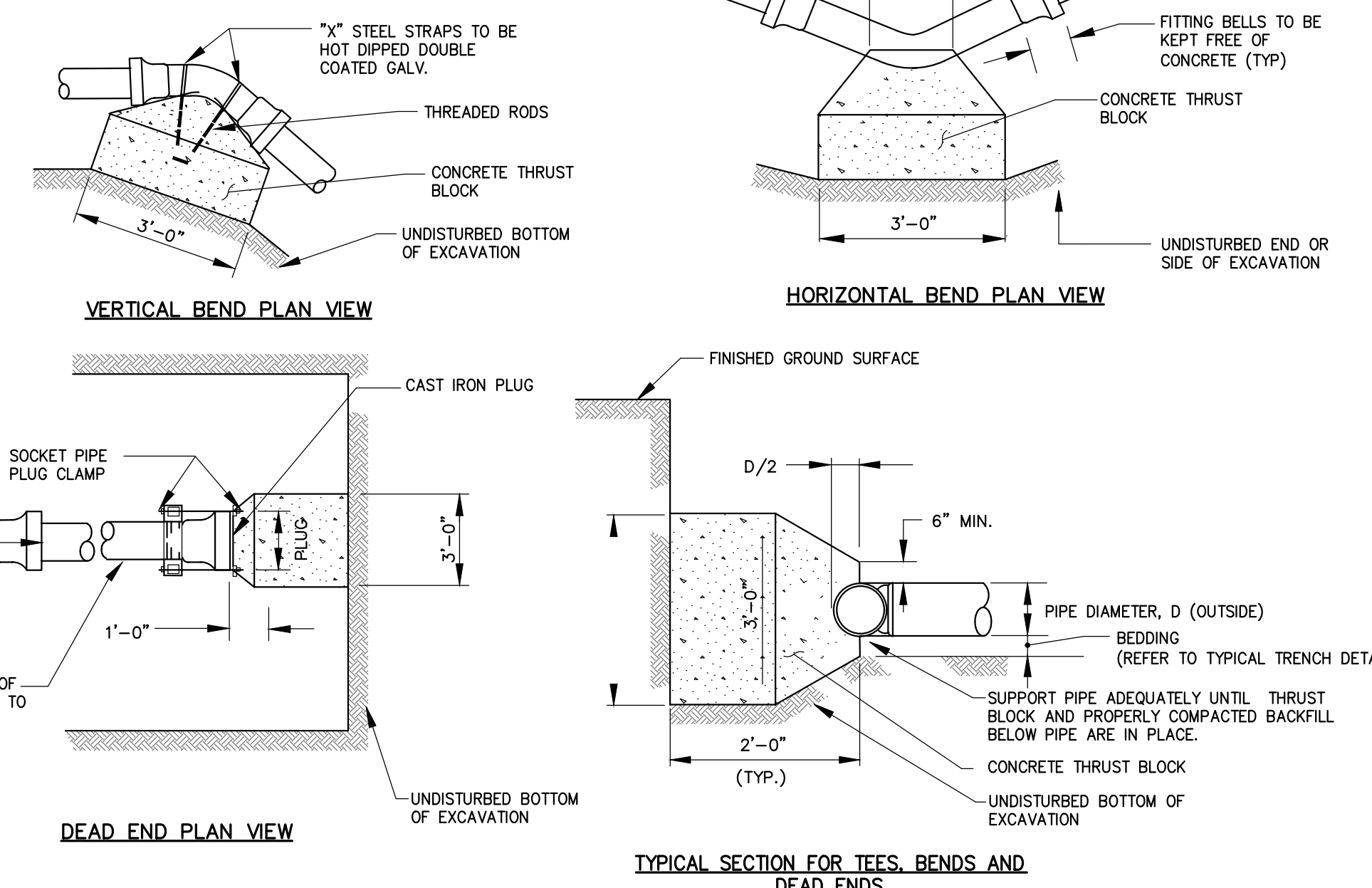
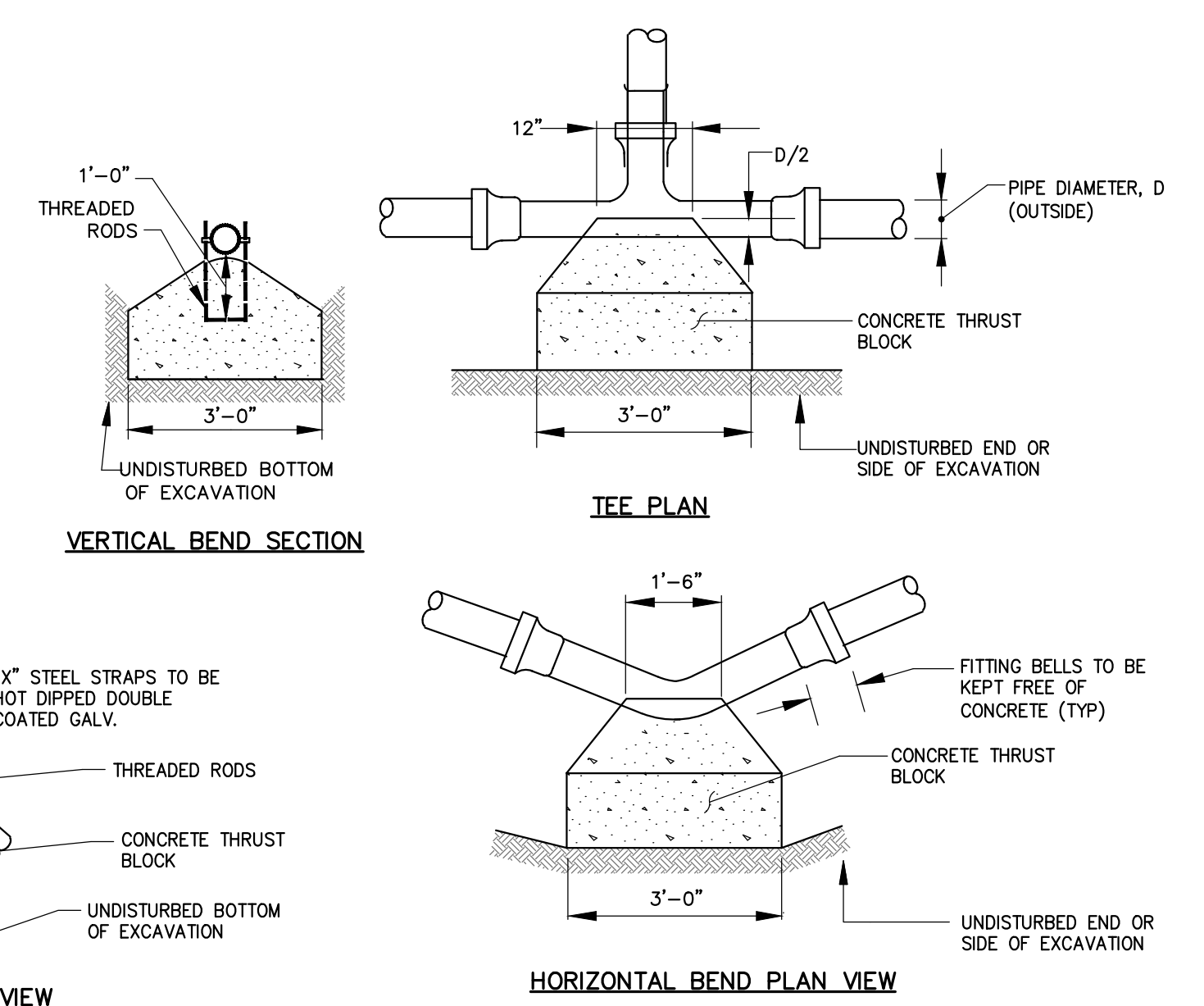
JOB NO.: 228340.11
DATE: JANUARY 2017
SCALE: NOT TO SCALE
SHEET: 30 OF 46

C-603

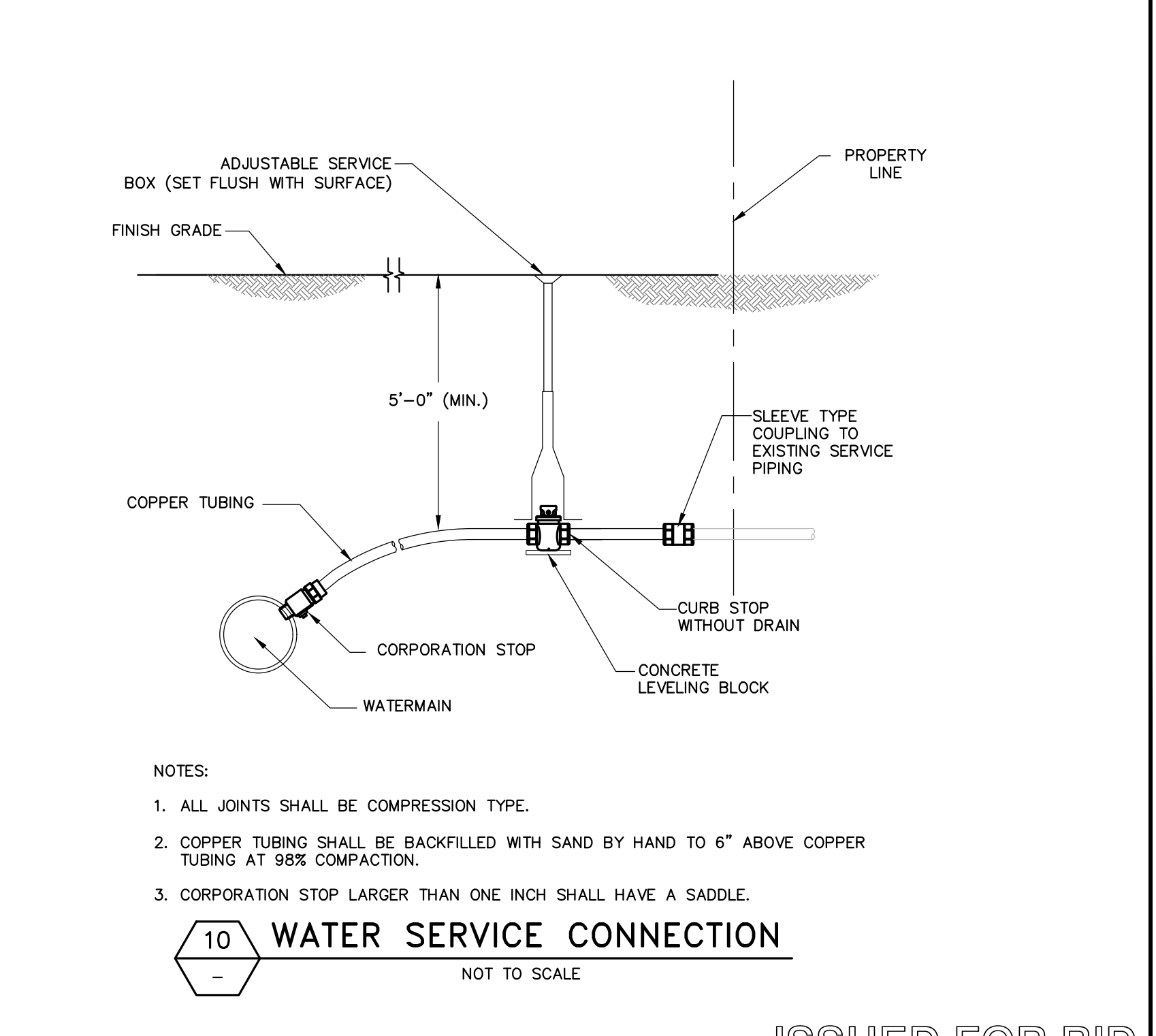
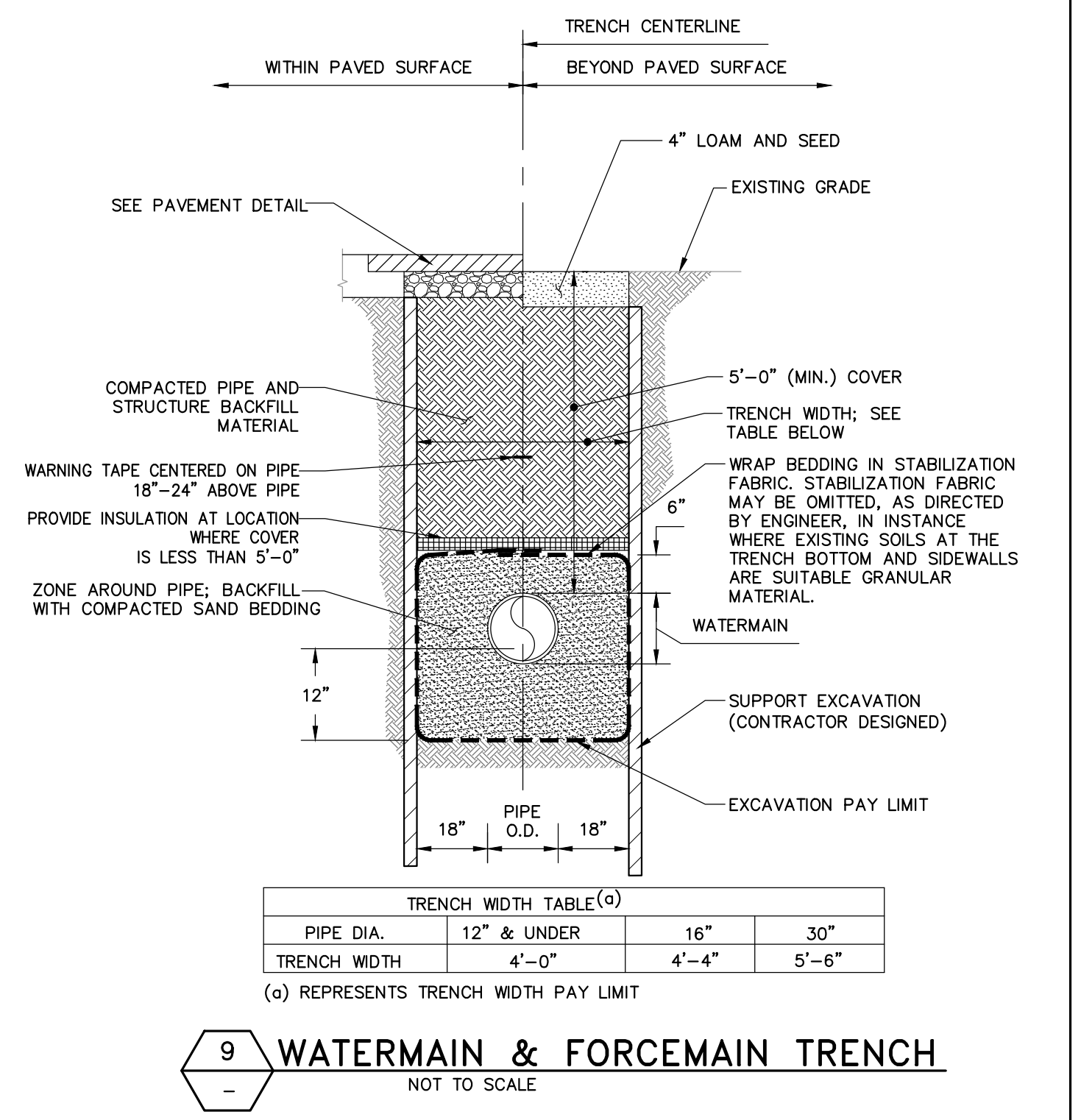
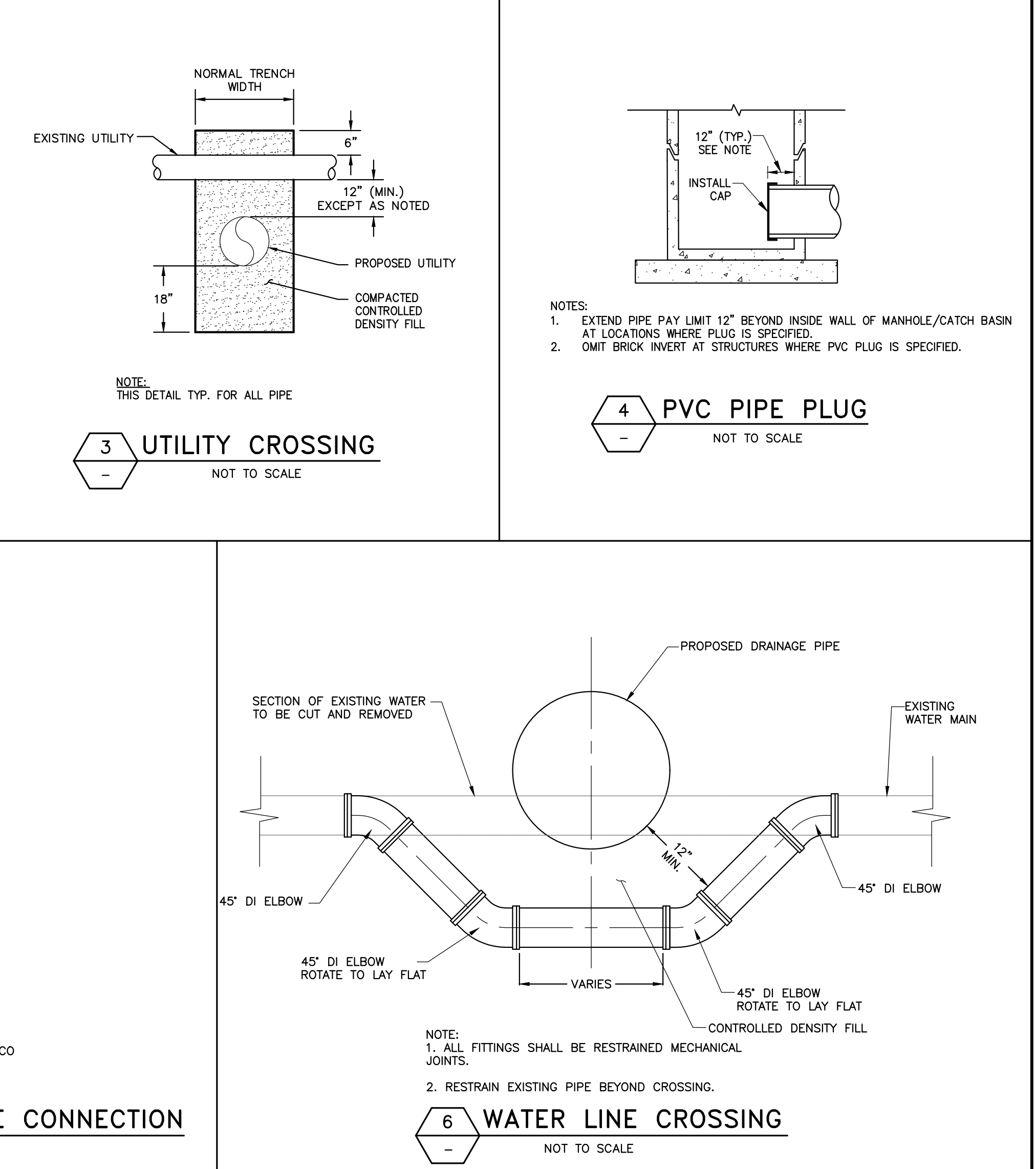
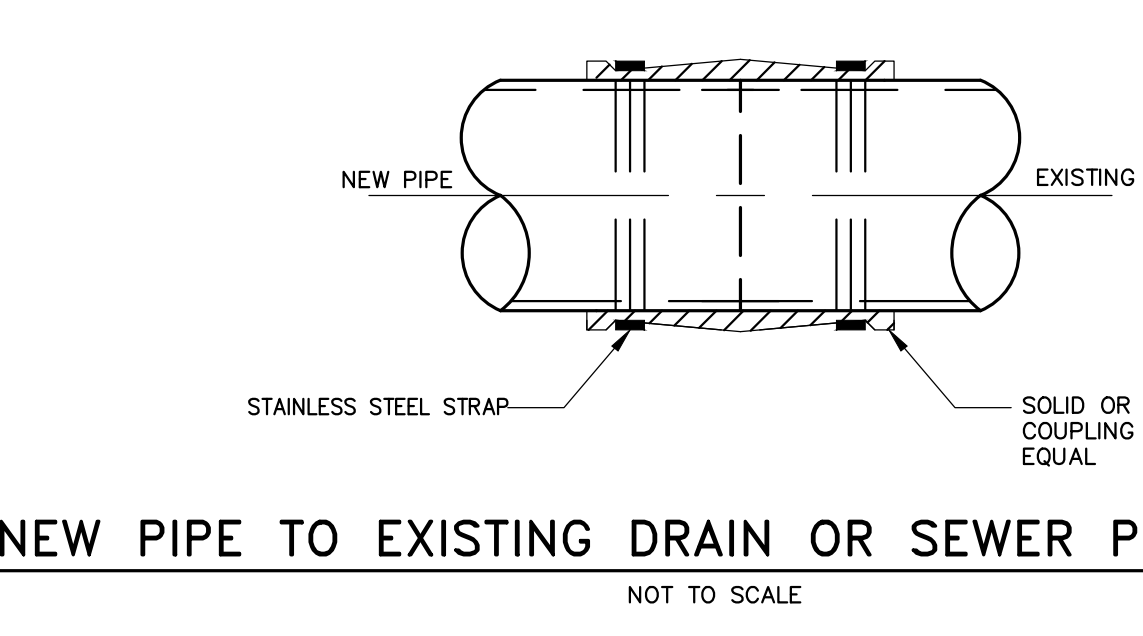
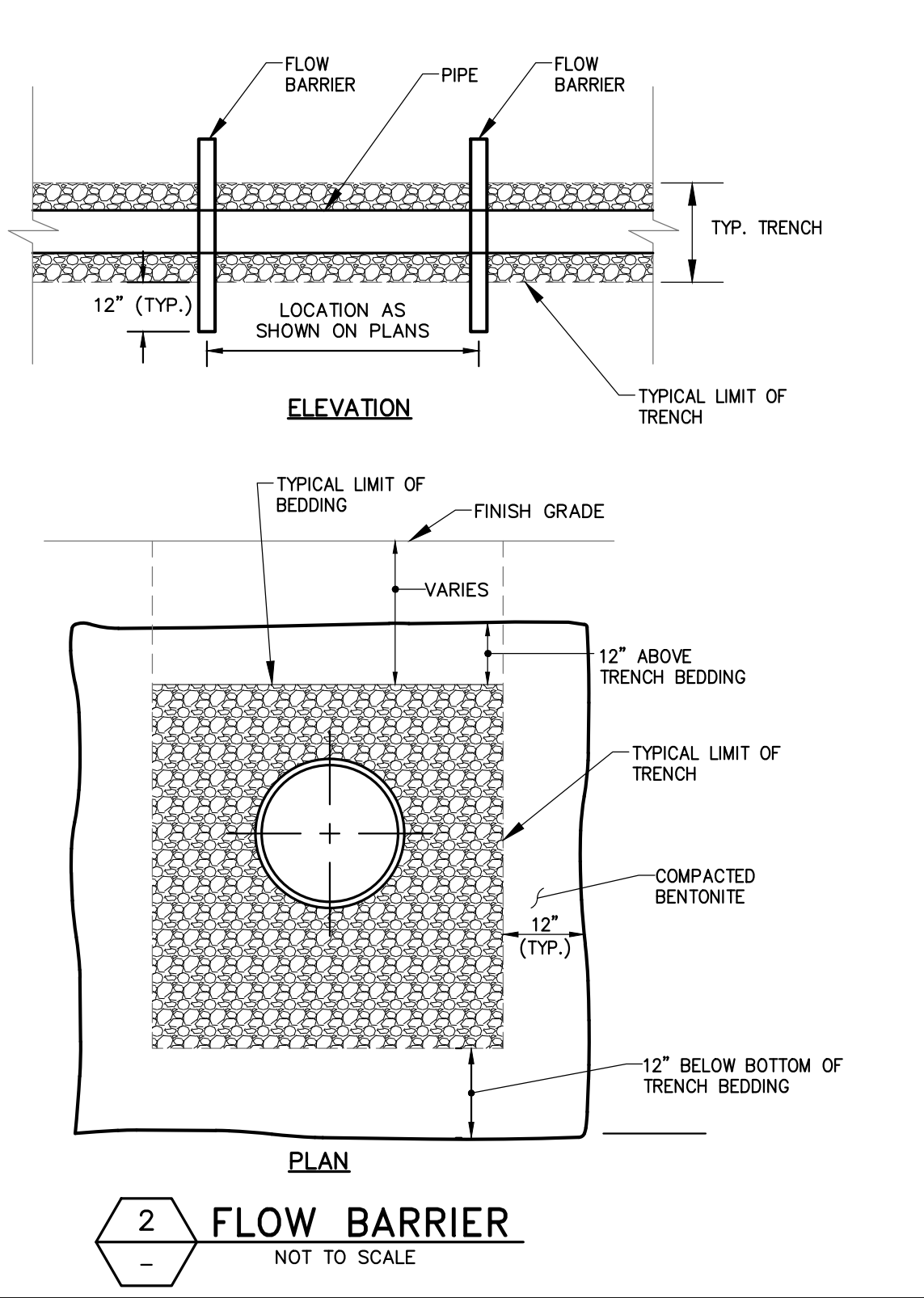
Required Length of Restrained Joint

| Pipe Size (in) | Horizontal Bend | | | Vertical Bends (Symmetrical - See Detail S Sheet C-602) | | | | | |
|----------------|-----------------|--------|----|---|-------------------|-------------------|-------------------|---------------|---------------|
| | 11-1/4 | 22-1/2 | 45 | 11-1/4 Upper Bend | 11-1/4 Lower Bend | 22-1/2 Upper Bend | 22-1/2 Lower Bend | 45 Upper Bend | 45 Lower Bend |
| 30 | 5 | 10 | 20 | 9 | 5 | 18 | 10 | 37 | 20 |

Required lengths above calculated with the following information:
 Pipe Material - Ductile Iron
 Soil Type - SP
 Safety Factor - 1.5 to 1
 Trench Type - 3
 Depth of Bury - 5
 Test Pressure (PSI) - 150



- NOTES:
- ALL FITTINGS SHALL BE ANCHORED BY MECHANICAL MEANS OR BY CONCRETE THRUST BLOCKS, OR BOTH.
 - ALL EXPOSED METAL SHALL BE PAINTED OR COATED.
 - CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRESS OF 3000 P.S.I. AT 28 DAYS.
 - THESE ARE TYPICAL THRUST BLOCK INSTALLATIONS. ACTUAL METHOD OF RESTRAINT MUST BE DETERMINED BY FIELD CONDITIONS. SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER.



- NOTES:
- ALL JOINTS SHALL BE COMPRESSION TYPE.
 - COPPER TUBING SHALL BE BACKFILLED WITH SAND BY HAND TO 6" ABOVE COPPER TUBING AT 98% COMPACTION.
 - CORPORATION STOP LARGER THAN ONE INCH SHALL HAVE A SADDLE.

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DRAWN BY: MB

CIVIL DETAILS - 5

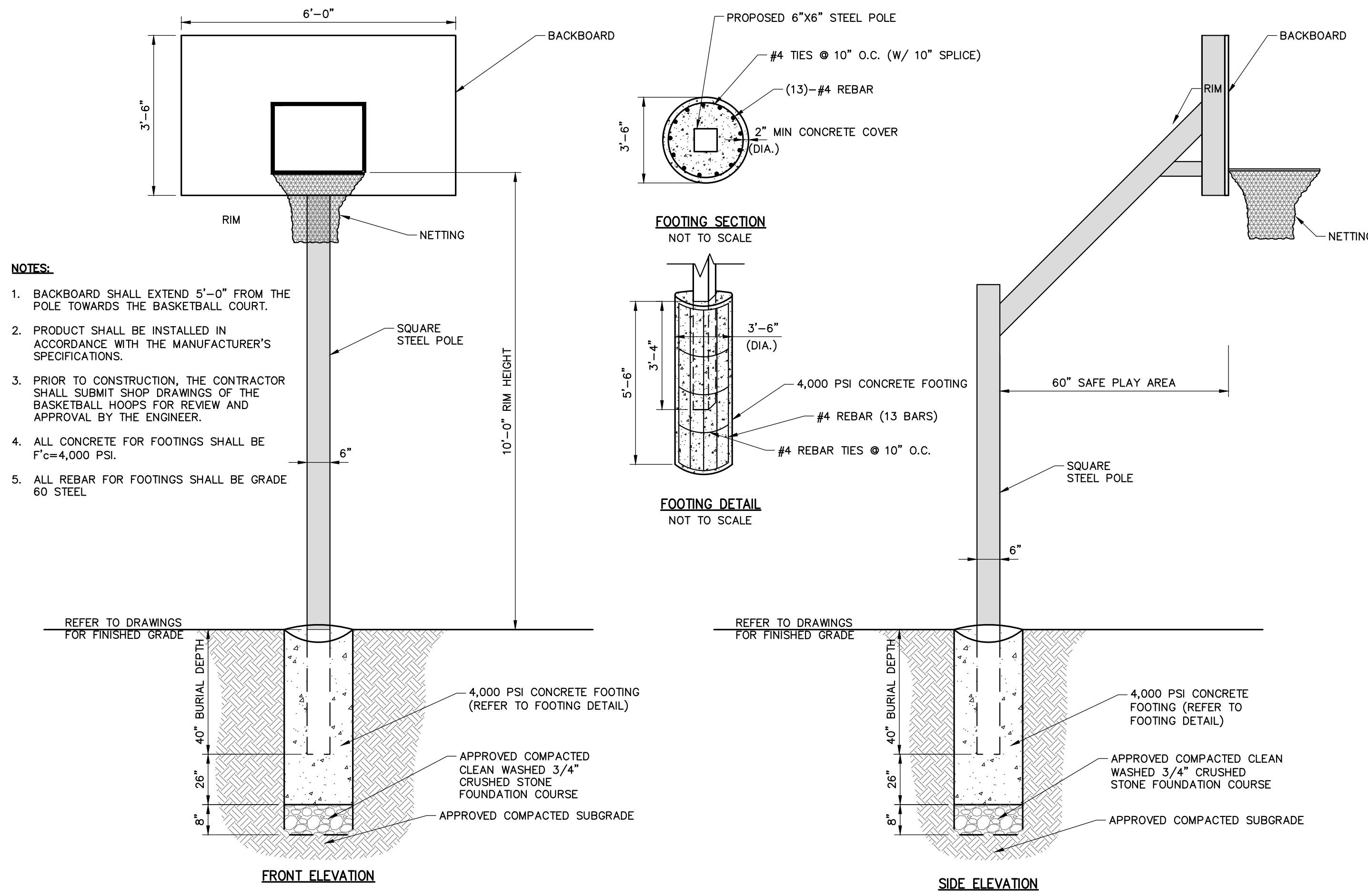
CITY OF SALEM, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

CONTRACT A
CANAL STREET
FLOOD MITIGATION PROJECT
SALEM, MASSACHUSETTS

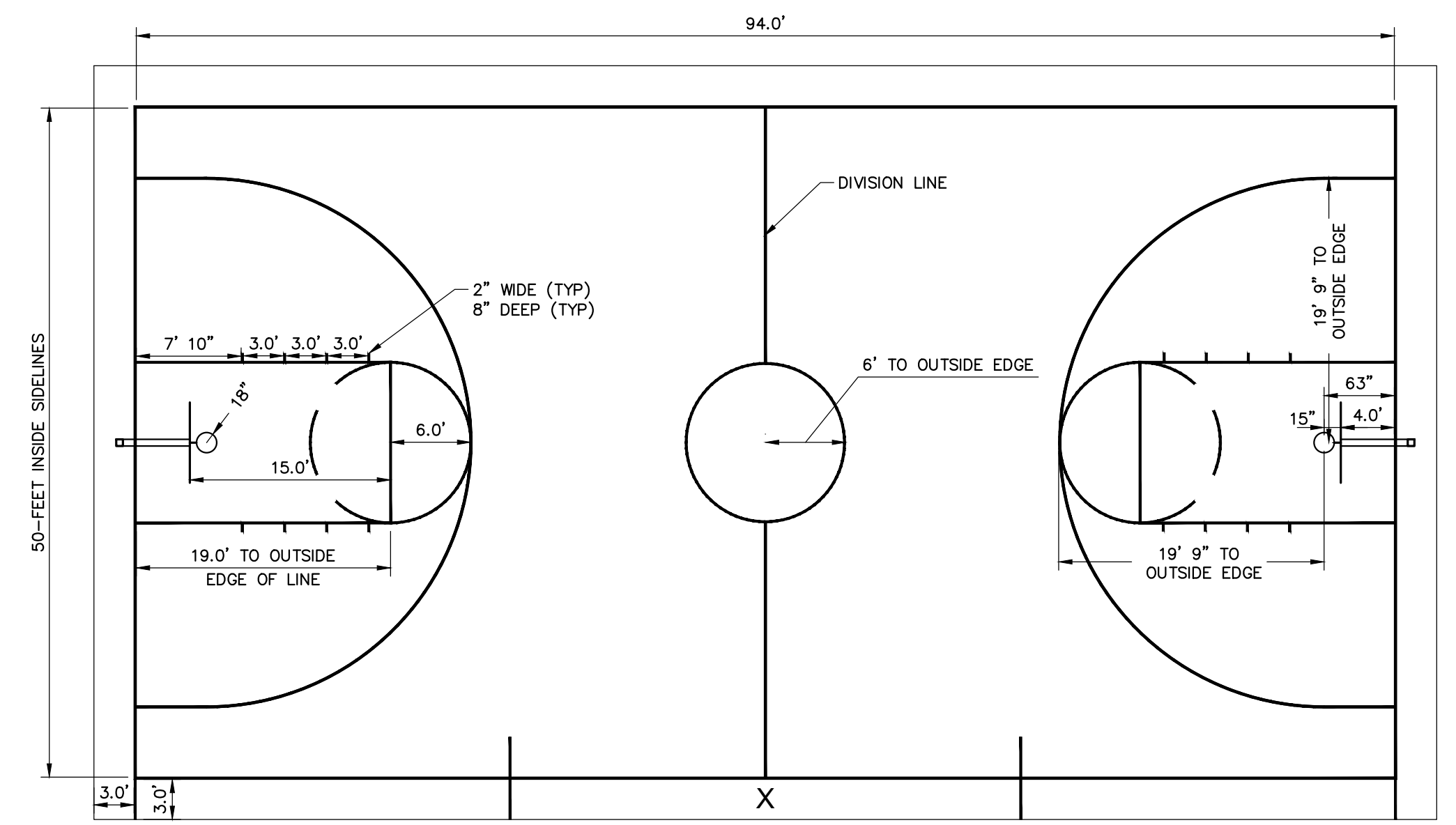
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DATE: JANUARY 2017
SCALE: NOT TO SCALE
SHEET: 31 OF 46

C-604

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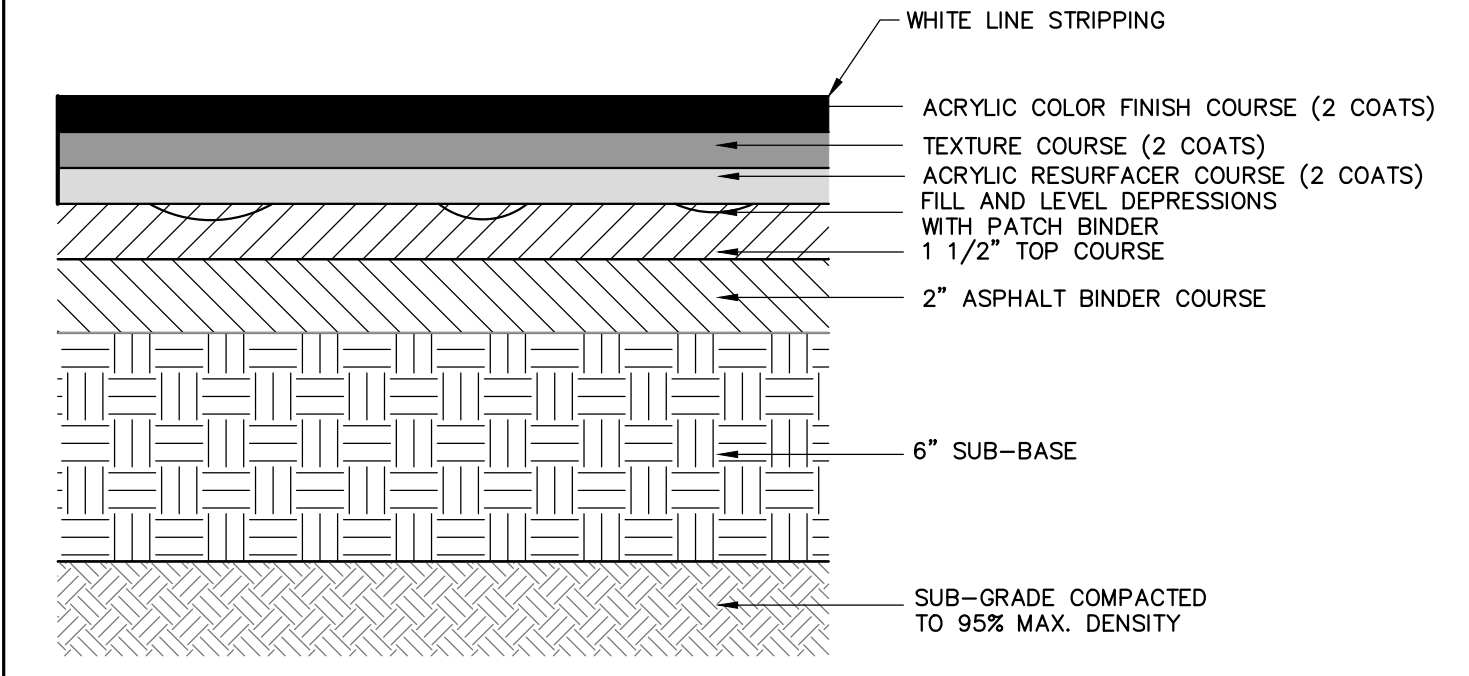


