

LINCOLN AVENUE BIO-RETENTION POND FACILITIES  
CITY OF TAKOMA PARK, MARYLAND

SHEET  
No. 1  
OF 17

DRAWING  
NUMBER

BR-1

SHEET INDEX

SHEET No.	DRAWING No.	TITLE
1	1-BR.1	TITLE AND GENERAL NOTES
2	1-BR.2	GENERAL NOTES
3	1-BR.3	BIO-1A, BIO-1B, AND STORM DRAIN SITE PLAN
4	1-BR.4	EXISTING BIO-POND AND STORM DRAIN PLAN
5	1-BR.5	BIO-1A, BIO1B, AND STORM DRAIN PLANS
6	1-BR.6.1 2-BR.6.2	STR-A AND 12" PVC PIPE DRAIN (OPTION-1) PLAN STR-1 & STR-4 (OPTION -1 OR OPTION-2) PLAN
7	1-BR.7 2-BR.7	SECTION THRU BIO-1B (A-A) SECTION THRU BIO-1A (B-B)
8	1-BR.8	SECTION THRU BIO-1A (C-C)
9	1-BR.9	BIO-1B, SECTION AT D-D
10	1-BR.10	BIO-1A, SECTION AT E-E
11	1-BR.11	STR-3, DETAIL-1
12	1-BR.12	STR-3, DETAIL-2
13	1-BR.13	BIO-1B, DETAILS AT RIP-RAP BERM
14.1 14.2 14.3	1-BR.14.1 1-BR.14.2 1-BR.14.3	SECTION THRU F-F, STR-1, (OPTION-1) SECTION THRU G-G, STR-1 & STR-4 (OPTION-2) SECTION THRU G-G, STR-1 & STR-1A (OPTION-3)
15	1-BR.15 2-BR.15 3-BR.15	CURB CUT AT BIO-1B, PLAN CROSS SECTION THRU BIO-1B AT CURB CUT LONGITUDINAL SECTION THRU BIO-1B AT CURB CUT
16	1-BR.16 2-BR.16	LONGITUDINAL SECTION THRU UNDER-SIDEWALK DRAIN CROSS SECTION THRU UNDER-SIDEWALK DRAIN
17	1-BR.17	IMBRICATED WALL PROFILE
18	1-BR.18	STR-1 RTHRU STR-5 STORM DRAIN PROFILE

LEGEND

AS BUILT LINES	
AS BUILT LINES	
PROPOSED LINES	
PROPOSED HIDDEN LINES	
LIMIT OF DISTURBANCE	
GAS LINE	
WATER LINE	
SEWER LINE	
GEO FABRIC	

LEGEND

	EXISTING	PROPOSED	AS BUILT
IMBRICATED RIP RAP			
RIVER JACK ROCK/ RIP RAP			
#57 STONE			
BRICK			
CONCRETE			
EARTH			
MULCH			
C-33 / SAND			
BIO PLANTING SOIL			

GENERAL NOTES

STORM DRAIN INSTALLATION

1. A pre-construction conference shall be held prior to the start of construction. The details of construction shall be discussed; and the contractor shall be prepared to furnish the necessary equipment, material, and labor to accomplish the task.
2. Before any construction may occur, the contractor shall have plans which have been signed and approved by the City of Takoma Park Public Works Department, obtained all City, county, state, federal and other required permits, and have posted all required bonds.
3. All storm drainage improvements shall be designed and constructed in accordance with the latest edition of the City of Takoma Park Public Works Pre-Approved Plans and Policies and the Standard Specifications for Road, Bridge and Municipal Construction.
4. Any deviation from the approved plans will require written approval, all changes shall be submitted to the City.
5. A copy of the approved storm water plans must be on the job site whenever construction is in progress.
6. All disturbed areas shall be seeded and mulched or similarly stabilized to the satisfaction of the City of Takoma Park Department of Public Works for the prevention of on-site erosion after the completion of construction.
7. Minimum cover over storm drainage pipes in ROW or vehicular path shall be 18 inches, unless other design is approved.
8. Steel pipe shall have Asphalt Treatment #1 or better inside and outside.
9. All catch basins with a depth of over five feet (5') to the pipe invert shall have a standard ladder installed.
10. All storm drainage main extensions within the public right-of-way or in easements must be staked for line and grade prior to starting construction.
11. Rock for erosion protection of roadway ditches, where required, must be of sound quarry rock, placed to a depth of one foot (1') and must meet the following specifications: 4"-8" rock/40%-70% passing; 2"-4" rock/30%-40% passing; 2"-minus rock/10%-20% passing. Recycled concrete shall not be used for erosion protection, including for construction entrance or temporary stabilization elsewhere on site.
12. All pipe, manholes, catch basins, and appurtenances shall be laid on a properly prepared foundation in accordance with the current Montgomery County and City of Takoma Park Standard specifications for road and bridge construction. This shall include necessary leveling of the trench bottom or the top of the foundation material as well as placement and compaction of required bedding material to uniform grade so that the entire length of the pipe will be supported on a uniformly dense, unyielding base. If the native material in the bottom of the trench meets the requirements for "gravel backfill for pipe bedding," the first lift of pipe bedding may be omitted provided the material in the bottom of the trench is loosened, regraded, and compacted to form a dense unyielding base. All pipe bedding shall be #57 stone, pea gravel or better. Pipe shall not be installed on sod, frozen earth, large boulders, or rock. Pipe bedding for flexible pipes shall be pea gravel or # 57 stone to the spring line of the pipe.
13. Construction of dewatering discharges shall always meet The State of Maryland Surface Water Quality Standard. Temporary discharges to sanitary sewer require prior authorization and permit and notification to the City of Takoma Park Public Works.
14. All trench backfill shall be compacted to 95 percent density in roadways, roadway shoulders, roadway prism and driveways, and 85 percent density in unpaved areas. All pipe zone compaction shall be 95 percent.
15. The Contractor shall be responsible for providing adequate safeguards, safety devices, protective equipment, confined space protection, flaggers, and any other needed actions to protect the life, health, and safety of the public, and to protect property in connection with the performance of work covered by the contract. Any work within the traveled right-of-way that may interrupt normal traffic flow shall require a Traffic Control Plan approved by the City of Takoma Park.

DESIGNED BY: A. Khalilian, P.E.  
DRAWN BY: Z. Mathewos  
APPROVED BY: A. Khalilian, P.E.  
DATE APPROVED: March 4, 2019  
SCALE: NTS

PROJECT TYPE:  
PROPOSED BIO-RETENTION  
POND

PROJECT TITLE:  
TITLE AND GENERAL NOTES

PROJECT NAME:  
LINCOLN AVENUE  
BIO-RETENTION FACILITIES  
  
CITY OF TAKOMA PARK  
DEPARTMENT OF PUBLIC WORKS  
MONTGOMERY COUNTY, MARYLAND



16. No final cut or fill slope shall exceed slopes of two (2) horizontal to one (1) vertical without stabilization by rockery or by a structural retaining wall.
17. All manhole ladders shall be firmly attached and extend to within 1' of the bottom of the structure.
18. Approximate locations of existing utilities have been obtained from available records and are shown for convenience. The Contractor shall be responsible for verification of existing utility locations whether or not these utilities are shown on the plans. The Contractor shall exercise all care to avoid damage to any utility. If conflicts with existing utilities arise during construction, the contractor shall notify the City Construction Inspector and any changes required shall be approved by the City Engineer prior to commencement of related construction on the project.
19. The underground utility location service shall be contacted for field location of existing utilities prior to any construction. The owner or his representative shall be contacted if a utility conflict exists. The Contractor is responsible to ensure that utility locates are maintained throughout the life of the project.
20. The Contractor shall verify the locations, widths, thicknesses, and elevations of all existing pavements and structures that are to interface with new work. Provide all trimming, cutting, saw cutting, grading, leveling, sloping, coating, and other work, including materials as necessary, to cause the interface with existing works to be proper, acceptable to the Engineer and the City of Takoma Park, complete in place and ready to use.
21. All inlet, manhole, and catch basin frames and grates shall not be adjusted to grade until immediately prior to final paving. All catch basin grates shall be set 0.10' below pavement level.
22. Open cut road crossings for utility trenches on existing traveled roadway shall be backfilled only with 5/8" minus crushed rock and mechanically compacted (unless otherwise approved by the City). Cuts into the existing asphalt shall be neat line cut with saw or jackhammer in a continuous line. A temporary cold mix patch must be placed immediately after backfill and compaction. A permanent hot mix patch shall be placed within 30 days and shall be a minimum of 1" thicker than the original asphalt with a minimum thickness of 2".
23. All damages incurred to public and/or private property by the contractor during the course of construction shall be promptly repaired to the satisfaction of the City Construction Inspector.
24. Grout all seams and openings in all inlets, catch basins, and manholes. Jet set grout is NOT allowed.
25. When widening an existing roadway where an existing Type I catch basin will remain in the travel lane, the existing frame and cover shall be replaced with a round, locking frame and cover.
26. Recycled concrete shall not be used around stormwater facilities.

#### **BIORETENTION AREA SOIL MIXTURE REQUIREMENTS**

1. **SOIL TEXTURE AND STRUCTURE:**  
Soil mixture for bioretention shall have a sand, sandy loam, loamy sand, or loam texture per USDA texture range. Maximum clay content is 5%; soil mixture shall be 50-60% sand; 20-30% leaf mulch; and 20-30% topsoil. The soil shall be a uniform mix, free of stones, stumps, roots, or other similar objects larger than two inches. No other materials or substance shall be mixed or dumped within the bioretention that may be harmful to plant growth, or prove a hindrance to the planting or maintenance operation. The planting soil shall be free of Bermuda Grass, Quack grass, Johnson Grass, Mugwort, Nutsedge, Poison Ivy, Canadian Thistle, Tearthumb, or other noxious weeds.
2. **SOIL TESTING**  
Planting soil for bioretention area must be tested prior to installation for PH and organic matter. The soil mixture should meet the following criteria (Landscape Contractors Association, 1986)  
PH Range: 5.5-6.5  
Organic Matter: 1.5-3.0%

It is required that a sieve analysis, PH, and organic matter tests be performed per each bioretention area.

This requirement may be waived or substituted by presenting test results by the contractor from the supplier in lieu of performing tests. Any soil placed is subject to approval after placement and must be removed and replaced if it does not meet this requirements.

1. **SOIL PLACEMENT:**  
Placement of the planting soil in the bioretention area should be in lifts of 12 to 18 inches and lightly compacted. Minimal compaction effort can be applied to the soil by tamping with a bucket from a dozen or backhoe. No equipment shall be traveling over the bottom of the bio retention pond at any stage of the construction in order to prevent compaction.
2. **MULCH SPECIFICATIONS:**  
Individual planting shall be mulched (refer to landscape details, DRWG. C-16). Acceptable mulch shall be shredded hardwood only. Mulch must be well aged, uniform in color, and free of foreign material including plant material. Well-aged mulch is defined as mulch that has stockpiled or stored for at least twelve months.
3. **SAND SPECIFICATIONS:**  
Provide clean sand, free of deleterious material. Sand shall meet AASHTO M-6 or ASTM C-33 with grain size of 0.02"-0.04".
4. **GRAVEL FILTER SPECIFICATIONS:**  
Underdrain gravel blanket shall be double washed, #57 stone. 1/2" to 1" size. Pea Gravel shall be washed, river-run, round diameter, 1/4" – 1/2" in size.
5. **CONSTRUCTION REQUIREMENTS:**
- City engineer or qualified representative shall monitor subgrade preparation at the completion of excavation, during underdrain, filter installation and backfill of soil into bioretention areas.
  - Soil certifications for backfill are required to be maintained by contractor.
  - The final topsoil layers should be thoroughly wetted to achieve settlement of the soil/sand backfill mix.
  - Additional soil backfill should be placed as required to achieve the design top surface elevation.
  - The work shall be inspected by the engineer prior to final stabilization and planting.
  - Sediment and erosion control practices may be removed upon approval by the City Engineer.

