REQUEST FOR PROPOSALS (RFP)
FRISCO BAY MARINA BOAT RAMP TURNAROUND DRAINAGE IMPROVEMENTS

Invitation:

The Town of Frisco is seeking proposals, in this RFP, for CONSTRUCTION services for the project named above. All bids associated with this RFP shall be due no later than 12:00PM, Friday, January 27th, 2023.

Background:

In 2019, the Town of Frisco completed the Big Dig and Phase 1 of the Frisco Bay Marina. The project included the construction of a new beach, widening of the pier, new docks and dock system, new boat ramp, and boat ramp turnaround area. The installation of the of the new turnaround area, located at the top of the boat ramp, was designed in a manner that directs all the drainage from storm events and vehicles/trailers that have just launched, away from Dillon Reservoir and into a storm sewer that is 165ft to the west, with an elevation difference of 2ft. The inlet and drainage structure are part of a small storm system that is tied into a cistern that was intended to act as a dry well, which would allow all the sediment to settle in a contained area and let the water percolate into the soil(s).

Several years of operation have passed since its installation, it has been determined that the original design has not worked and there is now a ponding issue stemming from groundwater infiltrating into the cistern at a rate that causes it to surcharge. Due to this, a significant portion of the turnaround area floods where the reservoir level matches the rim elevation of the inlet (9,017.23ft), and when the reservoir is over full, nearly the entire turnaround area will be submerged.

Knowing that a solution needed to be created, the Town of Frisco has been working with its contracted civil engineer, JR Engineering, to find a solution to this problem. After on-site visits and a thorough analysis of data concerning groundwater levels and reservoir water levels, the Town and JR Engineering decided to rework the existing storm system by turning the dry well to a wet well and adding a sump pump to the system. This will ensure that the entire system can be pumped into a detention pond, and the turnaround area can be kept free of major ponding in the future.

Project Scope and Description:

The Town of Frisco is seeking proposals from qualified firms to assist in the completion of a design (currently at 60%), working closely with the Town's contracted engineer (JR Engineering), to produce a 100% CD set of drawings. After completion of the drawings, the contractor would be responsible for constructing the plan as designed. The scope shall include:

- Removal and replacement of hardscape surfaces
- Removal of previous piping and installation of new piping
- Decommissioning of previous cistern drywell area with flowfill
- Electrical connections and conduit installation
- Sump pump installation and all associated apparatuses
- Water quality pond upgrade and expansion
- Storm manholes
- Riprap placement
- Drainage channel
- Reseeding and restoration of impacted area(s)

Project Schedule:

The Town of Frisco would like to see completion of this project by October 2020.

RFP Advertisement	January 4, 2023
Mandatory Site Visit	January 10, 2023 @ 10AM
Questions Due, via email	January 13, 2023 @ 3PM
Questions Answered, via email	January 18, 2023 @ 3PM
RFP Submissions Deadline	January 27, 2023 @ 12PM
Select Firm	January 28, 2023
**Pending Council Approval*	
Contract to Council	February 14, 2023

Additional Information:

Additional information concerning this Request for Proposals (RFP) is available from:

Addison Canino
Assistant Public Works Director
Town of Frisco Public Works
AddisonC@townoffrisco.com

Project Contacts:

- Addison Canino, Assistant Director, Frisco Public Works
  - 970.331.6632
  - AddisonC@townoffrisco.com

All Proposals Shall Include:

- Name, address and telephone number of person(s) authorized to legally represent firm.
- Any confidential information in the proposal shall be labeled or marked as *CONFIDENTIAL*.
- Background experience in stormwater system installation or repair
- Proof of insurance coverage that the firm maintains.
    - Town of Frisco will require insurance certificates naming the Town as co-insured.
- Provide project costs for services provided in an itemized format on the provided bid tabulation sheet.

Proposed Fees:

Proposal should include all fees the contractor anticipates based on the plans and information given in this RFP. Fees should be based on, as much as possible, on unit prices where units are noted, or a lump sum where appropriate. Include bonding costs in fee proposal, in addition to any other anticipated design costs.

Proposal Response:

Proposal response shall contain all information as requested herein, and any additional information necessary to summarize the overall benefit of the proposal to the Town. A bid tab will be provided in the solicitation of this RFP, and all prospective bidders shall complete the bid tab with their proposal. Proposing firms should submit their proposal electronically no later than 12:00PM, January 27th, 2023. Late proposals will not be accepted under any circumstance. Since proposals will be sent electronically, all emails shall have the subject line of "FRISCO BAY MARINA BOAT RAMP TURNAROUND DRAINAGE IMPROVEMENTS." If file sizes are too large to attach to an email, please use a file sharing service with a link to proposal in the email submission.

Submittals directed to:

Addison Canino
Asst. Public Works Director
Town of Frisco, CO
AddisonC@townoffrisco.com

The submittal of a proposal shall be taken as evidence that the proposing individual/firm has full knowledge of the scope, nature, quality and quantity of the project to be performed and the detailed requirements and conditions under which the project is to be performed.

This solicitation does not commit the Town of Frisco to award a contract, to pay any cost incurred with the preparation of a proposal, or to procure or contract for services or supplies. The Town of Frisco reserves the right to accept or reject any or all proposals received in response to this request, to negotiate with any qualified source, or cancel in whole or part this proposal process if it is in the best interest of the Town to do so. Subsequent to contract

negotiations, prospective consultants may be required to submit revisions to their proposals. All proposers should note that any contract pursuant to this solicitation is dependent upon the recommendation of the Town staff and the approval of the Frisco Town Council.

General Requirement of the Selected Proposing Firm:

- Enter into a contract with the Town. (These documents and proposal submittals become part of the contract).
- Maintain insurance coverage for the duration of the contract period.
- Prohibited from assigning or subcontracting the whole or any part of the contract without the prior written consent of the Town.
- Shall not hire, discharge, promote, demote or otherwise discriminate in matters of compensation, terms, conditions or privileges of employment against any person otherwise qualified solely because of race, creed, sex, national origin, ancestry, physical or mental disability, color or age.
- All work done by the selected firm will be in compliance with all Town of Frisco, Colorado State, Fire and American Society of Mechanical Engineering codes.
- Operate as an independent contractor and will not be considered employee(s) of the Town of Frisco.
- Successful contractor will be paid on actual invoices as work is completed.
- Performance and Payment Bonds will be required.
- Obtain a Town of Frisco Business License prior to commencement of work
- Obtain final approval signoff from Summit Fire & EMS prior to commencing construction

Selection Criteria:

The Town will select the contractor it deems best for this project with consideration to price, experience, proposed project methodology, proposed timeline, references, and other materials presented by the firm.