1 BASKETBALL HOOP
NOT TO SCALE

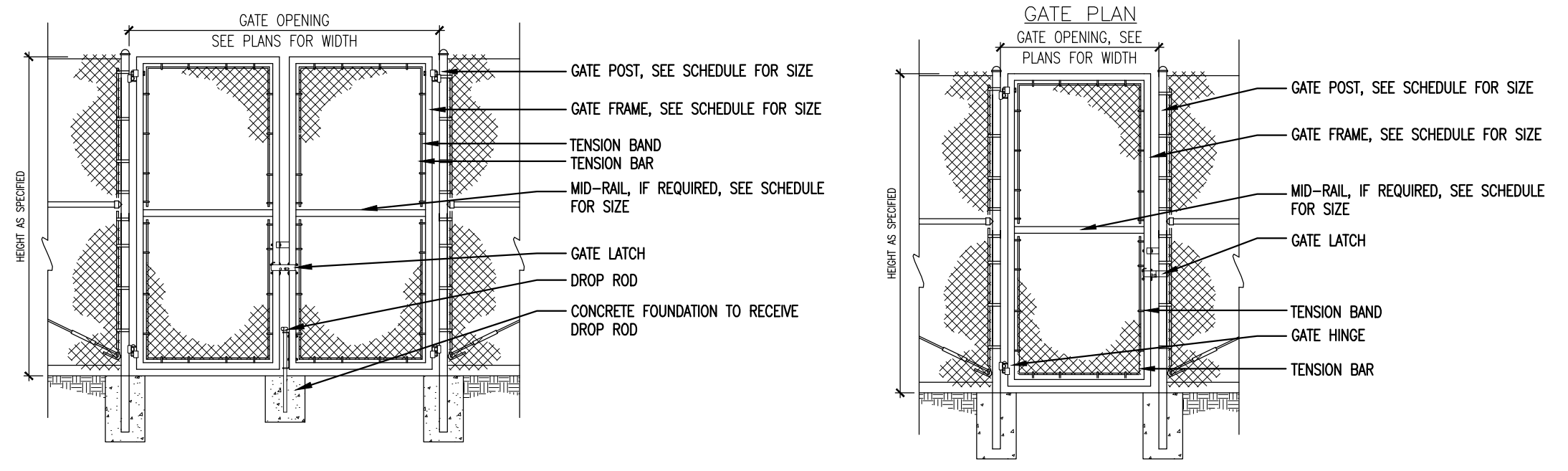


- NOTES:**
- ALL LINES SHALL BE 2-INCHES WIDE (NEUTRAL ZONE EXCLUDED)
 - END LINES AND SIDELINES SHALL BE A MINIMUM OF 2-INCHES IN WIDTH
 - THE THREE-POINT LINE SHALL BE THE SAME COLORS AS THE FREE-THROW LANE LINE AND SEMICIRCLE

2 BASKETBALL COURT LINE STRIPING LAYOUT
1" = 10'

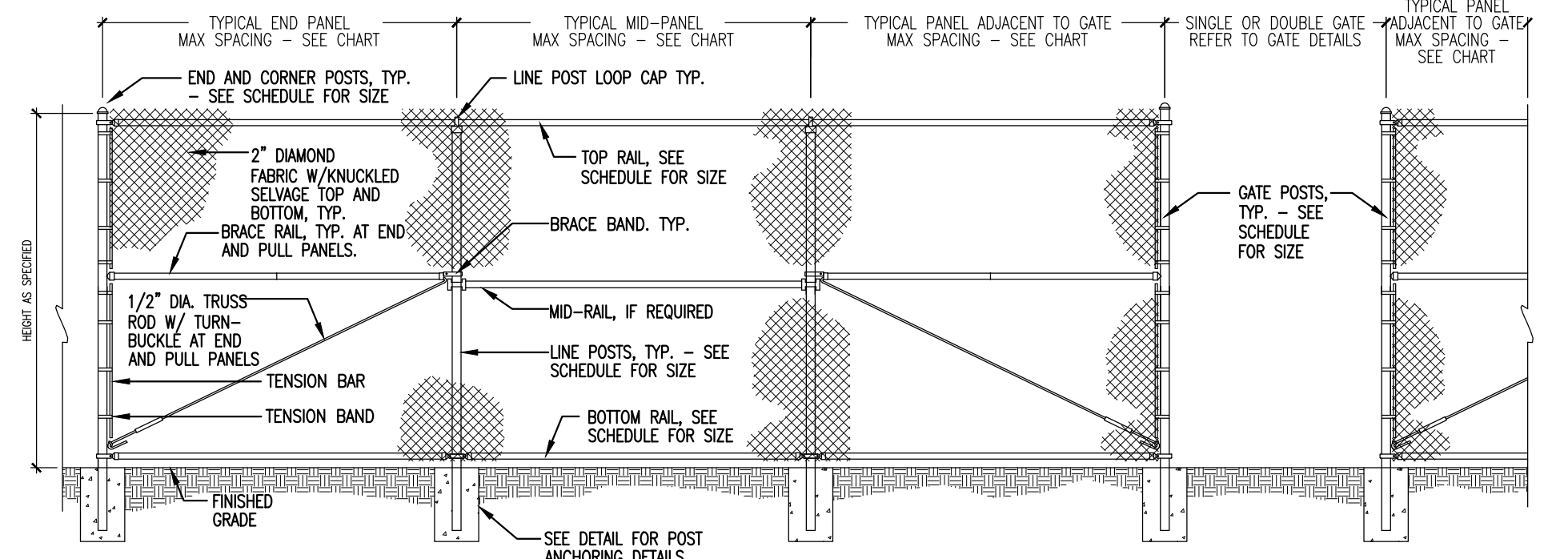


4 BASKETBALL COURT SECTION
NOT TO SCALE



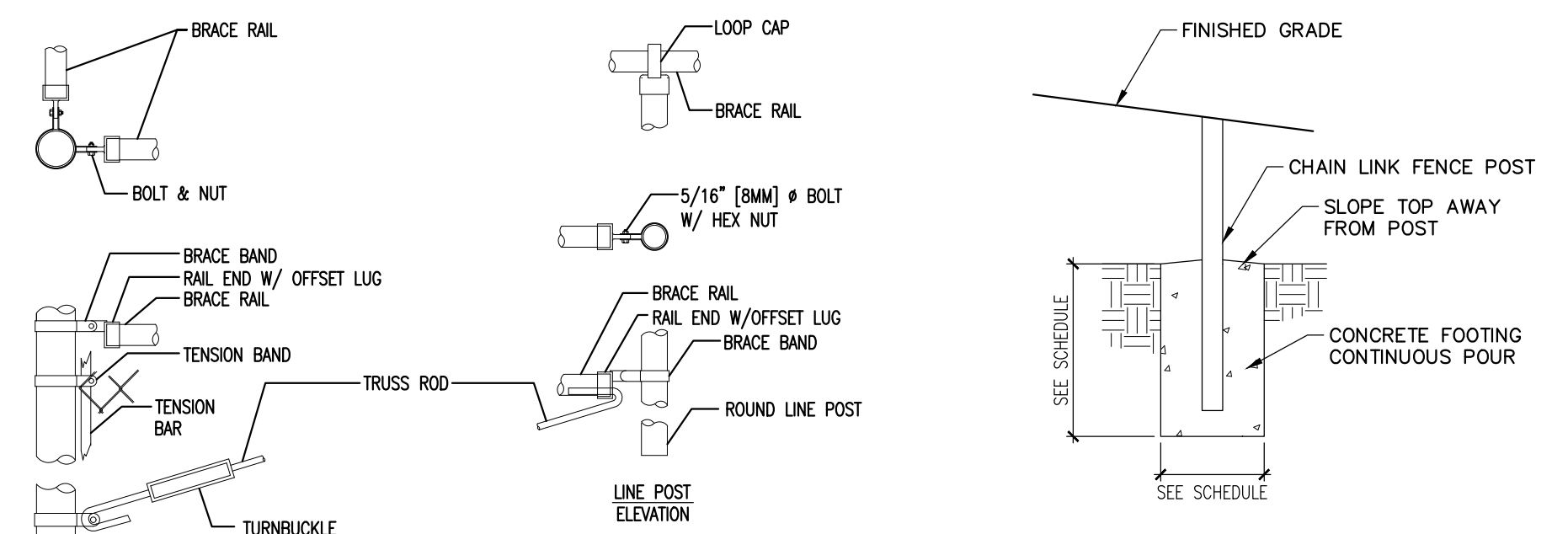
TYPICAL CLF GATE DETAILS

NOTE: DETAIL FOR GENERAL INFORMATION ONLY, CONTRACTOR SHALL SUBMIT FULL SHOP DRAWINGS FOR APPROVAL.



TYPICAL FENCE PANEL DETAILS

NOTE: FENCES 8' HAVE ONE MID-RAIL



TYPICAL POST ANCHORING DETAILS

TYPICAL CLF COMPONENT DETAILS

| MEMBER | SCHEDULE OF SIZES FOR CHAIN LINK FENCING | | |
|------------------------------------|--|-------------------------------|-------------------------------|
| | 4' HEIGHT | 6' HEIGHT | 8' HEIGHT |
| POST SPACING (MAXIMUM) | 8' | 8' | 8' |
| TOP, BOTTOM AND MID-RAILS | 1 5/8" | 1 5/8" | 1 5/8" |
| DIAMETER OF LINE POSTS | 2" | 3" | 3" |
| END AND CORNER POSTS | 2 1/2" | 3" | 3" |
| GATE POSTS | 3" | 4" | 4" |
| SIZE OF GATE MEMBERS | 2" | 2" | 2" |
| SINGLE GATE | 4' WIDE HEIGHT OF FENCE | 4' WIDE HEIGHT OF FENCE | 4' WIDE HEIGHT OF FENCE |
| DOUBLE GATE | 12' WIDE HEIGHT OF FENCE | 12' WIDE HEIGHT OF FENCE | 12' WIDE HEIGHT OF FENCE |
| HORIZONTAL BRACE ON GATE | NO | 3" | 3" |
| DEPTH OF POST IN CURB/FOOTING | LINE POST-12" CORNER POST-12" | LINE POST-18" CORNER POST-30" | LINE POST-18" CORNER POST-30" |
| DEPTH OF FOOTING (SQUARE/DIA.=12") | LINE FTNG-18" CORNER FTNG-18" | LINE FTNG-24" CORNER FTNG-38" | LINE FTNG-24" CORNER FTNG-38" |
| NO. MESH GAUGE | 6 | 9 | 6 |

| NOMINAL O.D. | POST AND SLEEVE SCHEDULE | | | | | |
|--------------|--------------------------|-------------|--------|--------------|-------------|-------------|
| | POSTS | | | SLEEVES | | |
| | ACTUAL I.D. | ACTUAL O.D. | WEIGHT | NOMINAL O.D. | ACTUAL I.D. | ACTUAL O.D. |
| 1 5/8" | 1.380 | 1.660 | 2.27 | 2 7/8" | 2.375 | 2.875 |
| 2" | 1.610 | 1.900 | 2.71 | 3 1/8" | 2.625 | 3.125 |
| 2 1/2" | 2.067 | 2.375 | 3.65 | 3 5/8" | 3.125 | 3.625 |
| 3" | 2.469 | 2.875 | 5.79 | 4 1/8" | 3.625 | 4.125 |
| 3 1/2" | 3.068 | 3.500 | 7.58 | 4 3/4" | 4.250 | 4.750 |
| 4" | 3.548 | 4.000 | 9.10 | 5 1/4" | 4.750 | 5.250 |

- NOTES:**
- WHERE RADIAL PANELS ARE CALLED FOR IN THE PLANS, ALL RAILS SHALL BE BENT TO MATCH THE RADIUS OF THE CURVE.
 - POSTS SHALL BE LOCATED AT THE BEGINNING, MIDDLE AND ENDS OF AN ARC, DIAGONAL BRACES SHALL BE LOCATED BEFORE AND AFTER A GIVEN ARC.
 - THE PERMISSIBLE VARIATION IN WEIGHT IS 15.5% ABOVE OR 5% BELOW.
 - ALL FENCE SHALL HAVE FACTORY APPLIED BLACK EPOXY COATING.

5 BASEBALL CHAIN LINK FENCE
NOT TO SCALE

TYPICAL CHAIN LINK FENCE SCHEDULE OF SIZES

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CIVIL DETAILS - 6

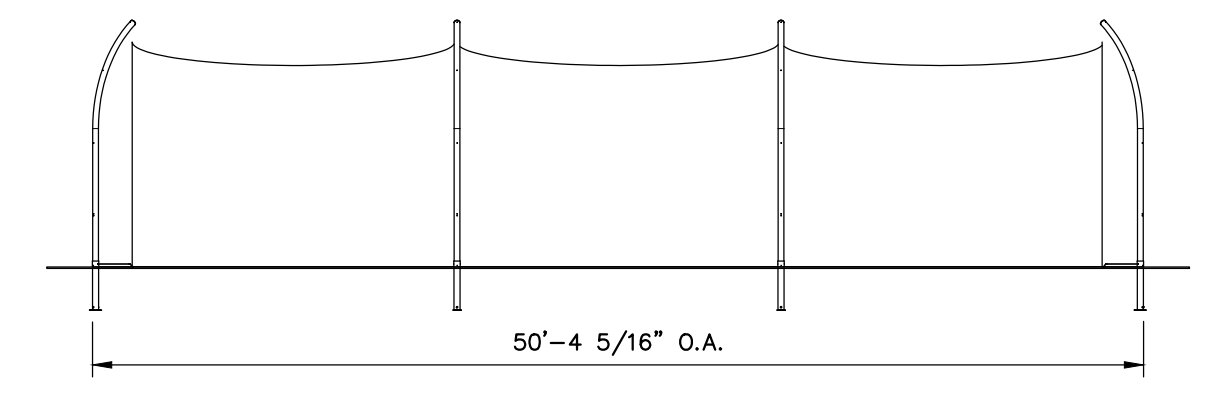
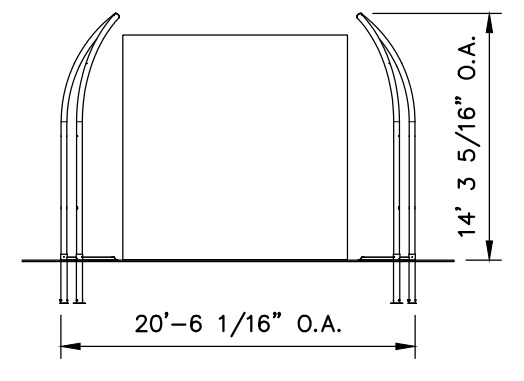
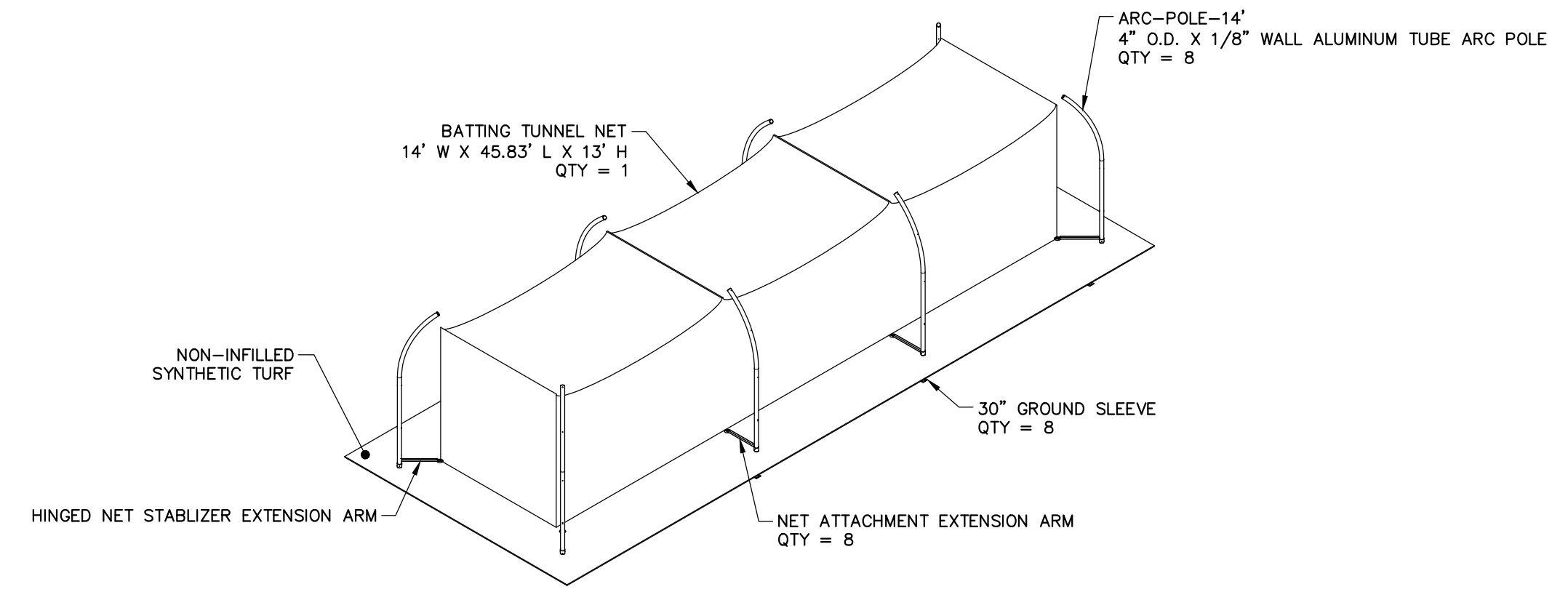
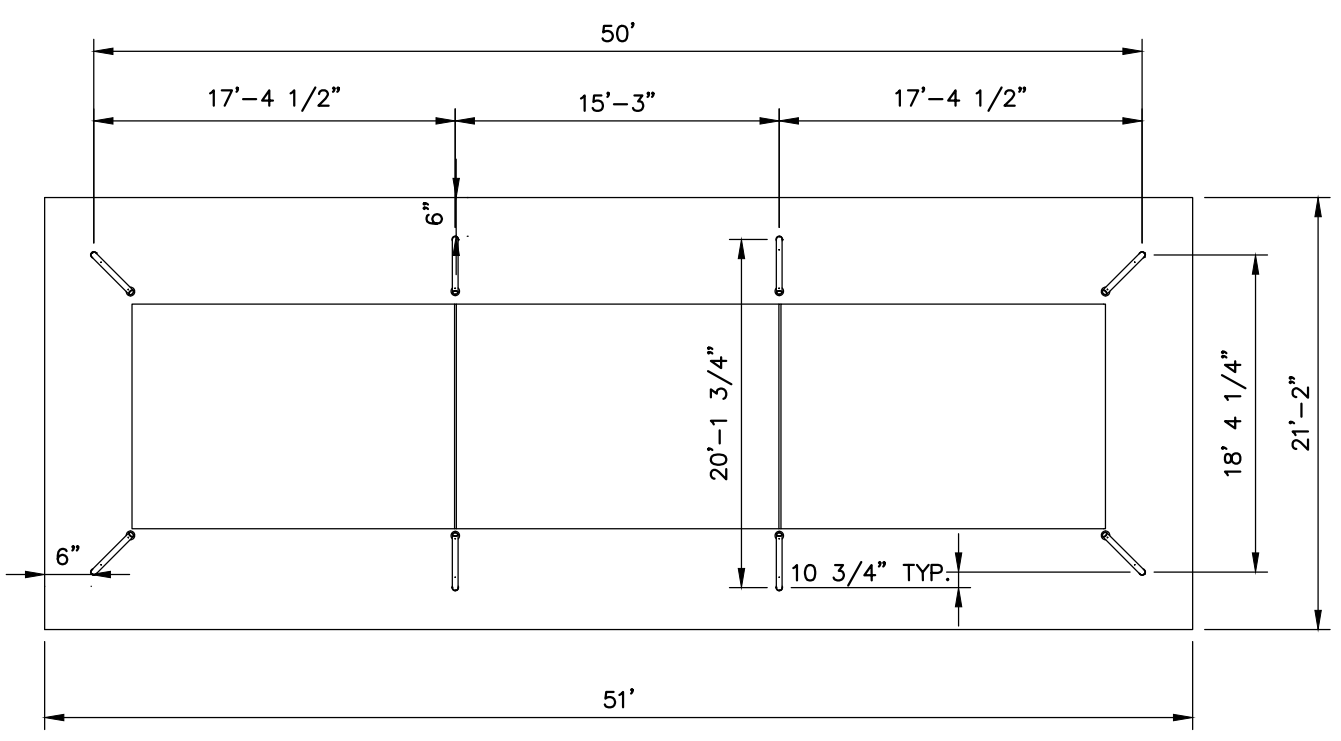
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FLOOD MITIGATION PROJECT
SALEM, MASSACHUSETTS

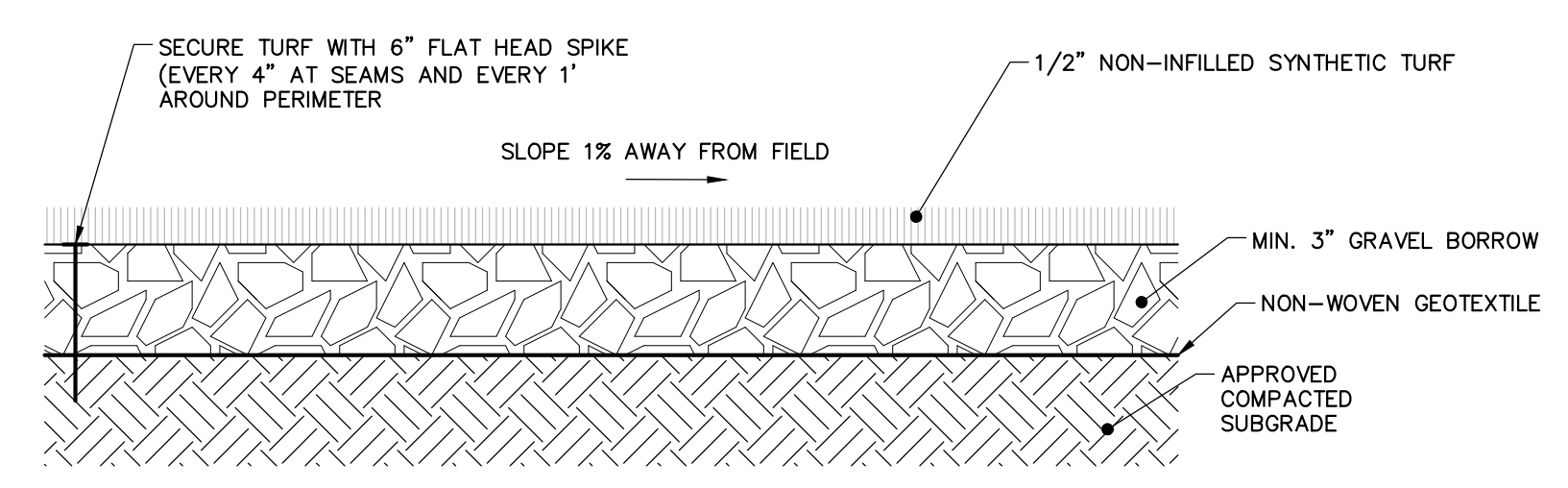
JOB NO.: 228340.11
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SHEET: 32 OF 46

C-605

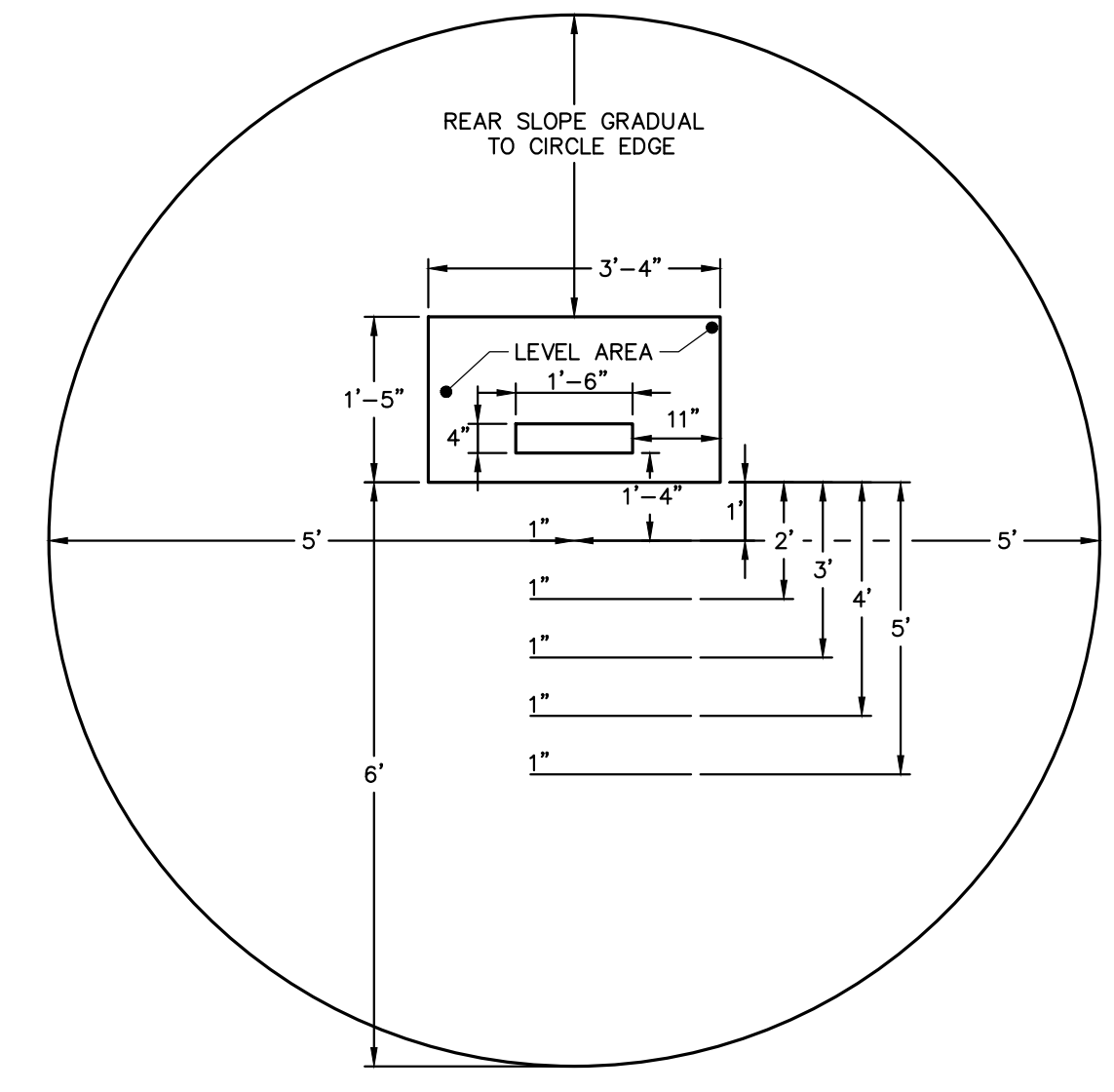
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1 BATTING CAGE
NOT TO SCALE



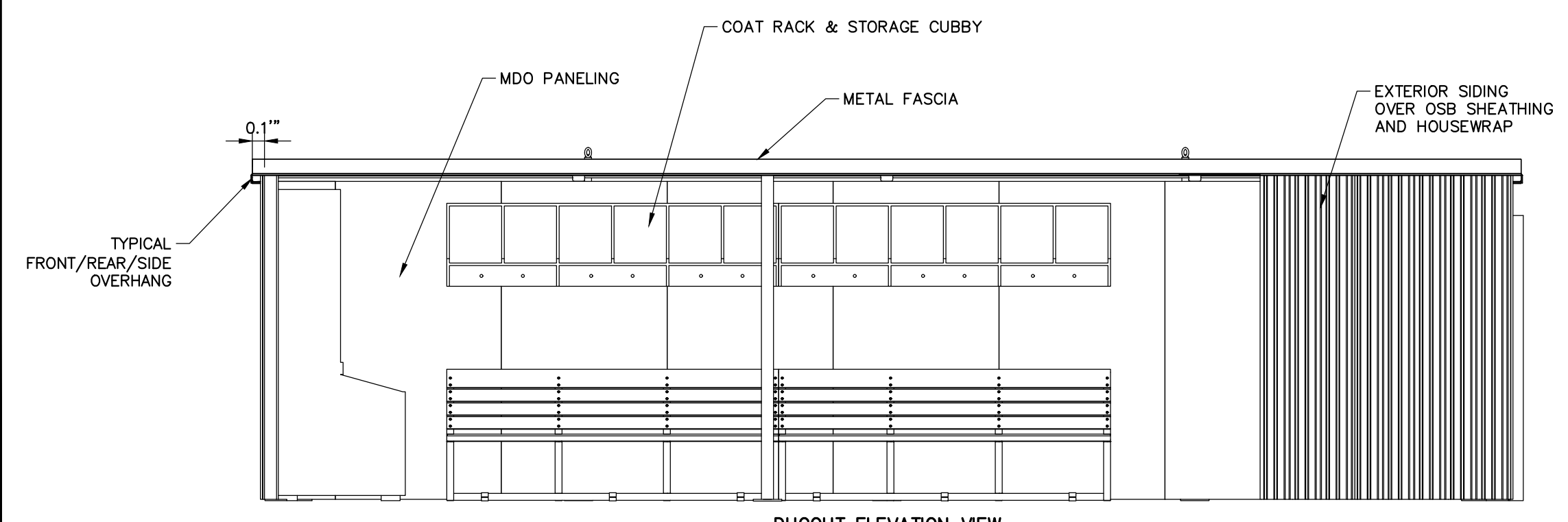
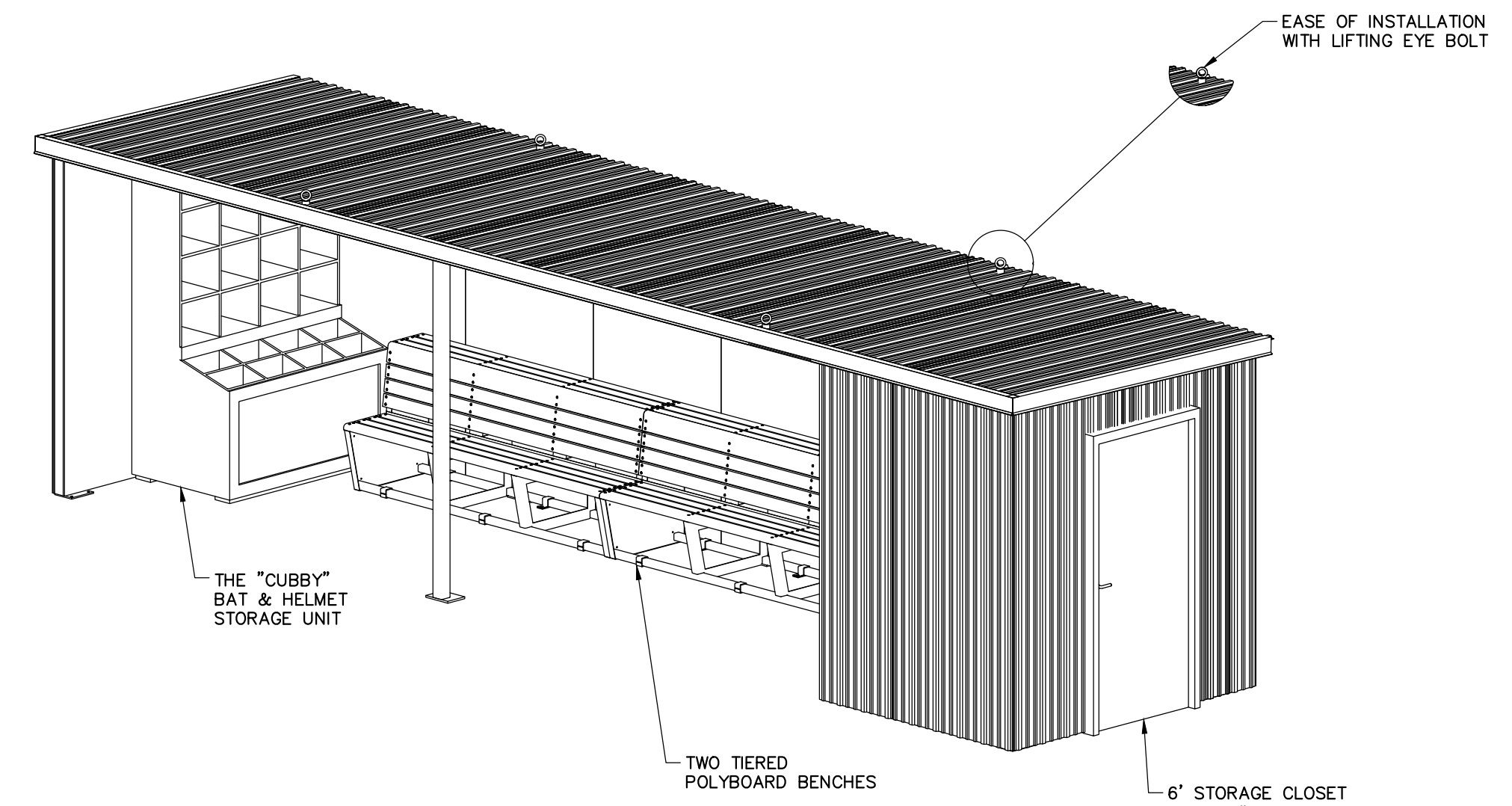
2 BATTING CAGE SURFACE
NOT TO SCALE



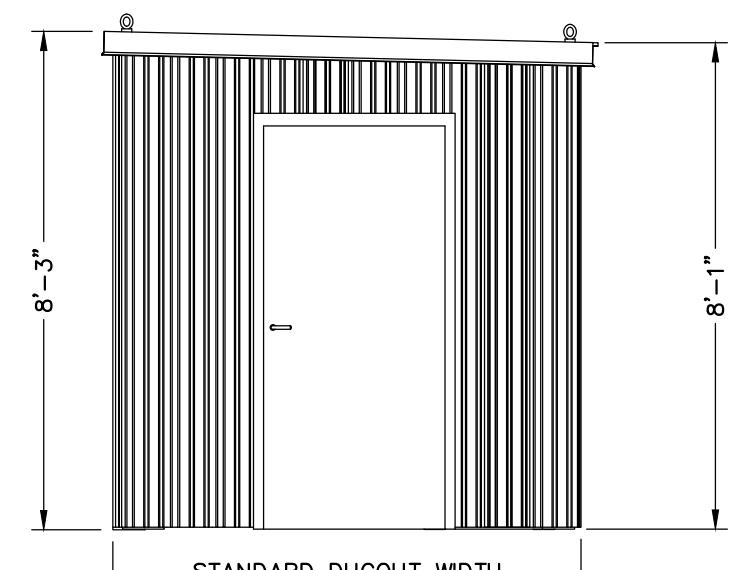
NOTES:

1. THE TOP OF THE PITCHER'S RUBBER TO BE 6 INCHES ABOVE THE TOP SURFACE OF HOME PLATE.
2. CENTER OF PITCHER'S MOUND CIRCLE IS 45 FEET FROM THE BACK APEX OF HOME PLATE. TOTAL DISTANCE FROM PITCHER'S RUBBER TO APEX OF HOME PLATE IS 46 FEET 0 INCHES.
3. PITCHER'S MOUND AREA SHALL BE MINIMUM 4 INCHES OF CLAY

4 PITCHER'S MOUND
NOT TO SCALE



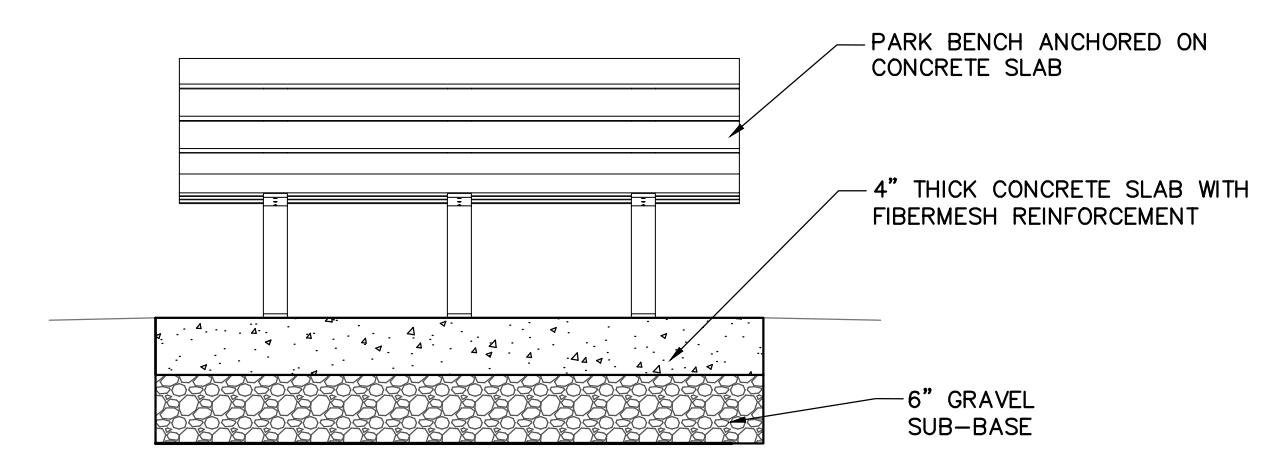
DUGOUT ELEVATION VIEW



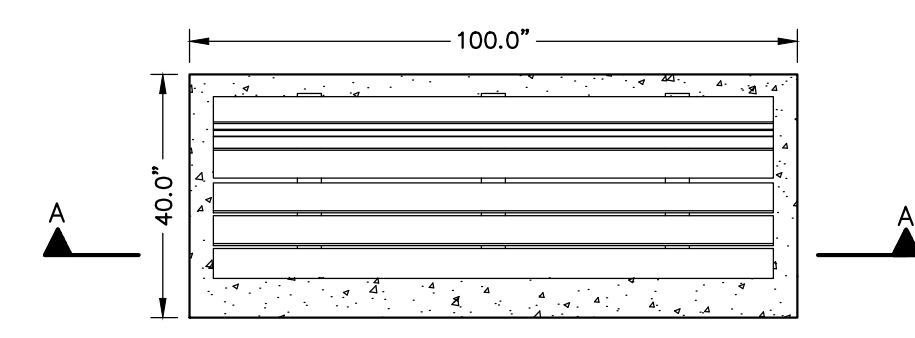
DUGOUT SIDE ELEVATION VIEW

- NOTES:
1. STEEL FRAME STRUCTURE: POWDER COATED TUBULAR STEEL DESIGN GALVANIZED STEEL TRACK AND STUDS, 16\"/>
 - 2. ALL DIMENSIONS ARE FROM STEEL FRAME STRUCTURE NOT FINISHINGS.