#### **CONCRETE WORKS**

1. **MINIMUM SPECIFIED COMPRESSIVE STRENGTH OF CONCRETE:**  
For structural walls, foundations, and all other concrete not expose to weather: 3000psi  
For structural walls with lateral soil pressure exposed to weather: 3500 psi  
For beams and above grade slabs exposed to traffic: 4000 psi
2. **MINIMUM REQUIREMENT FOR CONCRETE TESTING**  
Taking sample for strength tests shall be performed in accordance with ASTM C 172  
Mold and standard curing for strength testing shall be done in accordance with ASTM C 31  
Test cylinders in accordance with ASTM C 39  
As per ACI 318, section 26.12.1.1, strength tests shall be the average of the strength of at least two 6 by 12 inch or three 4 by 8 inch cylinders made from the same sample of concrete tested at 28 days

#### **STRUCTURAL MASONRY**

1. Load bearing masonry walls are considered to be structural masonry.
2. **REQUIRED COMPRESSIVE STRENGTH OF MASONRY UNITS:**  
Solid clay units \_\_\_\_\_ 6200 psi  
Concrete units \_\_\_\_\_ 1900 psi
3. Concrete masonry units (CMU) shall be grade N, conforming to ASTM C 90. Refer to architectural drawings and specifications for unit size.
4. Mortar: Type S, ASTM C 270
5. Grout for reinforced masonry: Fine grout, ASTM C 476 with minimum 28 days compressive strength of 2000 psi

SHEET

No. 2  
OF 17

DRAWING  
NUMBER

BR-2

DESIGNED BY: A. Khalilian, P.E.  
DRAWN BY: Z. Mathewos  
APPROVED BY: A. Khalilian, P.E.  
DATE APPROVED: March 4, 2019  
SCALE: NTS

PROJECT TYPE:  
PROPOSED BIO-RETENTION  
PONDS

PROJECT TITLE:  
GENERAL NOTES AND  
SPECIFICATIONS

PROJECT NAME:  
LINCOLN AVENUE  
BIO-RETENTION FACILITIES

CITY OF TAKOMA PARK  
DEPARTMENT OF PUBLIC WORKS  
MONTGOMERY COUNTY, MARYLAND

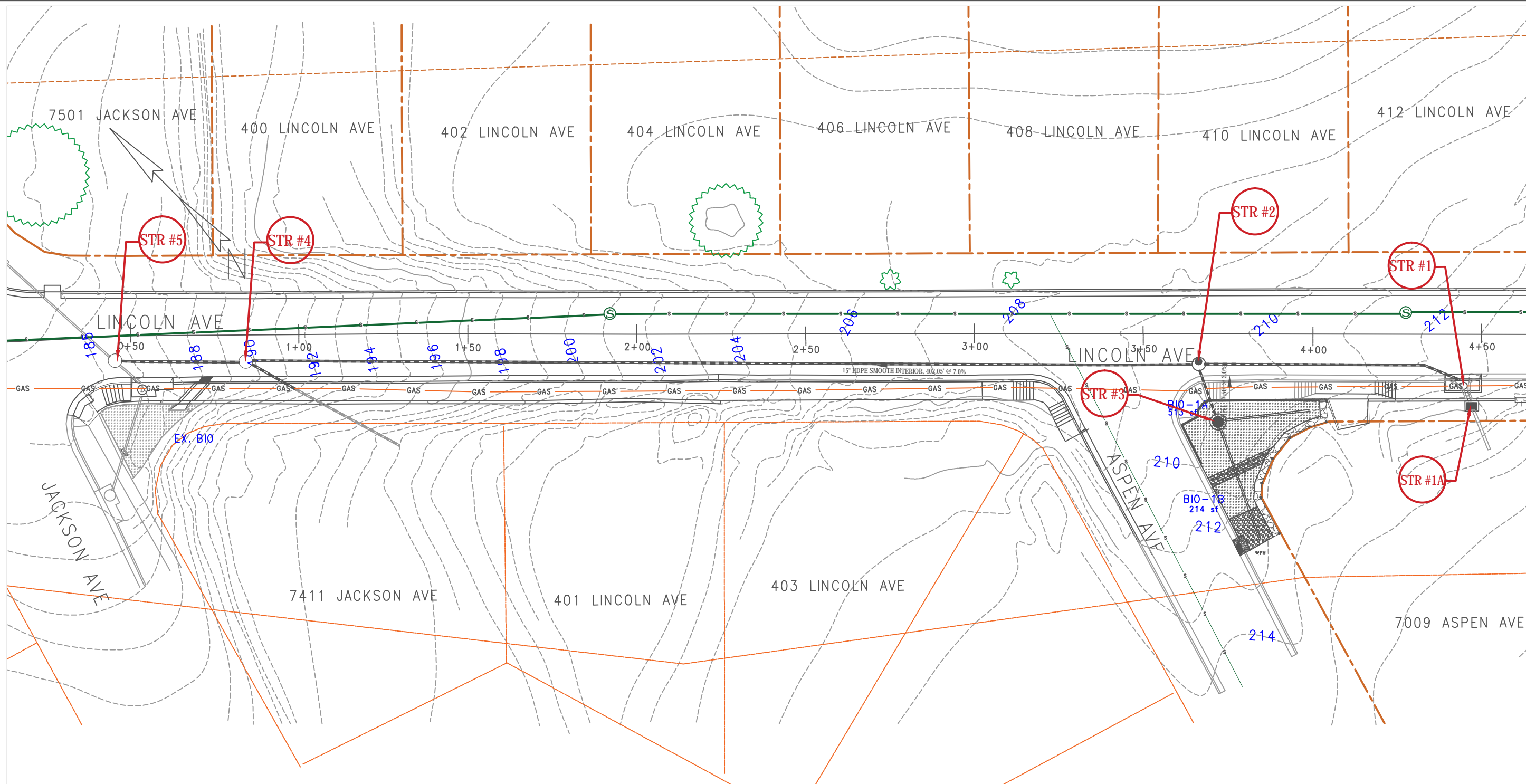


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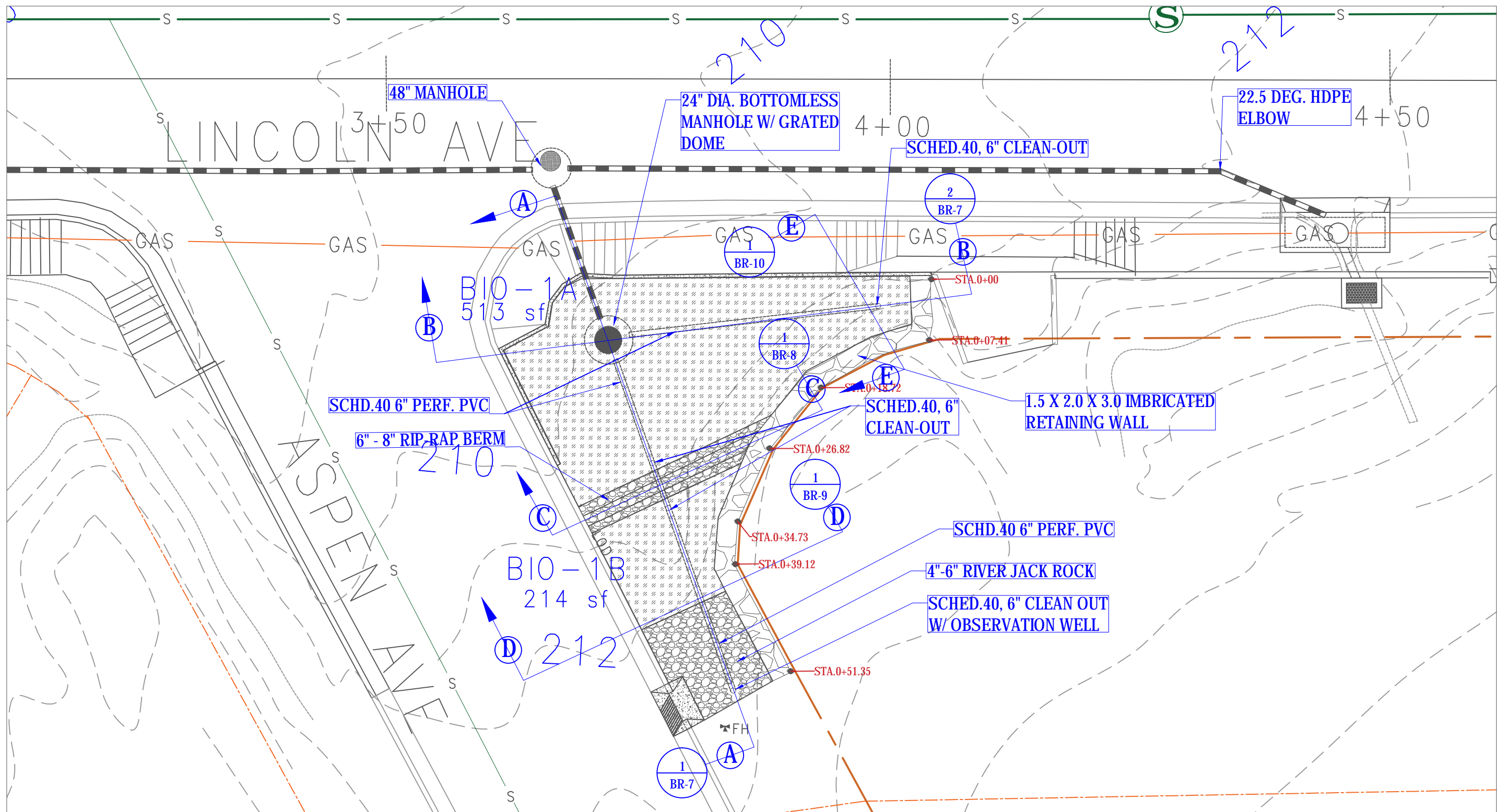


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BR-3

# BIO-RETENTION POND (BIO-1A & BIO-1B) SITE PLAN

SCALE: 1" = 30'-0"





**1**  
**BR-5**

## PROPOSED STORM DRAIN CHANGE PLAN

SCALE: 1" = 10'-0"

**MAFI**  
Associates Inc.  
Consulting Engineers

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FACILITIES  
CITY OF TAKOMA PARK  
DEPARTMENT OF PUBLIC WORKS  
MONTGOMERY COUNTY, MARYLAND