Exhibits:

A. 60% Drawings
B. Bid Tabulation Sheet

FRISCO BAY MARINA STORM DRAINAGE IMPROVEMENTS

BOAT RAMP STORMWATER PUMP STATION

TOWN OF FRISCO, COUNTY OF SUMMIT, STATE OF COLORADO

PUBLIC IMPROVEMENT CONSTRUCTION PLANS

KEY CONTACTS

OWNER:

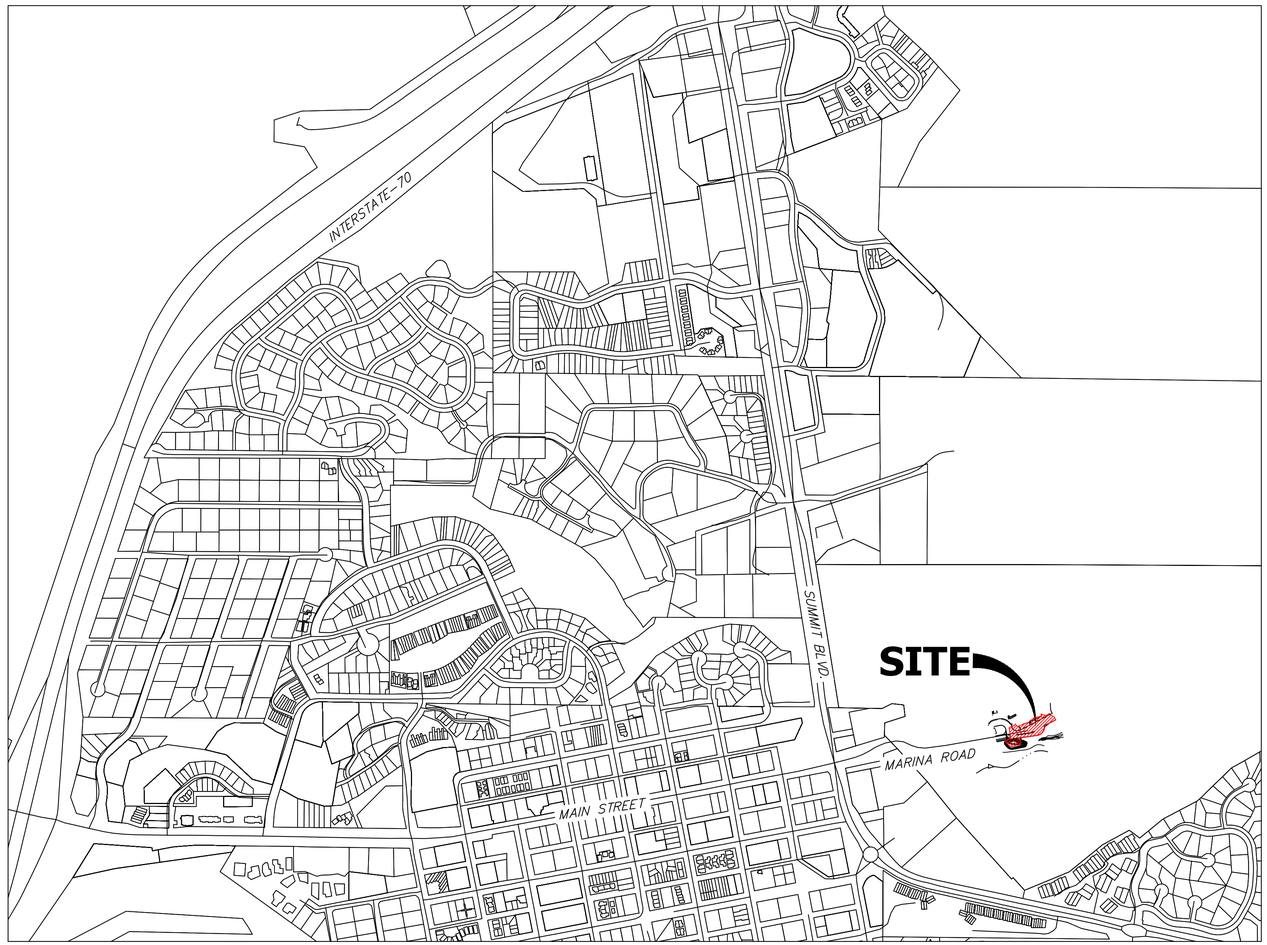
TOWN OF FRISCO PUBLIC WORKS (970) 668-9150
102 SCHOOL ROAD
FRISCO, CO 80443
ATTN: ADDISON CANINO

CIVIL ENGINEER/SURVEYOR

JR ENGINEERING (303) 740-9393
7200 SOUTH ALTON WAY, SUITE C400
CENTENNIAL, CO 80112
ATTN: DAREN STERLING – DSTERLING@JRENGINEERING.COM

ELECTRICAL ENGINEER

EG POWER (720) 533-4850
1701 WASHINGTON AVE
GOLDEN, CO 80401
ATTN: ERIC GROMKO, PE



PROJECT LOCATION MAP
SCALE: 1"=500'

SHEET INDEX	
SHEET NO.	SHEET TITLE
1	COVER SHEET
2	GENERAL NOTES
3	SITE PLAN
4	DEMOLITION PLAN
5	STORM SEWER PLAN & PROFILE
6	POND GRADING PLAN
7	EROSION CONTROL PLAN
8 – 14	DETAILS
15	DRAINAGE PLAN
TOTAL – 15	

BENCHMARK:

THE BENCHMARK USED FOR THIS SITE IS NGS BM OVERLOOK, 3-1/4" ALUMINUM CAP IN CONCRETE, EAST OF ORANGE CARSONITE POST AND NORTH OF GREEN CARSONITE POST, EL=9183.16 (NAVD88).

BASIS OF BEARING:

THE EAST LINE OF SECTION 35, TOWNSHIP 5 SOUTH, RANGE 78 WEST OF THE 6TH PRINCIPAL MERIDIAN, BEING MONUMENTED BY A 3-1/4" BRASS CAP STAMPED " DMWW CO S16" AT THE NORTH END AND BY 3-1/4" BRASS CAP STAMPED "US CADASTRAL SURVEY BUREAU OF LAND MANAGEMENT T5S R78W 1/4 S35/36 1959" AT THE SOUTH END, BEARING S00°14'49"W AS REFERENCED TO COLORADO STATE PLANE CENTRAL ZONE.

811 Know what's **below.** **Call** before you dig.

ENGINEER'S STATEMENT

PREPARED UNDER

PRELIMINARY NOT FOR CONSTRUCTION

TRISTAN BONSER, COLORADO P.E. 47602
FOR AND ON BEHALF OF JR ENGINEERING, LLC

UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, JR ENGINEERING APPROVES THEIR USE ONLY FOR THE PURPOSES DESIGNATED BY WRITTEN AUTHORIZATION.