3 DUGOUT
NOT TO SCALE



SECTION A-A



PLAN

NOTES:

1. PARK BENCH SHALL BE ANCHORED IN CONCRETE SLAB WITH STAINLESS STEEL NUTS AND BOLTS.
2. CEMENT CONCRETE SHALL BE 4000 PSI-TYPE II

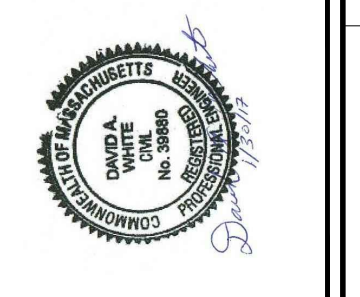
5 PARK BENCH
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CIVIL DETAILS - 8

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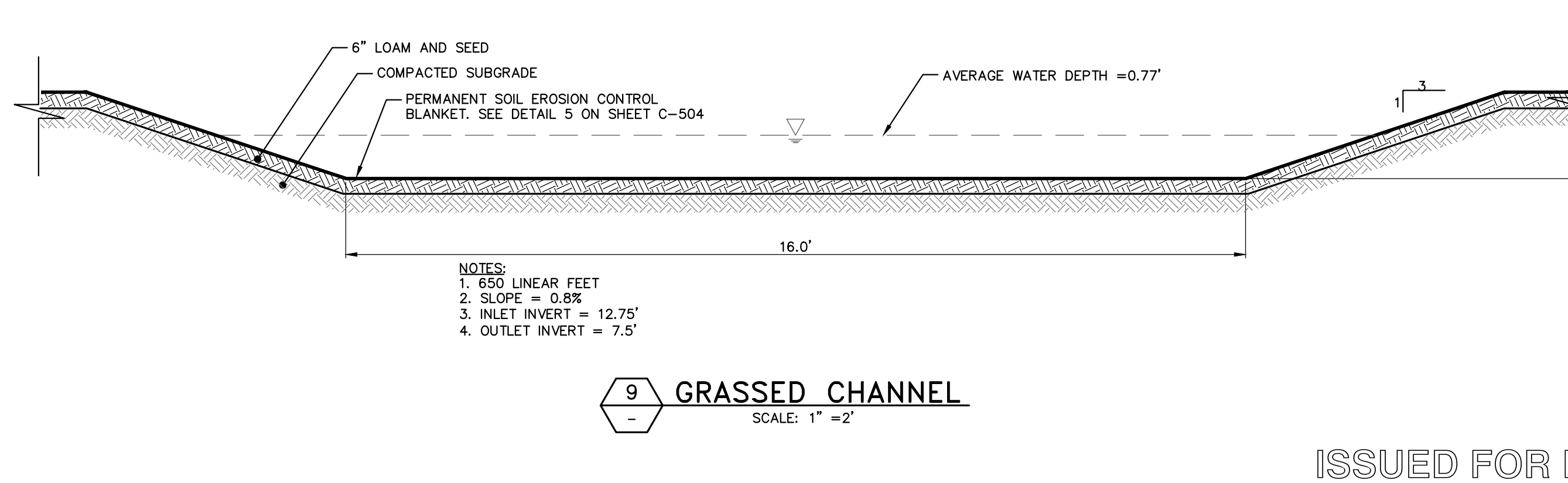
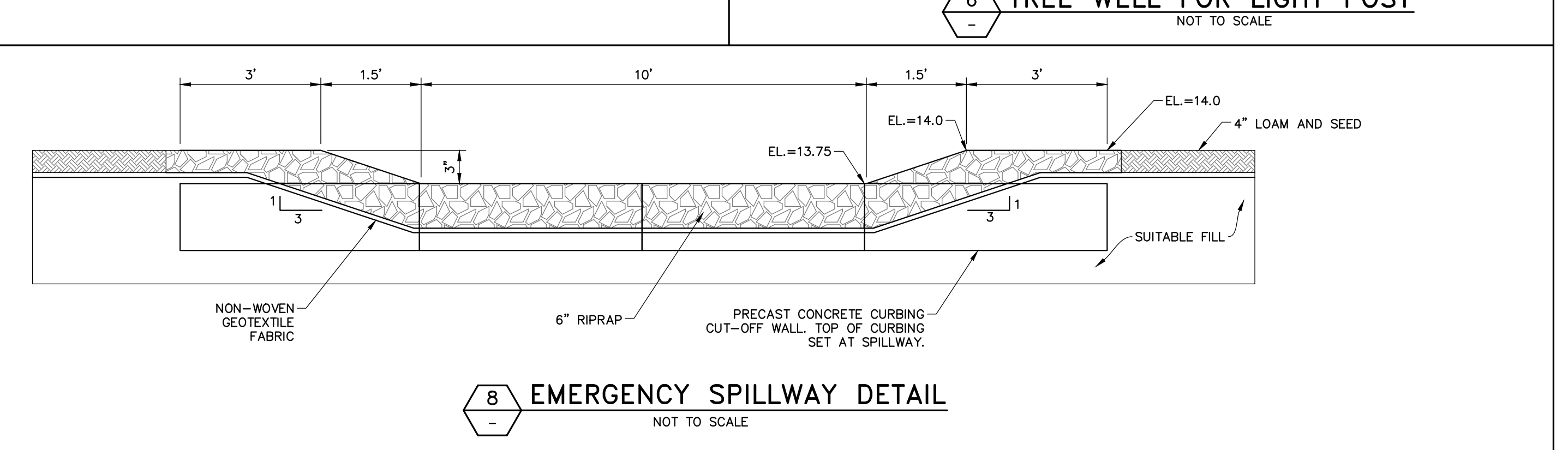
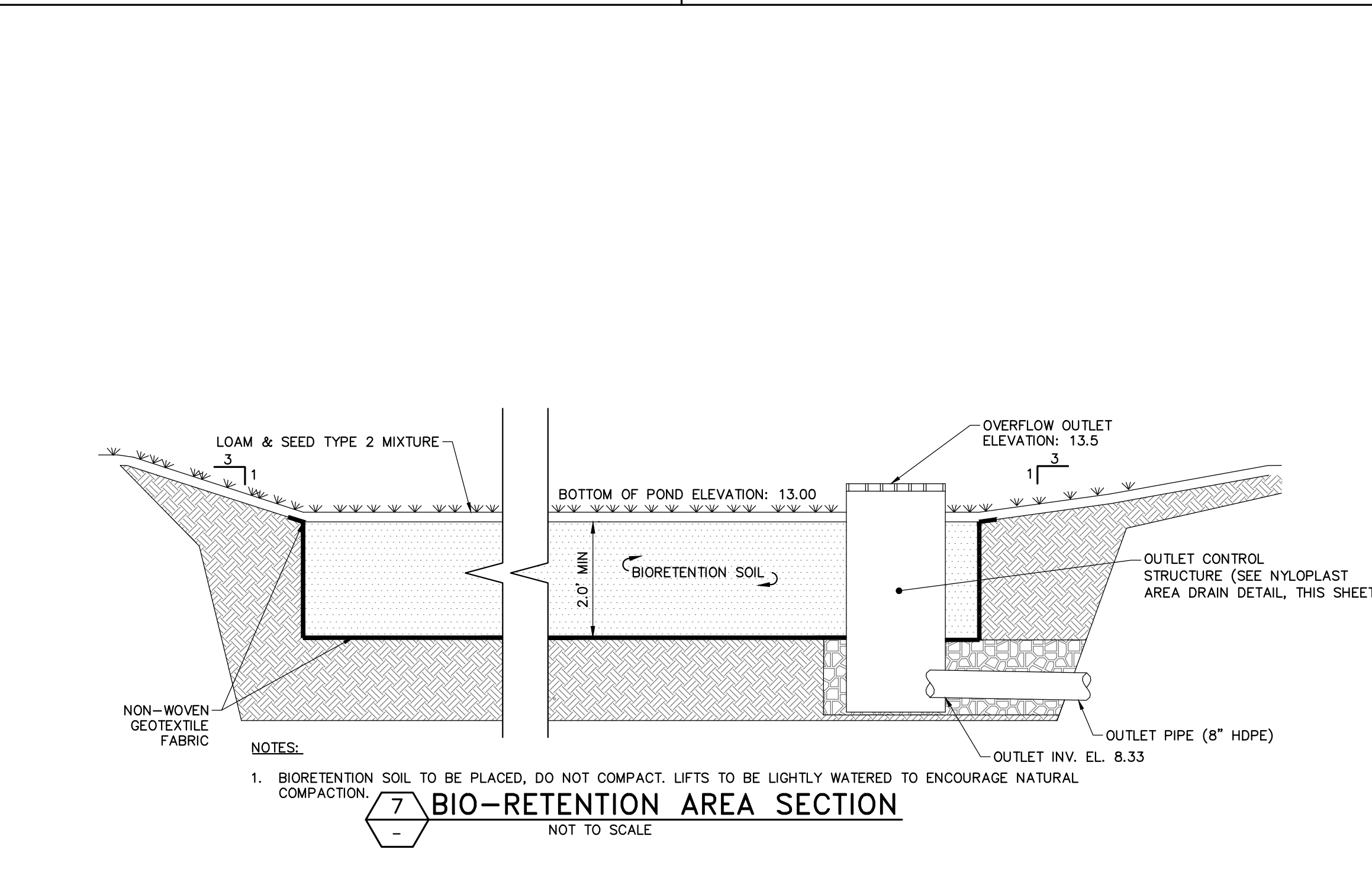
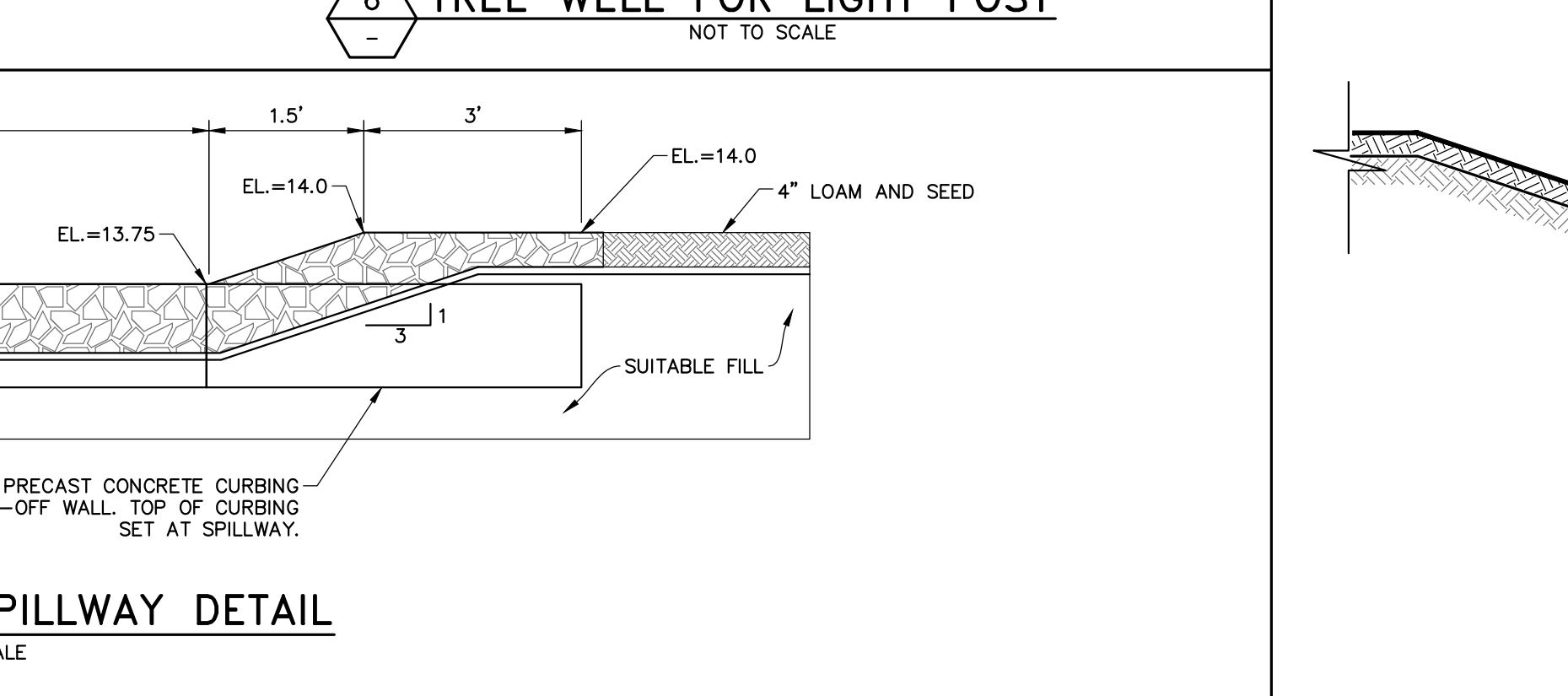
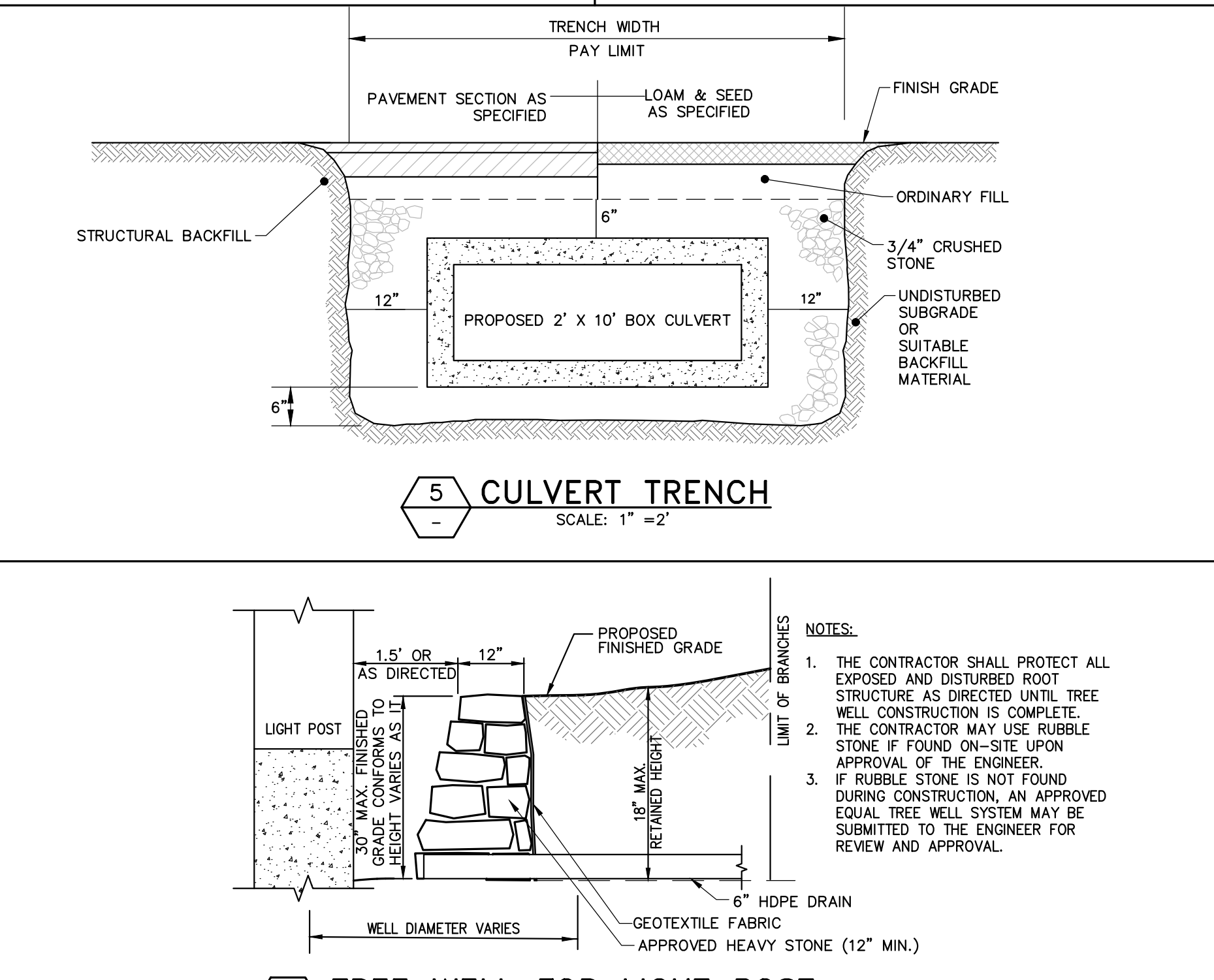
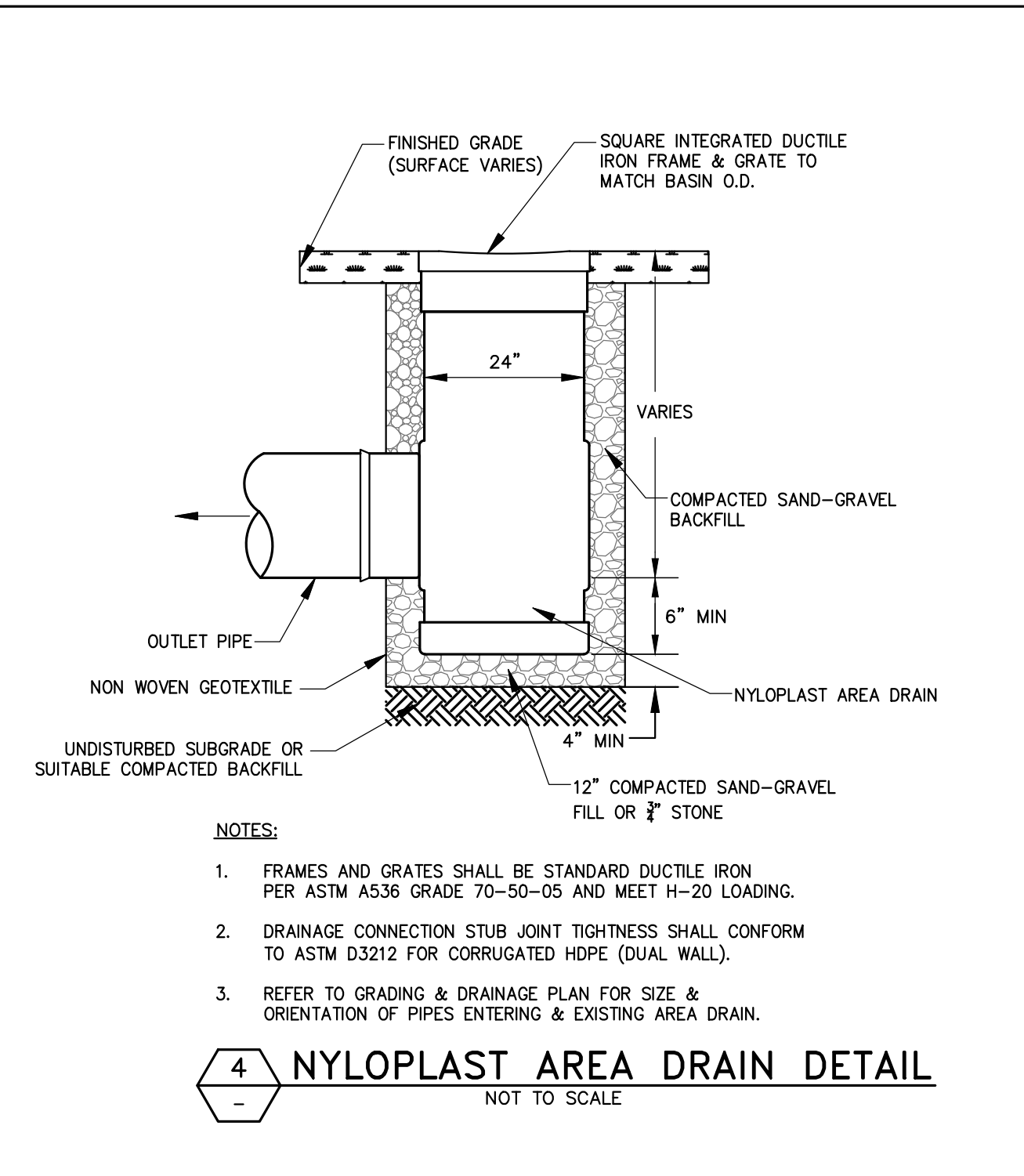
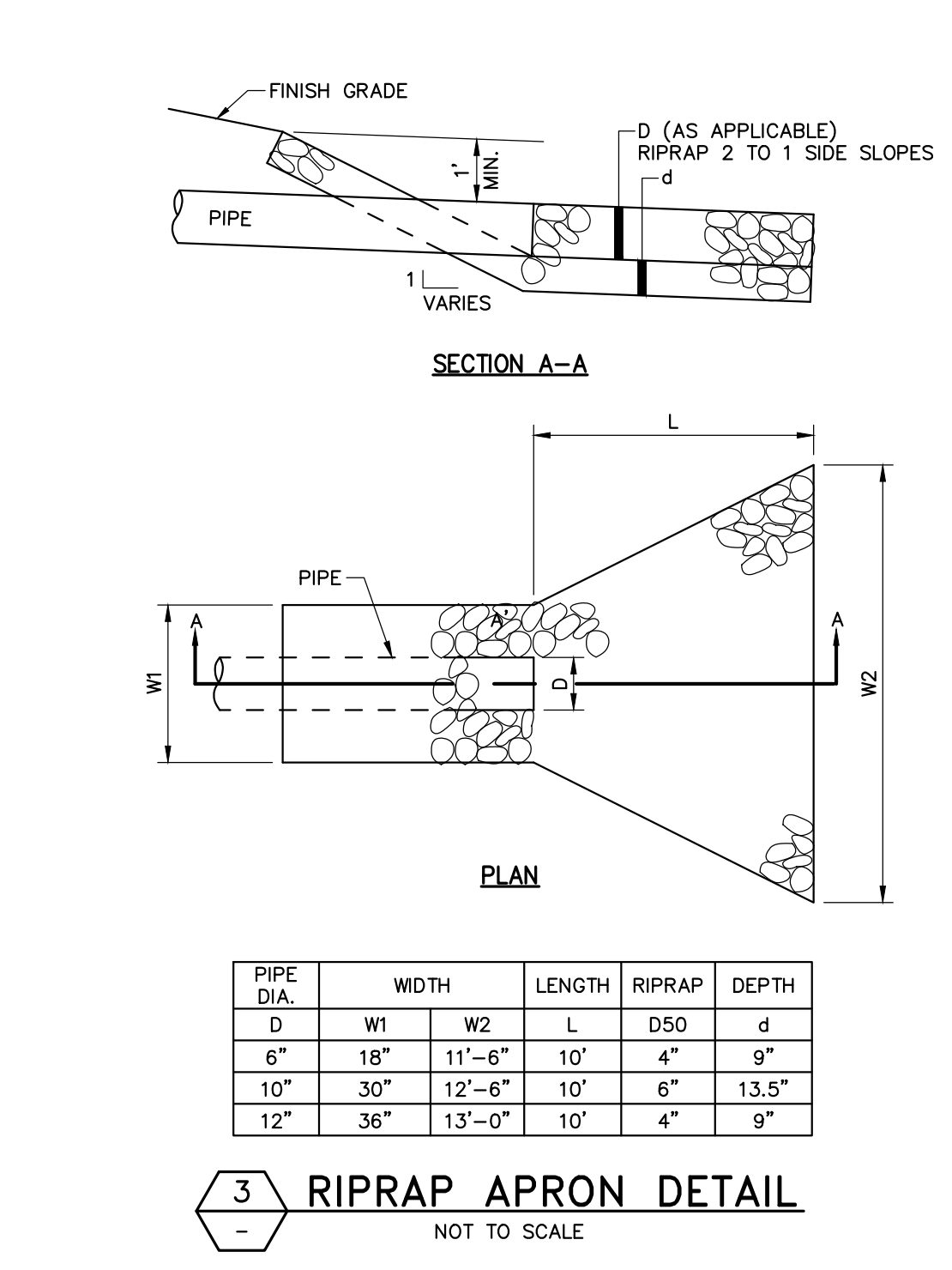
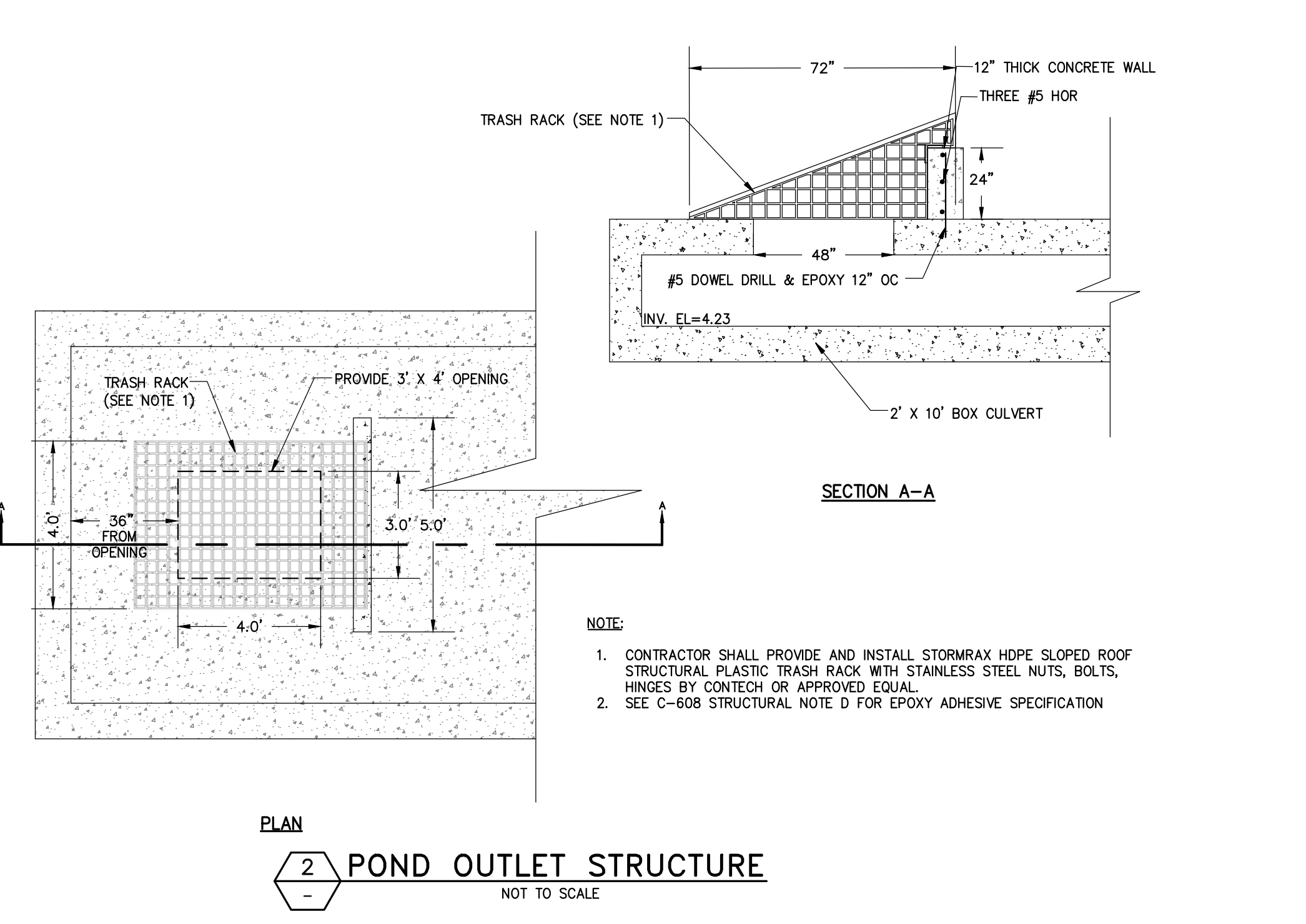
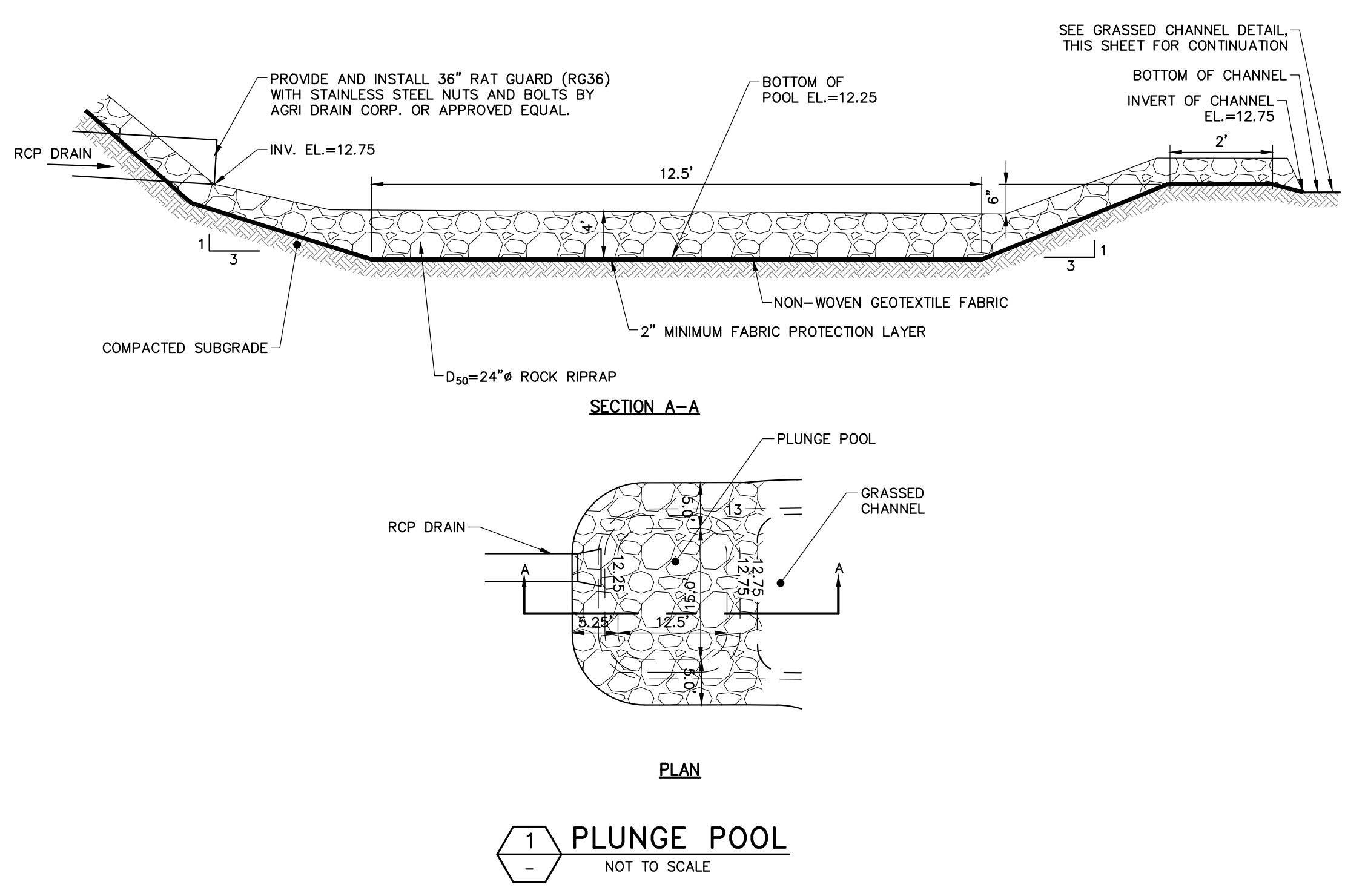
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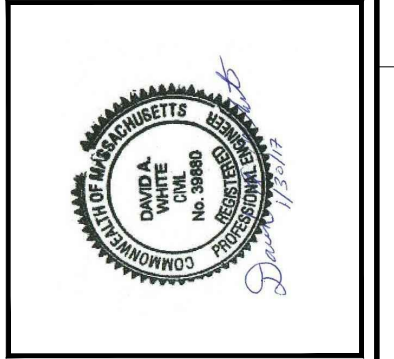
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CIVIL DETAILS - 9

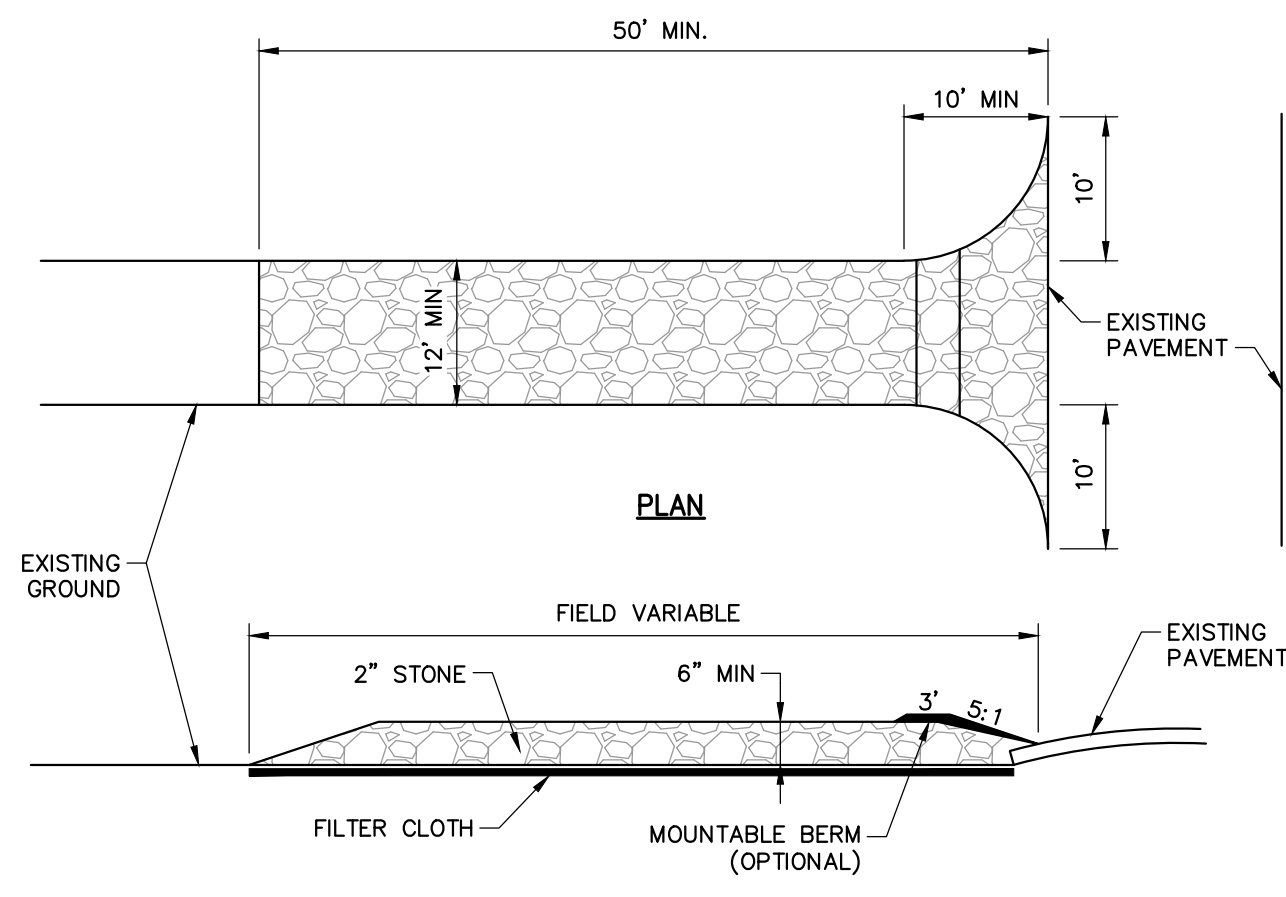
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CONTRACT A
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SALEM, MASSACHUSETTS

JOB NO.: 228340.11
DATE: JANUARY 2017
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SHEET: 35 OF 46

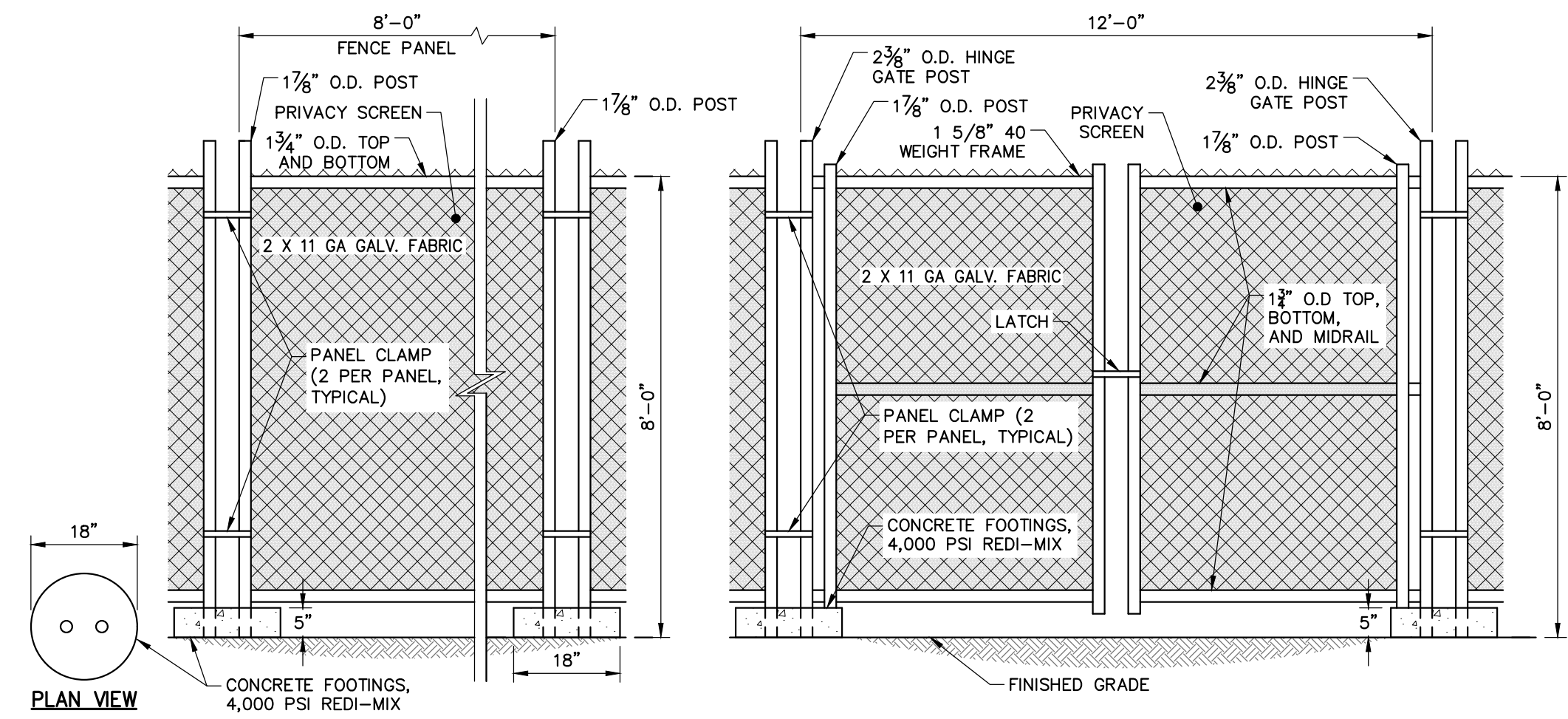
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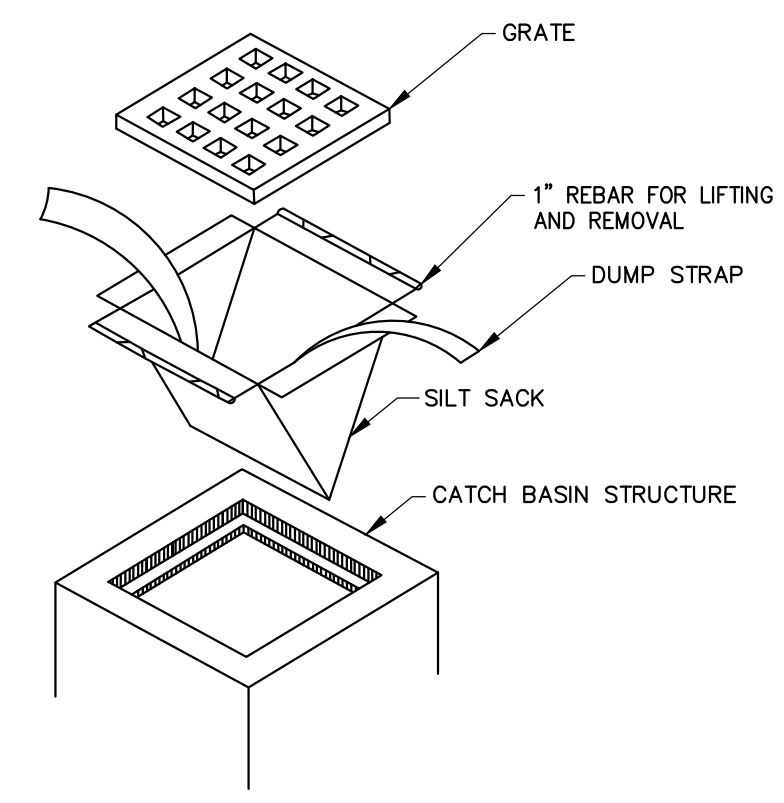
- CONSTRUCTION SPECIFICATIONS:**
- USE 2" DIAMETER STONE OR RECLAIMED/RECYCLED CONCRETE EQUIVALENT.
 - RECOMMENDED LENGTH GREATER THAN 50 FEET WHERE PRACTICAL.
 - THICKNESS NOT LESS THAN 6 INCHES.
 - 10 FOOT MINIMUM WIDTH, BUT NOT LESS THAN FULL WIDTH AT POINTS WHERE INGRESS AND EGRESS OCCUR.
 - FILTER CLOTH SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
 - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WILL BE PERMITTED.
 - ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND, AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
 - PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED BY THE CONTRACTOR.
 - REMOVE STABILIZED CONSTRUCTION ENTRANCE PRIOR TO PLACEMENT OF BITUMINOUS CONCRETE PAVEMENT.