PROJECT TYPE:  
PROPOSED BIO-RETENTION  
PONDS

PROJECT TITLE:  
BIO-RETENTION (BIO #1A) AND (BIO #1B)  
PLANS

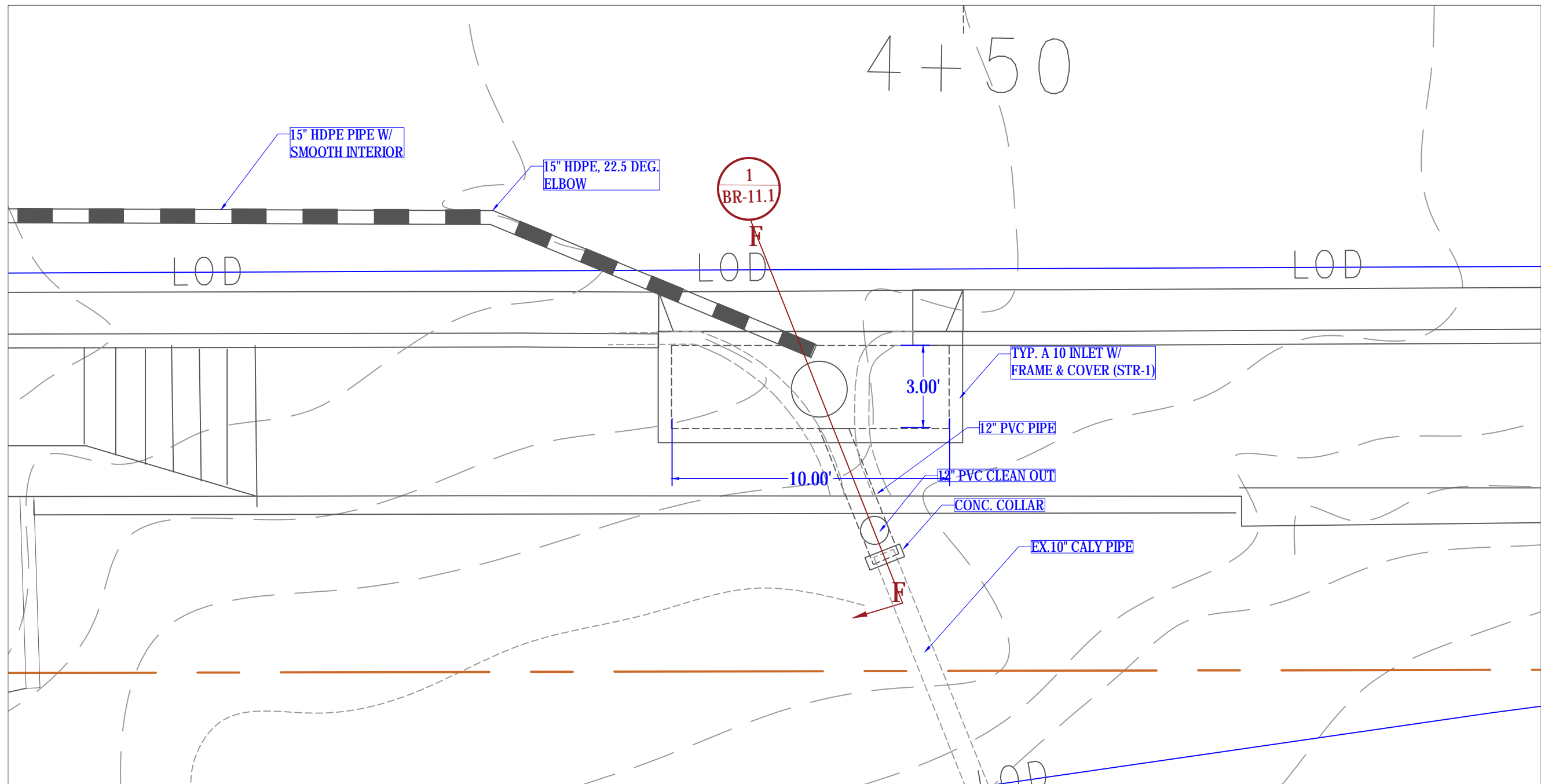
DESIGNED BY: A. Khalilian, P.E.  
DRAWN BY: Z. Mathewos  
APPROVED BY: A. Khalilian, P.E.  
DATE APPROVED: March 4, 2019  
SCALE: 1" = 10'-0"

SHEET No.

BR-5

SHEET  
5 OF 17





1  
BR-6.1
 
**STRU-1 AND 12" PVC PIPE W/ CLEAN OUT (OPTION 1) PLAN**  
 SCALE: 1" = 4'-0"



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 MONTGOMERY COUNTY, MARYLAND

PROJECT TYPE:  
 PROPOSED BIO-RETENTION  
 POND  
 PROJECT TITLE:  
 STRU-1 AND PVC PIPE PLAN

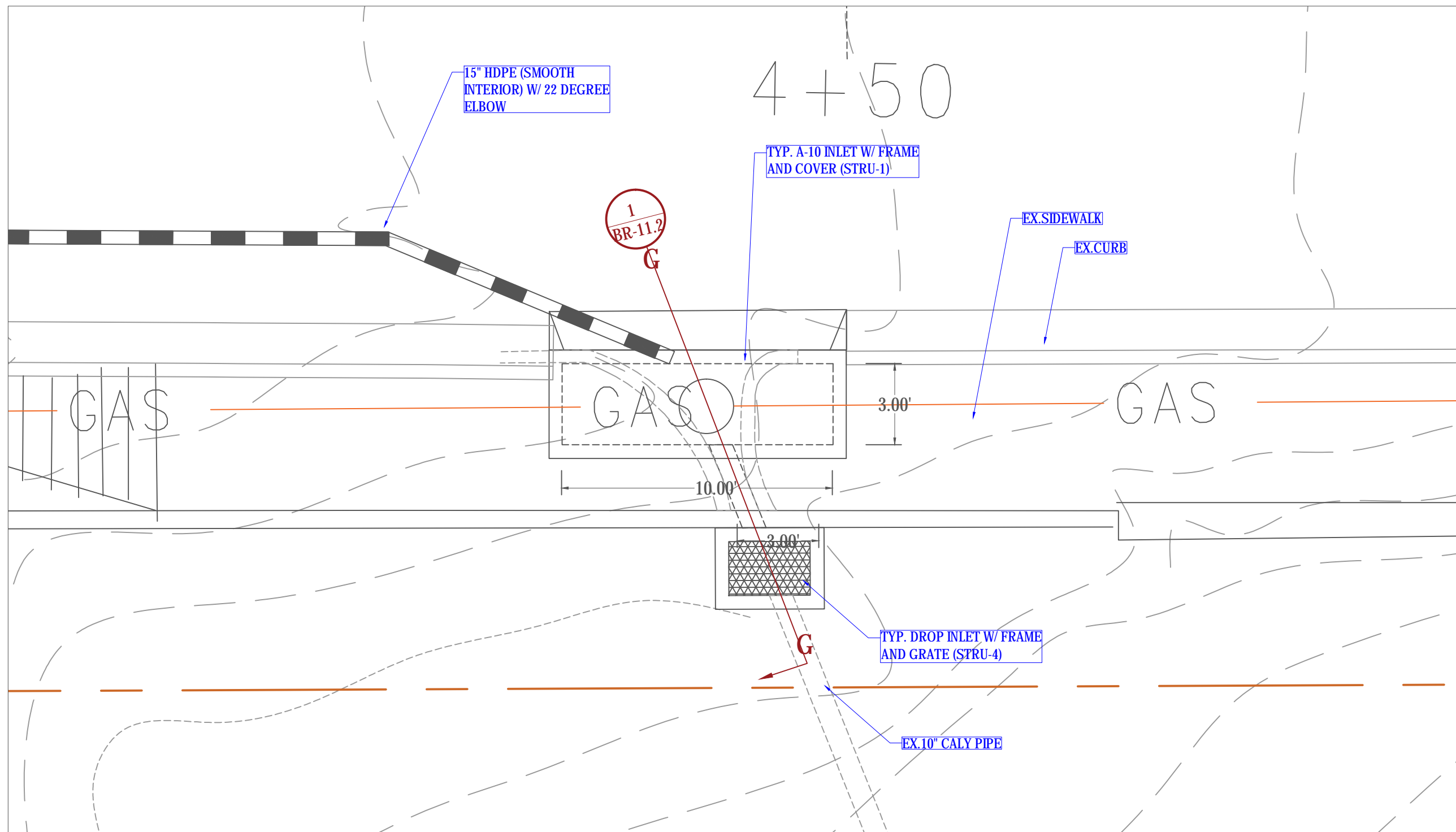
DESIGNED BY: A. Khalilian, P.E.  
 DRAWN BY: Z. Mathewos  
 APPROVED BY: A. Khalilian, P.E.  
 DATE APPROVED: March 4, 2019  
 SCALE: 1" = 4'-0"

SHEET No.

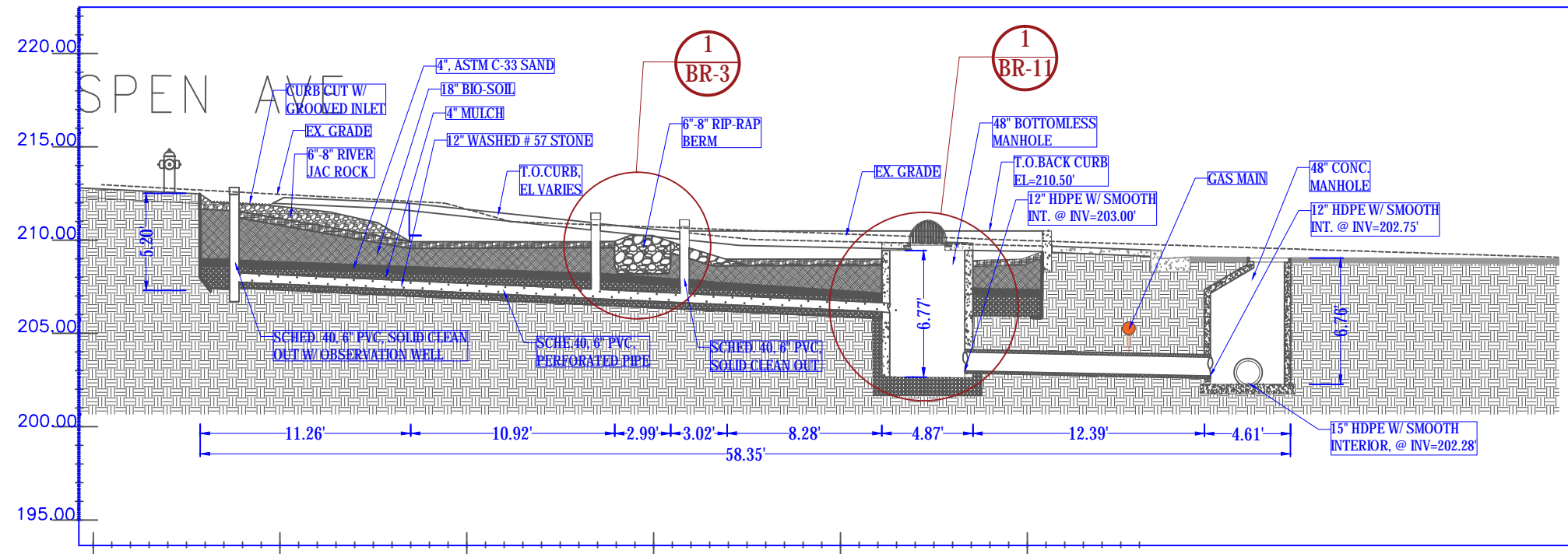
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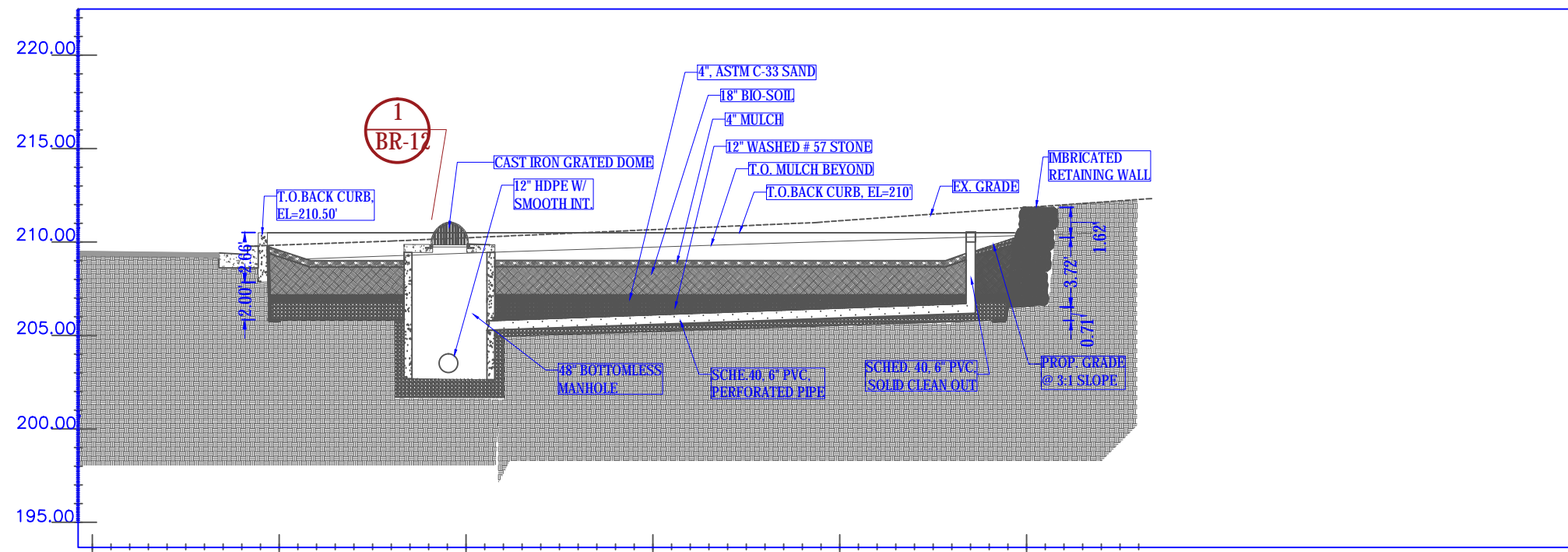
6 OF 17