PREPARED FOR
TOWN OF FRISCO
PO BOX 4100
FRISCO, CO 80443
CONTACT: ADDISON CANINO
(970) 668-9150

J·R ENGINEERING
A Westrian Company
Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com

No.	REVISION	BY	DATE

H-SCALE	1"=500'
V-SCALE	N/A
DATE	12/30/22
DESIGNED BY	AHC
DRAWN BY	AHC
CHECKED BY	

FRISCO BAY MARINA STORM DRAINAGE IMPROVEMENTS

COVER SHEET

SHEET 1 OF 15

JOB NO. 16113.00

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GENERAL NOTES

1. THE CONTRACTOR SHALL HAVE ONE SIGNED COPY OF PLANS APPROVED BY THE TOWN OF FRISCO.
2. ONE COPY OF THE APPROPRIATE DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS ON THE JOB AT ALL TIMES.
3. THE CONTRACTOR SHALL NOTIFY THE OWNER, ENGINEER, AND TOWN OF FRISCO 48-HOURS PRIOR TO THE START OF CONSTRUCTION. A PRE-CONSTRUCTION MEETING SHALL BE SCHEDULED WITH THE TOWN OF FRISCO ENGINEERING INSPECTOR 48-HOURS PRIOR TO THE START OF ANY WORK.
4. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR CONDITIONS AT AND ADJACENT TO THE JOB SITE, INCLUDING, BUT NOT LIMITED TO, SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF ANY WORK. THIS REQUIREMENT SHALL APPLY TO NORMAL AND NON-NORMAL WORKING HOURS.
5. THE TOWN OF FRISCO, OWNER, AND ENGINEER CONSTRUCTION REVIEW OF THE CONTRACTOR'S PERFORMANCE IS NOT INTENDED TO INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES IN, ON, OR NEAR THE CONSTRUCTION SITE.
6. ALL TRENCHES SHALL BE ADEQUATELY SUPPORTED AND THE SAFETY OF WORKERS PROVIDED FOR AS REQUIRED BY THE MOST RECENT OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) "SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION." THESE REGULATIONS ARE DESCRIBED IN SUBPART P, PART 1926 OF THE CODE OF FEDERAL REGULATIONS. SHEETING AND SHORING (OR APPROVED EQUAL) SHALL BE UTILIZED WHERE NECESSARY TO PREVENT ANY EXCESSIVE WIDENING OR SLOUGHING OF THE TRENCH WHICH MAY BE DETRIMENTAL TO HUMAN SAFETY, TO THE PIPE BEING PLACED, OR TO ANY EXISTING SITE IMPROVEMENTS OR STRUCTURES.
7. ALL TRENCH BACKFILL AND SUBGRADE PREPARATION SHALL BE TESTED TO ENSURE COMPLIANCE WITH GEOTECHNICAL STANDARDS AND SHALL BE TESTED BY AN APPROVED SOIL TESTING FIRM AT THE REQUIRED FREQUENCY AS SPECIFIED BY THE TOWN OF FRISCO. TEST RESULTS SHALL BE SUBMITTED TO, REVIEWED BY, AND APPROVED BY THE GEOTECHNICAL ENGINEER PRIOR TO INSTALLING APPROVED BACKFILL ON PREPARED SUBGRADE. ALL BASE COURSE DENSITY SHALL ALSO BE TESTED BY AN APPROVED SOIL TESTING FIRM AT THE REQUIRED FREQUENCY AS SPECIFIED BY THE TOWN OF FRISCO TO ENSURE COMPLIANCE. BASE COURSE TEST RESULTS SHALL ALSO BE APPROVED BY THE GEOTECHNICAL ENGINEER PRIOR TO BACKFILLING. TEST RESULTS SHALL BE REVIEWED AND APPROVED BY THE TOWN OF FRISCO ENGINEERING DIVISION PRIOR TO INITIATION OF THE REQUIRED 2-YEAR WARRANTY PERIOD.
8. CONTRACTOR SHALL CONFORM TO ALL FEDERAL, STATE, AND LOCAL HEALTH AND SAFETY RULES AND REGULATIONS.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL UTILITIES DURING CONSTRUCTION AND FOR COORDINATING WITH THE APPROPRIATE UTILITY COMPANY FOR ANY UTILITY CROSSINGS REQUIRED. REPAIR DAMAGED UTILITIES SHALL BE AT THE CONTRACTOR'S EXPENSE, INCLUDING BUT NOT LIMITED TO UNIDENTIFIED UNDERGROUND UTILITIES.
10. EXISTING FENCES, TREES, SIDEWALKS, CURBS AND GUTTERS, LANDSCAPING, STRUCTURES, AND IMPROVEMENTS DESTROYED, DAMAGED, OR REMOVED DUE TO CONSTRUCTION OF THIS PROJECT SHALL BE REPLACED OR RESTORED TO THE PRE-CONSTRUCTION CONDITION AT THE CONTRACTORS EXPENSE, UNLESS OTHERWISE INDICATED ON THESE PLANS.
11. THE CONTRACTOR SHALL OBTAIN A STORMWATER CONSTRUCTION PERMIT FROM THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT, WATER QUALITY CONTROL DIVISION, PRIOR TO CLEARING, GRADING, OR EXCAVATING A SITE OF ONE-HALF ACRE OR MORE. A COPY OF THE APPROVED PERMIT MUST BE SUBMITTED TO THE TOWN OF FRISCO PRIOR TO THE START OF CLEARING, GRADING, OR EXCAVATING. A COPY OF THE APPROVED PERMIT MUST ALSO BE AVAILABLE ON THE PROJECT SITE AT ALL TIMES DURING CONSTRUCTION.