1 STABILIZED CONSTRUCTION ENTRANCE
NOT TO SCALE



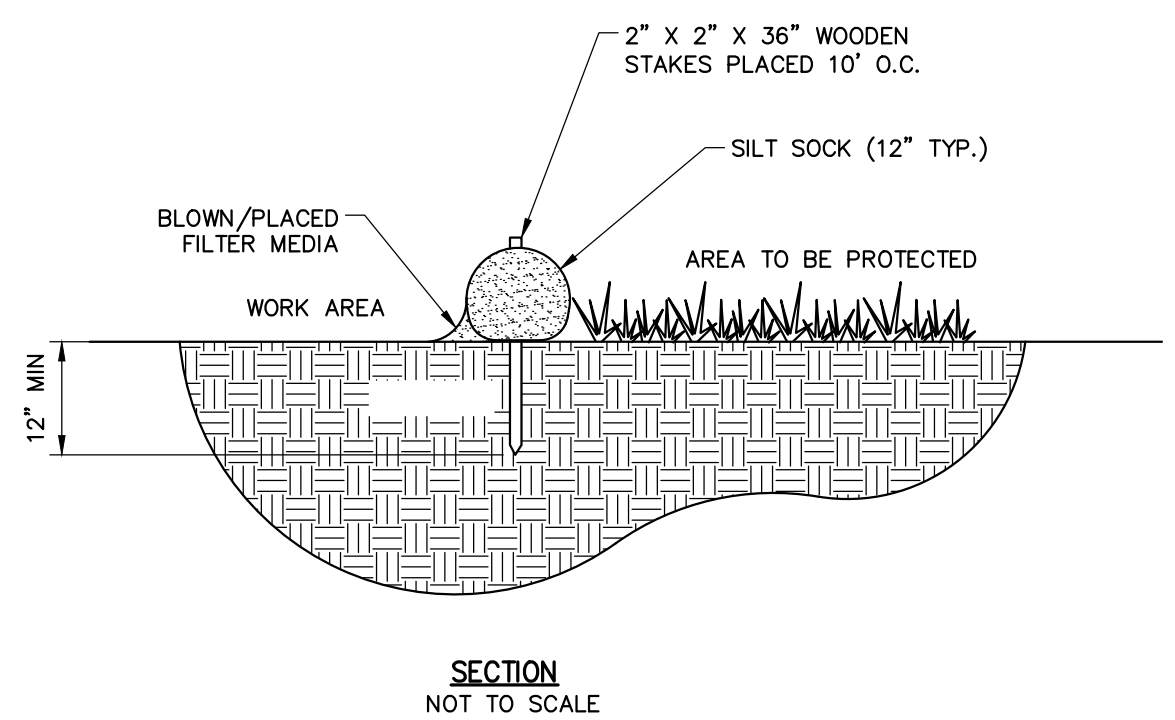
- NOTES:**
- CONTRACTOR SHALL PROVIDE PERIODIC INSPECTION AND MAINTENANCE OF FENCE INCLUDING REPAIRS AS NECESSARY AND REQUIRED.
 - CONTRACTOR SHALL INSTALL GREEN PRIVACY SCREENING FABRIC OR APPROVED EQUAL AROUND THE PERIMETER OF THE TEMPORARY CONSTRUCTION FENCING.
 - PRIOR TO CONSTRUCTION THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND SAMPLES OF THE PRIVACY SCREENING TO THE ENGINEER FOR REVIEW AND APPROVAL.

2 TEMPORARY CHAIN LINK CONSTRUCTION FENCE
NOT TO SCALE



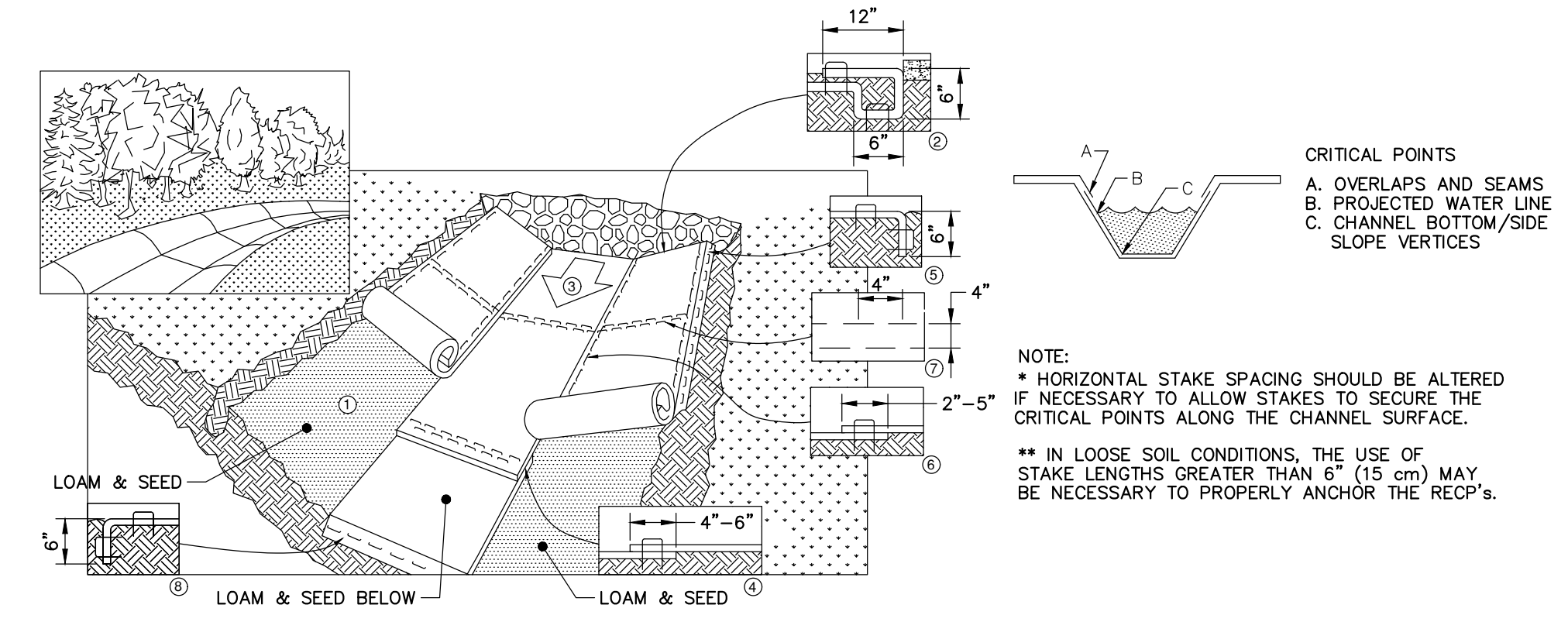
- NOTE:**
- INSTALL SILTSACK PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS. EMPTY OR REMOVE SEDIMENT FROM SILTSACK WHEN RESTRAINT CORD IS NO LONGER VISIBLE. CLEAN, RINSE, AND REPLACE AS NEEDED.
 - SILT SACKS TO BE INSTALLED AND MAINTAINED DURING CONSTRUCTION OPERATIONS.

3 SILT SACK INLET PROTECTION
NOT TO SCALE



- NOTES:**
- LOCATE FENCING AS SHOWN ON PLANS.
 - NO MATERIAL OR EQUIPMENT SHALL BE STORED OR STOCKPILED WITHIN THE AREA SURROUNDED BY TREE PROTECTION FENCING.
 - FENCE MUST REMAIN AND BE MAINTAINED THROUGHOUT ENTIRE BUILDING PHASES DURING WHICH CONSTRUCTION MAY AFFECT TREES.

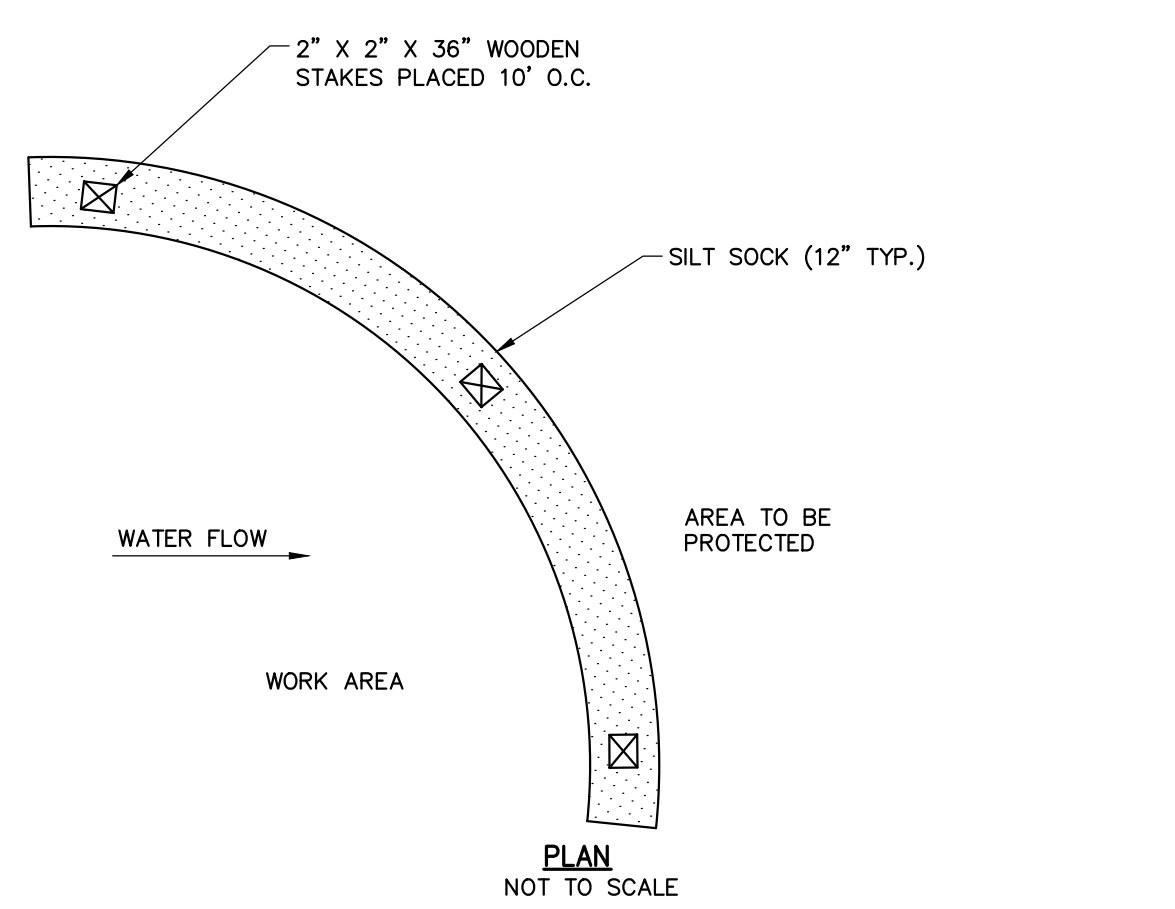
4 TREE PROTECTION
NOT TO SCALE



- NOTE:**
- HORIZONTAL STAKE SPACING SHOULD BE ALTERED IF NECESSARY TO ALLOW STAKES TO SECURE THE CRITICAL POINTS ALONG THE CHANNEL SURFACE.
 - IN LOOSE SOIL CONDITIONS, THE USE OF STAKE LENGTHS GREATER THAN 6" (15 CM) MAY BE NECESSARY TO PROPERLY ANCHOR THE RECP'S.
- PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP'S), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. PROVIDE LOAM AND SEED BELOW TRM.
 - BEGIN AT THE TOP OF THE CHANNEL OR SLOPE BY ANCHORING THE RECP'S IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH WITH APPROXIMATELY 12" (30 CM) OF RECP'S EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP'S WITH A ROW OF BIODEGRADABLE STAKES APPROXIMATELY 12" (30 CM) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAKING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30 CM) PORTION OF RECP'S BACK OVER SEED AND COMPACTED SOIL. SECURE RECP'S OVER COMPACTED SOIL WITH A ROW OF BIODEGRADABLE STAKES SPACED APPROXIMATELY 12" (30 CM) ACROSS THE WIDTH OF THE RECP'S.
 - ROLL CENTER RECP'S IN DIRECTION OF WATER FLOW IN BOTTOM OF CHANNEL OR SLOPE. RECP'S WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP'S MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING BIODEGRADABLE STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAKE PATTERN GUIDE. WHEN USING THE DOT SYSTEM, BIODEGRADABLE STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAKE PATTERN.
 - PLACE CONSECUTIVE RECP'S END OVER END (SHINGLE STYLE) WITH A 4" - 6" (10 CM - 15 CM) OVERLAP. USE A DOUBLE ROW OF BIODEGRADABLE STAKES STAGGERED 4" (10 CM) APART AND 4" (10 CM) ON CENTER TO SECURE RECP'S.
 - FULL LENGTH EDGE OF RECP'S AT TOP OF SIDE SLOPES MUST BE ANCHORED WITH A ROW OF BIODEGRADABLE STAKES APPROXIMATELY 12" (30 CM) APART IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAKING.
 - ADJACENT RECP'S MUST BE OVERLAPPED APPROXIMATELY 2" - 5" (5 CM - 12.5 CM) (DEPENDING ON RECP'S TYPE) AND STAKING.
 - IN HIGH FLOW CHANNEL APPLICATIONS, A STAKE CHECK SLOT IS RECOMMENDED AT 30 TO 40 FOOT (9 M - 12 M) INTERVALS. USE A DOUBLE ROW OF BIODEGRADABLE STAKES STAGGERED 4" (10 CM) APART AND 4" (10 CM) ON CENTER OVER ENTIRE WIDTH OF THE CHANNEL.
 - THE TERMINAL END OF THE RECP'S MUST BE ANCHORED WITH A ROW OF BIODEGRADABLE STAKES APPROXIMATELY 12" (30 CM) APART IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAKING.

- NOTE:**
- IN LOOSE SOIL CONDITIONS, THE USE OF BIODEGRADABLE STAKE LENGTHS GREATER THAN 6" (15 CM) MAY BE NECESSARY TO PROPERLY ANCHOR THE RECP'S.

5 EROSION CONTROL BLANKET
NOT TO SCALE



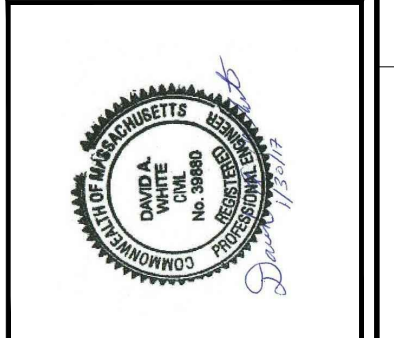
6 SILT SOCK SEDIMENT CONTROL
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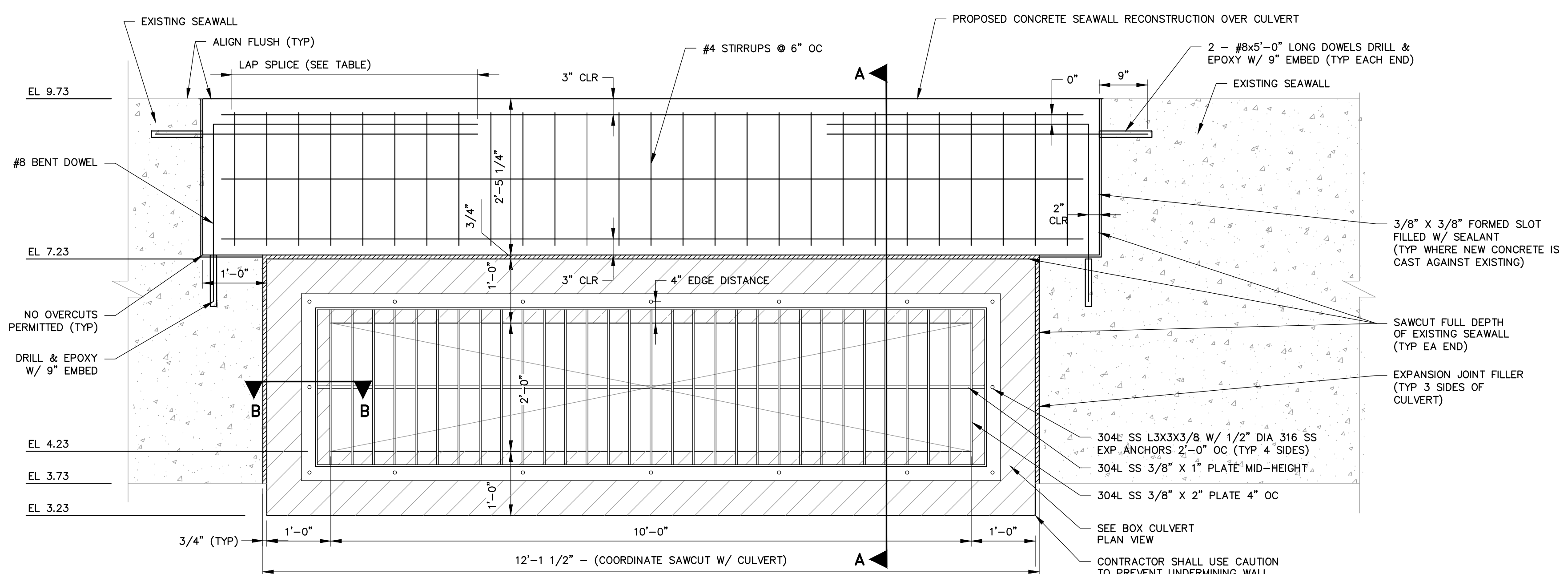
CONTRACT A
CANAL STREET
FLOOD MITIGATION PROJECT
SALEM, MASSACHUSETTS

JOB NO.: 228340.11
DATE: JANUARY 2017
SCALE: NOT TO SCALE
SHEET: 36 OF 46

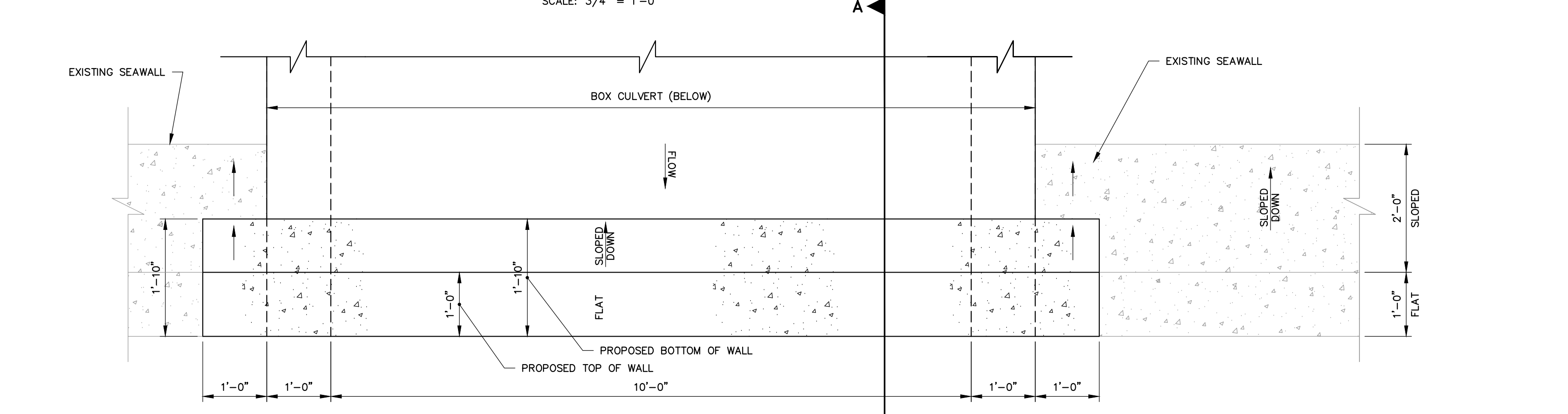
C-609

STRUCTURAL NOTES:

- A. REINFORCED CONCRETE:**
- CONCRETE MIX DESIGN SHALL COMPLY WITH SPECIFICATION 03 30 00. CONCRETE MINIMUM 28-DAY COMPRESSIVE STRENGTH = 4,500 PSI WITH AIR ENTRAINMENT.
 - CONCRETE MATERIALS SHALL COMPLY WITH SPECIFICATION 03 30 00 AND THE FOLLOWING REQUIREMENTS:
CORROSION INHIBITING ADMIXTURE = ASTM C1582
 - ALL DESIGN SHALL BE IN ACCORDANCE WITH ACI 318 CONCRETE BUILDING CODE, LATEST EDITION. ALL CONCRETE SHALL BE PROVIDED, PLACED, AND CURED AS PER ALL APPLICABLE SECTIONS OF THE ACI, AS APPROVED BY THE ENGINEER.
 - REINFORCEMENT: ASTM A615 GRADE 60 WITH EPOXY COATING AS PER ASTM A775 - ALL SPLICES CLASS B (UNO). REINFORCEMENT SHALL BE DETAILED, FABRICATED, AND PLACED AS PER ACI 315 DETAILING MANUAL.
 - CONCRETE FINISH: TOP SHALL BE STEEL TROWEL TO MATCH EXISTING. FORMED SIDES SHALL BE RUBBED FINISH WITH ALL PITS, VOIDS, AND HONEYCOMBS FILLED WITH GROUT AS PART OF RUBBED FINISH.
 - ALL CONCRETE SHALL BE FIELD TESTED BY AN INDEPENDENT TESTING LABORATORY AS PER SPECIFICATIONS COORDINATED BY CONTRACTOR.
- B. DESIGN LOADS (IBC 2009 W/ MA SUPPLEMENT):**
- GROUND SNOW LOAD: 45 PSF
WIND LOAD: V=110 MPH EXPOSURE C
LIVE LOAD: 100 PSF
FLOOD LOAD: BFE=16.00 $\gamma_w=64$ PCF $C_p=1.6$ $C_d=0.75$ $C_b=1.0$ $C_{str}=0.80$
- C. SEALANT:** PROVIDE POLYURETHANE SEALANT COMPLYING WITH ASTM C920 TYPE S, GRADE NS, CLASS 50, USE M.O. PROVIDE JOINT MATERIAL COMPLYING WITH ASTM D994
- D. EPOXY ADHESIVE:** ASTM C881 TYPE IV GRADE 2 AND 3, CLASS A,B,C EQUAL TO HIT-RE 500 BY HILTI OR APPROVED EQUAL.
- E. BACKFILL:** PLACED IN LOOSE LIFTS NO MORE THAN 12 INCHES THICK AND COMPACTED TO 95% OF ITS MAXIMUM STANDARD PROCTOR DENSITY.
- F. SUBMITTALS:**
- CONCRETE MATERIALS AND ADMIXTURES
 - CONCRETE MIX DESIGN
 - EPOXY ADHESIVE
 - SEALANT
 - EXPANSION JOINT MATERIAL
 - STEEL REINFORCING
- G.** ALL DIMENSIONS AND ELEVATIONS SHOWN ARE APPROXIMATE AND SHALL BE FIELD VERIFIED PRIOR TO REBAR FABRICATION.
- H.** FIELD VERIFY EXACT DIMENSIONS OF PRECAST BOX CULVERT PRIOR TO SAW-CUTTING EXISTING SEAWALL.
- I.** INSPECT CONDITION OF EXISTING SEAWALL WITHIN PROPOSED LIMITS OF WORK. NOTIFY ENGINEER OF ANY OBSERVED DEFECTS (CRACKING, SPALLING, DETERIORATION, ETC) PRIOR TO THE START OF WORK.
- J.** NOTIFY ENGINEER IMMEDIATELY SHOULD ANY EXISTING CONDITIONS PREVENT PERFORMANCE OF THE WORK AS SHOWN ON THE DRAWINGS.
- K.** REFER TO SHEET C-215 FOR PLAN, PROFILE, AND LOCATION OF PROPOSED CULVERT OUTFALL.



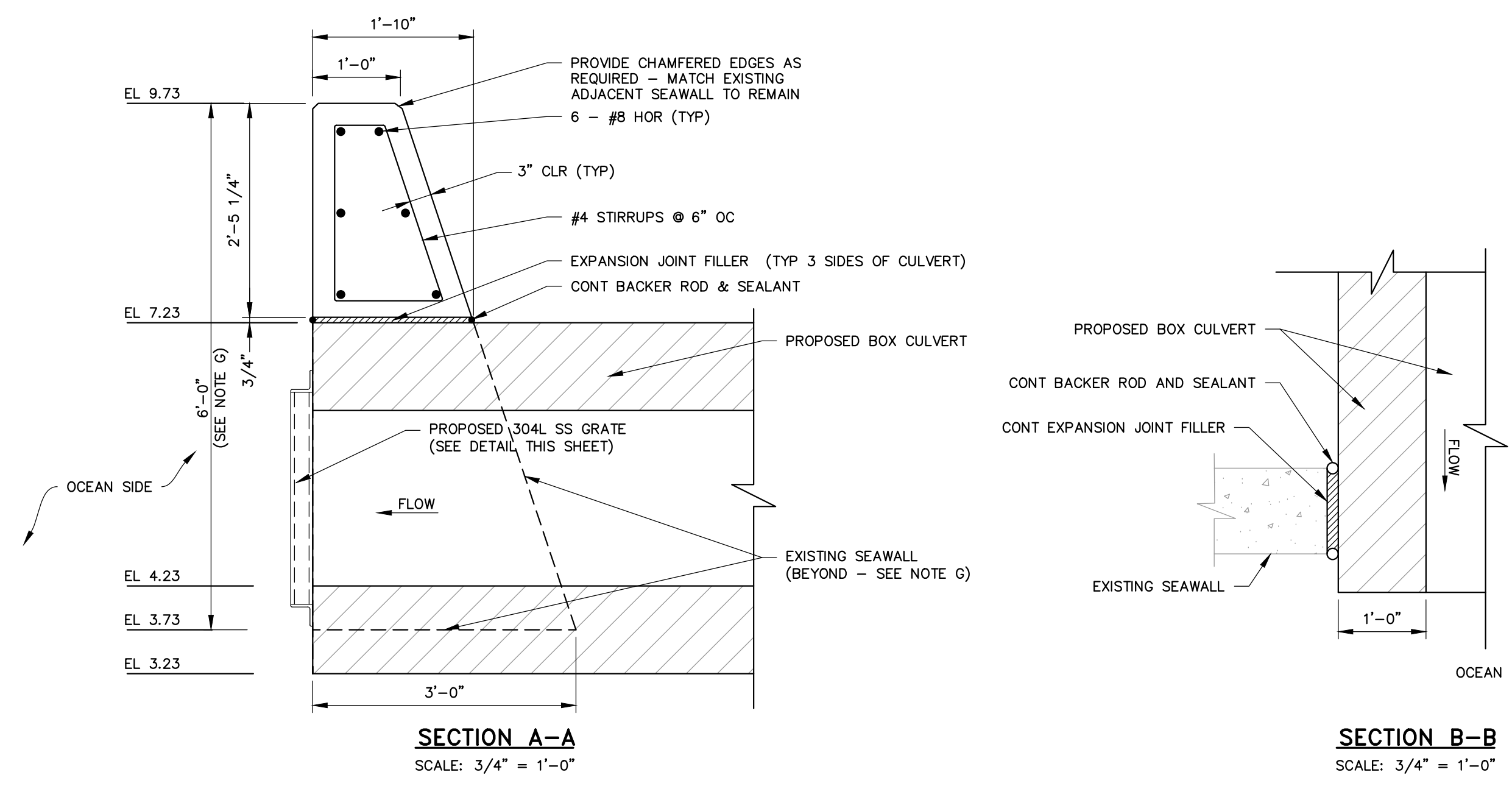
BOX CULVERT ELEVATION @ SEAWALL
SCALE: 3/4" = 1'-0"



BOX CULVERT PLAN VIEW @ SEAWALL
SCALE: 3/4" = 1'-0"

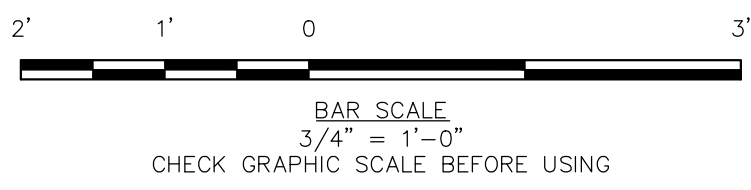
| MINIMUM REINFORCING BAR SPLICE LENGTHS (IN) | | |
|---|----------|------------|
| BAR SIZE | TOP BARS | OTHER BARS |
| 4 | 22 | 17 |
| 5 | 28 | 21 |
| 6 | 33 | 26 |
| 7 | 48 | 37 |
| 8 | 55 | 42 |

- NOTES:**
- THIS TABLE IS BASED ON NORMAL WEIGHT CONCRETE, EPOXY COATED BARS, CLEAR SPACING NOT LESS THAN FOUR BAR DIAMETERS, AND CLEAR COVER NOT LESS THAN TWO BAR DIAMETERS.
 - WHERE SPACING BETWEEN BARS IS LESS THAN FOUR BAR DIAMETERS, OR CLEAR COVER IS LESS THAN TWO BAR DIAMETERS, INCREASE SPLICE LENGTHS SHOWN BY 67%.
 - TOP BARS = HORIZONTAL BARS WITH MORE THAN 12" OF CONCRETE CAST BELOW THE BARS (NOT APPLICABLE TO HORIZONTAL WALL REINFORCING).
 - FOR f_c OTHER THAN 4,500 PSI, MULTIPLY THE VALUES IN THE TABLE BY THE SQUARE ROOT OF 4,500 DIVIDED BY THE SQUARE ROOT OF f_c .



SECTION A-A
SCALE: 3/4" = 1'-0"

SECTION B-B
SCALE: 3/4" = 1'-0"



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FOREST RIVER PARK CULVERT OUTFALL & SEAWALL MODIFICATIONS STRUCTURAL DETAILS

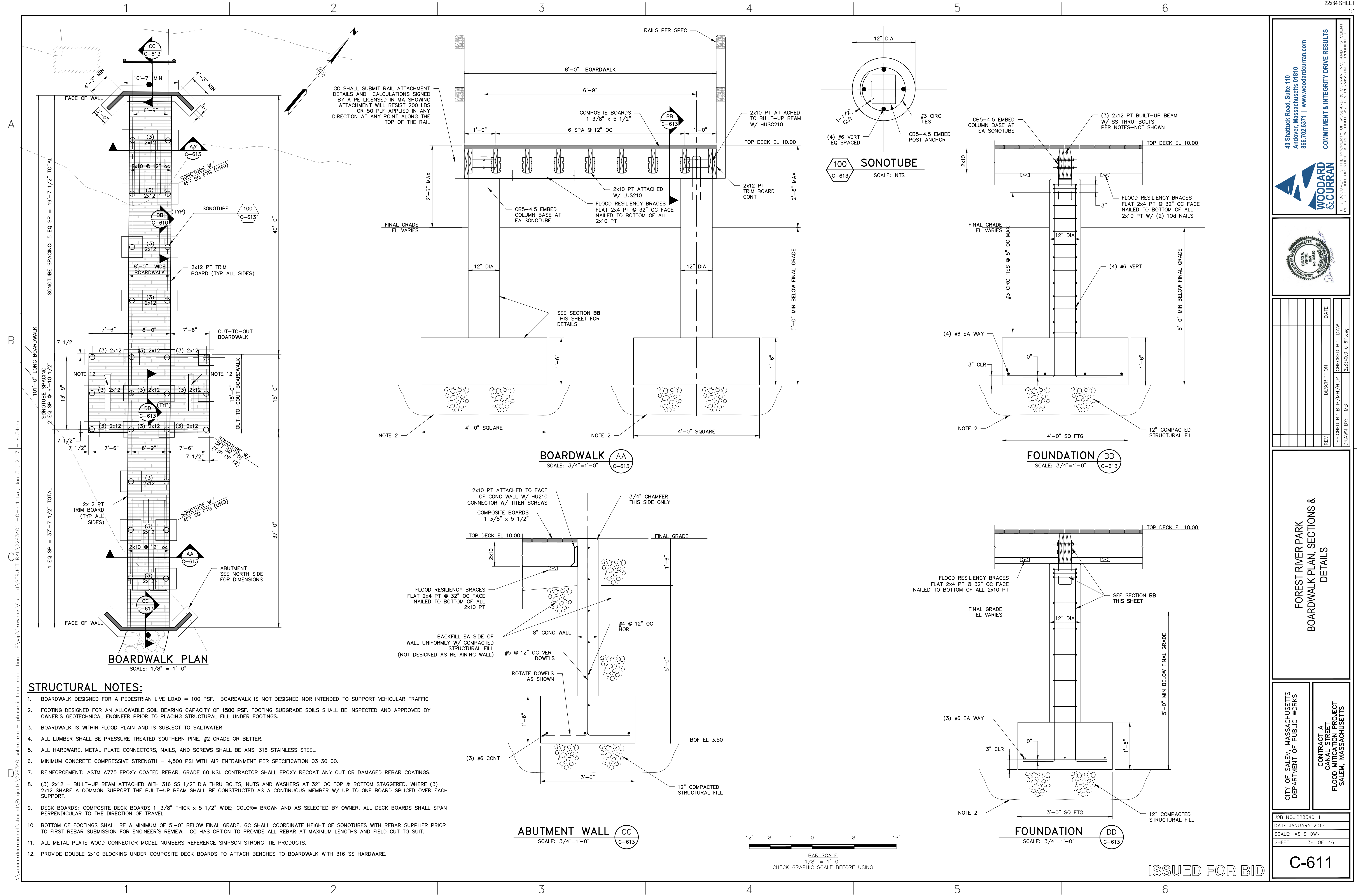
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DEPARTMENT OF PUBLIC WORKS

CONTRACT A
CANAL STREET PROJECT
FLOOD MITIGATION PROJECT
SALEM, MASSACHUSETTS

JOB NO.: 228340.11
DATE: JANUARY 2017
SCALE: AS SHOWN
SHEET: 37 OF 46

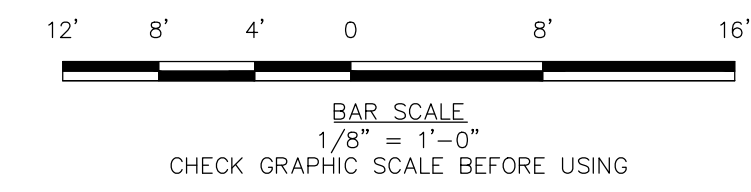
C-610

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STRUCTURAL NOTES:

1. BOARDWALK DESIGNED FOR A PEDESTRIAN LIVE LOAD = 100 PSF. BOARDWALK IS NOT DESIGNED NOR INTENDED TO SUPPORT VEHICULAR TRAFFIC
2. FOOTING DESIGNED FOR AN ALLOWABLE SOIL BEARING CAPACITY OF 1500 PSF. FOOTING SUBGRADE SOILS SHALL BE INSPECTED AND APPROVED BY OWNER'S GEOTECHNICAL ENGINEER PRIOR TO PLACING STRUCTURAL FILL UNDER FOOTINGS.
3. BOARDWALK IS WITHIN FLOOD PLAIN AND IS SUBJECT TO SALTWATER.
4. ALL LUMBER SHALL BE PRESSURE TREATED SOUTHERN PINE, #2 GRADE OR BETTER.
5. ALL HARDWARE, METAL PLATE CONNECTORS, NAILS, AND SCREWS SHALL BE ANSI 316 STAINLESS STEEL.
6. MINIMUM CONCRETE COMPRESSIVE STRENGTH = 4,500 PSI WITH AIR ENTRAINMENT PER SPECIFICATION 03 30 00.
7. REINFORCEMENT: ASTM A775 EPOXY COATED REBAR, GRADE 60 KSI. CONTRACTOR SHALL EPOXY RECOAT ANY CUT OR DAMAGED REBAR COATINGS.
8. (3) 2x12 = BUILT-UP BEAM ATTACHED WITH 316 SS 1/2" DIA THRU BOLTS, NUTS AND WASHERS AT 32" OC TOP & BOTTOM STAGGERED. WHERE (3) 2x12 SHARE A COMMON SUPPORT THE BUILT-UP BEAM SHALL BE CONSTRUCTED AS A CONTINUOUS MEMBER W/ UP TO ONE BOARD SPLICED OVER EACH SUPPORT.
9. DECK BOARDS: COMPOSITE DECK BOARDS 1-3/8" THICK x 5 1/2" WIDE; COLOR= BROWN AND AS SELECTED BY OWNER. ALL DECK BOARDS SHALL SPAN PERPENDICULAR TO THE DIRECTION OF TRAVEL.
10. BOTTOM OF FOOTINGS SHALL BE A MINIMUM OF 5'-0" BELOW FINAL GRADE. GC SHALL COORDINATE HEIGHT OF SONOTUBES WITH REBAR SUPPLIER PRIOR TO FIRST REBAR SUBMISSION FOR ENGINEER'S REVIEW. GC HAS OPTION TO PROVIDE ALL REBAR AT MAXIMUM LENGTHS AND FIELD CUT TO SUIT.
11. ALL METAL PLATE WOOD CONNECTOR MODEL NUMBERS REFERENCE SIMPSON STRONG-TIE PRODUCTS.
12. PROVIDE DOUBLE 2x10 BLOCKING UNDER COMPOSITE DECK BOARDS TO ATTACH BENCHES TO BOARDWALK WITH 316 SS HARDWARE.