1  
BR-6.2 STRU-1 AND STRU-4 (OPTION 1 OR OPTION 2) PLAN  
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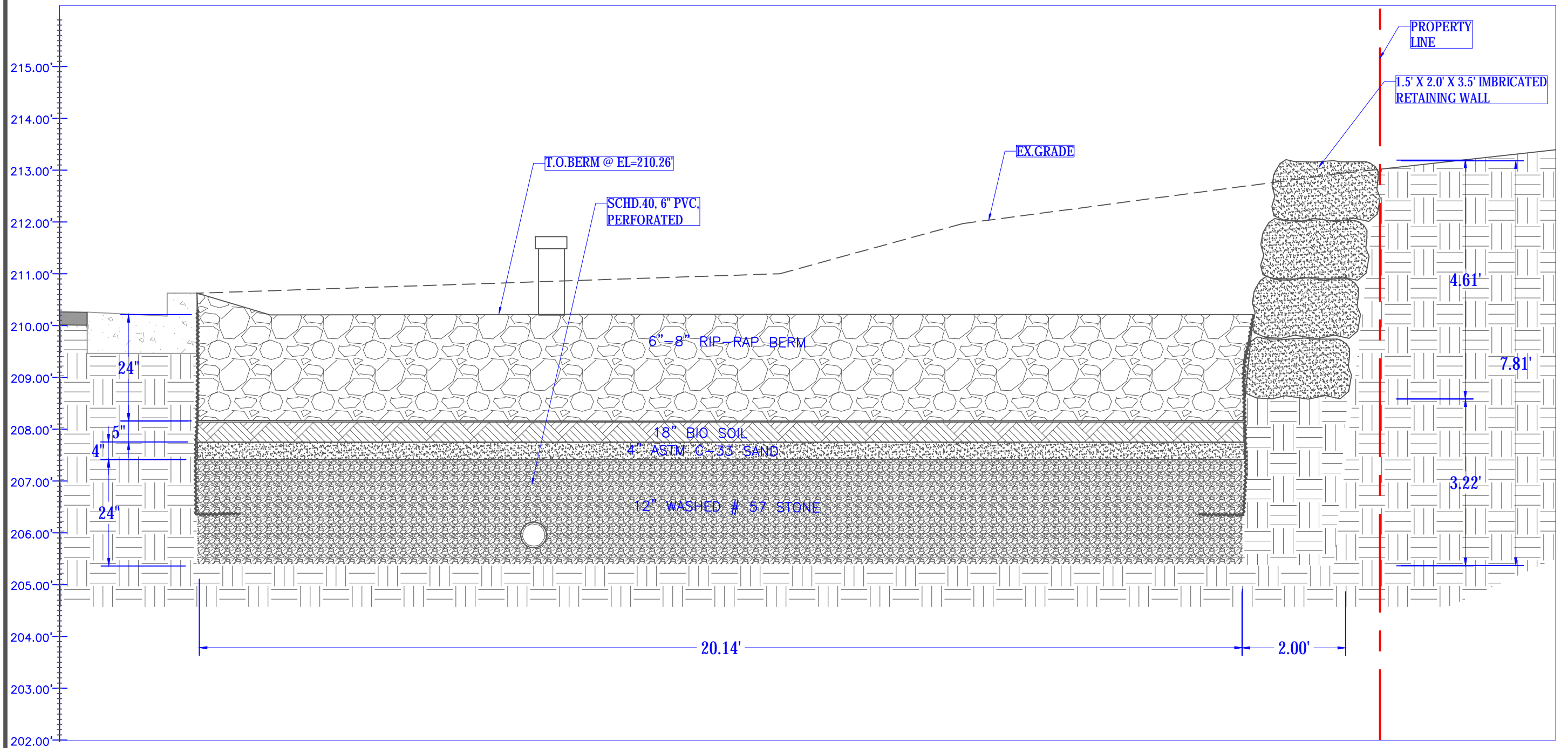


1  
BR-7 BIO-1A 7 1B SECTION THRU A-A  
SCALE: 1" = 8'-0"



2  
BR-7 BIO-1A SECTION THRU B-B  
SCALE: 1" = 8'-0"

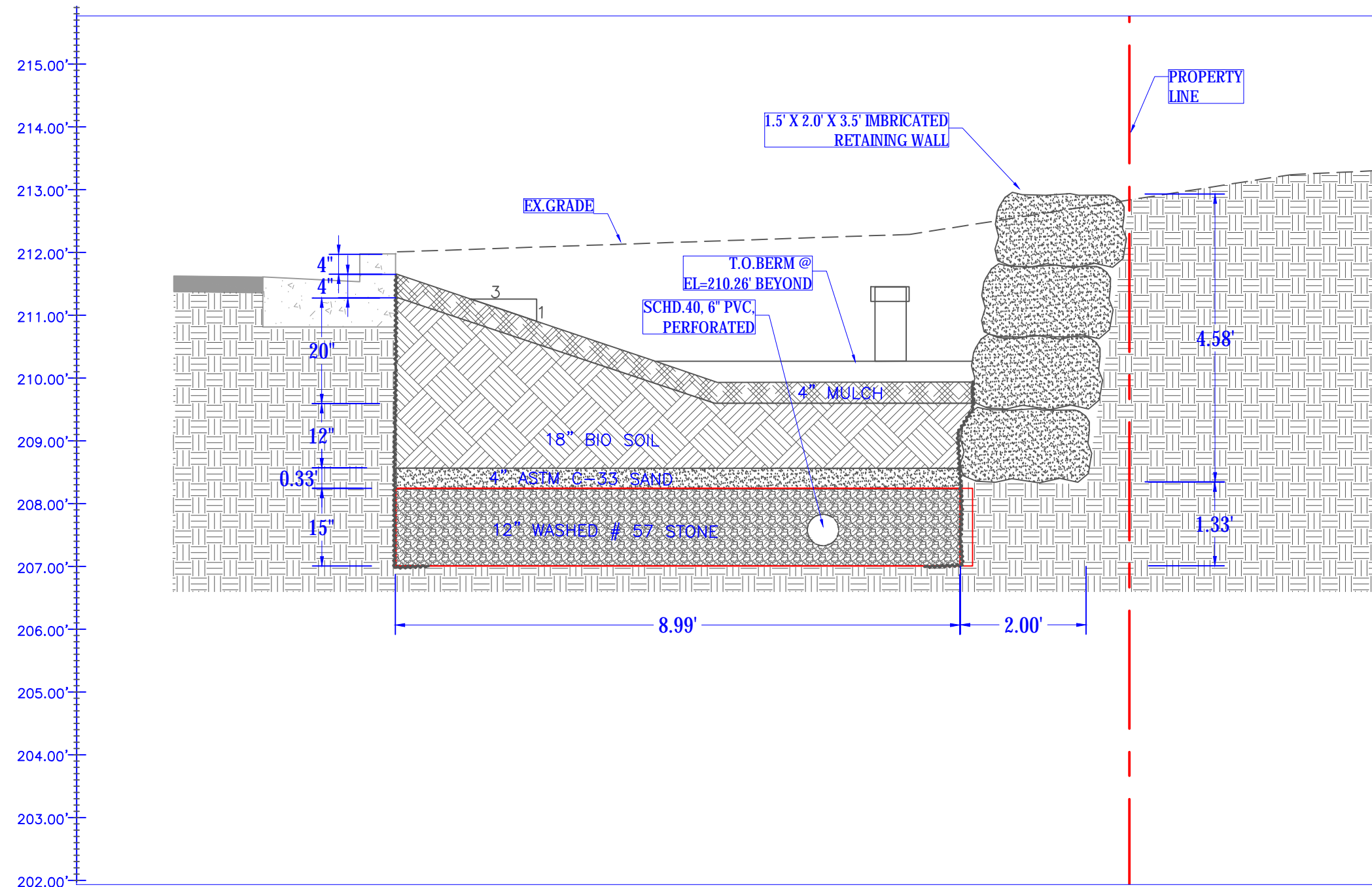




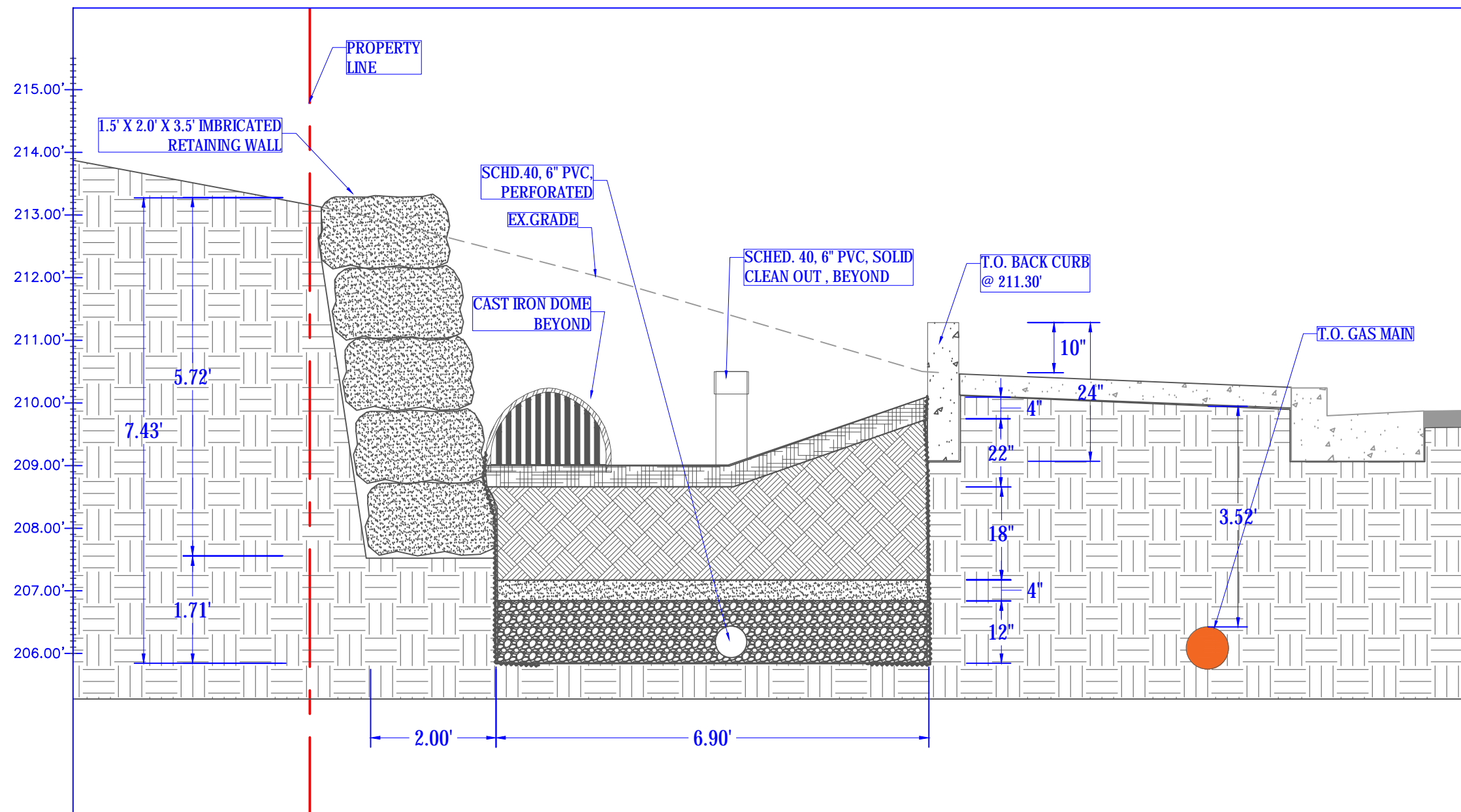
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BR-8