12. IF GROUNDWATER IS ENCOUNTERED DURING EXCAVATION AND DEWATERING FROM THE TRENCH TO STORM SEWER, CHANNEL, IRRIGATION DITCH, OR ANY WATERS OF THE UNITED STATES IS NECESSARY, THE CONTRACTOR SHALL OBTAIN A COLORADO STATE CONSTRUCTION DEWATERING DISCHARGE PERMIT FROM THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT. A COPY OF THE APPROVED PERMIT MUST BE SUBMITTED TO THE TOWN OF FRISCO PRIOR TO THE START OF ANY DEWATERING. A COPY OF THE APPROVED PERMIT MUST ALSO BE AVAILABLE OF THE PROJECT SITE AT ALL TIMES DURING CONSTRUCTION.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING STORM RUNOFF AND ANY GROUNDWATER ENCOUNTERED DURING THE CONSTRUCTIONS OF ANY PART OF THE PROJECT. GROUNDWATER SHALL BE PUMPED, PIPED, REMOVED, AND DISPOSED OF IN A MANNER WHICH DOES NOT CAUSE FLOODING OF EXISTING STREETS NOR EROSION ON ADJACENT PROPERTIES IN ORDER TO CONSTRUCT THE IMPROVEMENTS SHOWN OF THE PLANS. NO CONCRETE SHALL BE PLACED WHERE GROUNDWATER IS VISIBLE OR UNTIL THE GROUNDWATER TABLE HAS BEEN LOWERED BELOW THE PROPOSED IMPROVEMENTS. ANY UNSTABLE AREAS, AS A RESULT OF GROUNDWATER, ENCOUNTERED DURING THE CONSTRUCTION OF THE PROPOSED IMPROVEMENTS SHALL BE STABILIZED AS AGREED UPON BY THE CONTRACTOR, THE TOWN OF FRISCO, AND THE GEOTECHNICAL ENGINEER AT THE TIME OF OCCURRENCE.
14. THE CONTRACTOR IS RESPONSIBLE FOR FIELD LOCATING AND VERIFYING ELEVATIONS OF ALL EXISTING STORM SEWER AND OTHER IMPROVEMENTS AT THE POINT OF CONNECTION SHOWN ON THE PLANS, AND AT ANY UTILITY CROSSINGS PRIOR TO INSTALLING ANY OF THE NEW IMPROVEMENTS. IF A CONFLICT EXISTS AND/OR A DESIGN MODIFICATION IS REQUIRED, THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER TO MODIFY THE DESIGN.
15. PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION, THE CONTRACTOR SHALL CONTACT ALL UTILITIES AND COORDINATE SCHEDULES.
16. ALL PUBLIC IMPROVEMENT WORK, INCLUDING CORRECTION WORK, SHALL BE INSPECTED BY A TOWN OF FRISCO REPRESENTATIVE WHO SHALL HAVE THE AUTHORITY TO HALT CONSTRUCTION WHEN STANDARD CONSTRUCTION PRACTICES ARE NOT BEING ADHERED TO. THE TOWN OF FRISCO RESERVES THE RIGHT TO ACCEPT OR REJECT ANY SUCH MATERIALS AND WORKMANSHIP THAT DOES NOT CONFORM TO ITS ENGINEERING CODE OF STANDARDS AND SPECIFICATIONS FOR THE DESIGN AND CONSTRUCTION OF PUBLIC IMPROVEMENTS. CONTRACTOR IS RESPONSIBLE FOR BEING AWARE OF, NOTIFYING, COORDINATING, AND SCHEDULING ALL INSPECTIONS REQUIRED FOR FINAL APPROVALS AND PROJECT ACCEPTANCE.
17. RECORD DRAWINGS SHOWING ALL CHANGES FROM THE APPROVED CONSTRUCTION DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER AND OWNER PRIOR TO INITIATION OF THE REQUIRED 2-YEAR WARRANTY PERIOD. THE RECORD DRAWINGS SHALL CONSIST OF A MARKED-UP SET OF THE CONSTRUCTION DRAWINGS VERIFYING THE FOLLOWING:
    - ALL LENGTHS, SIZES, AND MATERIALS OF INSTALLED PIPE, MANHOLES, AND ANY OTHER IMPROVEMENT
    - HORIZONTAL LOCATIONS OF ALL BENDS, VALVES, STUBS, PLUGS, TEES, ETC.
    - TOP OF PIPE AND FITTING ELEVATIONS AT REGULAR INTERVALS.
    - ANY OTHER VARIATIONS FROM THE CONSTRUCTION DOCUMENTS MUST BE CLEARLY NOTED AND DETAILED ON THE PLANS.
    - AS-BUILT FIELD NOTES, FROM WHICH THE AS-BUILT DRAWINGS WILL BE PREPARED, ARE TO BE PROVIDED AND STAMPED/SIGNED AND DATED BY A COLORADO REGISTERED PROFESSIONAL LAND SURVEYOR.
18. THE CONTRACTOR SHALL WARRANT ALL WORK TO BE FREE FROM DEFECTS IN WORKMANSHIP AND MATERIALS FOR A PERIOD OF 2-YEARS FROM THE DATE OF ACCEPTANCE INTO THE WARRANTY PERIOD OF ALL CONSTRUCTION CALLED FOR BY THE PUBLIC IMPROVEMENTS AGREEMENT WITH THE TOWN OF FRISCO.
19. DURING CONSTRUCTION AND UPON COMPLETION OF CONSTRUCTION, THE SITE SHALL BE CLEANED AND RESTORED TO A CONDITION EQUAL, OR BETTER THAN, THAT WHICH EXISTED PRIOR TO CONSTRUCTION ACTIVITIES ON SITE.
20. THE OWNER SHALL IMPLEMENT A ROUTINE AND DILIGENT MAINTENANCE PLAN TO MAINTAIN PROPER GRADING AND DRAINAGE.