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**FOREST RIVER PARK
BOARDWALK PLAN, SECTIONS &
DETAILS**

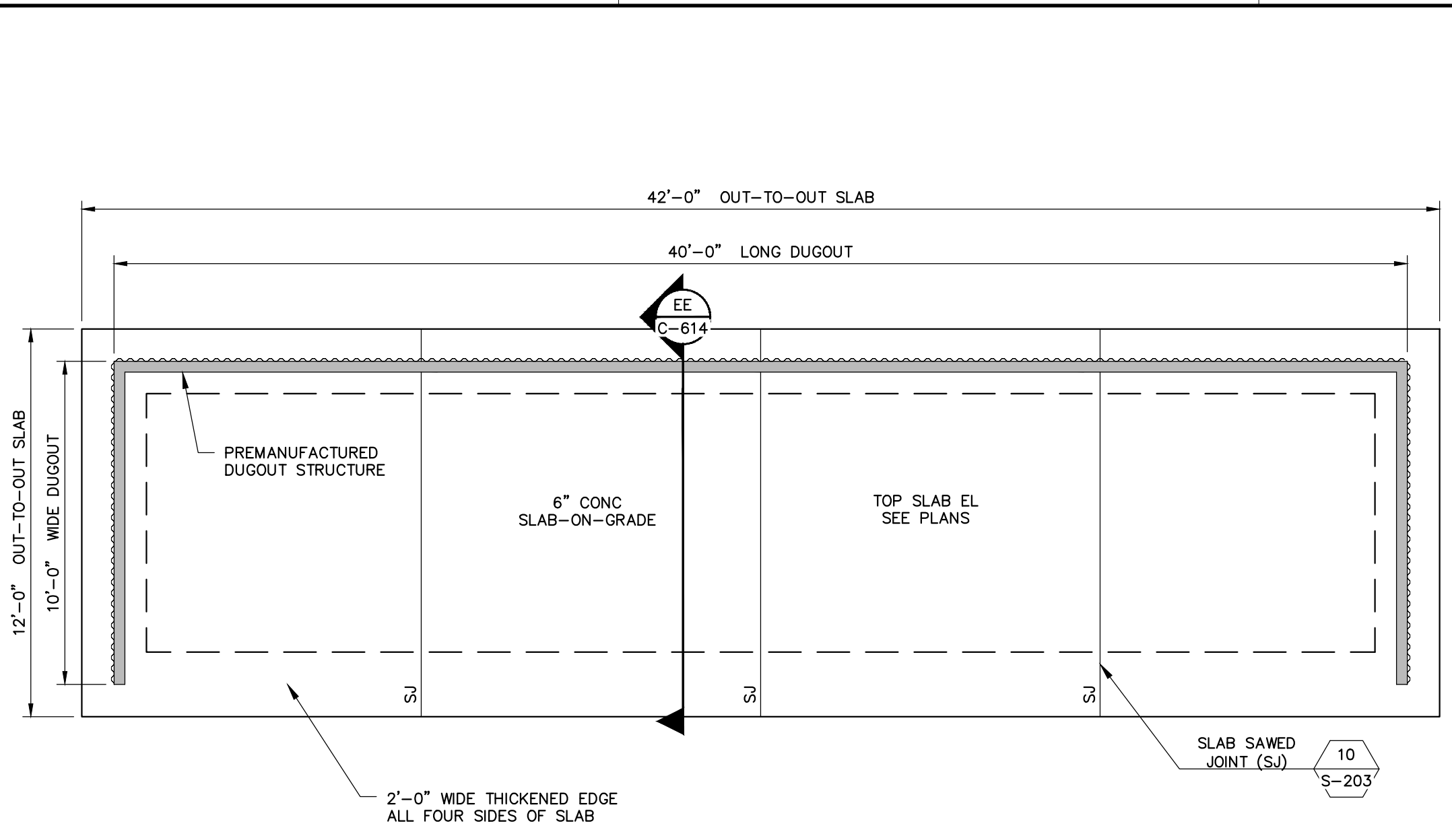
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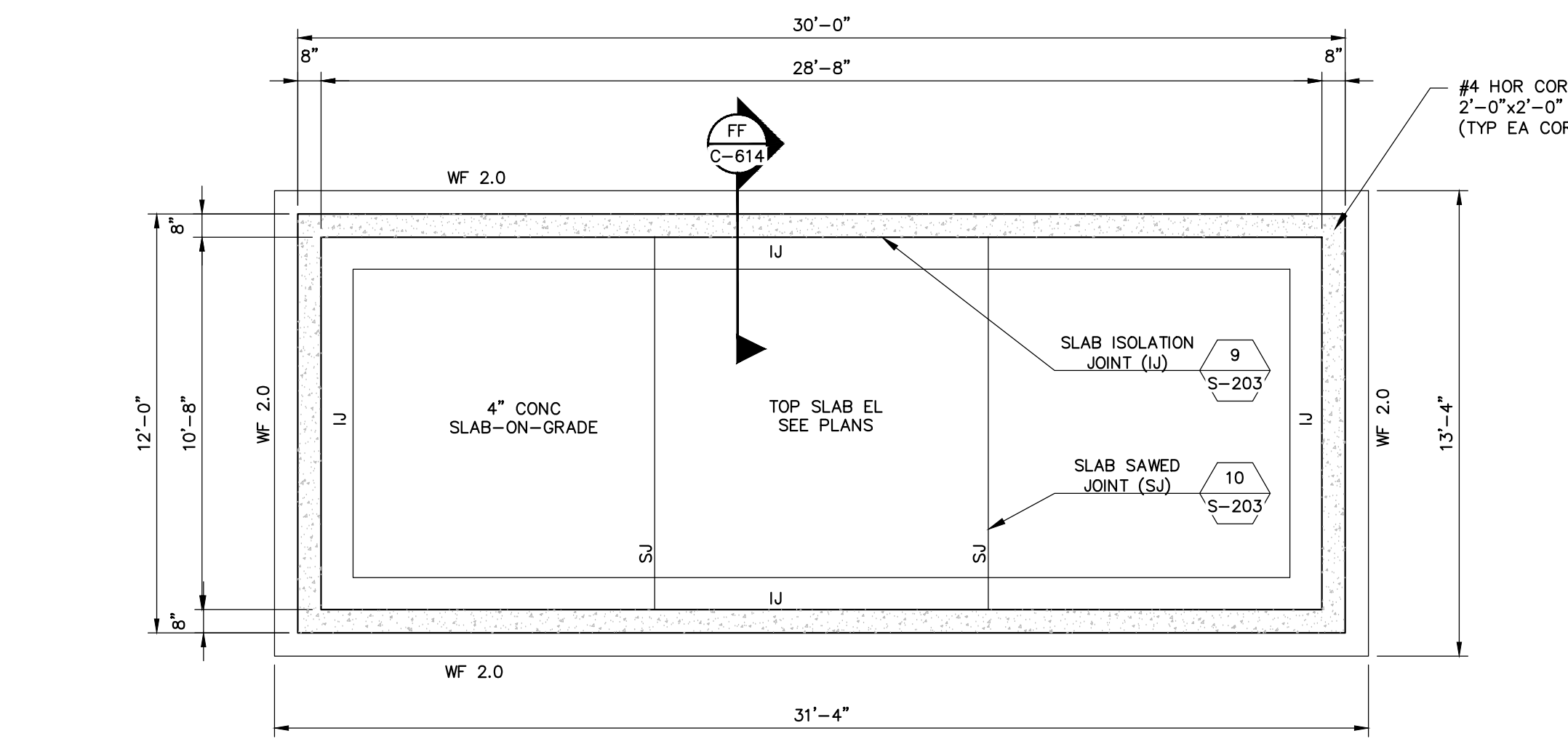
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DATE: JANUARY 2017
SCALE: AS SHOWN
SHEET: 38 OF 46

C-611

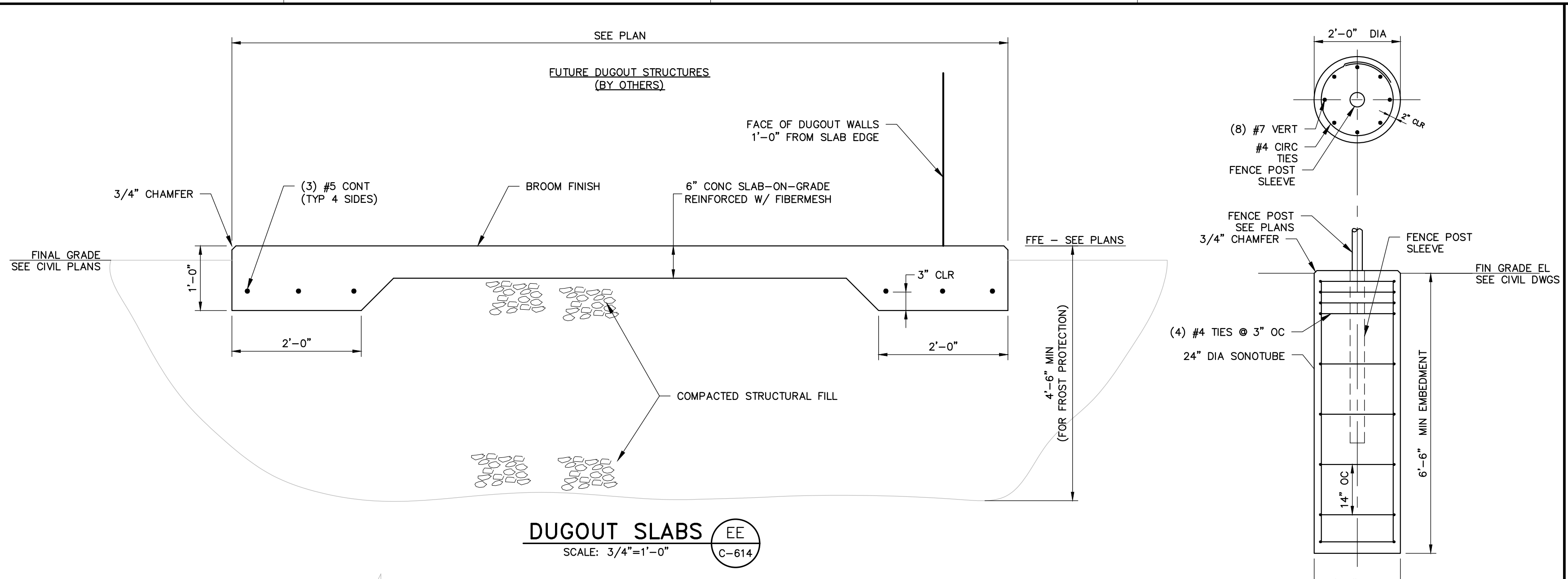
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DUGOUT SLAB PLAN (TYP OF 2)
SCALE: 1/4" = 1'-0"

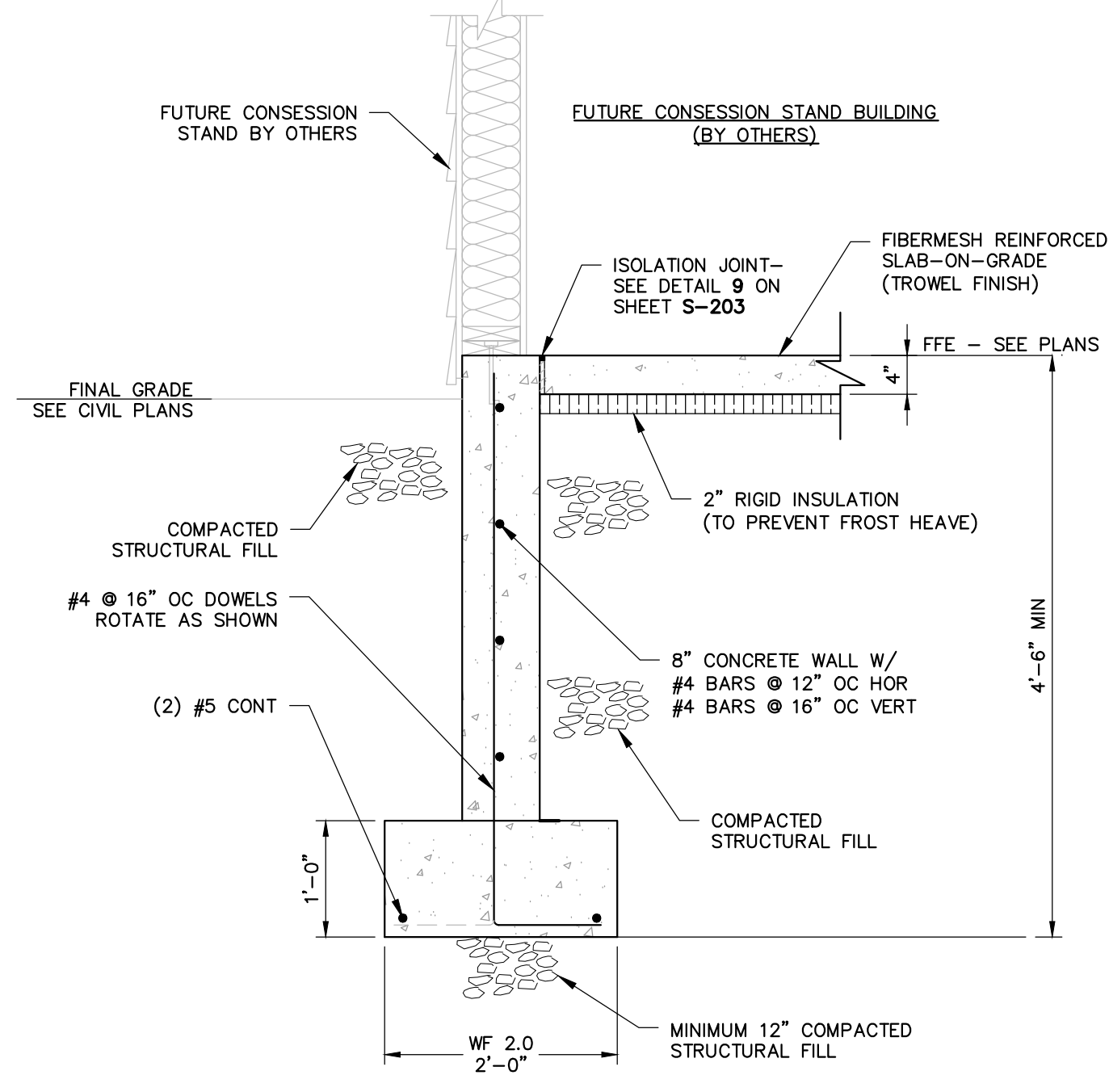


CONCESSION STAND FOUNDATION PLAN
SCALE: 1/4" = 1'-0"

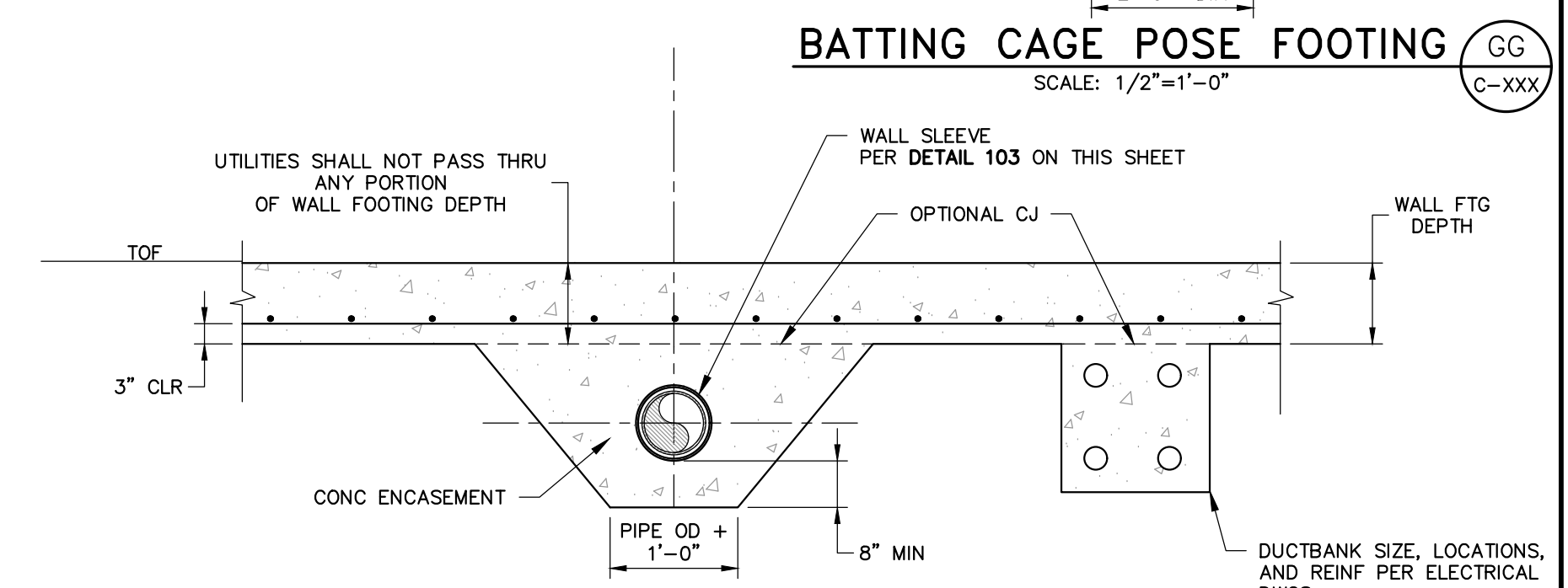


DUGOUT SLABS (EE)
SCALE: 3/4" = 1'-0"

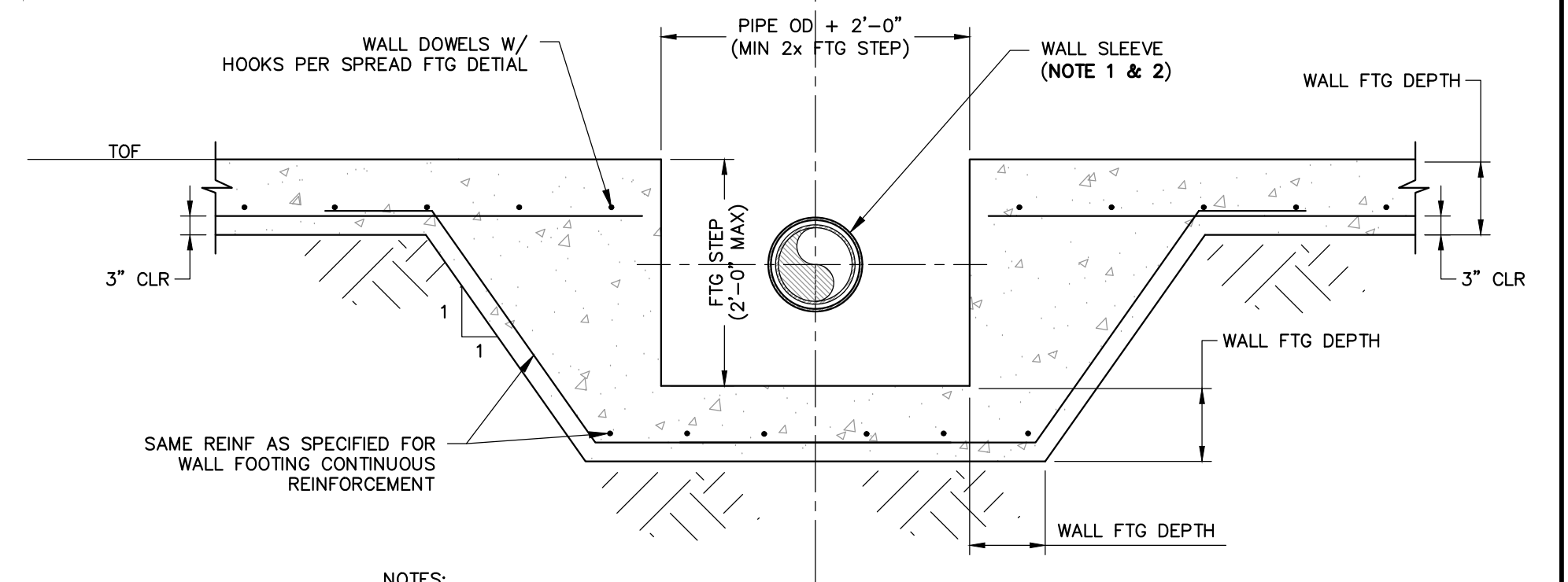
BATTING CAGE POSE FOOTING (GG)
SCALE: 1/2" = 1'-0"



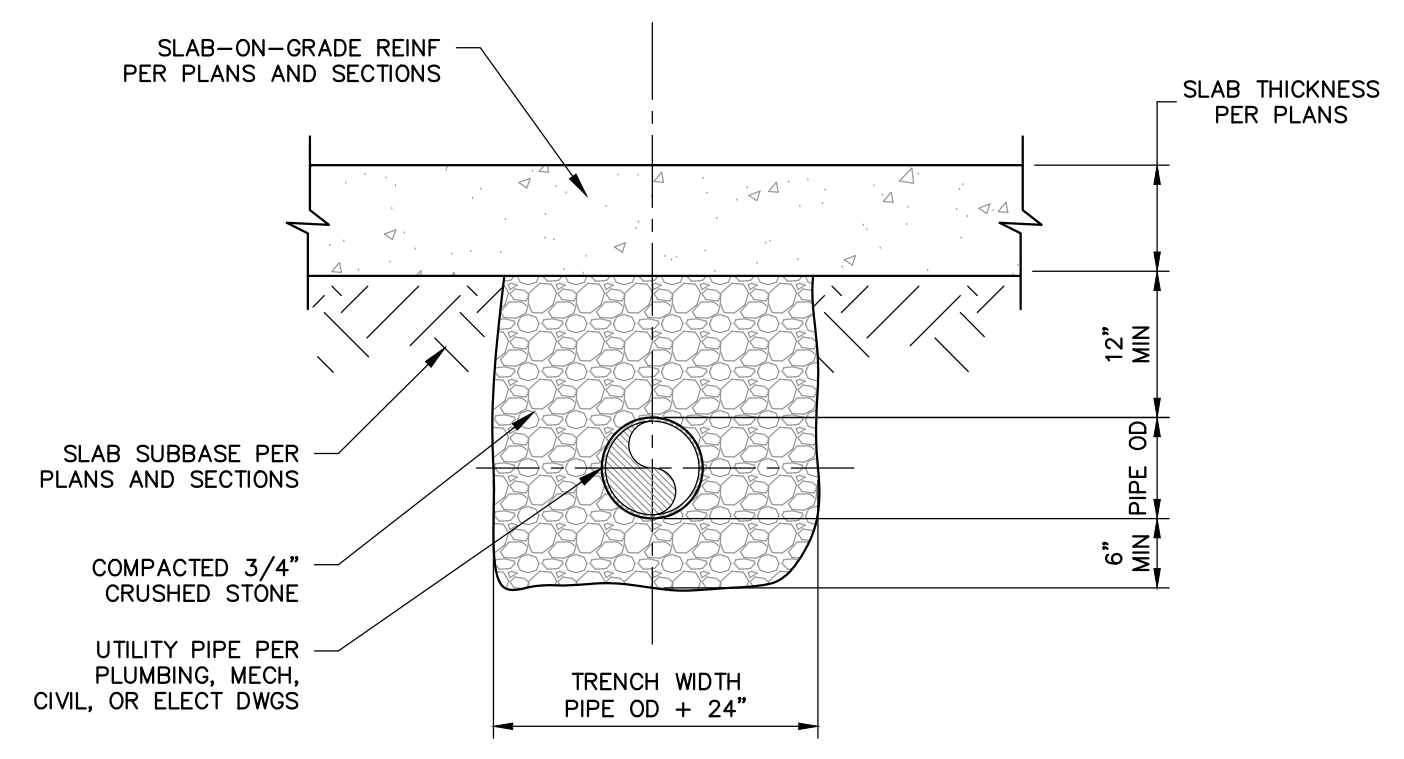
CONCESSION STAND FOUNDATION (FF)
SCALE: 3/4" = 1'-0"



101 UTILITIES BELOW WALL FOOTING
SCALE: NTS



103 STEPPED WALL FTG AT UTILITY
SCALE: NTS

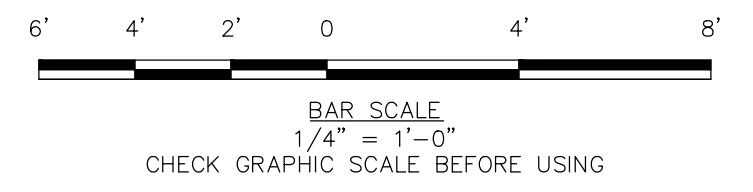


102 UNDERSLAB UTILITY TRENCH
SCALE: NTS

STRUCTURAL NOTES:

- FOOTING DESIGNED FOR AN ALLOWABLE SOIL BEARING CAPACITY OF 1500 PSF. FOOTING SUBGRADE SOILS SHALL BE INSPECTED AND APPROVED BY OWNER'S GEOTECHNICAL ENGINEER PRIOR TO PLACING STRUCTURAL FILL UNDER FOOTINGS.
- CONCRETE MIX DESIGN SHALL COMPLY WITH SPECIFICATION 03 30 00. CONCRETE MINIMUM 28-DAY COMPRESSIVE STRENGTH = 4,500 PSI WITH AIR ENTRAINMENT.
- REINFORCE ALL SLABS WITH FIBERMESH PER SPECIFICATION 03 30 00.
- EPOXY COATED REINFORCEMENT IS NOT REQUIRED FOR WORK SHOWN ON THIS DRAWING.
- GC TO COORDINATE ALL UTILITY PENETRATIONS THROUGH FOUNDATION WALLS AND SLABS WITH ENGINEER AND OWNER, PER DETAILS ON THIS SHEET.
- REFER TO CIVIL PLANS FOR LOCATION AND ORIENTATION OF FOUNDATIONS AND SLABS FOR FUTURE BALLPARK STRUCTURES.
- SEAL ALL CONCRETE SLABS WITH CURE AND SEAL COMPOUND PER SPECIFICATION 03 30 20 OR WATER REPELLENTS PER SPECIFICATION 07 10 00.

- NOTES:
- BUILDING FOUNDATION WALLS WITH WALL PENETRATION ABOVE GROUNDWATER ELEVATION PROVIDE SCH 80 PVC SIZED TO ALLOW INSTALLATION OF UTILITY THROUGH FOUNDATION WALL AFTER WALL PLACEMENT.
 - BUILDING FOUNDATION WALLS WITH WALL PENETRATION BELOW GROUNDWATER AND ALL BASEMENT WALL PENETRATIONS SHALL HAVE THERMOPLASTIC SLEEVE WITH LINK-SEALS AND 316 SS HARDWARE.
 - PROVIDE SIMILAR DETAIL FOR ELECTRICAL DUCTBANK PENETRATIONS. GC TO COORDINATE WITH ELECTRICAL CONTRACTOR FOR DUCTBANK SIZE AND CONDUIT INSTALLATION THROUGH FOUNDATION WALL.
 - DETAIL DOES NOT APPLY TO CONCRETE TANK CONSTRUCTION



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FOREST RIVER PARK DUGOUTS & CONCESSION STAND FOUNDATION PLANS, SECTIONS & DETAILS

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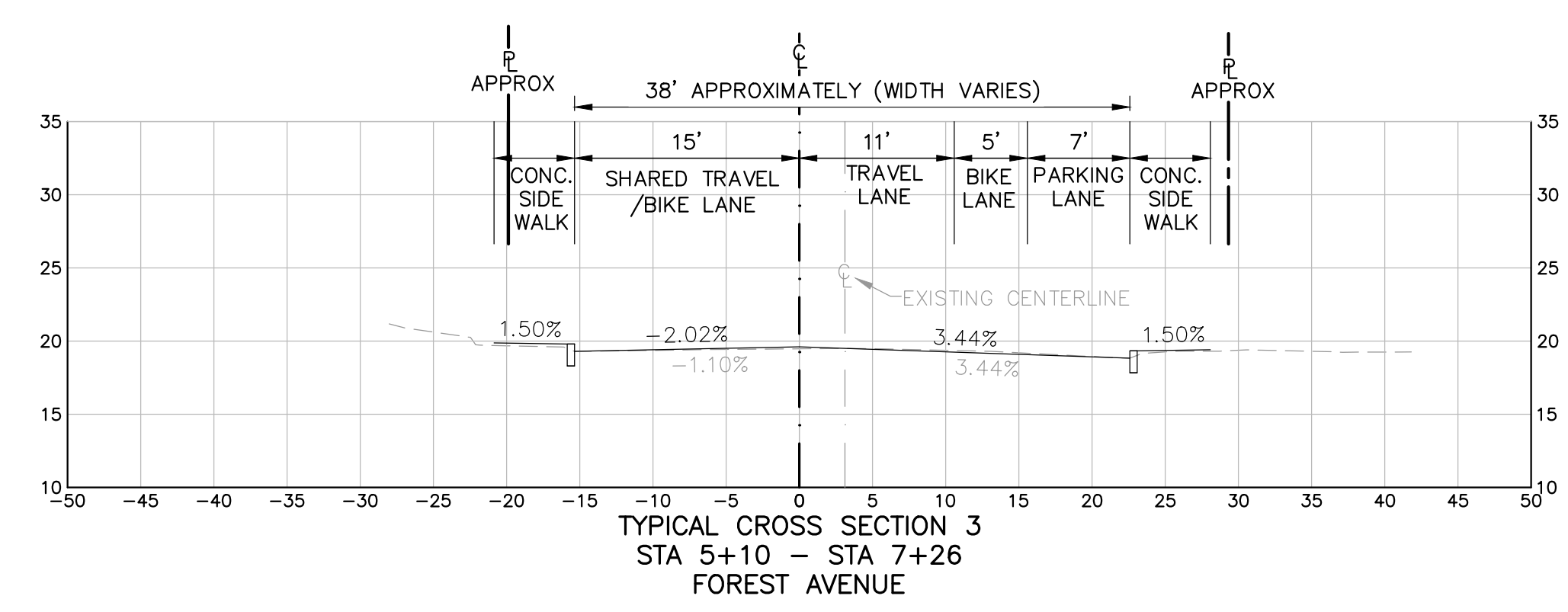
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JOB NO.: 228340.11
DATE: JANUARY 2017
SCALE: AS SHOWN
SHEET: 39 OF 46

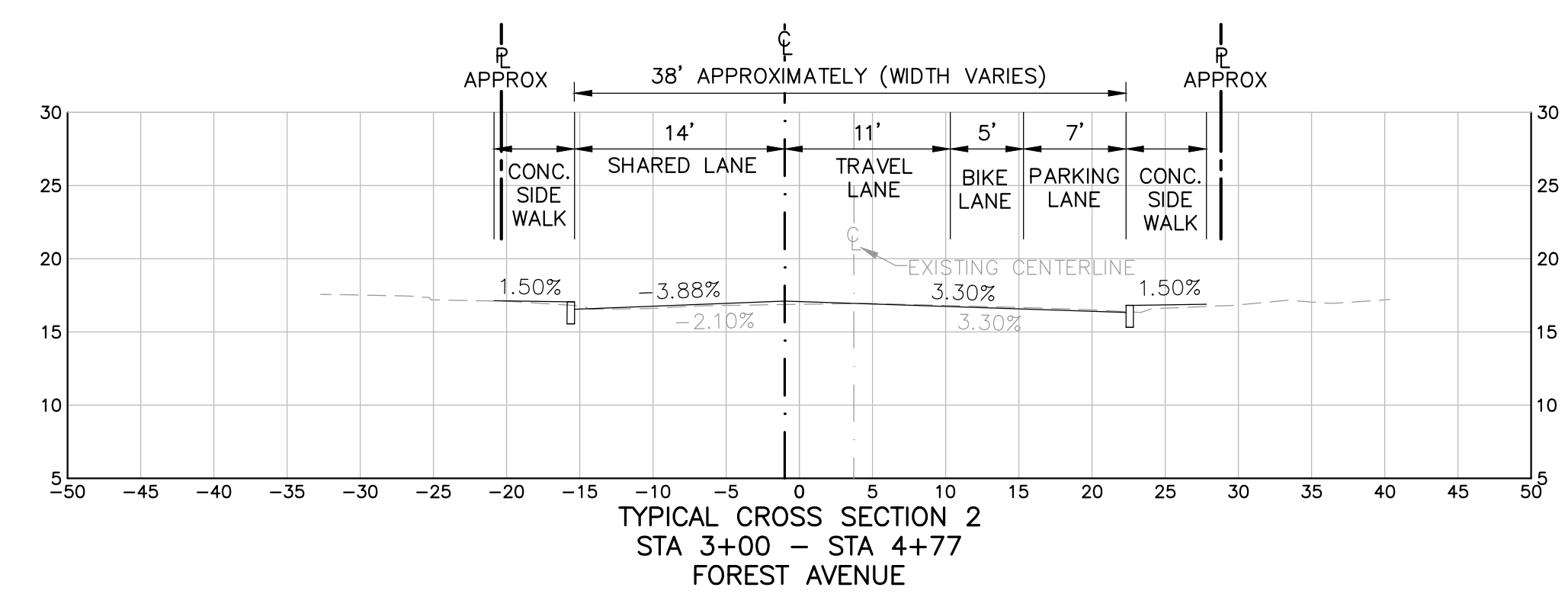
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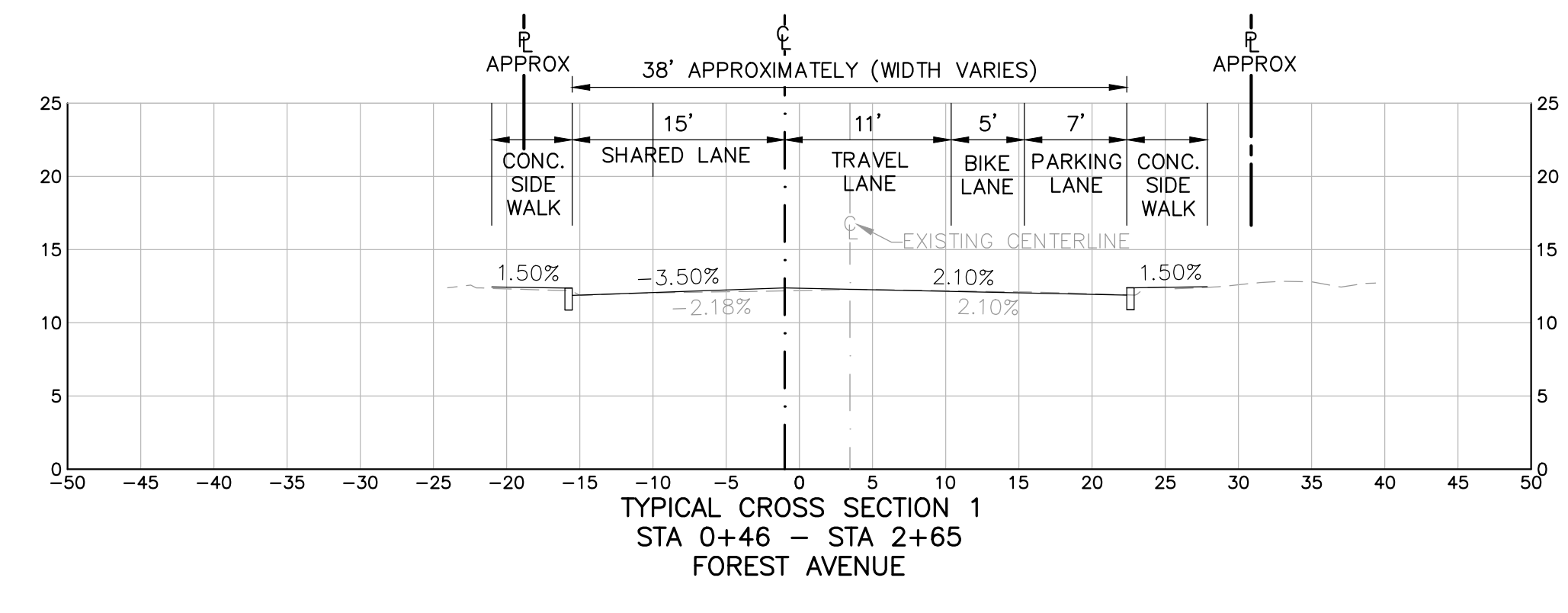
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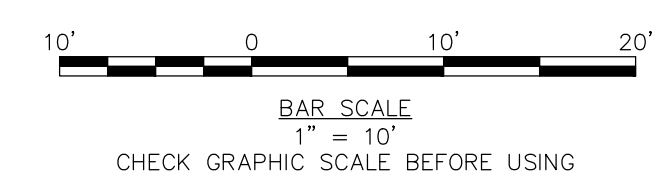
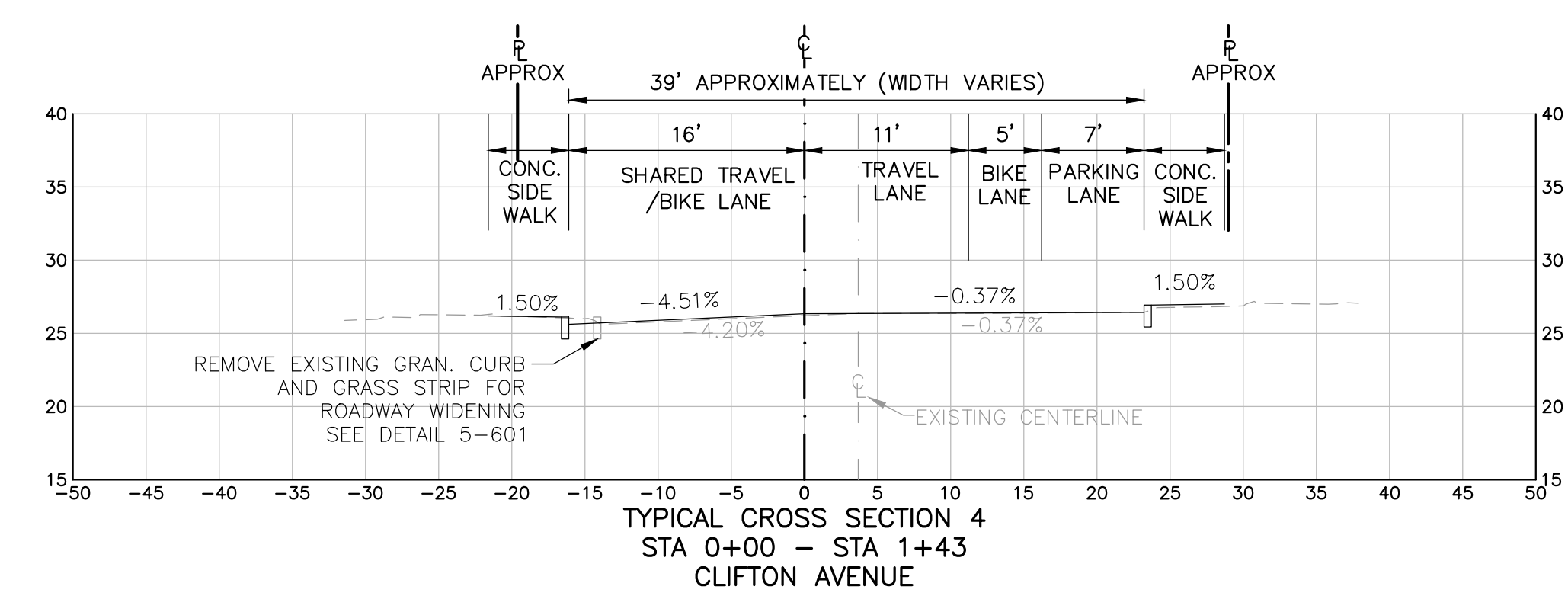
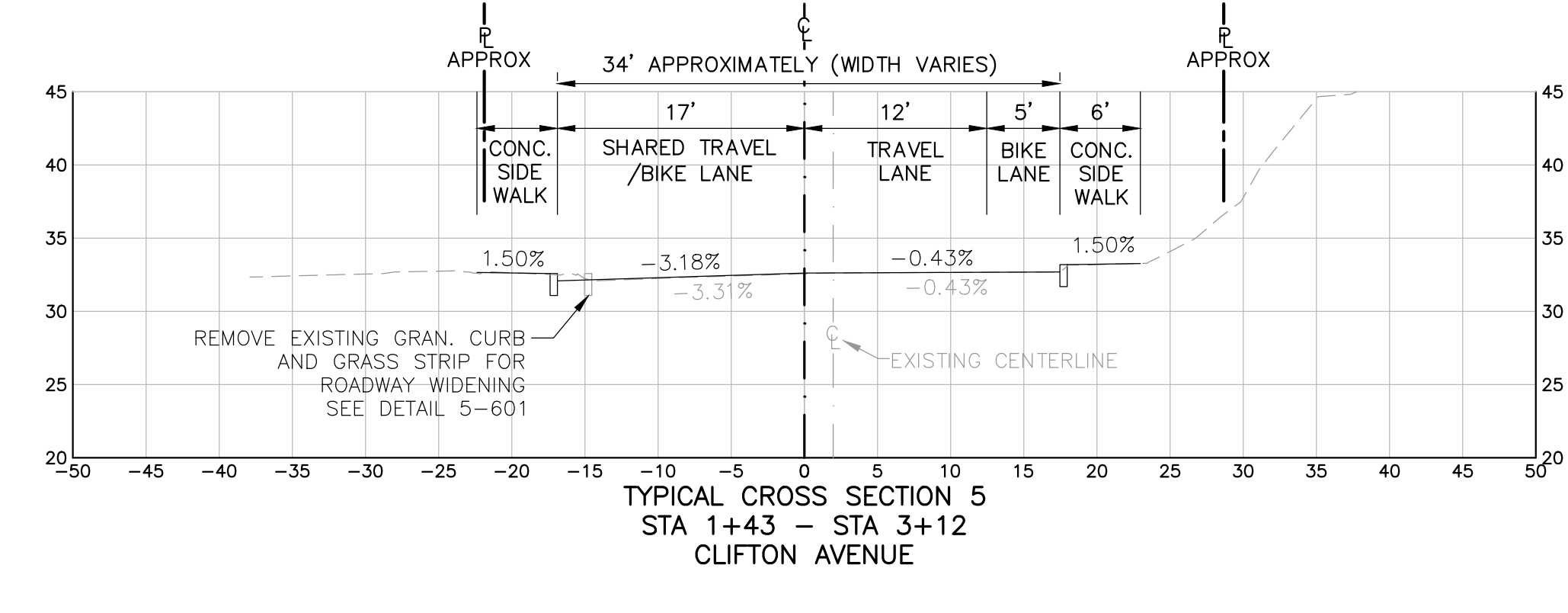
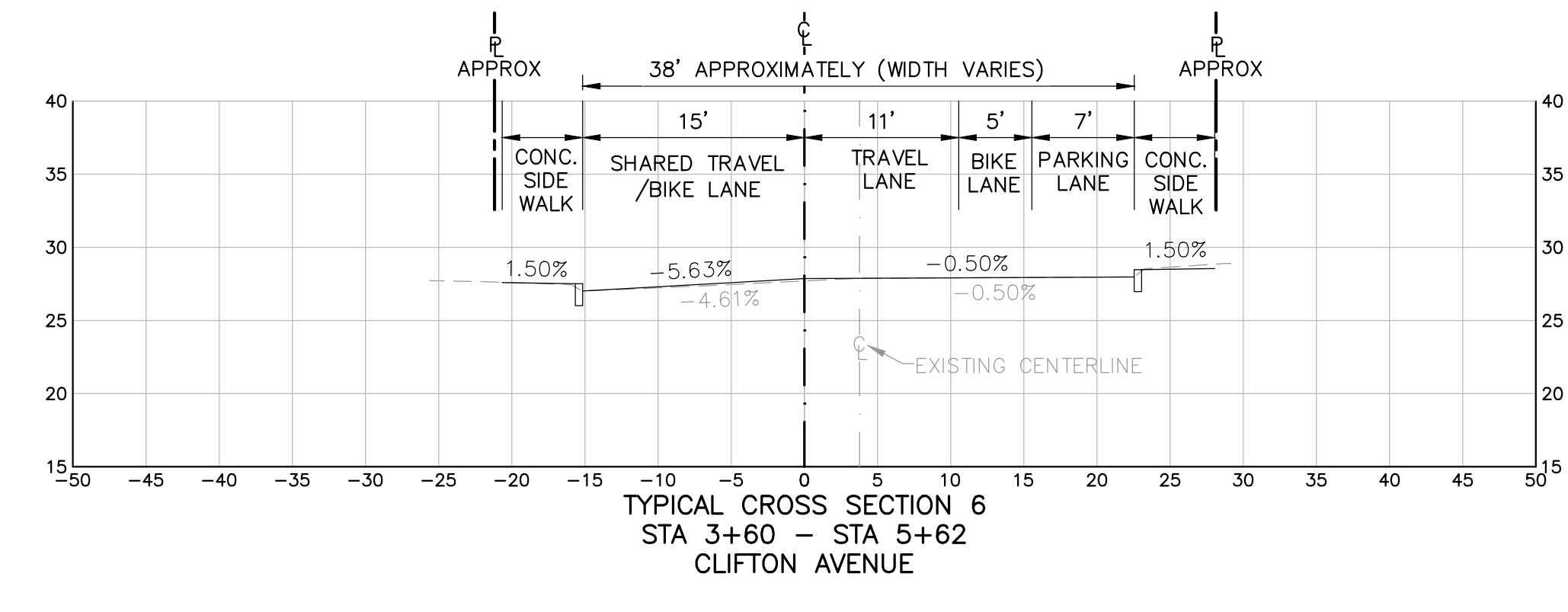
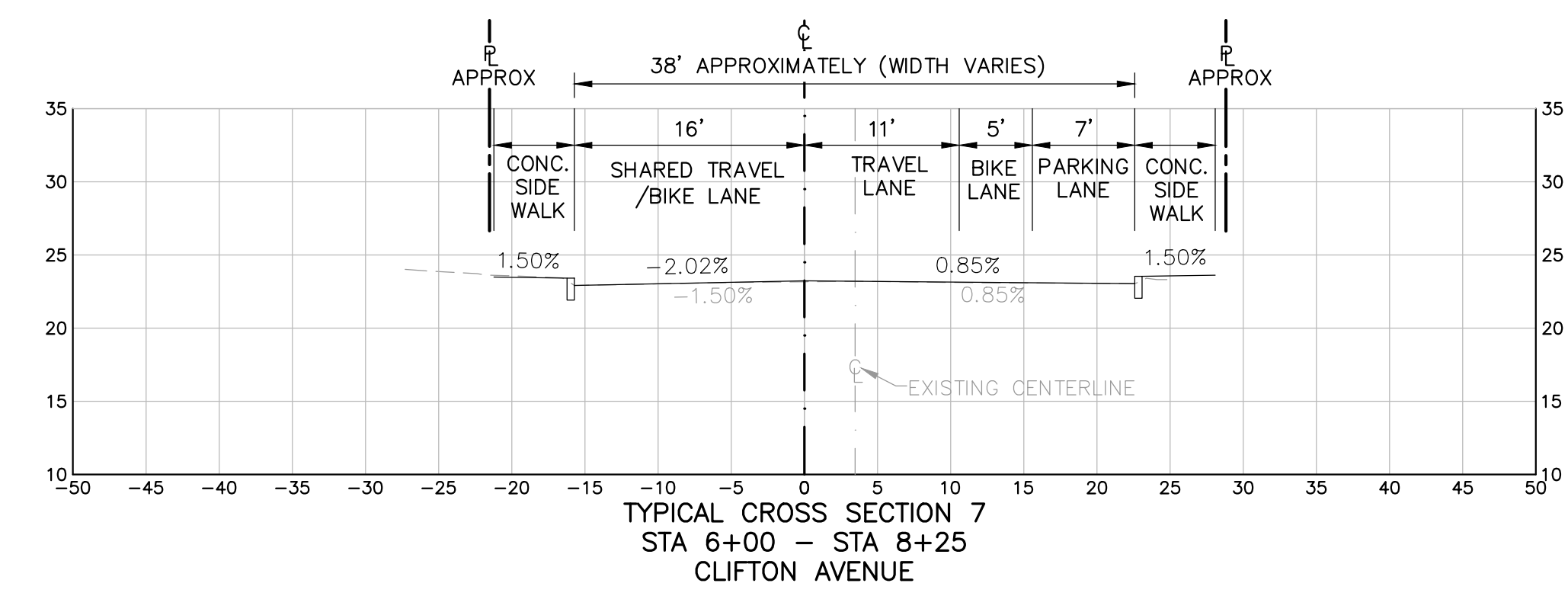
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C