CROSS SECTION THRU BERM (SECTION C-C)

SCALE: 1" = 2'-0"

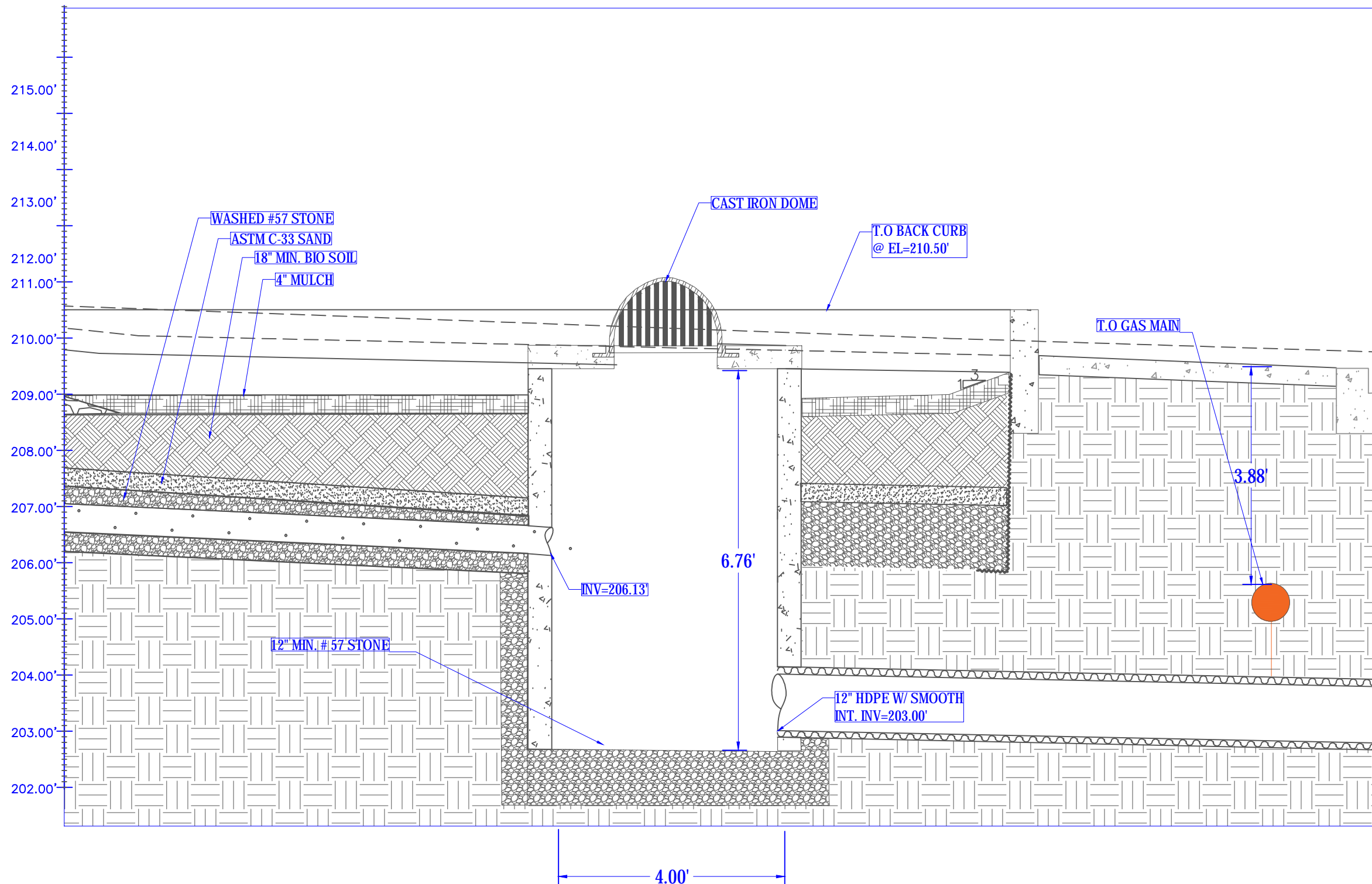


**1**  
**BR-9** **SECTION THRU BIO-1B (SECTION D-D)**  
SCALE: 1" = 2'-0"



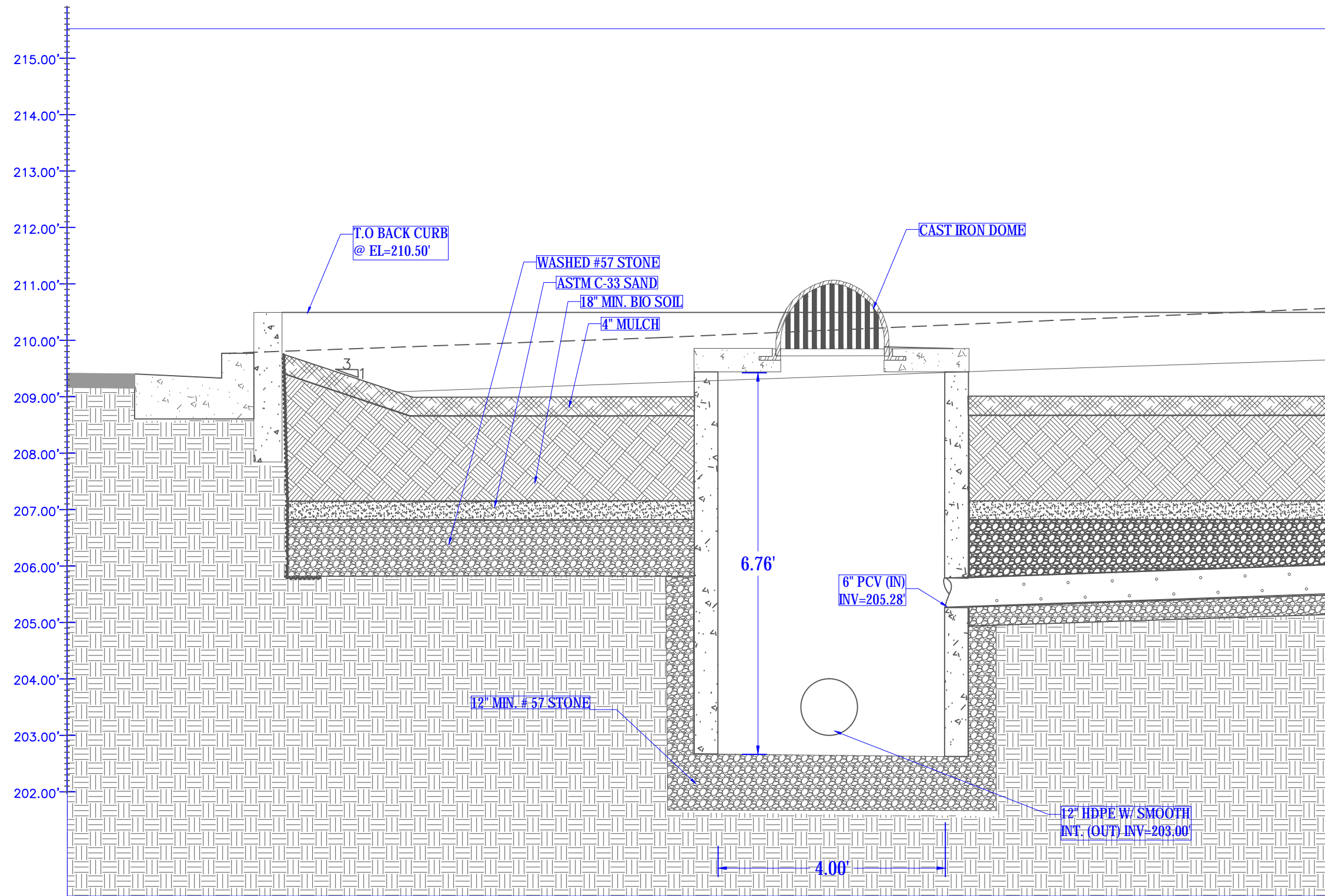
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BR-10 CROSS SECTION THRU BIO-1A (E-E)  
SCALE: 1" = 2'-0"





**1**  
**BR-11**

**DETAILS#1 AT STR-3**  
 SCALE: 1" = 2'-0"



1  
BR-12 DETAILS#2 AT STR-3  
SCALE: 1" = 2'-0"



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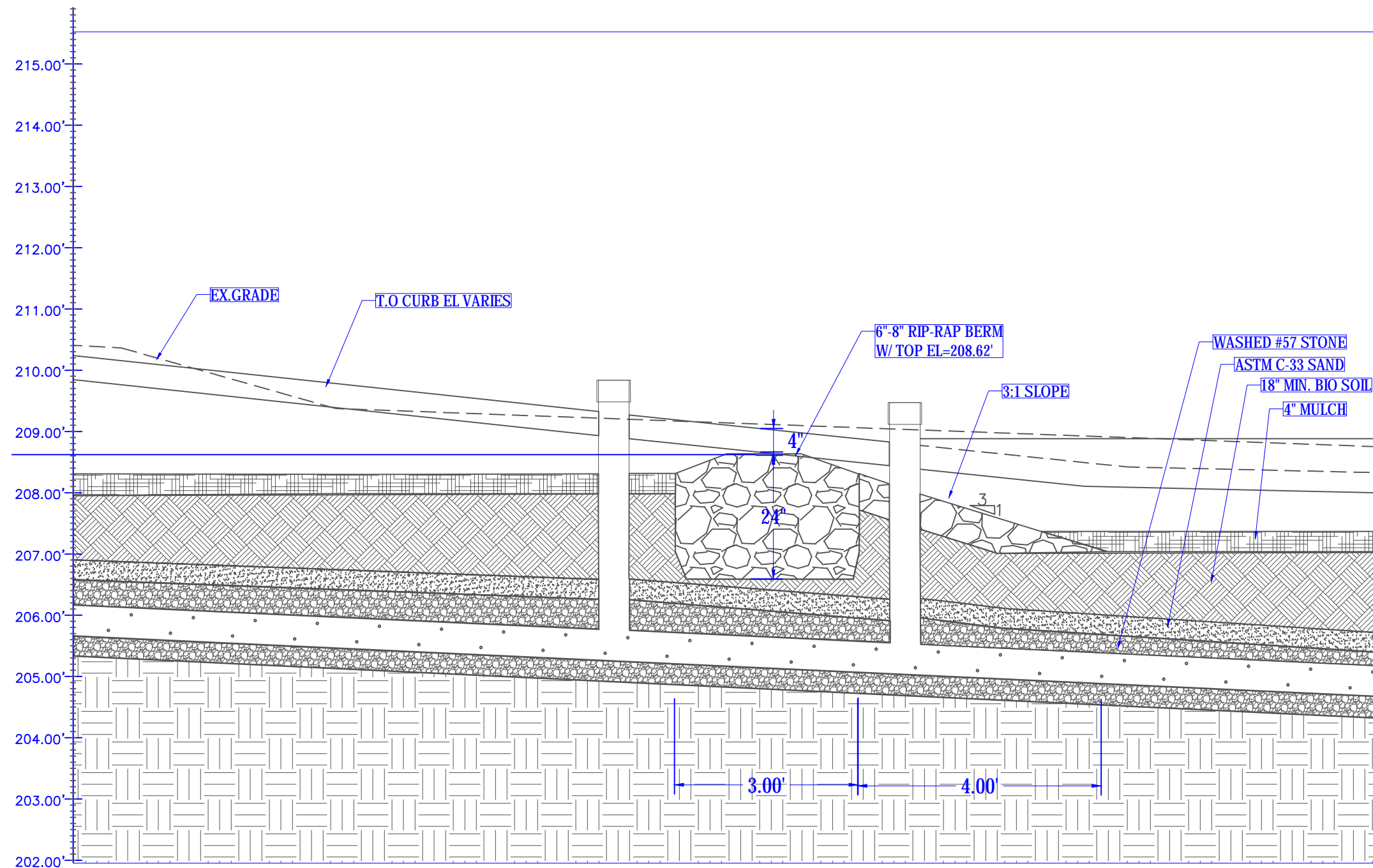
PROJECT TYPE:  
PROPOSED BIO-RETENTION  
POND  
PROJECT TITLE:  
BIO-1B SECTION & DETAILS AT BERM

DESIGNED BY: A. Khalilian, P.E.  
DRAWN BY: Z. Mathewos  
APPROVED BY: A. Khalilian, P.E.  
DATE APPROVED: March 4, 2019  
SCALE: 1" = 2'-0"

SHEET No.