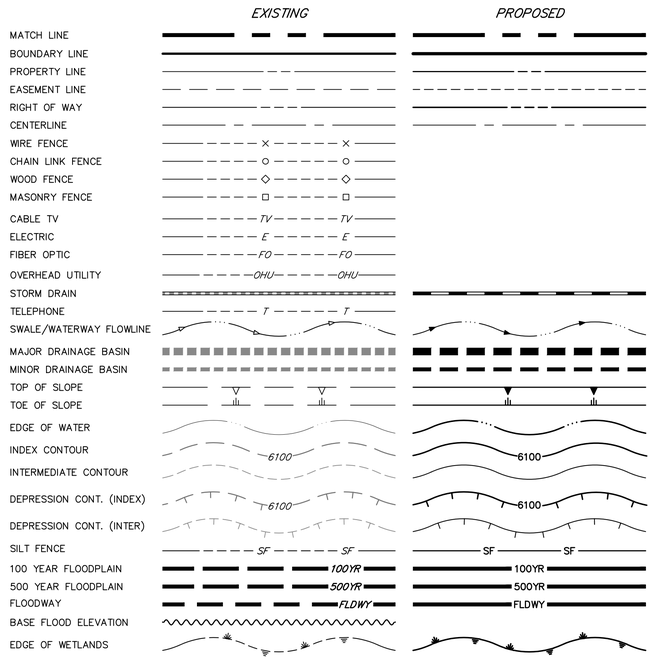
GRADING AND EROSION CONTROL NOTES

1. ALL SITE GRADING SHALL CONFORM TO THE RECOMMENDATIONS OF THE LATEST GEOTECHNICAL INVESTIGATION OF THIS SITE AND SHALL FURTHER BE IN CONFORMANCE WITH THE TOWN OF FRISCO'S GRADING CRITERIA, IF APPLICABLE.
2. EXISTING ELEVATIONS SHOWN ON THIS DRAWING HAVE BEEN DEPICTED FROM THE BEST AVAILABLE INFORMATION AND ARE SHOWN TO THE EXTENT KNOWN. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY EXISTING GRADE CONDITIONS AT THE LIMITS OF CONSTRUCTION AND AT LOCATIONS THAT INTERFERE WITH EXISTING OR PROPOSED STRUCTURES AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES THAT CONTRADICT THE ENGINEERS INTENT FOR THE DRAINAGE PATTERNS, MAXIMUM AND MINIMUM SLOPES, AND PROPOSED ELEVATIONS AS SHOWN ON THE PLAN. THE ENGINEER WILL NOT BE LIABLE FOR ANY COSTS ASSOCIATED WITH THE CHANGES TO THE DESIGN WITHOUT PROPER NOTIFICATION.
3. PROPOSED CONTOURS AND SPOT ELEVATIONS AS SHOWN HEREIN ARE DEFINED AS FINISHED ELEVATION AFTER PAVING, LANDSCAPING, ETC. CONTRACTOR SHALL COORDINATE WITH GEOTECH FOR PAVEMENT THICKNESS AND LANDSCAPE THICKNESS OF TOPSOIL, SOD, AND LANDSCAPE MATERIALS.
4. TEMPORARY CUT/FILL SLOPES SHALL NOT EXCEED A STEEPNESS OF [1:1] (H:V). PERMANENT SLOPES SHALL NOT EXCEED 2:1 (H:V) UNLESS NOTED OTHERWISE.
5. CONTRACTOR SHALL ADJUST ALL EXISTING AND PROPOSED MANHOLE RIMS, VALVE BOXES, ETC. TO MATCH FINAL GRADE.
6. THE CONTRACTOR SHALL PREPARE, SUBMIT, AND ACQUIRE A COLORADO DEPARTMENT OF PUBLIC HEALTH AND THE ENVIRONMENT EROSION CONTROL PLAN AND PERMIT PRIOR TO BEGINNING ANY SITE DISTURBING ACTIVITY. IF DISTURBING GREATER THAN ONE ACRE OF LAND AS PART OF THIS PROJECT, CONTRACTOR SHALL PROVIDE PAYMENT FOR ALL PERMIT FEES.
7. CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION/SEDIMENTATION CONTROL DURING CONSTRUCTION, FOR ANY TIME OF YEAR, IN ACCORDANCE WITH THE CDPHE EROSION PREVENTION AND SEDIMENT CONTROL REQUIREMENTS, THE STANDARD CONSTRUCTION SPECIFICATIONS FOR THIS PROJECT AND THE EROSION CONTROL NOTES INCLUDED WITHIN THESE PLANS. IF DISCREPANCIES BETWEEN STANDARDS OCCUR, THE MORE STRINGENT REGULATION SHALL APPLY.
8. APPROVAL OF THE EROSION CONTROL PLAN DOES NOT CONSTITUTE AN APPROVAL OF PERMANENT DRAINAGE DESIGN.
9. THE IMPLEMENTATION OF THE EROSION CONTROL PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED AND VEGETATION/LANDSCAPING IS ESTABLISHED.
10. THE BOUNDARIES OF THE LIMITS OF CONSTRUCTION SHALL BE CLEARLY FLAGGED IN THE FIELD PRIOR TO CONSTRUCTION. DURING THE CONSTRUCTION PERIOD, NO DISTURBANCE BEYOND THE FLAGGED LIMITS OF CONSTRUCTION SHALL BE PERMITTED. THE FLAGGING SHALL BE MAINTAINED BY THE CONTRACTOR FOR THE DURATION OF CONSTRUCTION.
11. EROSION CONTROL FACILITIES MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES, AND IN SUCH A MANNER AS TO ENSURE THAT SEDIMENT AND/OR SEDIMENT LADEN WATER DOES NOT ENTER THE DRAINAGE SYSTEM.
12. THE EROSION CONTROL FACILITIES SHALL BE INSPECTED DAILY BY THE CONTRACTOR AND MAINTAINED AS NECESSARY TO ENSURE THEIR CONTINUED FUNCTIONALITY.
13. THE EROSION CONTROL FACILITIES ON INACTIVE SITES SHALL BE INSPECTED AND MAINTAINED A MINIMUM OF ONCE A MONTH OR WITHIN 24 HOURS FOLLOWING A STORM EVENT.
14. STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES MAY BE REQUIRED TO ENSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.
15. CONTRACTOR SHALL PROVIDE DUST CONTROL AS REQUIRED.
16. SEEDING SHALL BE PERFORMED NO LATER THAN SEPTEMBER 1 FOR EACH PHASE OF CONSTRUCTION. ROUGHEN AND SEED ALL DISTURBED SURFACES.
17. EROSION CONTROL MEASURES SHALL BE REMOVED BY THE CONTRACTOR WHEN VEGETATION IS FULLY ESTABLISHED.
18. CONTRACTOR SHALL PROVIDE AND MAINTAIN A CONCRETE WASHOUT FACILITY.