NOTE: SEE SHEETS C-406 - C-410 FOR ROADWAY GRADING.

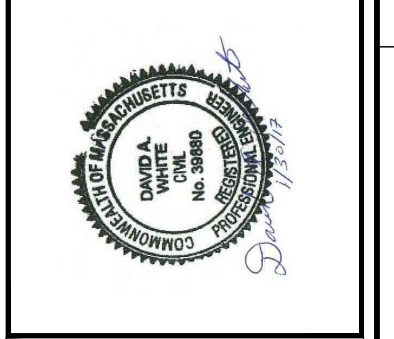


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228340-C-700 - C-705 (P. 04)

TYPICAL ROADWAY CROSS SECTIONS
FOREST AVENUE & CLIFTON AVENUE

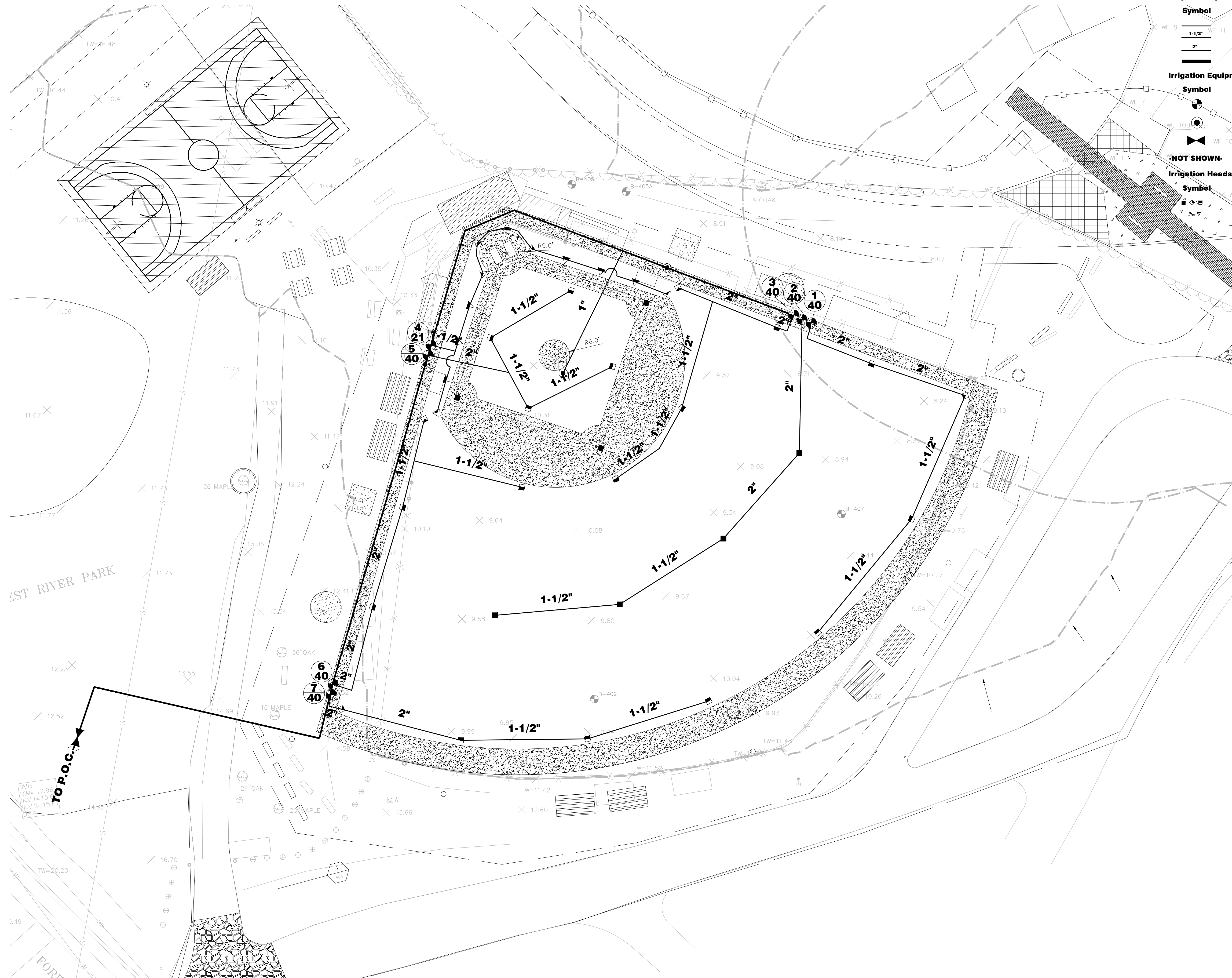
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SCALE: AS SHOWN
SHEET: 40 OF 46

C-700

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Irrigation Pipe Table

| Symbol | Pipe |
|--------|---|
| | 1" 200 PSI SDR 21 PVC PIPE, LATERALS |
| | 1-1/2" 200 PSI SDR 21 PVC PIPE, LATERALS |
| | 2" 200 PSI SDR 21 PVC PIPE, LATERALS |
| | 2-1/2" 200 PSI SDR 21 PVC PIPE, MAIN LINE |

Irrigation Equipment Table

| Symbol | Equipment |
|--------|-----------------------------------|
| | HUNTER PGV-151G 1-1/2" ZONE VALVE |
| | 1" QUICK COUPLER VALVE |
| | ISOLATION VALVE (LINE SIZE) |

NOT SHOWN: HUNTER IC-800PL CONTROLLER (TO BE LOCATED IN THE FIELD)

Irrigation Heads Table

| Symbol | Sprinkler Heads |
|--------|-----------------------------|
| | HUNTER I-25-04-10 ADJ ROTOR |
| | HUNTER PROS-04-15A SPRAYS |

General Notes

IRRIGATION DRAWINGS ARE DIAGRAMMATIC. ALL IRRIGATION EQUIPMENT PLACED IN THE FIELD WILL BE APPROVED BY THE OWNER OR ITS REPRESENTATIVE.
 CONTRACTOR RESPONSIBLE FOR VERIFICATION OF EQUIPMENT QUANTITY.
 DUE TO THE SCALE, ACCURACY OR CONDITION OF SITE PLANS, CONTRACTOR WILL MODIFY PATTERN TO GUARANTEE 100% COVERAGE OF INDICATED AREAS IN CASES WHERE SITE DIMENSIONS CONFLICT WITH DRAWING.
 ALL LATERAL PIPE WILL BE AS MARKED.
 ALL MAINLINE WILL BE AS MARKED.
 ALL SIDEWALK CROSSINGS TO BE SLEEVED.
 BACKFLOW AS PER LOCAL CODES.
 FLOW RATE IS 40 GPM @ 60 PSI

| No. | Revision/Issue | Date |
|-----|----------------|------|
| | | |

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FAX: (781) 376-8013
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STORE: (508) 398-9800
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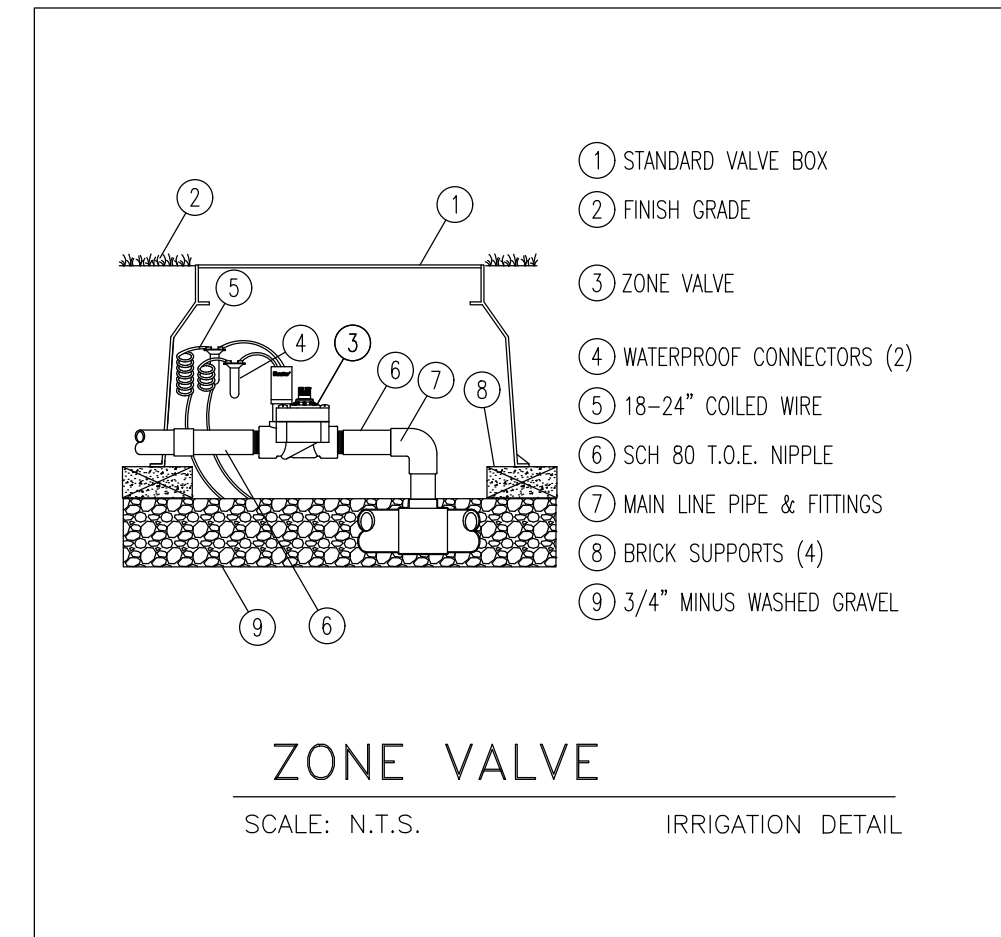
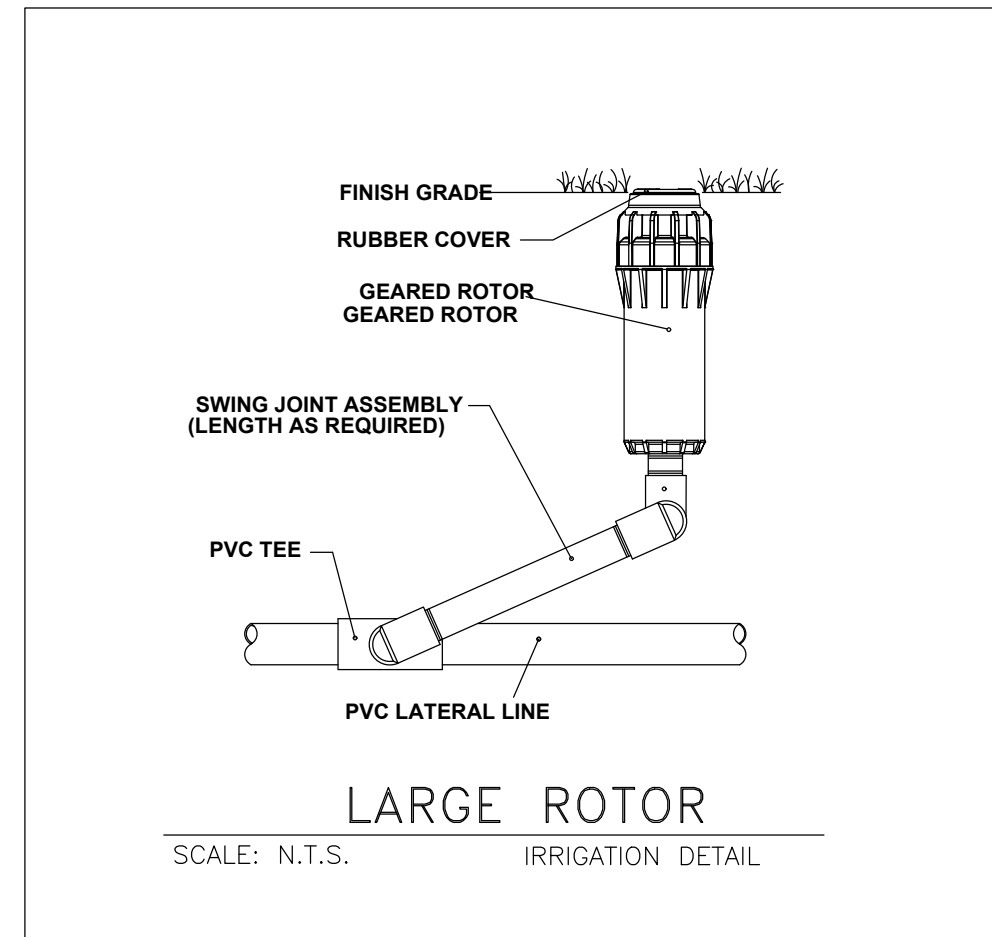
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WARWICK, RI 02888
STORE: (401) 461-4430
FAX: (401) 461-4431
EMAIL: WARWICK@CENTRALTIS.COM

| | |
|---|-------------|
| Project Name and Address | |
| FOREST RIVER PARK CITY OF SALEM, MASSACHUSETTS | |
| Project | Sheet |
| CapeForestRiverPark112515 | IR-100 |
| Date | 12-30-15 |
| Drawn by: | Checked by: |
| JP | JP |
| Scale | 1" = 30'-0" |

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| ZONE CHART | | | | |
|------------|------------|--------------|-----------------|----------------|
| ZONE # | VALVE SIZE | GPM PER HEAD | # HEADS ON ZONE | TOTAL ZONE GPM |
| 1 | 1-1/2" | 10 | 4 | 40 |
| 2 | 1-1/2" | 10 | 4 | 40 |
| 3 | 1-1/2" | 10 | 4 | 40 |
| 4 | 1-1/2" | .93,1.83 | 12 | 20.13 |
| 5 | 1-1/2" | 10 | 4 | 40 |
| 6 | 1-1/2" | 10 | 4 | 40 |
| 7 | 1-1/2" | 10 | 4 | 40 |



GENERAL IRRIGATION NOTES

1. THE IRRIGATION CONTRACTOR SHALL BECOME THOROUGHLY FAMILIAR WITH THE SPECIFICATIONS FOR THIS AND RELATED WORK PRIOR CONSTRUCTION.

2. SPRINKLER SYSTEM DESIGN IS BASED ON MINIMUM OPERATING PRESSURE AND MAXIMUM FLOW DEMAND SHOWN ON IRRIGATION DRAWINGS. VERIFY WATER PRESSURE PRIOR TO CONSTRUCTION.

3. THIS DESIGN IS DIAGRAMMATIC. PIPING, VALVES, ETC. MAY BE SHOWN WITHIN PAVED AREAS FOR DESIGN CLARIFICATION ONLY AND SHALL BE INSTALLED IN LANDSCAPED AREAS. AVOID CONFLICTS BETWEEN IRRIGATION SYSTEM, PLANTING AND ARCHITECTURAL FEATURES.

4. NO VALVE BOXES SHALL BE PLACED WITHIN PEDESTRIAN AREAS. EXACT CLEAR DISTANCE REQUIRED FROM ACTIVE AREAS SHALL BE VERIFIED PRIOR TO CONSTRUCTION. DO NOT PLACE VALVE BOXES IN LOW AREAS.

5. DO NOT WILLFULLY INSTALL IRRIGATION SYSTEM AS INDICATED ON DRAWINGS WHEN IT IS OBVIOUS IN FIELD THAT OBSTRUCTIONS, GRADE DIFFERENCES IN AREA DIMENSIONS EXIST THAT MIGHT NOT HAVE BEEN CONSIDERED DURING DESIGN. BRING SUCH OBSTRUCTIONS OR DIFFERENCES TO THE ATTENTION OF OWNER'S AUTHORIZED REPRESENTATIVE. IN EVENT THIS NOTIFICATION IS NOT PERFORMED, CONTRACTOR ASSUMES RESPONSIBILITY FOR REVISIONS.

6. INSTALL PIPE MATERIALS AND EQUIPMENT AS SHOWN IN DETAILS.

8. THE IRRIGATION CONTRACTOR SHALL TURN OVER TO THE OWNER: TWO OF EACH OF ALL OPERATING KEYS AND SERVICING TOOLS NEEDED FOR COMPLETE ACCESS, ADJUSTMENT, AND REPAIR OF ALL IRRIGATION SYSTEM COMPONENTS. THIS INCLUDES SPECIALIZED TOOLS REQUIRED FOR COMPLETE DISASSEMBLY OF EACH SPRINKLER AND VALVE.

SPRINKLER NOTES

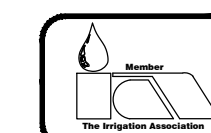
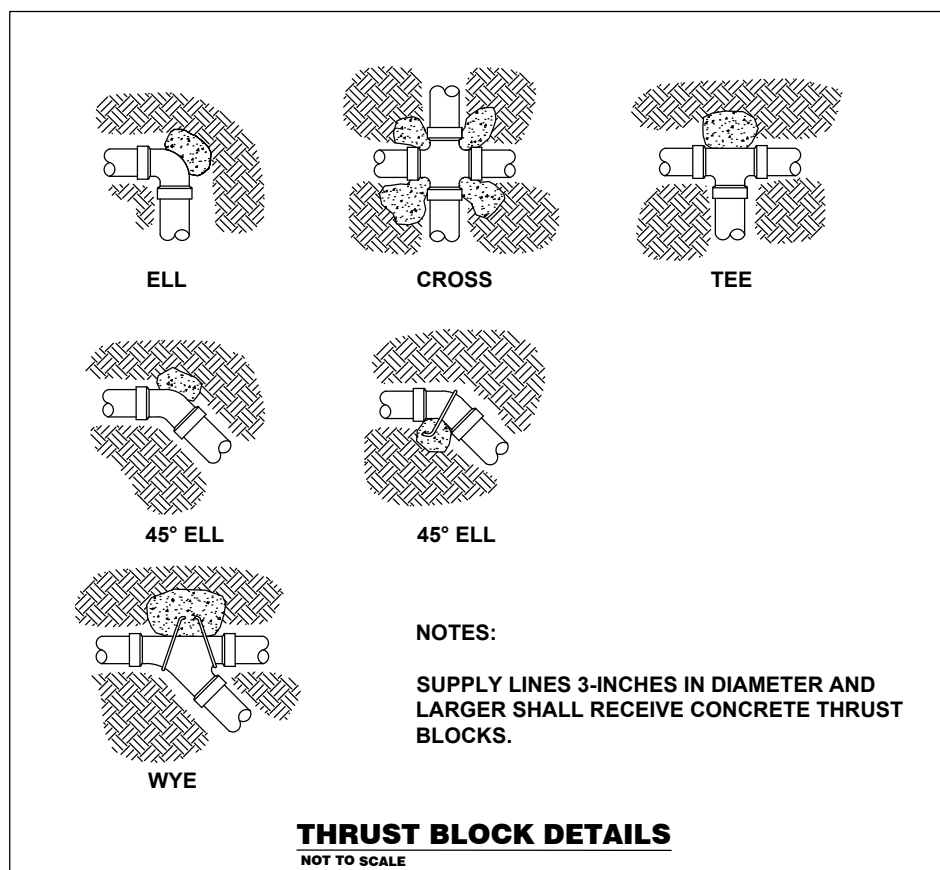
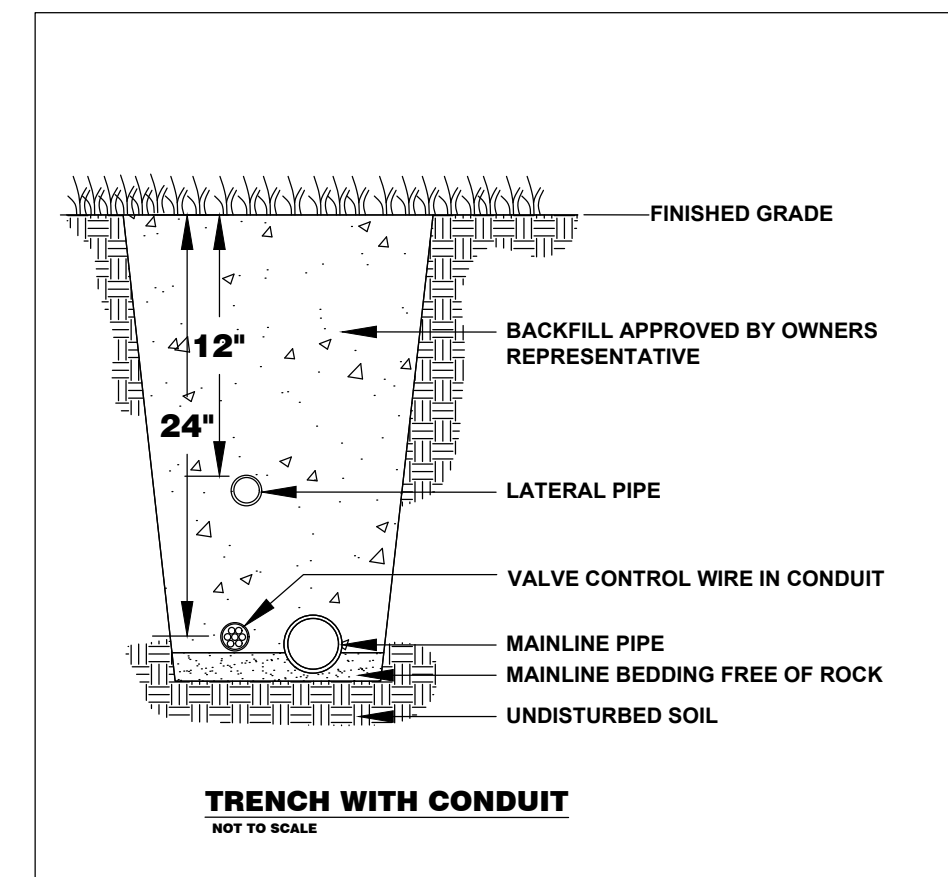
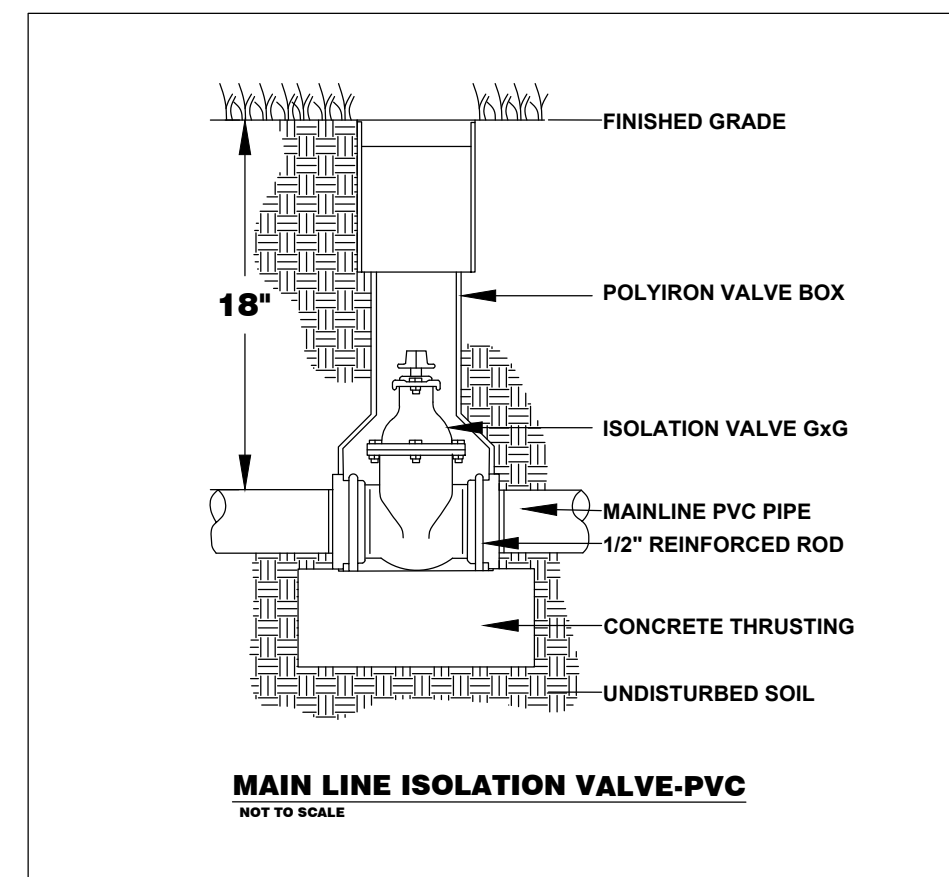
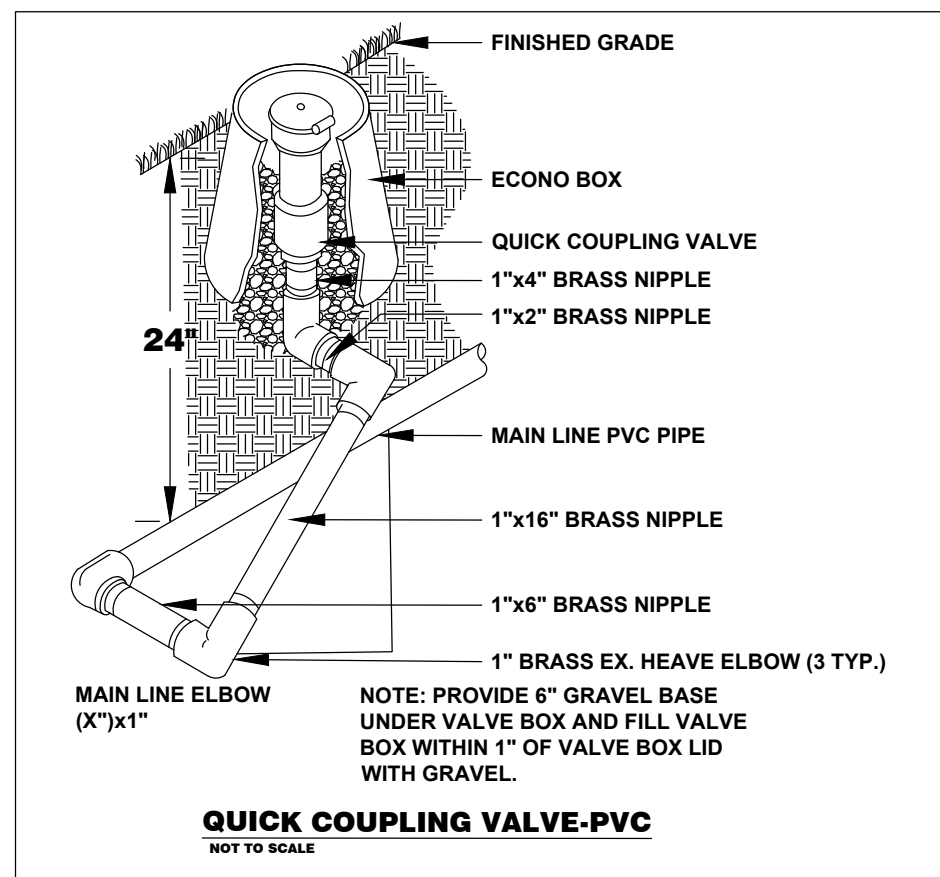
1. INSTALL POP-UP TYPE SPRINKLER HEADS INSTALLED IN PLANTING AREAS SO THAT TOP OF SPRINKLER HEAD IS AT LEAST 1/4\"/>

2. SET SPRINKLER HEADS FLUSH WITH AND PERPENDICULAR TO FINISH GRADE OF AREA TO BE IRRIGATED UNLESS OTHERWISE INDICATED ON DRAWINGS.

3. WHEN VERTICAL OBSTRUCTIONS (FIRE HYDRANTS, TREES, LIGHTS, ETC.) INTERFERE WITH SPRAY PATTERN OF SPRINKLER HEADS SO AS TO PREVENT PROPER COVERAGE, ADJUST SPRINKLER SYSTEM BY INSTALLING A SPRINKLER HEAD ON EACH SIDE OF OBSTRUCTION AND ADJUST ARC SO AS TO PROVIDE PROPER COVERAGE. PERFORM ADJUSTMENTS AT NO COST TO OWNERS AUTHORIZED REPRESENTATIVE.

4. FLUSH AND ADJUST SPRINKLERS FOR OPTIMUM PERFORMANCE AND TO PREVENT OVER SPRAY ONTO WALKS, ROADWAYS, AND BUILDINGS. THIS INCLUDES SELECTING THE BEST DEGREE OF ARC TO FIT SITE CONDITIONS AND TO THROTTLE FLOW CONTROL AT EACH VALVE TO OBTAIN OPTIMUM PRESSURE FOR EACH SYSTEM. DO NOT ADJUST ROTOR HEADS TO LESS THAN MAXIMUM THROW UNLESS SUCH ADJUSTMENT IS NEEDED TO AVOID OVERSPRAY ONTO BUILDINGS OR HARDSCAPE.