BR-12

SHEET  
12 OF 17

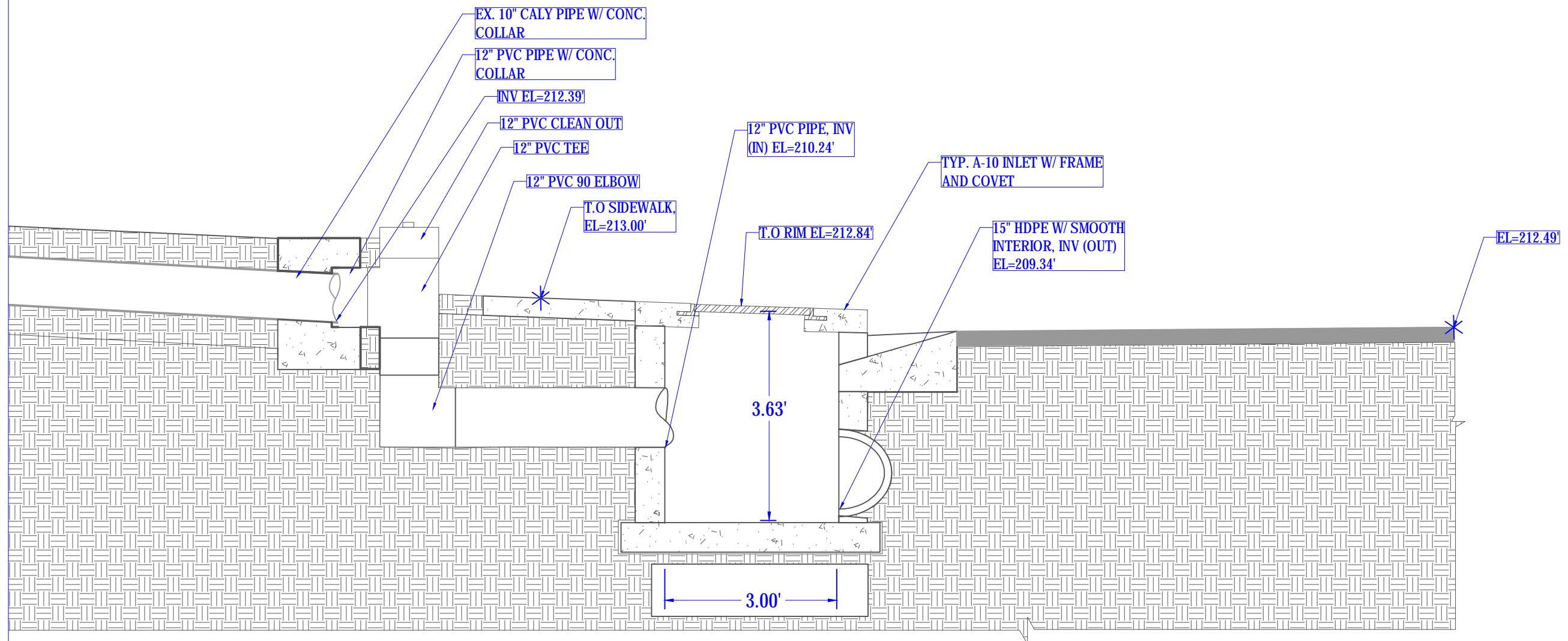


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BR-13

## DETAILS AT RIP-RAP BERM

SCALE: 1" = 2'-0"

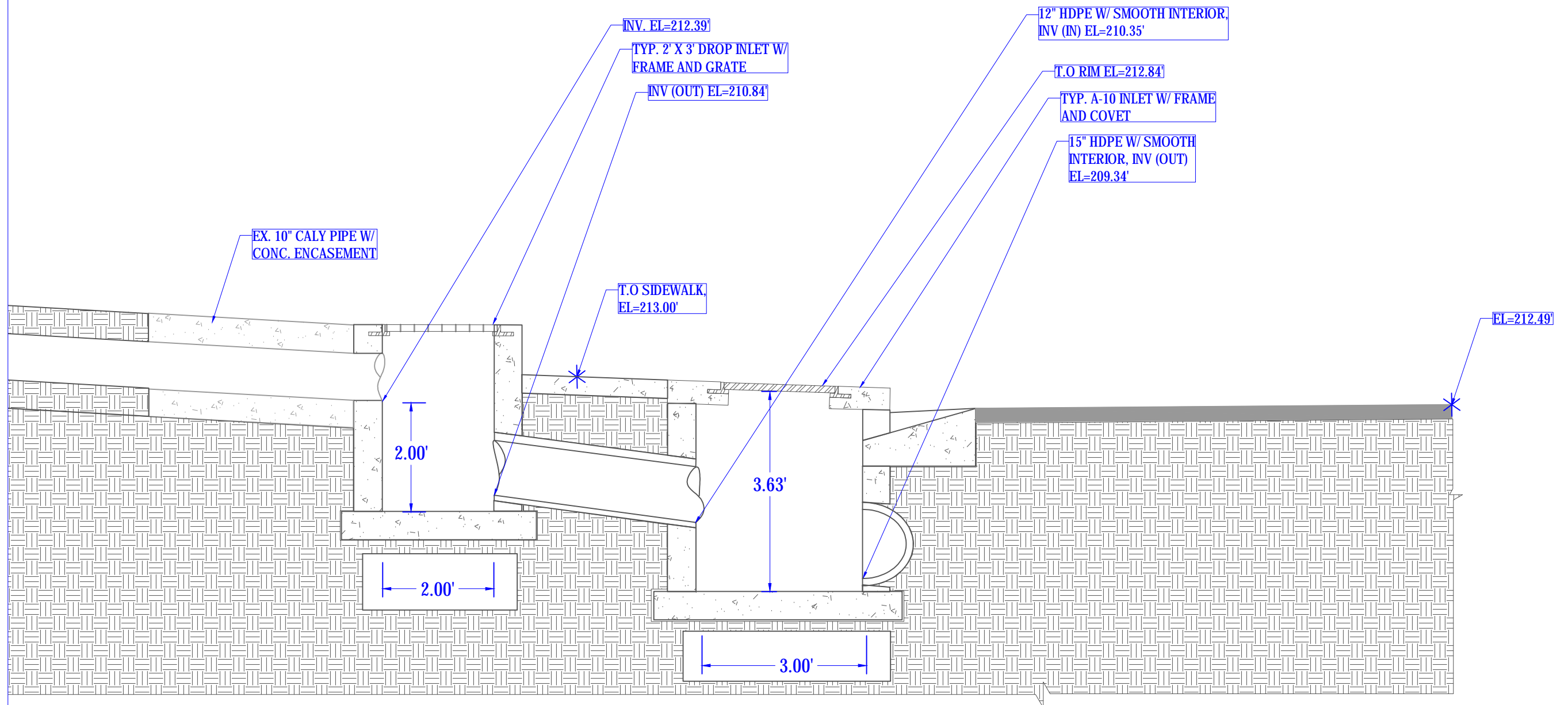




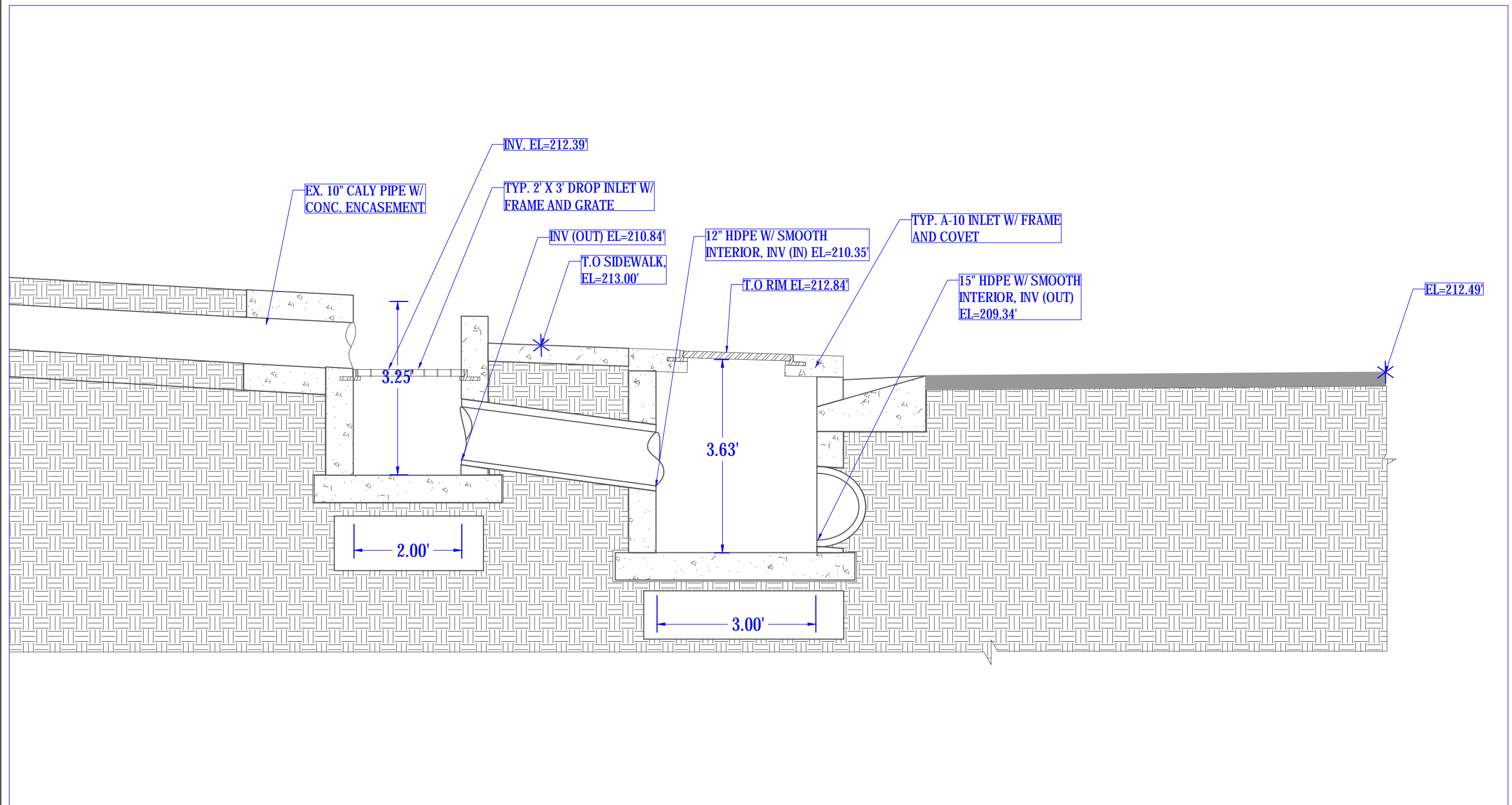
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BR-14.1