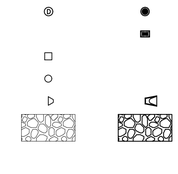
STORM SEWER GENERAL NOTES

1. ALL STORM SEWER PIPE SHALL BE ASTM C76 CLASS III REINFORCED CONCRETE PIPE (RCP) UNLESS OTHERWISE SPECIFIED IN THESE PLANS.
2. ALL STORM SEWER MANHOLES SHALL BE 1/4 INCH LOW TO FLUSH WITH FINAL PAVED SURFACE.
3. PRIOR TO INITIAL ACCEPTANCE OF PUBLIC IMPROVEMENTS, THE TOWN MAY REQUIRE THE APPLICANT OR HIS CONTRACTOR TO FILE A MAINTENANCE BOND WITH THE CITY IN THE AMOUNT OF FIFTEEN (15) PERCENT OF THE ESTIMATED COST OF CONSTRUCTION OR AN AMOUNT ADEQUATE TO ENSURE THE SATISFACTORY MAINTENANCE AND CONDITION OF THE REQUIRED PUBLIC IMPROVEMENTS FOR A PERIOD OF ONE (1) YEAR AFTER THE DATE OF THEIR FINAL ACCEPTANCE AND DEDICATION TO THE CITY.
4. THE CONTRACTOR SHALL FURNISH AND INSTALL, PER SPECIFICATIONS, THE APPROPRIATE BURIED UTILITY WARNING AND IDENTIFICATION TAPE ABOVE ALL PUBLIC SEWER LINES, INCLUDING SEWER LATERALS LOCATED IN PUBLIC RIGHTS-OF-WAY.
5. AFTER COMPLETION OF PIPE LAYING, ALL MAIN LINE SEWERS, SERVICE LATERALS AND STRUCTURES SHALL BE TESTED IN THE PRESENCE OF THE INSPECTOR. IT WILL BE THE PERMITTEE'S RESPONSIBILITY TO PAY FOR THE COST OF THIS WORK.
6. COMPACTION TESTS SHALL BE SUPPLIED BY CONTRACTOR FOR ALL TRENCHES.
7. BEDDING FOR THE RCP PIPE SHALL BE AG7122 NO. 57/67 CRUSHED ROCK. SQUEEGEE OR MIXTURES CONTAINING SQUEEGEE SHALL NOT BE USED. BEDDING SHALL BE SIX TO EIGHT INCHES DEEP UNDER THE PIPE AND BACKFILLED TO THE SPRING LINE.
8. REQUEST FOR AN INSPECTION OF REINFORCEMENT AND SUBGRADE MUST BE CALLED 24 HOURS PRIOR TO PLACEMENT OF CONCRETE AT MANHOLES AND INLETS. STORM SEWER INSTALLATION SHALL BE SUBJECTED TO ADDITIONAL PERIODIC INSPECTION BY THE ENGINEER. FOR STORM SEWER IN THE ROADWAY AREA, TRENCH COMPACTION SHALL BE IN ACCORDANCE WITH AASHTO T99 OR T180 AS REQUIRED IN SECTION 203.11 OF THE CDOT STANDARD SPECIFICATIONS. COMPACTION TESTS MUST BE PERFORMED BY A GEOTECHNICAL ENGINEER AND SHALL BE A MINIMUM OF EVERY 250 FEET ALONG THE TRENCH. TESTING INTERVALS MAY BE INCREASED AT THE DISCRETION OF THE CITY INSPECTOR.

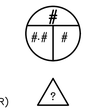
LAYER LINETYPE LEGEND



UTILITIES LEGEND



DRAINAGE PLANS



LANDSCAPE LEGEND

Know what's below. Call before you dig.

ENGINEER'S STATEMENT

STANDARD NOTES ... ONLY AS TO THE ...

TRISTAN BONSER, ... COLORADO P.E. 47602 ... FOR AND ON BEHALF OF JR ENGINEERING, LLC

PRELIMINARY NOT FOR CONSTRUCTION

UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, JR ENGINEERING APPROVES THEIR USE ONLY FOR THE PURPOSES DESIGNATED BY WRITTEN AUTHORIZATION.

PREPARED FOR
TOWN OF FRISCO
PO BOX 4100
FRISCO, CO 80443
CONTACT: ADDISON CANINO
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J·R ENGINEERING
A Westrian Company
Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com

No.	REVISION	BY	DATE

H-SCALE	N/A	DESIGNED BY	AHC
V-SCALE	N/A	DRAWN BY	AHC
DATE	12/30/22	CHECKED BY	

FRISCO BAY MARINA STORM DRAINAGE IMPROVEMENTS

GENERAL NOTES

SHEET 2 OF 15

JOB NO. 16113.00

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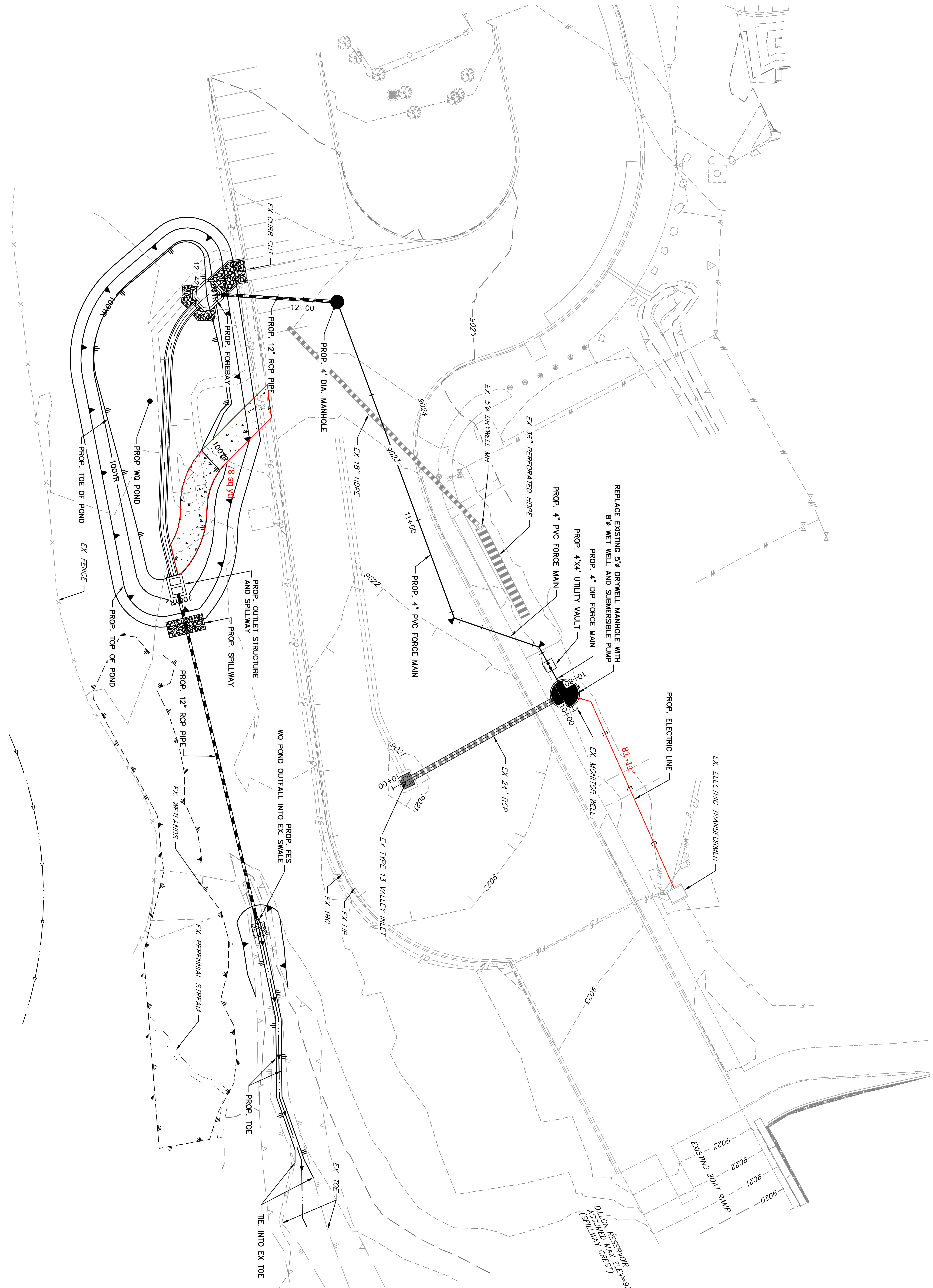


BENCHMARK:

THE BENCHMARK USED FOR THIS SITE IS NGS BM OVERLOOK, 3–1/4" ALUMINUM CAP IN CONCRETE, EAST OF ORANGE CARSONITE POST AND NORTH OF GREEN CARSONITE POST, EL=9183.16 (NAVD88).