5. INSTALL SPRINKLERS AS SHOWN ON DETAILS.



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FAX: (401) 461-4431
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| | | |
|---|-------------------|---------------|
| Project Name and Address | | IR-200 |
| FOREST RIVER PARK CITY OF SALEM, MASSACHUSETTS | | |
| Project CapeForestRiverPark112515 | Sheet | |
| Date 12-30-15 | | |
| Drawn by: JP | Checked by: JP | |
| Scale 1" = 30'-0" | | |

GENERAL

HOME RUN. ARROWS INDICATE NUMBER OF CIRCUITS, CROSS LINES INDICATE NUMBER OF WIRES, OTHER THAN TWO (2) PLUS BOND, WIRE SIZE NOT SHOWN INDICATES #12AWG MIN. INDICATES CIRCUIT NUMBER

PANEL DESIGNATION

WIRING IN RACEWAY

WIRING IN RACEWAY CONCEALED UNDERGROUND OR UNDERSLAB, MINIMUM 3/4" C

CONDUIT AND CABLE ID TAG

CONDUIT TURNING UP

CONDUIT TURNING DOWN

CONDUIT STUB

EY CONDUIT SEAL

FLEXIBLE NON-METALLIC CONDUIT

PANELBOARD

CONTROL PANEL

AUTOMATIC TEMPERATURE CONTROL PANEL

INTRINSIC SAFETY BARRIER PANEL

POWER COMPANY METER

LOCAL SELECTOR SWITCH
H/O/A - HAND/OFF/AUTO
H/O/R - HAND/OFF/REMOTE
L/O/R - LOCAL/OFF/REMOTE

PUSHBUTTON STATION, WITH "EM" EMERGENCY

JUNCTION BOX

MOTORIZED DAMPER

THERMOSTAT

RELAY

DOOR BELL/BUZZER AND TRANSFORMER - MTD CL UP 7'-0" AFF

EQUIPMENT TAGS

KEYED NOTE TAG

REVISION TRIANGLE

BRACKET

POWER

NON-FUSED SAFETY SWITCH

FUSED SAFETY SWITCH

NON-FUSED DISCONNECT/MAGNETIC MOTOR STARTER

MANUAL MOTOR SWITCH (MOTOR RATED SWITCH), TOGGLE OPERATED, SINGLE PHASE. 1 OR 2 POLE AS REQUIRED

ENCLOSED CIRCUIT BREAKER W/AMPERE RATING

ELECTRIC MOTOR, NUMBER INDICATES HORSEPOWER RATING, "F" INDICATES FRACTIONAL LESS THAN 1/20HP OR 100W

TRANSFORMER

POWER POLE

DUPLEX RECEPTACLE, NEMA 5-20R - MTD CL UP 24" OR AS NOTED, "WP" WEATHER PROOF, "G" PROTECTED BY GFCI RECEPTACLE OR BREAKER UPSTREAM, "H" MOUNTED 0'-6" BELOW CEILING, "TV" MOUNT 7'-6" UP

DOUBLE DUPLEX RECEPTACLE, NEMA 5-20R - MTD CL UP 24" OR AS NOTED

SINGLE RECEPTACLE, NEMA 5-20R - MTD CL UP 24" OR AS NOTED

GFCI DUPLEX RECEPTACLE, NEMA 5-20R - MOUNTED CL UP 48" OR 6" ABOVE COUNTER

DOUBLE DUPLEX GFCI RECEPTACLE, NEMA 5-20R - MOUNTED CL UP 48" OR 6" ABOVE COUNTER

FLUSH FLOOR OUTLET, DUPLEX RECEPTACLE, NEMA 5-20R

MULTI SERVICE FLUSH FLOOR BOX WITH DUPLEX RECEPTACLE AND PROVISIONS FOR DATA

POWER RECEPTACLE, NEMA CONFIGURATION AS NOTED OR AS REQUIRED FOR EQUIPMENT SERVED.

FLUSH CEILING MTD DEVICE BOXES, ONE W/ DUPLEX RCPT FOR PROJECTOR POWER AND ONE FOR DATA TO SERVE OH PROJECTOR. RUN ONE 1 1/2" C TO JBOX LOCATED AT FRONT OF ROOM FOR PROJECTOR CABLE PATHWAY. VERIFY FINAL LOCATION W/ OWNER PRIOR TO ROUGH IN.

MULTI-OUTLET POWER STRIP, MOUNT 0'-6" ABOVE COUNTERTOP, RECEPTACLE SPACING AS NOTED.

MISCELLANEOUS

DETAIL #

SECTION CALL OUT

SHEET #

DETAIL TITLE

DETAIL CALL OUT

LIGHTING

2x4 FLUORESCENT FIXTURE

ASSOCIATED CONTROL DEVICE FIXTURE TYPE (SEE LIGHT FIXTURE SCHEDULE)

1x4 FLUORESCENT FIXTURE

2x2 FLUORESCENT FIXTURE

DOWN LIGHT

WALL MOUNTED FIXTURES

POLE MOUNTED SITE LIGHTING FIXTURE

FIXTURE TYPE (SEE LIGHT FIXTURE SCHEDULE)

FLOOD LIGHT

EXIT SIGN, CEILING MOUNTED, ARROW INDICATES EGRESS DIRECTION, SHADING INDICATES SIGN FACE. NUMERAL INDICATES BATTERY UNIT CONNECTED

EXIT SIGN, WALL MOUNTED 7'-6" AFF OR 0'-6" ABOVE DOOR, SHADING INDICATES SIGN FACE. NUMERAL INDICATES BATTERY UNIT CONNECTED TO.

DUAL HEAD EMERGENCY LIGHT BATTERY PACK WITH NUMBER OF HEADS AS INDICATED - WALL MOUNTED MTD 7'-6" AFF. NUMERAL INDICATES BATTERY ID NUMBER.

TANDEM EMERGENCY LIGHT BATTERY PACK & EXIT SIGN - WALL MOUNTED MTD 7'-6" AFF OR 0'-6" ABOVE DOOR. NUMERAL INDICATES BATTERY ID NUMBER.

REMOTE EMERGENCY LIGHTING HEAD - WALL MOUNTED MTD 7'-6" AFF. NUMERAL INDICATES BATTERY UNIT CONNECTED TO.

SINGLE POLE TOGGLE SWITCH - MTD CL UP 4'-0" AFF

DOUBLE POLE TOGGLE SWITCH - MTD CL UP 4'-0" AFF

3-WAY TOGGLE SWITCH - MTD CL UP 4'-0" AFF

4-WAY TOGGLE SWITCH - MTD CL UP 4'-0" AFF

WALL MOUNTED OCCUPANCY SENSOR - MTD CL UP 4'-0" AFF

TOGGLE SWITCH WITH PILOT LIGHT - MTD CL UP 4'-0" AFF

DIMMER SWITCH - MTD CL UP 4'-0" AFF

LOW VOLTAGE SWITCH - MTD CL UP 4'-0" AFF

OCCUPANCY SENSOR

o. INDICATES CONTROLLED FIXTURE

PHOTOCELL

LIGHTING CONTACTOR

MOTION SENSOR

FIRE ALARM DIAGRAM SYMBOLS

FIRE ALARM CONTROL PANEL

FIRE ALARM ANNUNCIATOR

FIELD CHARGER POWER SUPPLY

FIRE ALARM MASTER BOX

KNOX BOX

FIRE ALARM MANUAL PULL STATION - WALL MTD CL UP 4'-0"

FIRE ALARM AUDIBLE/VISIBLE NOTIFICATION APPLIANCE CANDELA (CD) POWER PER NFPA 72 OR AS NOTED - WALL MTD BOTTOM UP 80" AFF. "H" HORN, "V" VOICE.

FIRE ALARM VISUAL NOTIFICATION APPLIANCE CANDELA (CD) POWER PER NFPA 72 OR AS NOTED - WALL MTD BOTTOM UP 80" AFF

CEILING MOUNTED SMOKE DETECTOR

CEILING MOUNTED HEAT DETECTOR

DUCT SMOKE DETECTOR

S=SUPPLY, R=RETURN

SPRINKLER SYSTEM FLOW SWITCH

SPRINKLER SYSTEM TAMPER SWITCH

SPRINKLER SYSTEM PRESSURE SWITCH

FIRE ALARM SYSTEM MAGNETIC DOOR HOLDER

MONITOR MODULE

CONTROL MODULE

RELAY MODULE

COMMUNICATIONS

TELEPHONE BACKBOARD

PROVISIONS FOR TELEPHONE OUTLET. TWO-GANG WALL BOX WITH ONE 1" C STUB TO ABOVE ACCESSIBLE CEILING - MTD CL UP SAME AS ASSOCIATED RECEPTACLE

W-INDICATES WALL MOUNTED AT 60" AFF

P-INDICATES PAYPHONE MOUNTED AT 4'-0" AFF

X-INDICATES NUMBER OF JACKS, SINGLE BOX

PROVISIONS FOR DATA OUTLET. TWO-GANG WALL BOX WITH ONE 1" C STUB TO ABOVE ACCESSIBLE CEILING - MTD CL UP SAME AS ASSOCIATED RECEPTACLE. SUBSCRIPTS AS NOTED ABOVE.

PROVISIONS FOR TELEPHONE & DATA OUTLET. TWO-GANG WALL BOX WITH ONE 1" C STUB TO ABOVE ACCESSIBLE CEILING - MTD CL UP SAME AS ASSOCIATED RECEPTACLE. SUBSCRIPTS AS NOTED ABOVE.

PROVISIONS FOR SCADA SYSTEM OUTLET. TWO-GANG WALL BOX WITH ONE 1" C STUB TO ABOVE ACCESSIBLE CEILING - MTD CL UP SAME AS ASSOCIATED RECEPTACLE

CEILING MOUNTED TELEPHONE SYSTEM OUTLET

CEILING MOUNTED DATA SYSTEM OUTLET

CEILING MOUNTED VOICE & DATA OUTLET

FLUSH TELEPHONE FLOOR OUTLET

FLUSH DATA FLOOR OUTLET

FLUSH VOICE & DATA FLOOR OUTLET

TELEVISION COAXIAL OUTLET, MOUNTED UP SAME AS ASSOCIATED RECEPTACLE

SECURITY

SECURITY PANEL

DOOR INTRUSION SWITCH

ELECTRIC DOOR STRIKE

CARD READER

KEY PAD

MOTION DETECTOR

SECURITY CAMERA

PTZ = PAN/TILT/ZOOM

INTERCOM & PAGING SYSTEM

CEILING MOUNTED SPEAKER

PAGING SYSTEM CONTROL PANEL

PAGING SYSTEM HANDSET

INSTRUMENTATION

FIELD MOUNTED INSTRUMENT

INSTRUMENT IDENTIFICATION TYPE

INSTRUMENT LOOP #

VENDOR SUPPLIED INSTRUMENT

INSTRUMENT IDENTIFIER:

AE ANALYSIS ELEMENT

AIT ANALYSIS INDICATING TRANSMITTER

AT ANALYSIS TRANSMITTER

DPS DIFFERENTIAL PRESSURE SWITCH

FCV FLOW CONTROL VALVE

FE FLOW ELEMENT

FT FLOW INDICATING TRANSMITTER

FT FLOW TRANSMITTER

FS FLOW SWITCH

LE LEVEL ELEMENT

LIT LEVEL INDICATING TRANSMITTER

LT LEVEL TRANSMITTER

LS LEVEL SWITCH

LSH LEVEL SWITCH HIGH

LSL LEVEL SWITCH LOW

MOV MOTOR OPERATED VALVE

PE PRESSURE ELEMENT

PIT PRESSURE INDICATING TRANSMITTER

PT PRESSURE TRANSMITTER

PS PRESSURE SWITCH

SV SOLENOID VALVE

TE TEMPERATURE ELEMENT

TIT TEMPERATURE INDICATING TRANSMITTER

TT TEMPERATURE TRANSMITTER

ZZ PROXIMITY SWITCH

MISC TERMINALS

ARROW, SMALL

ARROW, LARGE

ARROW, TRIANGULAR

CONTINUE, SMALL

CONTINUE, LARGE

DOT, SMALL

DOT, MEDIUM

DOT, LARGE

POLARITY SQUARE

SCREW TERMINAL

TERMINAL POINT, SMALL

TERMINAL POINT, LARGE

TERMINAL POINT, SQUARE

SHIELD

SHIELD W/TERMINAL POINT

ONE-LINE DIAGRAM SYMBOLS

HV VOLTAGE DRAWOUT TYPE POWER CIRCUIT BREAKER ELECTRICALLY OPERATED

MV VOLTAGE DRAWOUT TYPE POWER CIRCUIT BREAKER WITH MANUAL CONTROL SWITCH

LOW VOLTAGE CIRCUIT BREAKER

AF - AMP FRAME

AT - AMP TRIP

EO - ELECTRICALLY OPERATED

ST - SHUNT TRIP

GF - GROUND FAULT

EO - ELECTRICALLY OPERATED

DISCONNECT, ISOLATION OR SAFETY SWITCH

FUSED DISCONNECT SWITCH

MAGNETIC MOTOR STARTER. NUMERAL INDICATES NEMA SIZE FVAR UNLESS OTHERWISE NOTED.

FVR - FULL VOLTAGE REVERSING

RVAT - REDUCING VOLTAGE AUTO TRANSFORMER

2S - TWO SPEED

YD - WYE DELTA REDUCED VOLTAGE STARTER

CAPACITOR

VFD = VARIABLE FREQUENCY DRIVE

SS = SOLID STATE STARTER

DC = DC VARIABLE DRIVE

NUMERAL INDICATES AMP RATING

POWER TRANSFORMER

OA - LIQUID TYPE SELF COOLED

AA - DRY TYPE SELF COOLED

FA - FAN COOLED

CONNECTION

POTENTIAL TRANSFORMER

RATIO

NUMBER REQUIRED

CURRENT TRANSFORMER

RATIO

PHASE

MOTOR, NUMERAL INDICATES HORSEPOWER

GENERAL LOAD, NUMERAL INDICATES LOAD IN KVA

GENERATOR

ATS - AUTOMATIC TRANSFER SWITCH

MTS - MANUAL TRANSFER SWITCH

METER

A - AMMETER

V - VOLTMETER

W - WATTMETER

KWH - KILOWATT HOUR

KVAR - KILOVAR METER

VAR - VAR METER

HZ - FREQUENCY METER

PZ - POWER FACTOR METER

LINE OR LOAD REACTOR

NUMERAL INDICATES % IMPEDENCE

DIGITAL POWER MONITOR

METER TRANSFER SWITCH

AS - AMMETER SWITCH

VS - VOLTMETER SWITCH

SPD = SURGE PROTECTION DEVICE

ENDN = ETHERNET TO DEVICENET LINKING DEVICE

DPS = DEVICENET POWER SUPPLY

MEDIUM VOLTAGE CABLE

TERMINATION

DRAWOUT DEVICE

LIGHTNING ARRESTOR

KEY INTERLOCK

GROUNDING

BARE COPPER GROUND CABLE. (SIZE 4/0 UNLESS OTHERWISE NOTED)

3/4" X 10'-0" LONG GROUND ROD. (10'-0" MINIMUM LENGTH)

EQUIPMENT BOLTED CONNECTION OR APPROVED EQUAL.

CADWELD EXOTHERMIC CONNECTION

GROUND

CONTROL DIAGRAM SYMBOLS

NOTE: ALL CONTROL SYMBOLS ARE DRAWN ASSUMING DE-ENERGIZED CIRCUITS, EMPTY TANKS, UNPRESSURIZED LINES, ETC.

OPEN ON INCREASE

CLOSE ON INCREASE

PRESSURE SWITCH

LEVEL SWITCH

FLOW SWITCH

TEMPERATURE SWITCH

NORMALLY CLOSED

NORMALLY OPEN

PUSH BUTTON

INSTANTANEOUS CONTACT

TIMED CLOSE CONTACT

TIMED OPEN CONTACT

LIMIT SWITCH

SELECTOR SWITCH: QUANTITY OF ARROWS INDICATES NUMBER OF POSITIONS. XOO INDICATES UPPER CONTACT CLOSED IN LEFT POSITION AND OPEN IN CENTER AND RIGHT POSITIONS

INTERNAL WIRING

FIELD WIRING

RELAY COIL

ABBREVIATIONS

A,AMP AMPERES

AC ALTERNATING CURRENT

AFF ABOVE FINISHED FLOOR

AFG ABOVE FINISHED GRADE

AHJ AUTHORITY HAVING JURISDICTION

AIC AMPERE INTERRUPT CAPACITY

AWG AMERICAN WIRE GAUGE

BFG BELOW FINISHED GRADE

CATV CABLE TELEVISION

CB CIRCUIT BREAKER

CCTV CLOSED CIRCUIT TELEVISION

CL CENTER LINE

CKT CIRCUIT

CP CONTROL PANEL

CPT CONTROL POWER TRANSFORMER

CT CURRENT TRANSFORMER

CU COPPER

E.C. ELECTRICAL CONTRACTOR

E.M.T. ELECTRIC METALLIC TUBING

FAA FIRE ALARM ANNUNCIATOR

FACP FIRE ALARM CONTROL PANEL

FED FURNISHED BY OTHERS

FWE FURNISHED WITH EQUIPMENT

G.C. GENERAL CONTRACTOR

GEN GENERATOR

GFCI GROUND FAULT CIRCUIT INTERRUPTER

G,GROUND GROUND

HP HORSEPOWER

Hz FREQUENCY IN CYCLES/SECOND

IGS ISOLATED GROUND

IMT INTERMEDIATE METALLIC CONDUIT

JBOX JUNCTION BOX

K KILO

KCMIL 1000 CIRCULAR MILS

KVA KILOVOLT AMPERE

KVAR KILOVOLT AMPERE REACTIVE

KW KILOWATT

KWH KILOWATT HOUR

MCC MOTOR CONTROL CENTER

MCB MAIN CIRCUIT BREAKER

MFG MANUFACTURER

MH MANHOLE

MLO MAIN LUGS ONLY

MTD MOUNTED

MTR MOTOR

NC NORMALLY CLOSED

NEC NATIONAL ELECTRIC CODE

NEUT NEUTRAL

NO NORMALLY OPEN

OL OVERLOAD ELEMENT

PF POWER FACTOR

PH PHASE

PRI PRIMARY

PT POTENTIAL TRANSFORMER

PVC POLYVINYL CHLORIDE

RGS RIGID STEEL CONDUIT

RTD RESISTANCE TEMPERATURE DETECTOR

SEC SECONDARY

SS STAINLESS STEEL

SV SOLENOID VALVE

TEMP TEMPERATURE

TYP TYPICAL

UE UNDERGROUND ELECTRIC

UG UNDERGROUND

UPS UNINTERRUPTED POWER SUPPLY

V VOLTS

VAR VOLT-AMPERES

VAR VOLT-AMPERE REACTIVE

W WATT

WM WATT METER

WP WEATHER PROOF

XFMR TRANSFORMER

XP EXPLOSION PROOF

40 Shattuck Road, Suite 110
Andover, Massachusetts 01810
866.702.6371 | www.woodardcurran.com

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PROFESSIONAL ENGINEER

ANDREW FITZPATRICK

ELECTRICAL

NO. 50761

COMMONWEALTH OF MASSACHUSETTS

| REV | DESCRIPTION | DATE |
|-----|-------------|------|
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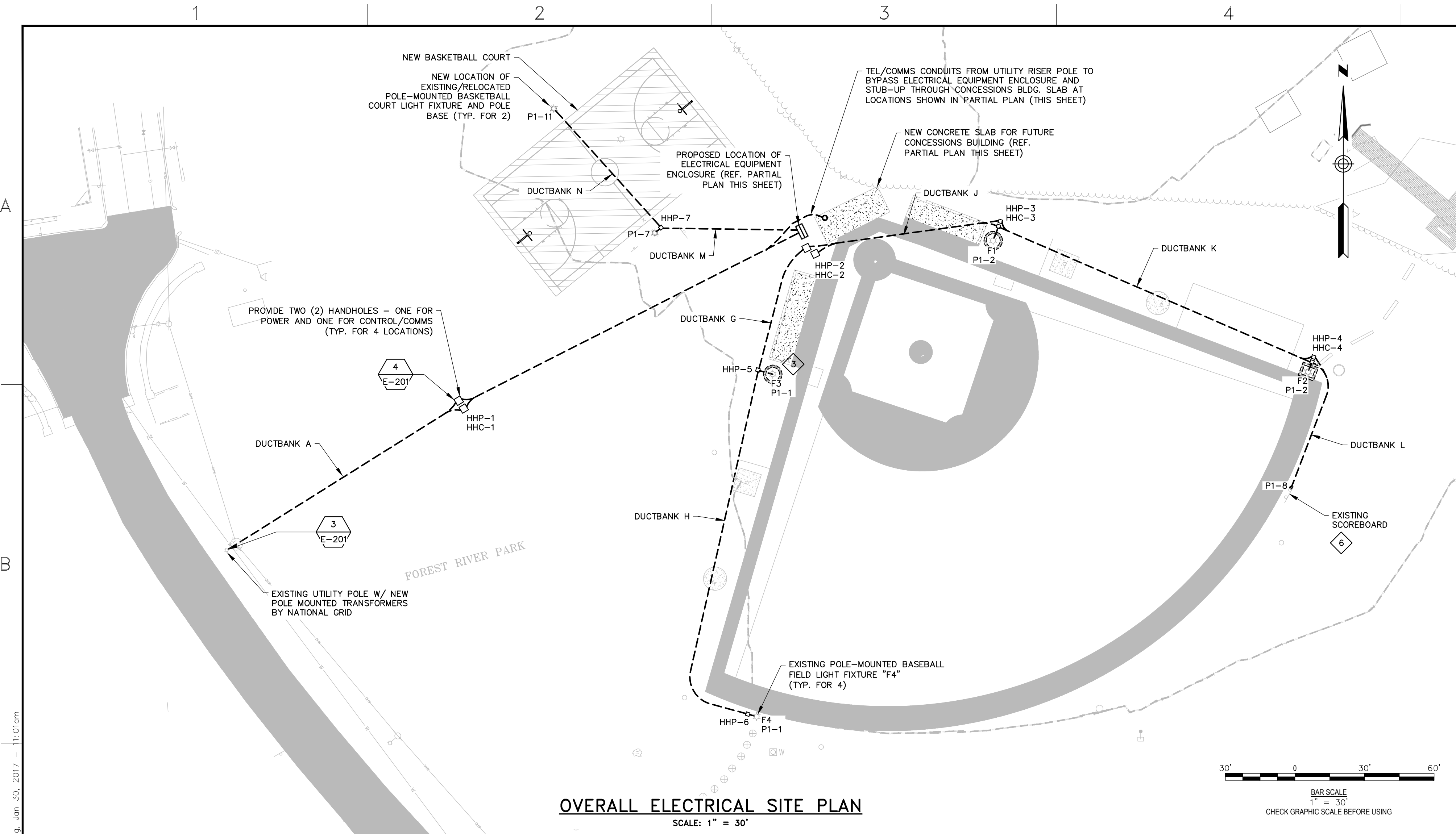
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CHECKED BY: AJF
DRAWN BY: KRM

ELECTRICAL LEGEND AND ABBREVIATIONS

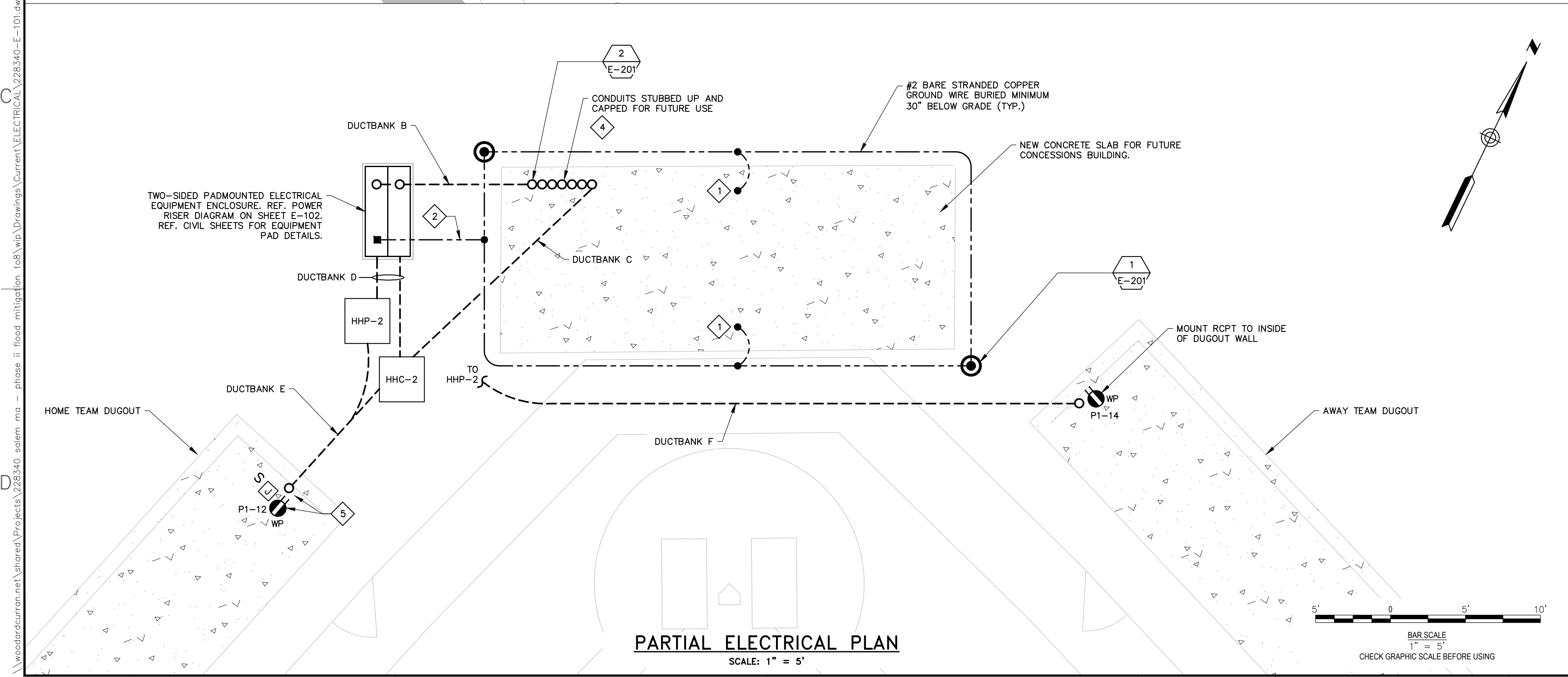
CITY OF SALEM, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

CONTRACT A
CANAL STREET
FLOOD MITIGATION PROJECT
SALEM, MASSACHUSETTS

JOB NO: 228340.11
DATE: JANUARY 2017
SCALE: AS SHOWN
SHEET: 43 OF 46



OVERALL ELECTRICAL SITE PLAN
SCALE: 1" = 30'



PARTIAL ELECTRICAL PLAN
SCALE: 1" = 5'

GENERAL NOTES:

1. REFERENCE CIVIL SHEET C-500 FOR ELECTRICAL DEMOLITION REQUIREMENTS. DUCTBANK ROUTING AND EQUIPMENT LOCATIONS ARE DIAGRAMMATIC. COORDINATE ALL UNDERGROUND DUCTBANK AND EQUIPMENT LOCATIONS WITH OWNER AND ENGINEER.
2. REFERENCE DUCTBANK DETAILS AND SCHEDULE ON SHEET E-201 FOR REQUIREMENTS ASSOCIATED WITH DUCTBANK CALLOUTS INDICATED THIS SHEET.
3. ELECTRICAL SITE PLAN DOES NOT SHOW ELECTRICAL WORK ASSOCIATED WITH THE SPRINKLER SYSTEM. HOWEVER, CONTRACTOR IS RESPONSIBLE FOR ALL ELECTRICAL WORK ASSOCIATED WITH THE SYSTEM. PROVIDE ALL CONDUIT, WIRING, EQUIPMENT CONNECTIONS, ETC. BASED ON FINAL SPRINKLER SYSTEM DESIGN AND IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS. REFERENCE POWER RISER DIAGRAM ON SHEET E-102 AND SPECIFICATION 32 80 00 FOR FURTHER DETAILS.

KEYED NOTES:

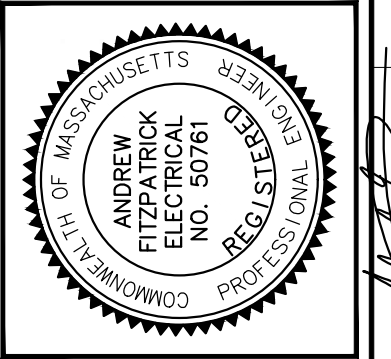
1. #2 BARE STRANDED COPPER GROUND WIRE EXOTHERMICALLY WELDED TO REBAR IN CONCRETE SLAB AND GROUND RING (TYP.).
2. #2 BARE STRANDED COPPER GROUNDING ELECTRODE CONDUCTOR CONNECTED TO MAIN GROUND BUS IN ELECTRICAL EQUIPMENT ENCLOSURE AND GROUND RING.
3. INTERCEPT EXISTING CONDUITS ENTERING THE LIGHT POLE BASE VIA NEW ELECTRICAL HANDHOLES INDICATED (TYP. FOR ALL EXISTING FIXTURES). FIELD VERIFY AND MATCH EXISTING CONDUIT SIZES.
4. COORDINATE FINAL CONDUIT STUB-UP LOCATIONS THROUGH CONCESSIONS STAND SLAB WITH OWNER/ENGINEER. CONDUITS TO BE USED FOR FUTURE POWER AND CONTROL/COMMS WIRING TO FUTURE CONCESSIONS STAND.
5. CONDUITS FROM HANDHOLES (HHP-2 & HHC-2) SHALL STUB-UP THROUGH DUGOUT SLAB - ONE (1) FOR 120V POWER AND ONE (1) FOR SCOREBOARD COMMUNICATIONS WIRING. PROVIDE RECEPTACLE MOUNTED INSIDE OF DUGOUT FOR POWER TO SCOREBOARD CONTROL CONSOLE, AND PROVIDE SINGLE-POLE SWITCH TO CONTROL POWER ON/OFF TO SCOREBOARD. PROVIDE NEMA 3R JUNCTION BOX MOUNTED ADJACENT TO NEW RCPT FOR COMMUNICATIONS CONNECTION BETWEEN SCOREBOARD AND SCOREBOARD CONTROL CONSOLE. REFERENCE WIRING DIAGRAM ON SHEET E-102 FOR SCOREBOARD POWER AND COMMUNICATIONS WIRING REQUIREMENTS.
6. SCOREBOARD SHALL BE POWERED VIA ON/OFF SWITCH IN HOME FIELD DUGOUT AND SHALL BE CONTROLLED BY SCOREBOARD CONTROL CONSOLE VIA COMMS JUNCTION BOX IN HOME FIELD DUGOUT. REFERENCE WIRING DIAGRAM ON SHEET E-102 AND PARTIAL PLAN (THIS SHEET) FOR DETAILS.

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Andover, Massachusetts 01910
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CHECKED BY: A.J.F.
2/28/2017

DESIGNED BY: KRM
DRAWN BY: KRM

ELECTRICAL SITE PLAN

CITY OF SALEM, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

CONTRACT A
CANN STREET
FLOOD MITIGATION PROJECT
SALEM, MASSACHUSETTS

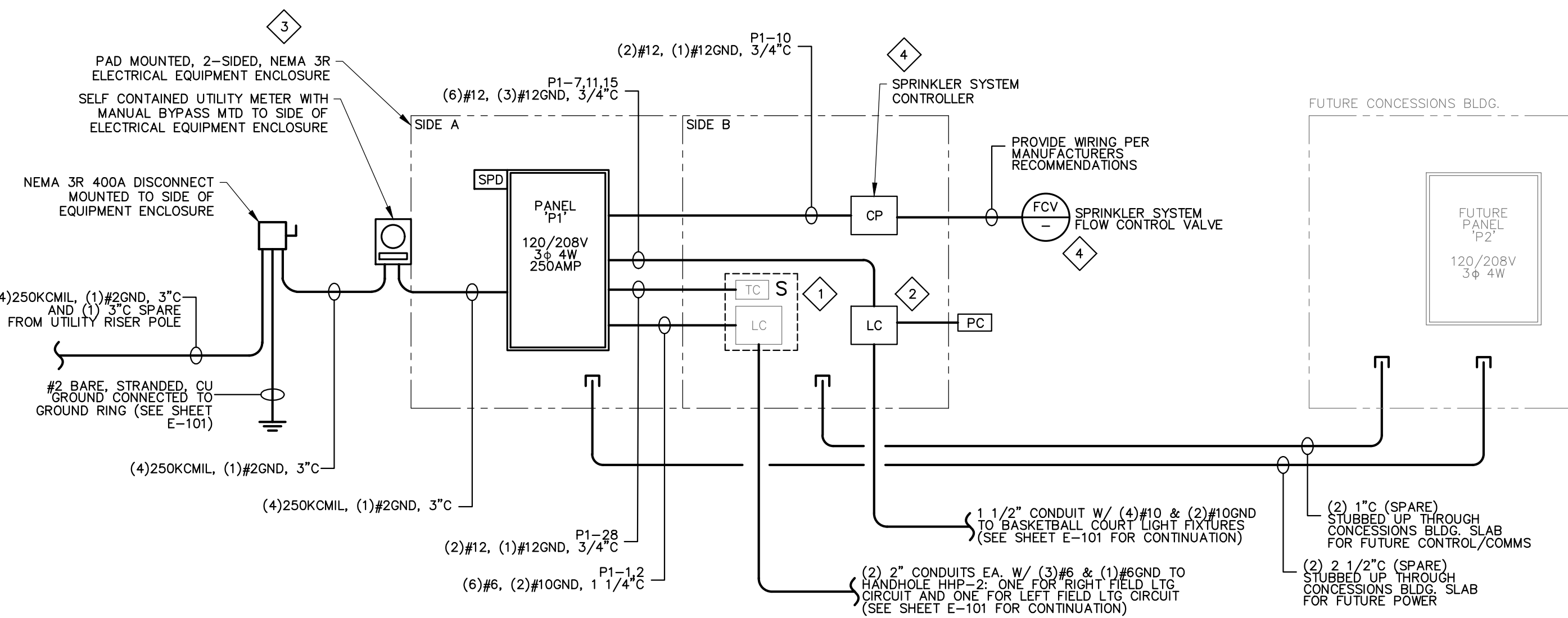
JOB NO.: 228340.11
DATE: JANUARY 2017
SCALE: NOT TO SCALE
SHEET: 44 OF 46

E-101

ISSUED FOR BID

KEYED NOTES:

- BASEBALL FIELD LIGHTING CONTACTOR AND TIMECLOCK ARE CURRENTLY LOCATED IN THE ELECTRICAL ROOM OF THE EXISTING CONCESSIONS STAND. EQUIPMENT SHALL BE DISCONNECTED AND RELOCATED TO NEW ELECTRICAL EQUIPMENT ENCLOSURE AS INDICATED. PROVIDE SINGLE POLE TOGGLE SWITCH TO CONTROL LIGHTING CONTACTOR/TIMECLOCK. EQUIPMENT SHALL BE WIRED TO MATCH EXISTING CONDITIONS. FIELD VERIFY AND ADJUST WORK TO SUIT CONDITIONS FOUND.
- BASKETBALL COURT LIGHTING CIRCUITS SHALL BE CONTROLLED VIA LIGHTING CONTACTOR, H/O/A SWITCH, AND PHOTOCELL. PHOTOCELL SHALL BE MOUNTED TO EXTERIOR OF EQUIPMENT ENCLOSURE. REFERENCE WIRING DIAGRAM THIS SHEET FOR WIRING REQUIREMENTS.
- THE ELECTRICAL EQUIPMENT ENCLOSURE SHALL BE TWO (2) SIDED (BACK-TO-BACK), ALUMINUM NEMA 3R, LOCKABLE, PUBLIC WORKS ENCLOSURE, SIMILAR TO APX TECHNOLOGIES INC., OR APPROVED EQUAL. ONE SIDE OF THE ENCLOSURE SHALL BE UTILIZED FOR MOUNTING ALL 120/208V POWER DISTRIBUTION EQUIPMENT, AND THE BACK SIDE SHALL BE UTILIZED FOR MOUNTING ALL LIGHTING CONTROL EQUIPMENT AND OTHER EQUIPMENT AS INDICATED. THE ENCLOSURE SHALL BE SIZED AS NECESSARY FOR ALL EQUIPMENT INDICATED. EACH SIDE OF THE ENCLOSURE SHALL BE PROVIDED WITH LED LIGHTING WITH SWITCHED CONTROL, AND GFCI RECEPTACLE FOR GENERAL USE. CONNECT TO CIRCUIT P1-16. DEVICES ARE NOT SHOWN FOR CLARITY.
- INSTALL SPRINKLER SYSTEM CONTROLLER IN ELECTRICAL EQUIPMENT ENCLOSURE. CONNECT ZONE VALVES AND ALL ASSOCIATED INSTRUMENTS & EQUIPMENT IN ACCORDANCE WITH MANUFACTURERS REQUIREMENTS. QUANTITY OF INSTRUMENTS & EQUIPMENT ARE SHOWN DIAGRAMMATICALLY. INSTALL ALL INSTRUMENTS, CONDUIT, WIRING ETC. BASED ON FINAL SPRINKLER SYSTEM DESIGN AND IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.