## SECTION THRU (F-F), STRU-1 (OPTION 1)

SCALE: 1" = 2'-0"



1 SECTION THRU (G-G) STRU-1 AND STRU-4 (OPTION 2)  
BR-14.2 SCALE: 1" = 2'-0"



1  
BR-14.3 SECTION THRU (G-G), STRU-1 AND STRU-1A (OPTION 3)  
SCALE: 1" = 2'-0"



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POND  
PROJECT TITLE:  
STRU-1 AND 4 DETAILS

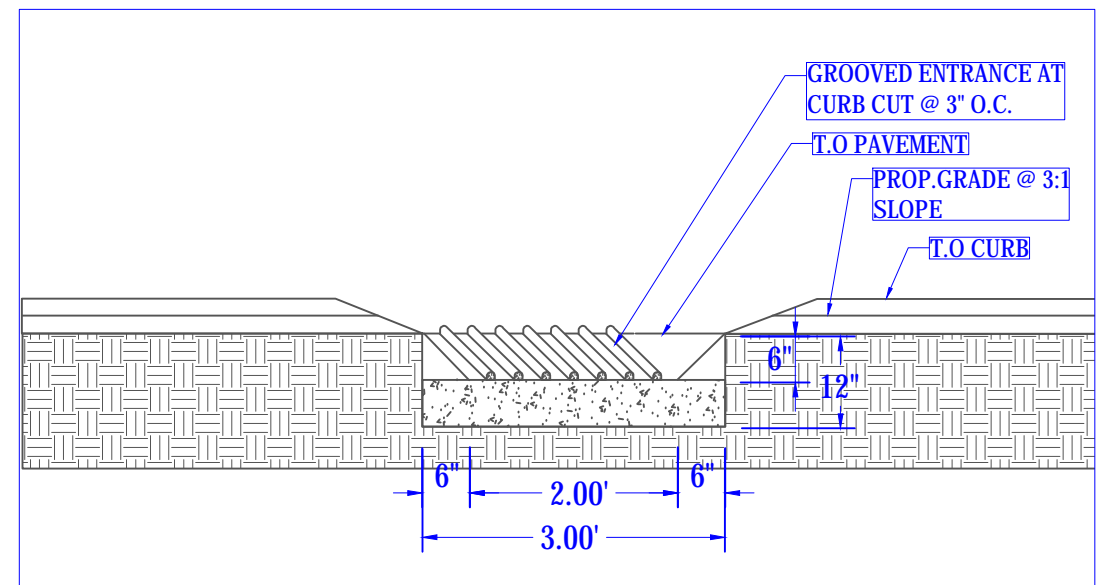
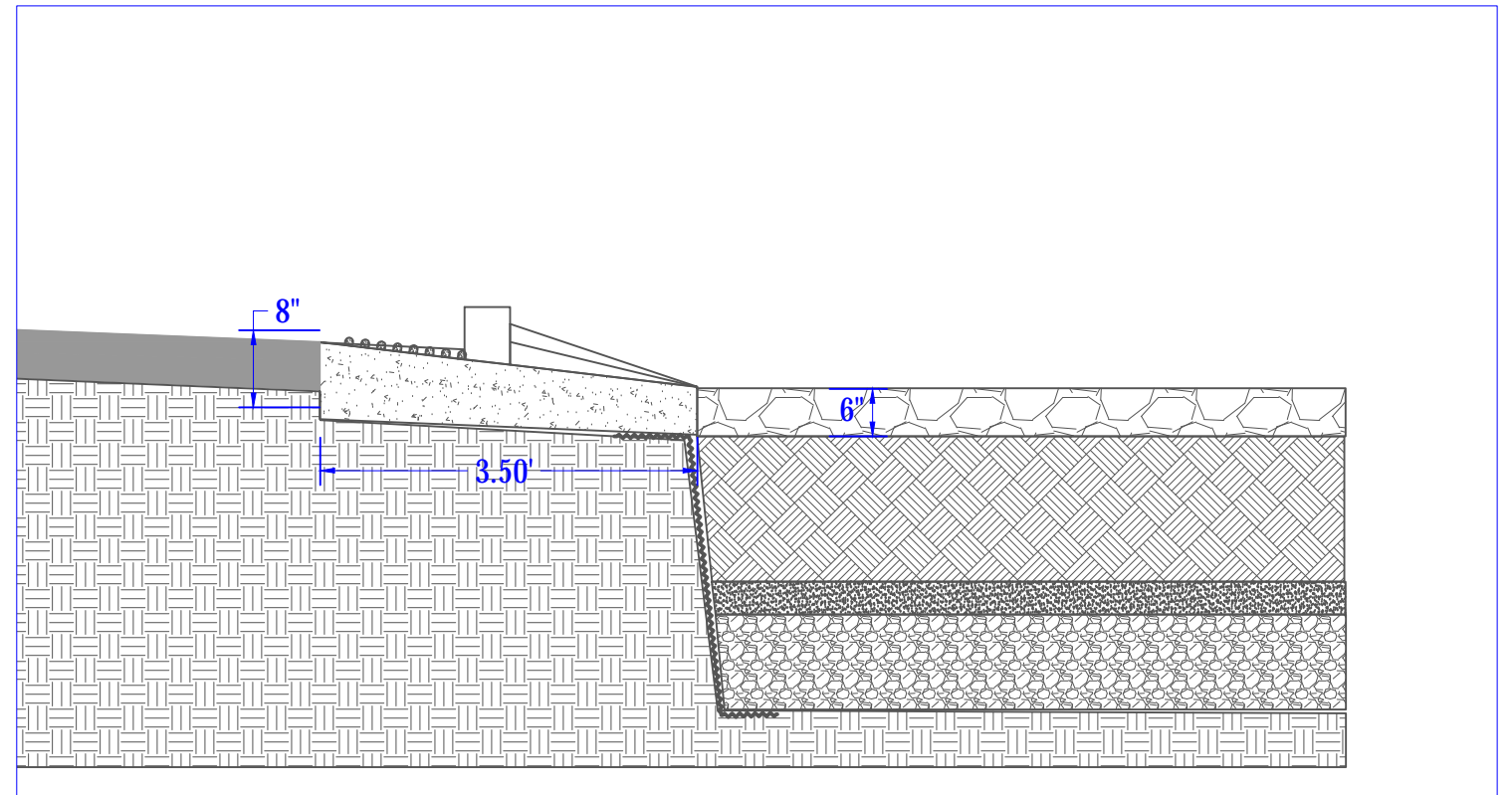
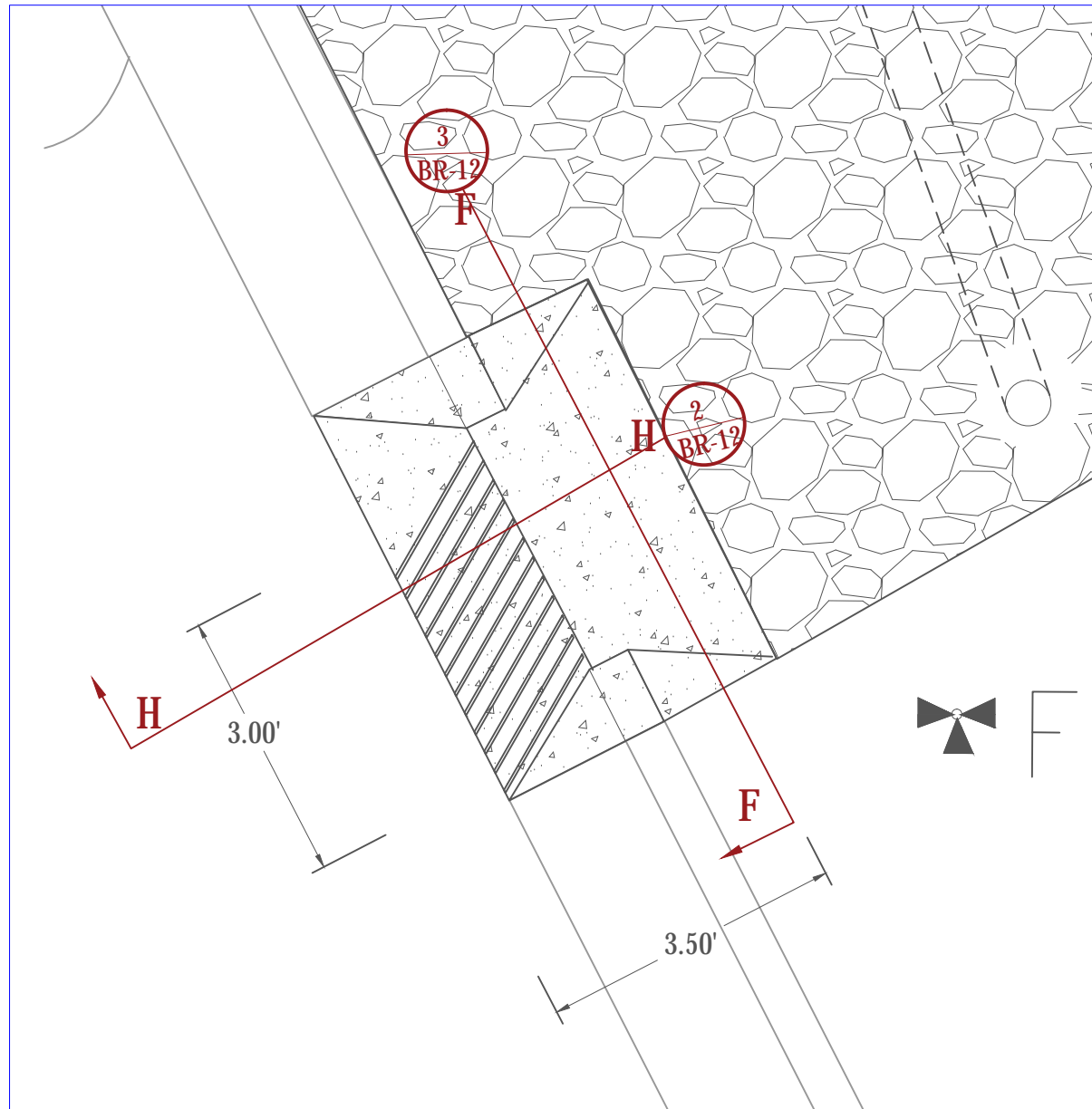
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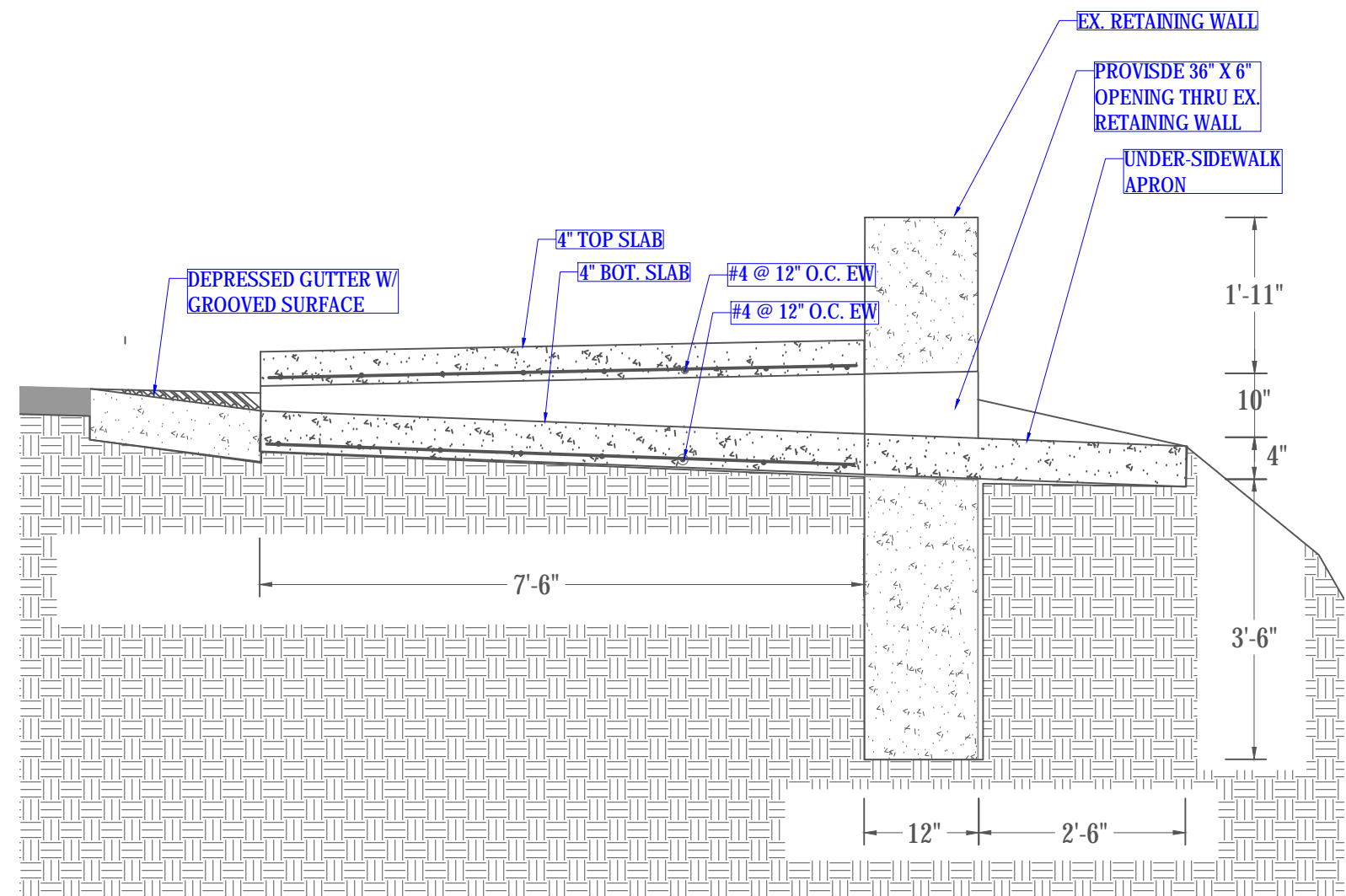
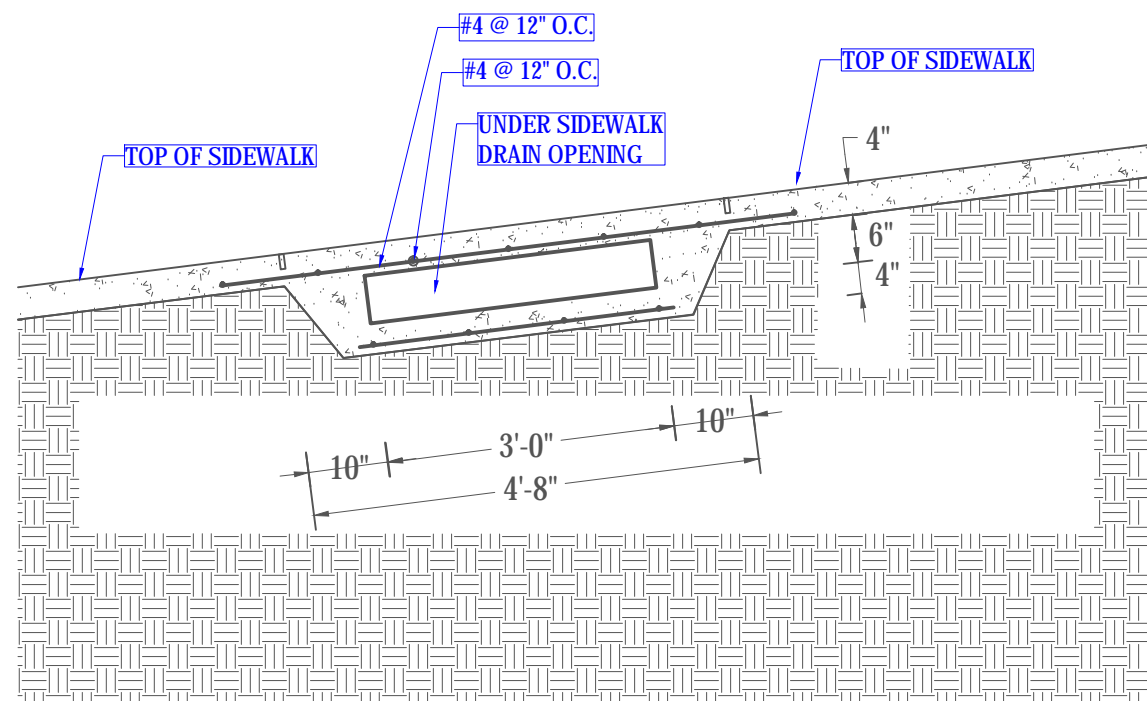
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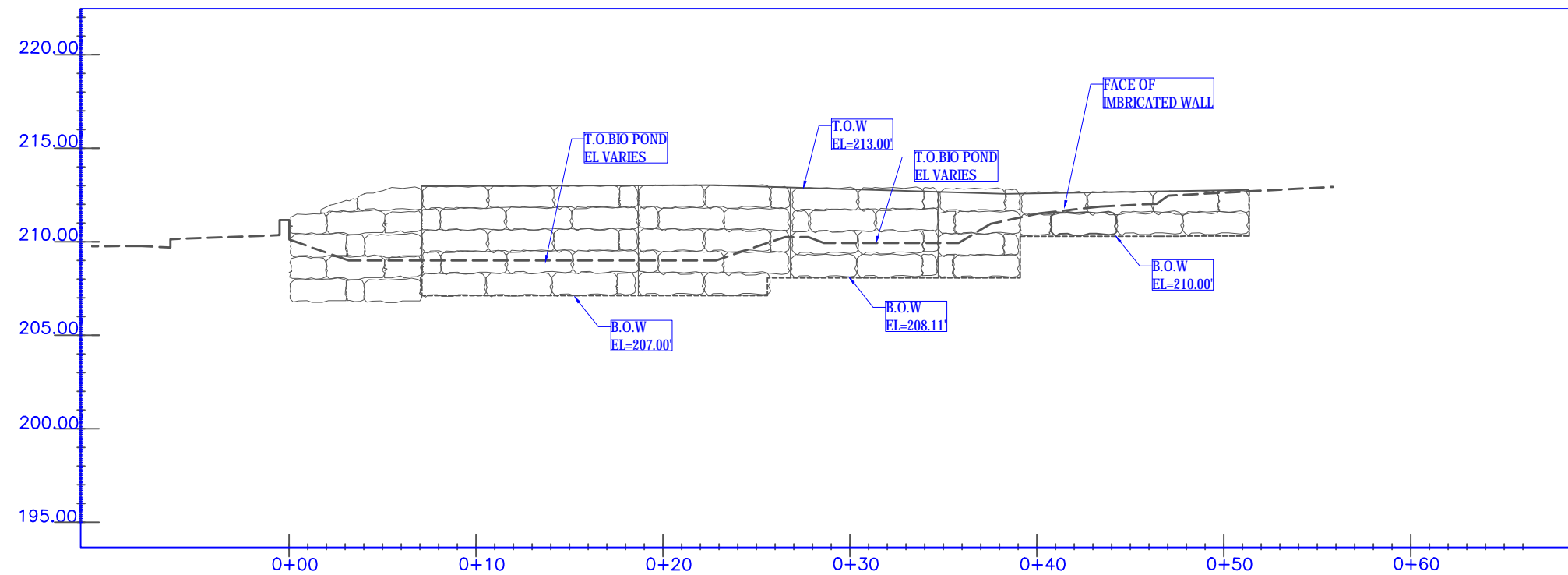
BR-14