BASIS OF BEARING:

THE EAST LINE OF SECTION 35, TOWNSHIP 5 SOUTH, RANGE 78 WEST OF THE 6TH PRINCIPAL MERIDIAN, BEING MONUMENTED BY A 3–1/4" BRASS CAP STAMPED " DMWW CO S16" AT THE NORTH END AND BY 3–1/4" BRASS CAP STAMPED "US CADASTRAL SURVEY BUREAU OF LAND MANAGEMENT T5S R78W 1/4 S35/36 1959" AT THE SOUTH END, BEARING S00°14'49"W AS REFERENCED TO COLORADO STATE PLANE CENTRAL ZONE.

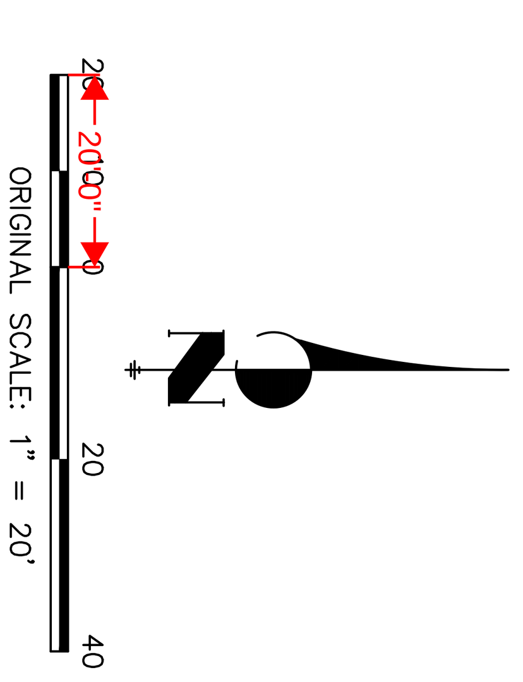
Know what's below. Call before you dig.

ENGINEER'S STATEMENT

PREPARED UNDER

TRISTAN BONSER, COLORADO P.E. 476..., FOR AND ON BEHALF OF JR ENGINEERING, LLC

PRELIMINARY NOT FOR CONSTRUCTION



FRISCO BAY MARINA STORM DRAINAGE IMPROVEMENTS	H-SCALE	1"=20'	
	V-SCALE	N/A	
SITE PLAN	DATE	12/30/22	
	DESIGNED BY	AHC	
	DRAWN BY	AHC	
	CHECKED BY		

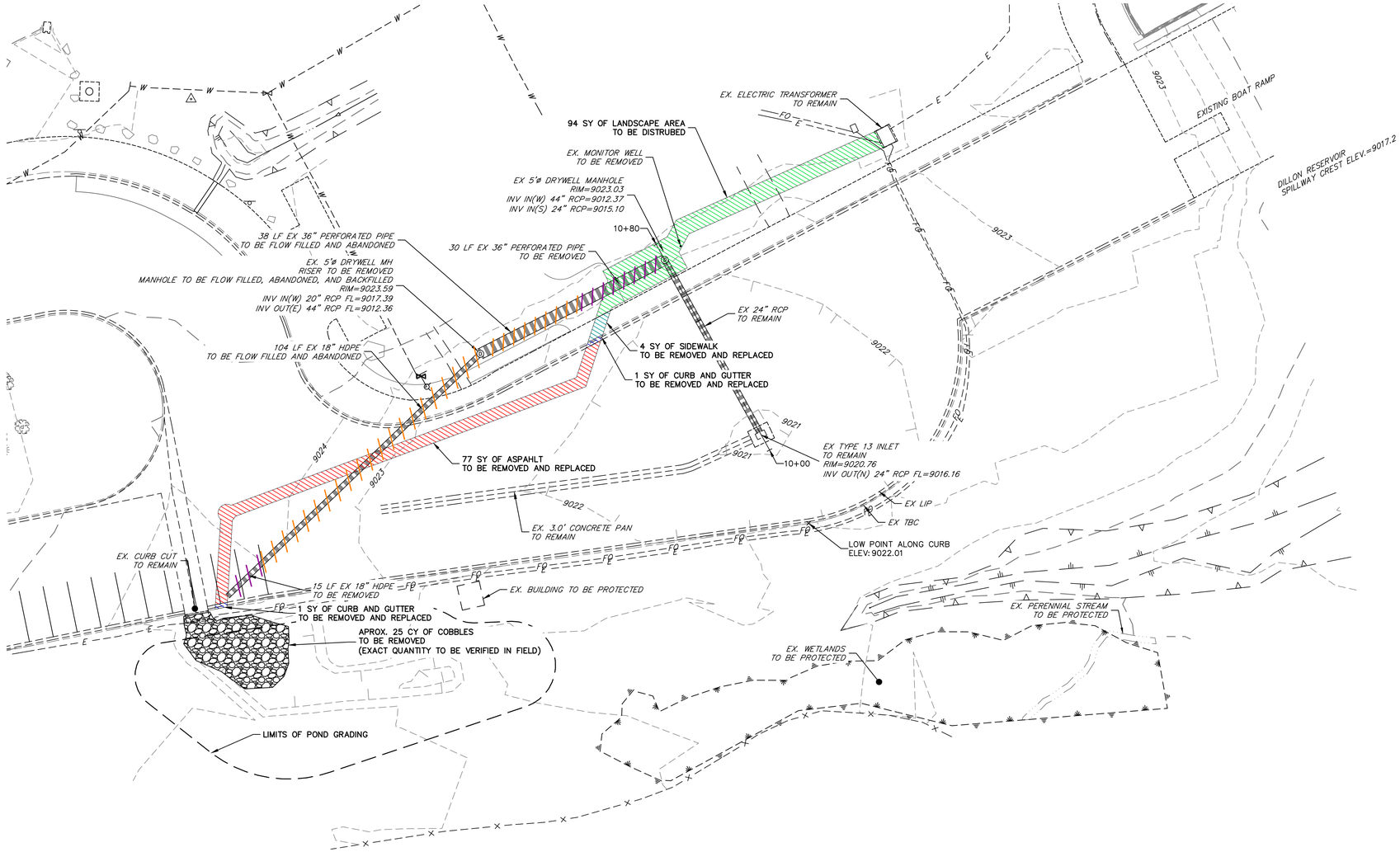
No.	REVISION	BY	DATE

J·R ENGINEERING
A Westrian Company
Centennial 303–740–9393 • Colorado Springs 719–593–2593
Fort Collins 970–491–9888 • www.jrengineering.com

PREPARED FOR
TOWN OF FRISCO
PO BOX 4100
FRISCO, CO 80443
CONTACT: ADDISON CANINO
(970) 668–9150

UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, JR ENGINEERING APPROVES THEIR USE ONLY FOR THE PURPOSES DESIGNATED BY WRITTEN AUTHORIZATION.