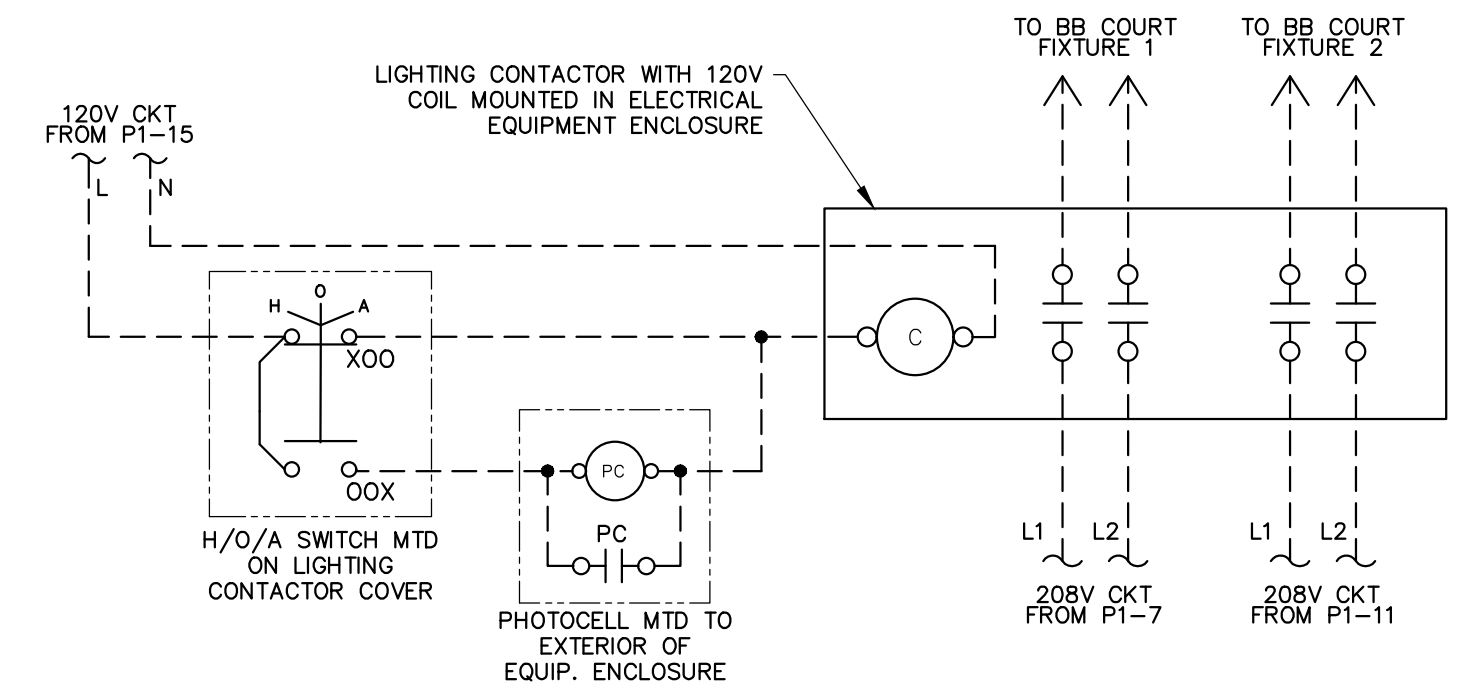


POWER RISER DIAGRAM
SCALE: NO SCALE

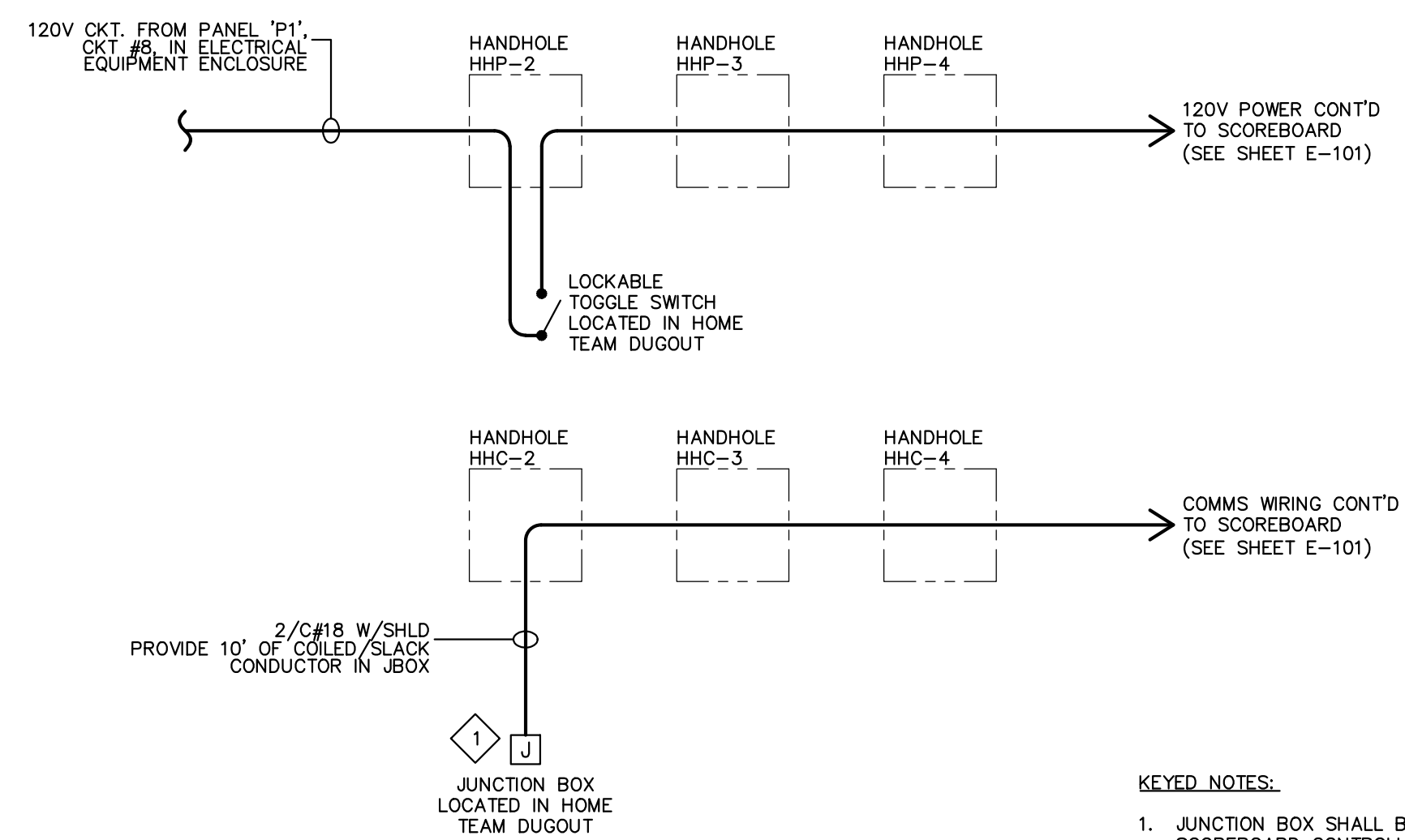
| DIRECTORY | BRKR | POLE | CKT # | KVA | KVA LOADS | | | KVA | CKT # | POLE | BRKR | DIRECTORY | | |
|--|------|------|-------|----------|-----------|------------|-------|-------|----------|-------------|-------|--|---------------------|--------------------------------|
| | | | | | A | B | C | | | | | | | |
| FIELD LTG - RIGHT SIDE (FIXTURES F3 & F4) | 60 | 3 | 1 | 5.00 | 10.00 | | 5.00 | 2 | 3 | 60 | | FIELD LTG - LEFT SIDE (FIXTURES F1 & F2) | | |
| | | | 3 | 5.00 | 10.00 | | 5.00 | 4 | | | | | | |
| | | | 5 | 5.00 | | 10.00 | 5.00 | 6 | | | | | | |
| BBALL COURT LTG - FIXTURE 1 | 20 | 2 | 7 | 0.38 | 0.53 | | 0.15 | 8 | 1 | 20 | | SCOREBOARD | | |
| | | | 9 | 0.38 | 0.53 | | 0.15 | 10 | | | | 1 | 20 | SPRINKLER CONTROLLER |
| | | | 11 | 0.38 | | 0.56 | 0.18 | 12 | | | | 1 | 20 | RCPT - HOME DUGOUT |
| BBALL COURT LTG - FIXTURE 2 | 20 | 2 | 13 | 0.38 | 0.56 | | 0.18 | 14 | 1 | 20 | | RCPT - AWAY DUGOUT | | |
| | | | 15 | 0.05 | 0.55 | | 0.50 | 16 | | | | 1 | 20 | LTG/RCPPTS - ELEC. EQUIP. ENCL |
| | | | 17 | | | | 0.00 | 18 | | | | 1 | 20 | SPARE |
| BBALL COURT LTG CONTROL CKT. | 15 | 1 | 15 | | | | | 20 | 1 | 20 | SPARE | | | |
| SPARE | 20 | 1 | 17 | | | | | 20 | 1 | 20 | SPARE | | | |
| SPARE | 20 | 1 | 19 | | | | | 20 | 1 | 20 | SPARE | | | |
| SPACE | | | 21 | | | | | 22 | | | | SPACE | | |
| SPACE | | | 23 | | | 0.00 | | 24 | | | | SPACE | | |
| FUTURE PANEL P2 (FUTURE CONCESSIONS STAND) | 100 | 3 | 25 | 10.00 | 10.00 | | | 26 | 2 | 15 | | SPACE | | |
| | | | 27 | 10.00 | 10.20 | | 0.20 | 28 | | | | | FIELD LTG TIMECLOCK | |
| | | | 29 | 10.00 | | 10.20 | 0.20 | 30 | | | | | | |
| | | | | SUBTOTAL | | 21.08 | 21.28 | 20.76 | SUBTOTAL | | | | | |
| VOLTAGE: | | | | 120/208 | | TOTAL KVA | | 63.11 | | PANEL NAME: | | P1 | | |
| MAIN BREAKER: | | | | 250 | | TOTAL AMPS | | 175 | | LOCATION: | | ELECTRICAL EQUIP. ENCLOSURE | | |
| BUSES: | | | | 250 | | | | | | MOUNTING: | | SURFACE | | |
| PH & WIRES: | | | | 3PH 4W | | | | | | AIC RATING: | | 22 KAIC | | |

1. Panelboard enclosure shall be NEMA 12 and shall be mounted inside of Electrical Equipment Enclosure.

PANEL SCHEDULE
SCALE: NO SCALE



BASKETBALL COURT LIGHTING WIRING DIAGRAM
SCALE: NO SCALE



- KEYED NOTES:**
- JUNCTION BOX SHALL BE USED FOR COMMUNICATIONS CONNECTION TO SCOREBOARD CONTROLLER. PROVIDE FEMALE PLUG ON FRONT OF JUNCTION BOX COVER COMPATIBLE WITH MALE PLUG CONNECTED TO EXISTING SCOREBOARD CONTROLLER. CONFIRM WITH EXISTING EQUIPMENT IN THE FIELD.

SCOREBOARD POWER & COMMUNICATIONS WIRING DIAGRAM
SCALE: NO SCALE

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CHECKED BY: A.J.F.
228340-E-102.dwg

DESIGNED BY: KRM
DRAWN BY: KRM

POWER RISER DIAGRAM, SCHEDULES & DETAILS

CITY OF SALEM, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

CONTRACT A
CANNON STREET
FLOOD MITIGATION PROJECT
SALEM, MASSACHUSETTS

JOB NO.: 228340.11
DATE: JANUARY 2017
SCALE: AS SHOWN
SHEET: 45 OF 46

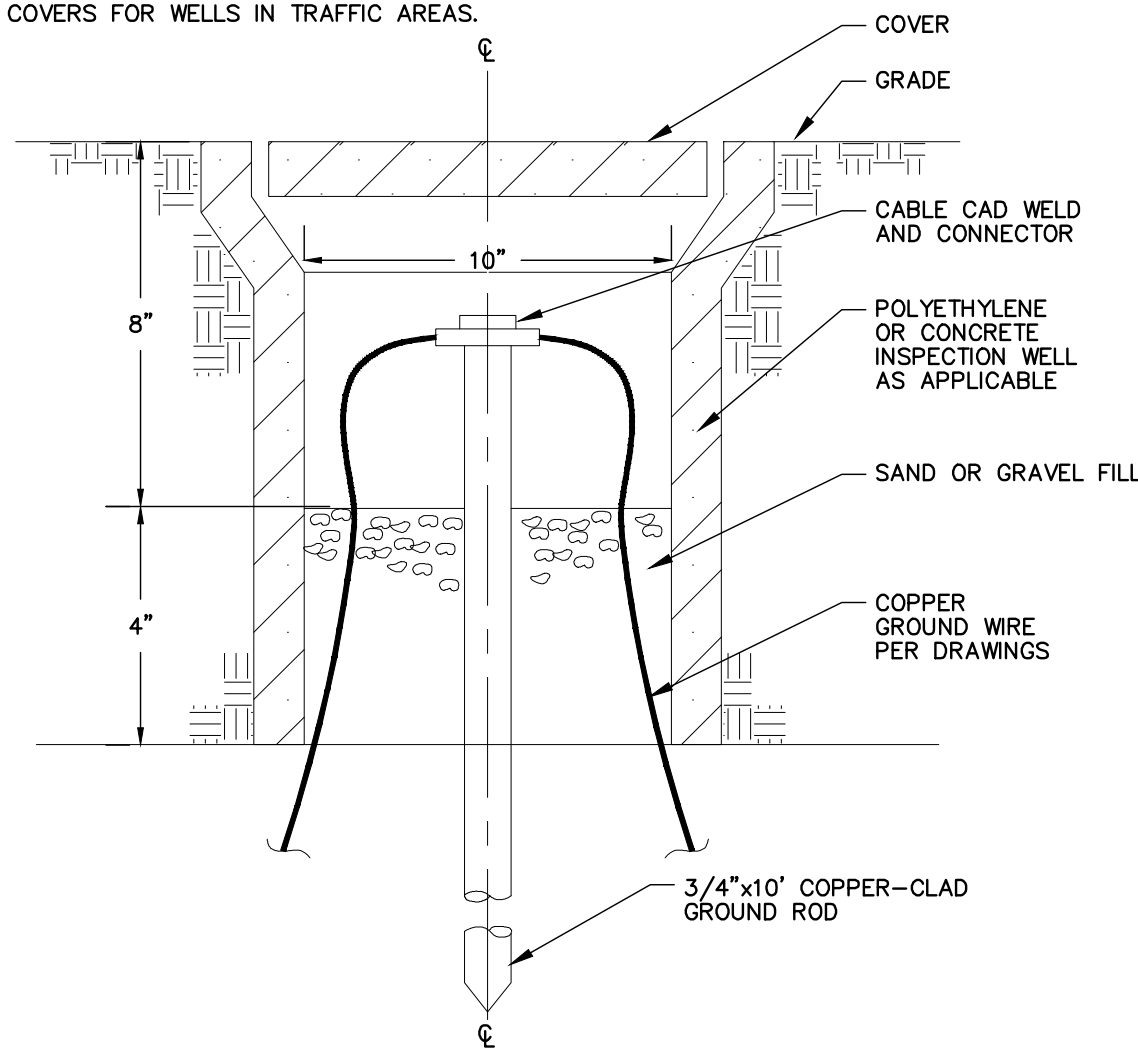
E-102

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 phase ii flood mitigation us8\wp\Drawings\Current\ELECTRICAL\228340-E-102.dwg

NOTES:

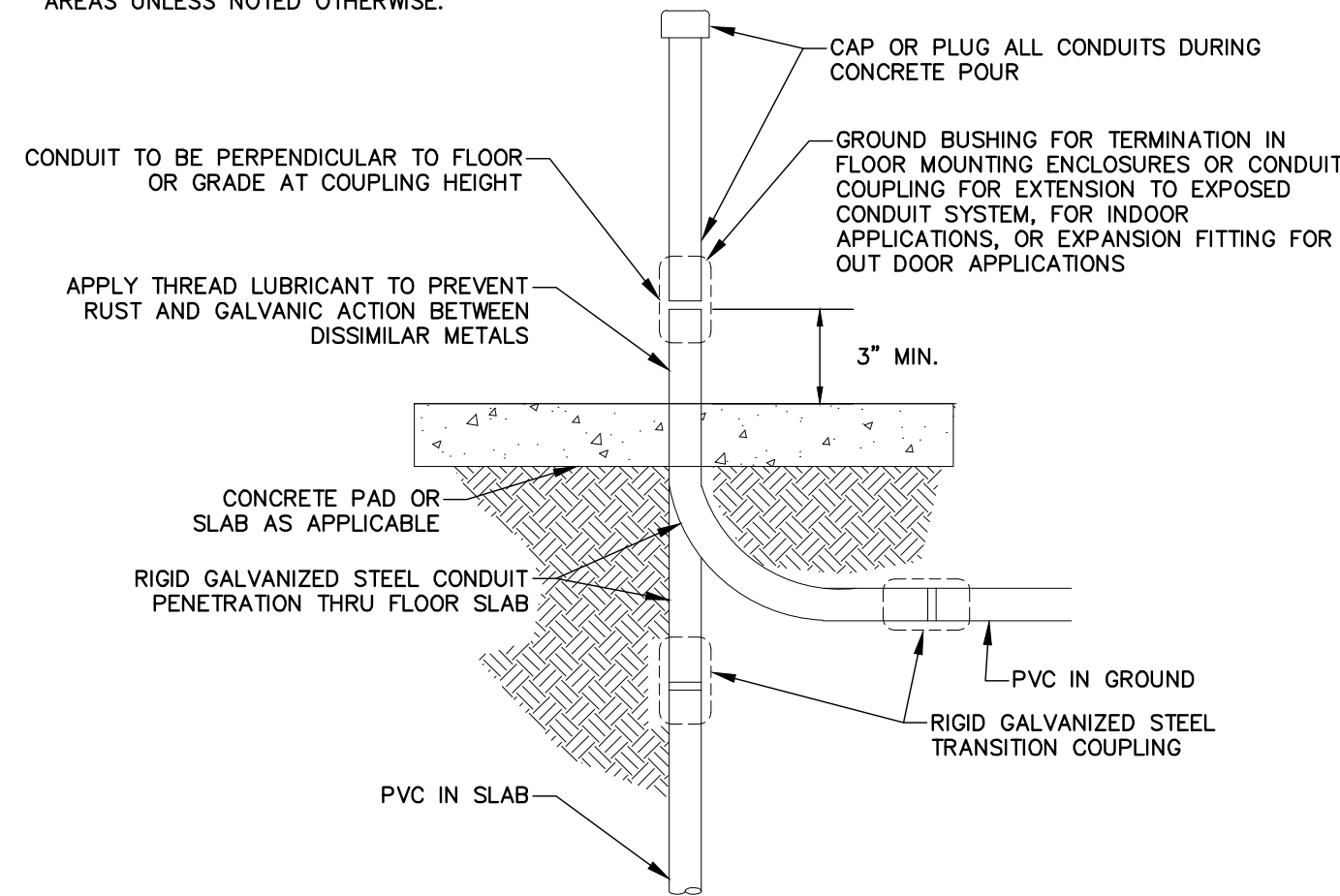
- INSPECTION WELLS IN ROADWAYS SHALL ADHERE TO AASHTO H20 LOADING REQUIREMENTS.
- WELLS SHALL BE FLUSH TYPE PRECAST CONCRETE, OR POLYMER CONCRETE PER AREA OF INSTALLATION. PROVIDE BOLTED DOWN COVERS WITH DESCRIPTION "GROUND ROD". PROVIDE STEEL COVERS FOR WELLS IN TRAFFIC AREAS.



1 TYPICAL GROUNDING WELL DETAIL
E-101 SCALE: N.T.S.

NOTES:

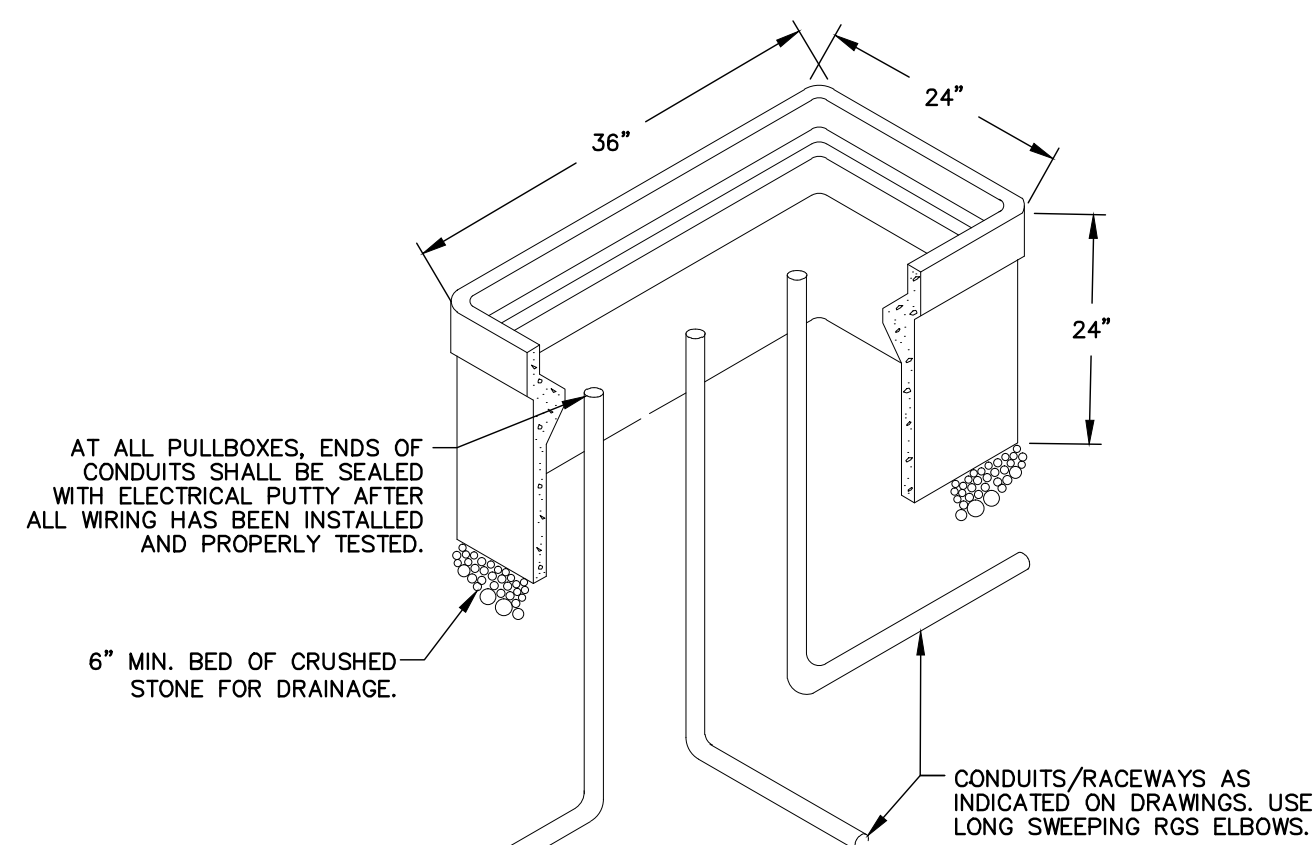
APPLICABLE FOR ALL UNDERGROUND AREAS UNLESS NOTED OTHERWISE.



2 TYPICAL UNDERGROUND CONDUIT STUB-UP DETAIL
E-101 SCALE: N.T.S.

NOTES:

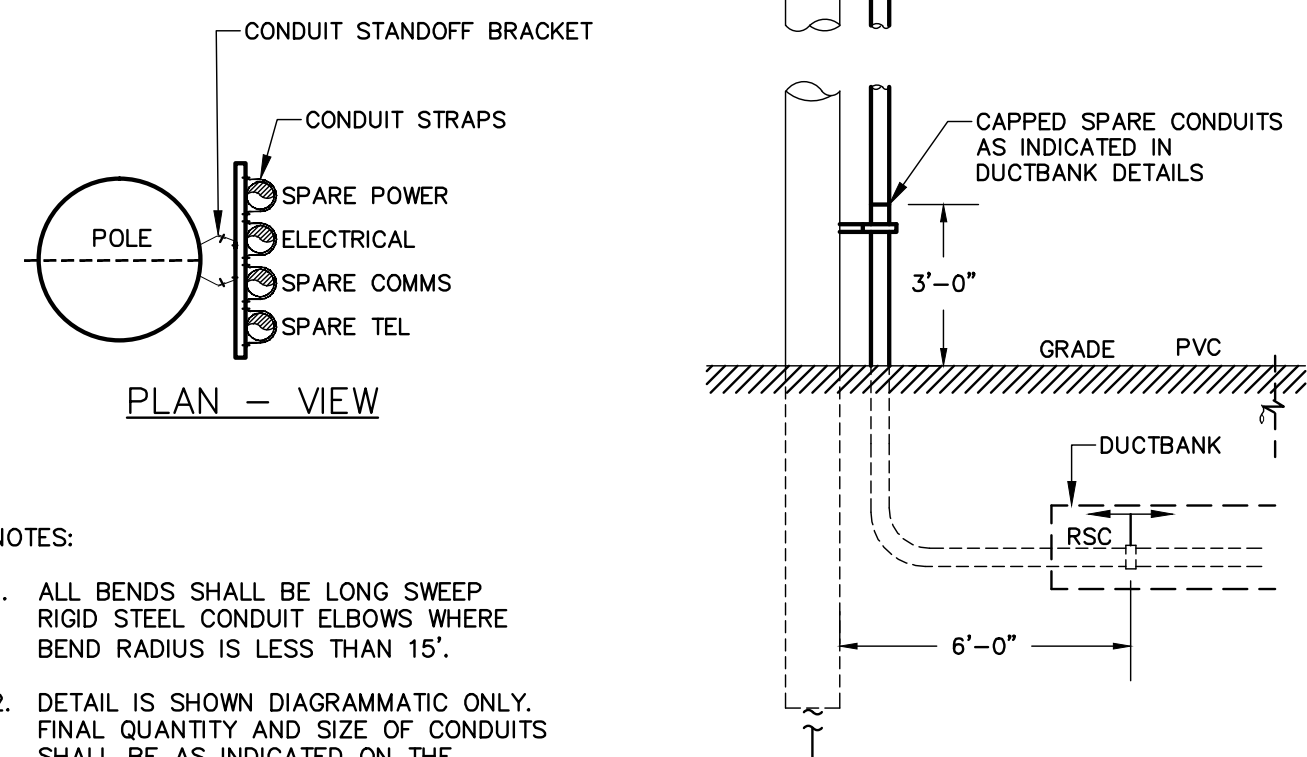
- NUMBER AND SIZE OF CONDUITS SHALL BE AS INDICATED ON THE DRAWINGS.
- REFERENCE SPECIFICATION 26 05 43 UNDERGROUND ELECTRICAL CONSTRUCTION, FOR FURTHER REQUIREMENTS.
- PULL BOXES SHALL ADHERE TO TIER 22 LOADING REQUIREMENTS.
- DIMENSIONS OF PULLBOXES SHALL BE ADJUSTED AS NECESSARY TO ACCOMMODATE QUANTITIES OF CONDUITS INDICATED ON THE DRAWINGS IN ACCORDANCE WITH CODE REQUIREMENTS.



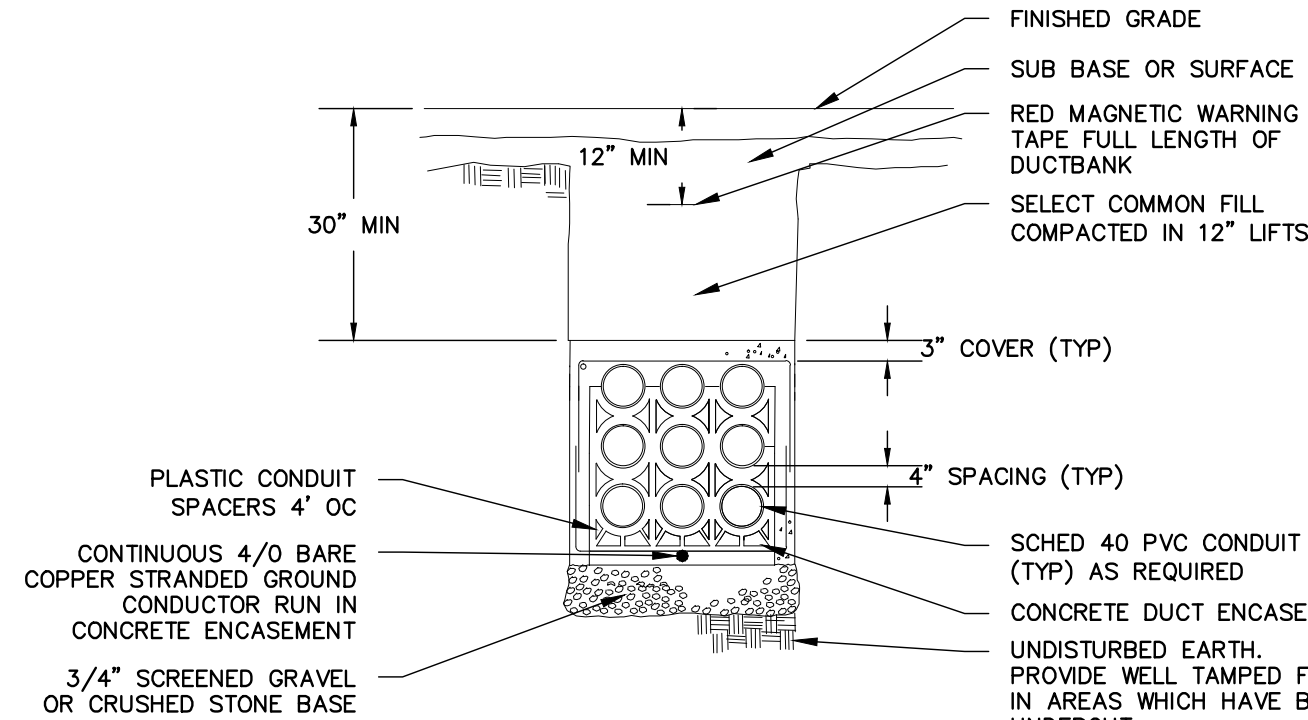
4 ELECTRIC HAND HOLE PULL BOX DETAIL
E-101 SCALE: N.T.S.

NOTES:

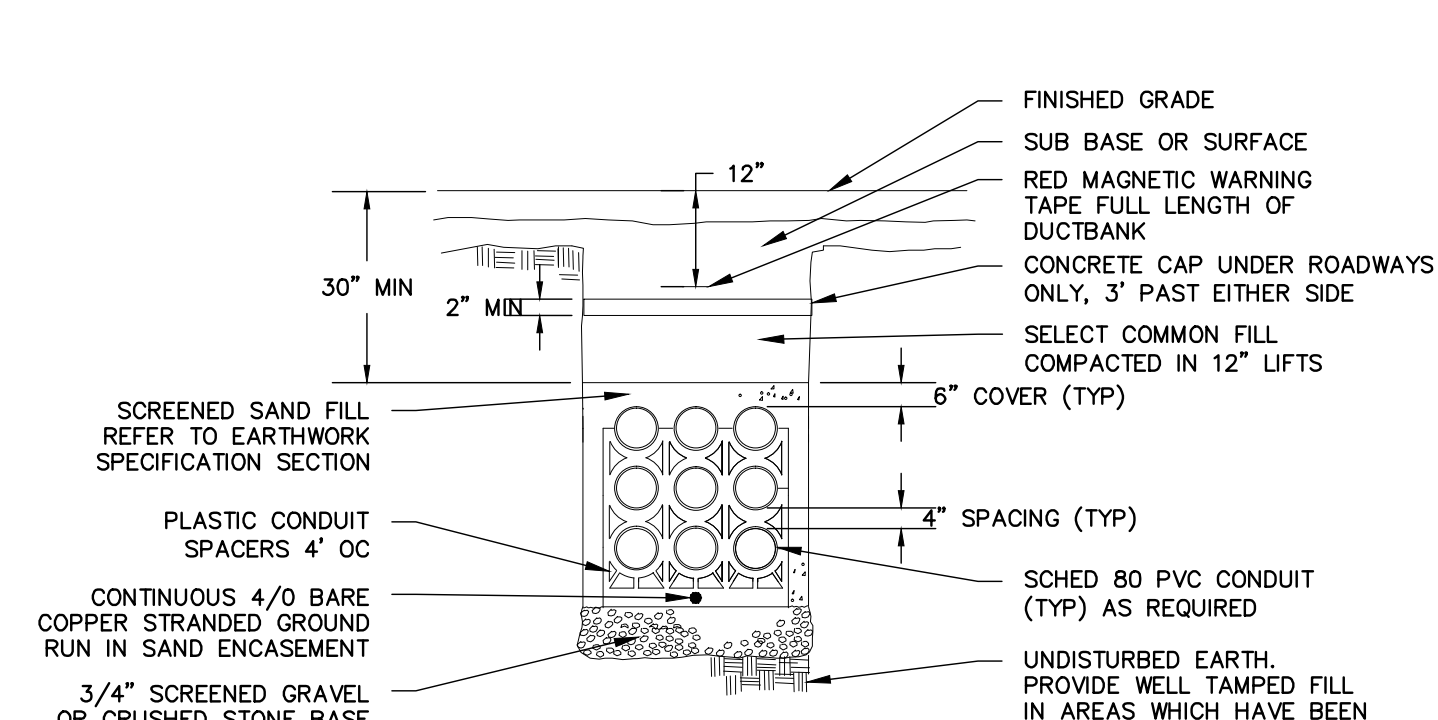
- ALL BENDS SHALL BE LONG SWEEP RIGID STEEL CONDUIT ELBOWS WHERE BEND RADIUS IS LESS THAN 15'.
- DETAIL IS SHOWN DIAGRAMMATIC ONLY. FINAL QUANTITY AND SIZE OF CONDUITS SHALL BE AS INDICATED ON THE DRAWINGS.



3 RISER POLE DETAIL
E-101 SCALE: N.T.S.



TYPE 1 – TYPICAL REINFORCED CONCRETE ENCASED UNDERGROUND DUCT BANK SECTION



TYPE 2 – TYPICAL SAND ENCASED/CONCRETE CAPPED UNDERGROUND DUCT BANK SECTION

SITE DUCTBANK NOTES:

- SEE TYPICAL DUCTBANK SECTION DETAILS (THIS SHEET) FOR DUCTBANK REQUIREMENTS. THE DUCTBANK TYPE LISTED UNDER "TYPE" COLUMN IN DUCTBANK SCHEDULE, REFERS TO ASSOCIATED DUCTBANK DETAIL TYPE, 1 OR 2 ABOVE.
- PROVIDE MINIMUM 1'-0" SPACING WITHIN DUCTBANK BETWEEN POWER AND CONTROL/COMMUNICATIONS CONDUITS.
- QUANTITY OF DUCTS SHOWN IN DETAILS ARE SHOWN DIAGRAMMATICALLY ONLY TO IDENTIFY GENERAL CONSTRUCTION AND SPACING REQUIREMENTS. QUANTITY AND SIZE OF CONDUITS SHALL BE AS IDENTIFIED IN THE DUCTBANK SCHEDULE.
- INSTALL A BARE STRANDED COPPER GROUND CABLE IN EACH DUCT BANK ENVELOPE. MAKE GROUND ELECTRICALLY CONTINUOUS THROUGH THE ENTIRE DUCT BANK SYSTEM. CONNECT GROUND CABLE TO BUILDING AND STATION GROUND GRID OR TO EQUIPMENT GROUND BUSES. IN ADDITION, CONNECT GROUND CABLE TO STEEL CONDUIT EXTENSIONS OF THE UNDERGROUND DUCT SYSTEM, MANHOLES AND HANDHOLES. PROVIDE GROUND CLAMP AND BONDING OF EACH STEEL CONDUIT EXTENSION, WHERE NECESSARY TO MAINTAIN CONTINUITY OF THE GROUND SYSTEM.

| DUCTBANK SCHEDULE | | | | | | |
|-------------------|---------------|-----------|---------------------------------|---|--|-----------------------------------|
| DUCTBANK CALLOUT | DUCTBANK TYPE | SIZE (IN) | FROM | TO | CONDUCTORS | DESCRIPTION |
| A | 1 | 3 | UTILITY POLE | ELEC. EQUIP. ENCLOSURE - SIDE A | (4)250KCMIL, (1)#2GND | POWER - 120/208V SERVICE ENTRANCE |
| | | 3 | UTILITY POLE | ELEC. EQUIP. ENCLOSURE - SIDE A | | POWER - SPARE |
| | | 2 | UTILITY POLE | FUTURE CONCESSIONS BLDG. SLAB | | TELEPHONE (FUTURE) |
| | | 2 | UTILITY POLE | FUTURE CONCESSIONS BLDG. SLAB | | COMMS - SPARE |
| B | 2 | 2 1/2 | ELEC. EQUIP. ENCLOSURE - SIDE A | FUTURE CONCESSIONS BLDG. SLAB | | POWER (FUTURE) |
| | | 2 1/2 | ELEC. EQUIP. ENCLOSURE - SIDE A | FUTURE CONCESSIONS BLDG. SLAB | | POWER (FUTURE) |
| | | 1 | ELEC. EQUIP. ENCLOSURE - SIDE B | FUTURE CONCESSIONS BLDG. SLAB | | COMMS/CONTROL (FUTURE) |
| | | 1 | ELEC. EQUIP. ENCLOSURE - SIDE B | FUTURE CONCESSIONS BLDG. SLAB | | COMMS/CONTROL (FUTURE) |
| C | 2 | 1 | HANDHOLE HHC-2 | FUTURE CONCESSIONS BLDG. SLAB | | COMMS/CONTROL (FUTURE) |
| D | 2 | 1 1/2 | ELEC. EQUIP. ENCLOSURE - SIDE A | HANDHOLE HHP-2 | (2)#10, (1)#10GND (RCPT - AWAY DUGOUT) (2)#10, (1)#10GND (RCPT - HOME DUGOUT) (2)#10, (1)#10GND (SCOREBOARD) | 120V POWER |
| | | 1 1/2 | ELEC. EQUIP. ENCLOSURE - SIDE A | HANDHOLE HHP-2 | | POWER - SPARE |
| | | 2 | ELEC. EQUIP. ENCLOSURE - SIDE B | HANDHOLE HHP-2 | (3)#6, (1)#6GND | RELD LTG - RIGHT SIDE |
| | | 2 | ELEC. EQUIP. ENCLOSURE - SIDE B | HANDHOLE HHP-2 | (3)#6, (1)#6GND | RELD LTG - LEFT SIDE |
| E | 2 | 1 | HANDHOLE HHP-2 | HOME DUGOUT - RCPT & SCOREBOARD ON/OFF SWITCH | (2)#10, (1)#10GND (RCPT - HOME DUGOUT) (4)#10, (2)#10GND (SCOREBOARD) | 120V POWER |
| | | 1 | HANDHOLE HHC-2 | HOME DUGOUT - COMMS JBOX | 2/C#18 W/SHLD | COMMS - SCOREBOARD |
| F | 2 | 3/4 | HANDHOLE HHP-2 | AWAY DUGOUT - RCPT | (2)#10, (1)#10GND (RCPT - AWAY DUGOUT) | 120V POWER |
| G | 2 | 2 | HANDHOLE HHP-2 | RELD LTG 'F3' VIA HHP-5 | (3)#6, (1)#6GND | RELD LTG - RIGHT SIDE |
| H | 2 | 2 | FIELD LTG 'F3' VIA HHP-5 | RELD LTG 'F4' VIA HHP-6 | (3)#6, (1)#6GND | RELD LTG - RIGHT SIDE |
| J | 2 | 1 | HANDHOLE HHP-2 | HANDHOLE HHP-3 | (2)#10, (1)#10GND (SCOREBOARD) | 120V POWER |
| | | 2 | HANDHOLE HHP-2 | RELD LTG 'F1' VIA HHP-3 | (3)#6, (1)#6GND | RELD LTG - LEFT SIDE |
| | | 1 | HANDHOLE HHC-2 | HANDHOLE HHC-3 | 2/C#18 W/SHLD | COMMS - SCOREBOARD |
| K | 2 | 1 | HANDHOLE HHP-3 | HANDHOLE HHP-4 | (2)#10, (1)#10GND (SCOREBOARD) | 120V POWER |
| | | 2 | FIELD LTG 'F1' VIA HHP-3 | RELD LTG 'F2' VIA HHP-4 | (3)#6, (1)#6GND | RELD LTG - LEFT SIDE |
| L | 2 | 1 | HANDHOLE HHC-3 | HANDHOLE HHC-4 | 2/C#18 W/SHLD | COMMS - SCOREBOARD |
| | | 1 | HANDHOLE HHP-4 | SCOREBOARD | (2)#10, (1)#10GND | 120V POWER |
| M | 2 | 1 | HANDHOLE HHC-4 | SCOREBOARD | 2/C#18 W/SHLD | COMMS - SCOREBOARD |
| | | 1 1/2 | ELEC. EQUIP. ENCLOSURE - SIDE B | BBALL COURT LTG VIA HHP-7 | (2)#10, (1)#10GND (RXTURE 1) (2)#10, (1)#10GND (RXTURE 2) | BBALL COURT LTG |
| N | 2 | 1 | HANDHOLE HHP-7 | BBALL COURT LTG - RXTURE 2 | (2)#10, (1)#10GND | BBALL COURT LTG |

DUCTBANK DETAILS & SCHEDULE
SCALE: NO SCALE

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COMMONWEALTH OF MASSACHUSETTS
REGISTERED PROFESSIONAL ELECTRICAL ENGINEER
ANDREW FITZPATRICK
NO. 9076

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DESIGNED BY: KRM
CHECKED BY: AUF
DRAWN BY: KRM
2/28/20 - E-201.dwg

ELECTRICAL DETAILS

CITY OF SALEM, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

CONTRACT A
CANAL STREET
FLOOD MITIGATION PROJECT
SALEM, MASSACHUSETTS

JOB NO.: 228340.11
DATE: JANUARY 2017
SCALE: AS SHOWN
SHEET: 46 OF 46

E-201

ISSUED FOR BID

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