SHEET  
14 OF 18







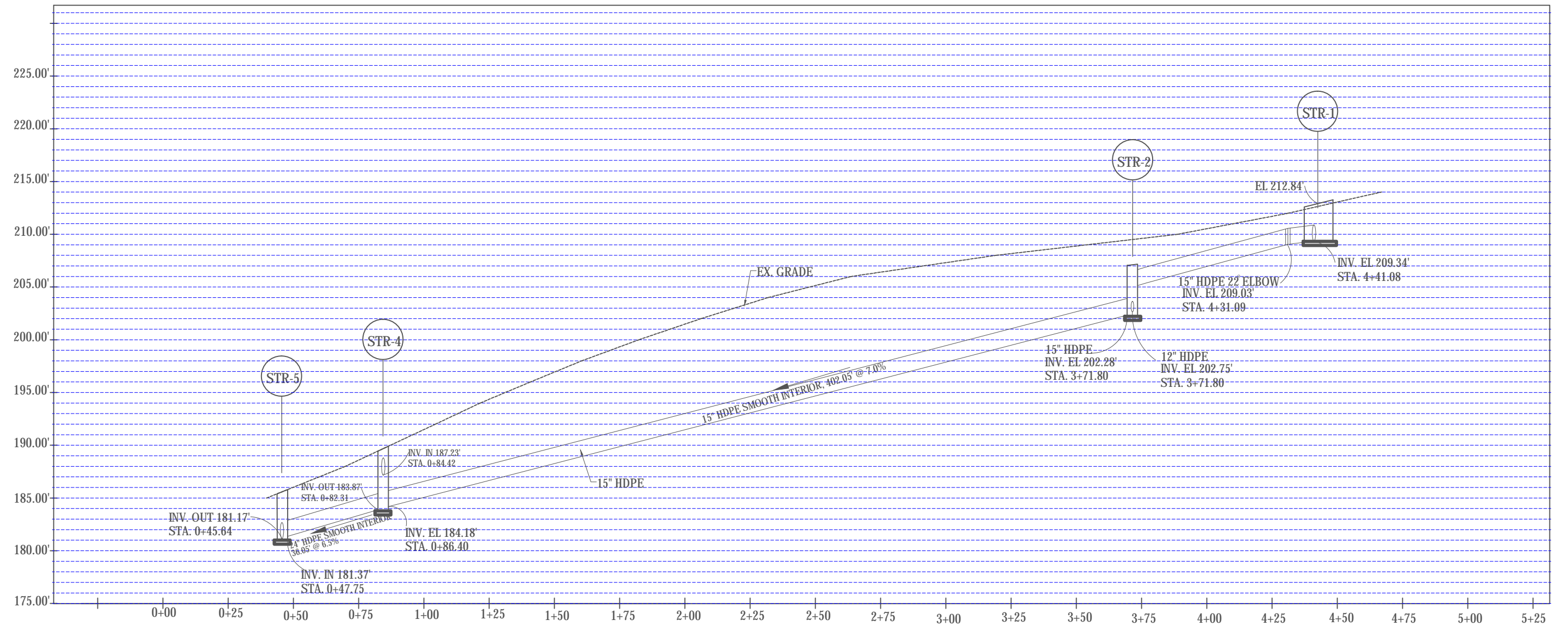


1  
BR-17

IMBRICATED WALL PROFILE

SCALE: 1" = 8'-0"





1  
BR-18

## STR-1 THRU EX. STR-5 STORM DRAIN PROFILE

SCALE: HORI 1" = 40'-0"  
VERT 1" = 10'-0"