JOB NO. 16113.00



LEGEND

- LANDSCAPE AREA TO BE DISTURBED
- ASPHALT AREA TO BE REMOVED AND REPLACED
- CURB AND GUTTER TO BE REMOVED AND REPLACED
- SIDEWALK TO BE REMOVED AND REPLACED
- LINEAR PIPE REMOVAL
- LINEAR PIPE FLOW FILL

N

20 10 0 20 40

ORIGINAL SCALE: 1" = 20'

BENCHMARK:

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ENGINEER'S STATEMENT

PREPARED UNDER

TRISTAN BONSER,
COLORADO P.E. 47602
FOR AND ON BEHALF OF JR ENGINEERING, LLC

PRELIMINARY NOT FOR CONSTRUCTION

COLORADO LICENSED TRISTAN BONSER PROFESSIONAL ENGINEER

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V-SCALE	N/A
DATE	12/30/22
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DRAWN BY	AHC
CHECKED BY	

FRISCO BAY MARINA STORM DRAINAGE IMPROVEMENTS

DEMOLITION PLAN

SHEET 4 OF 15

JOB NO. 16113.00

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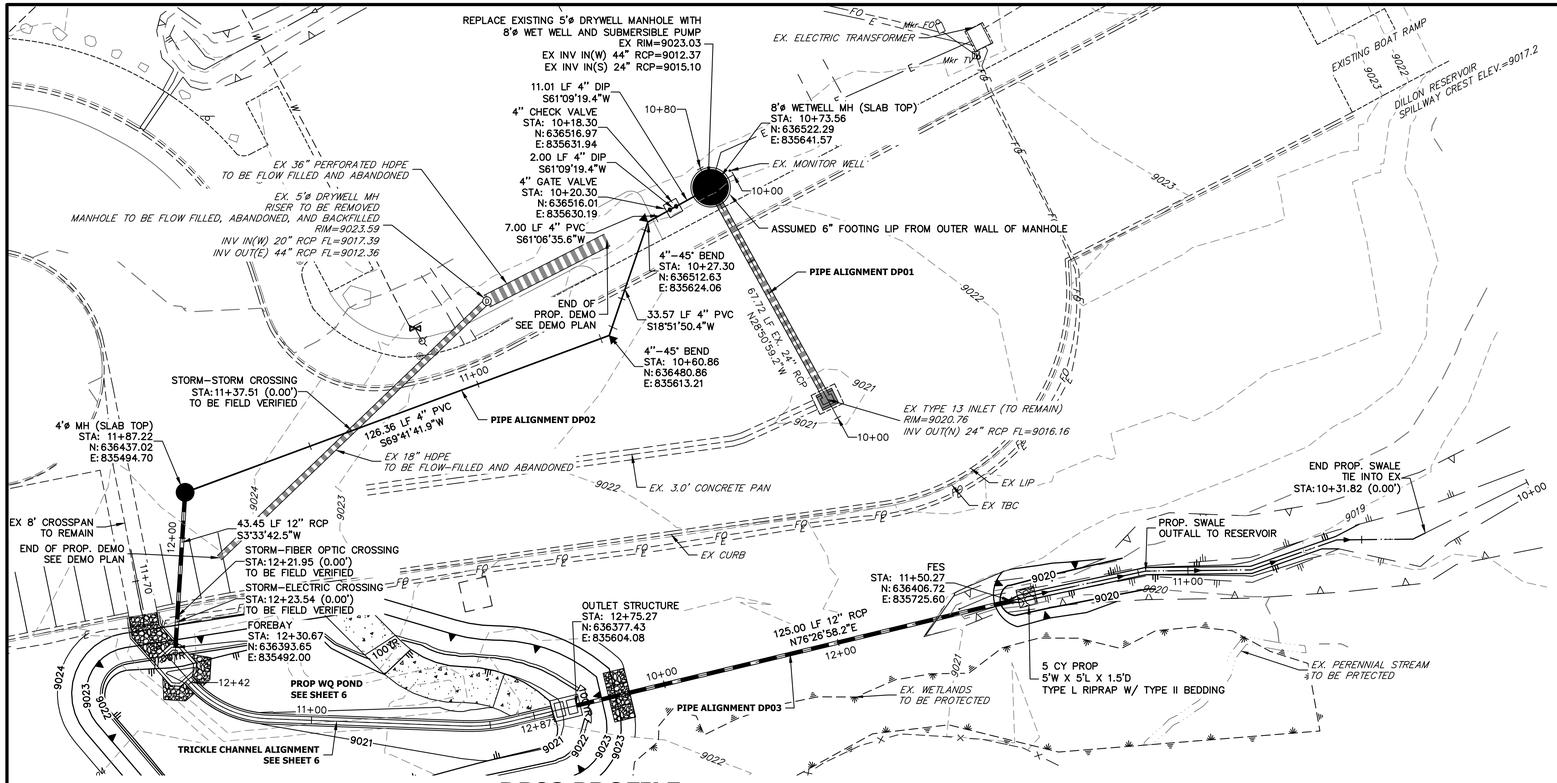

DP01 PROFILE
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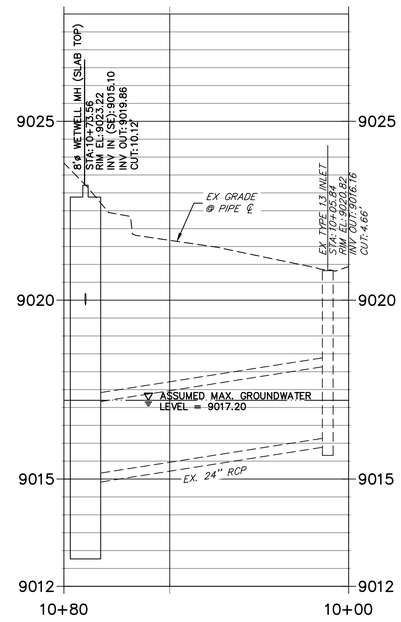

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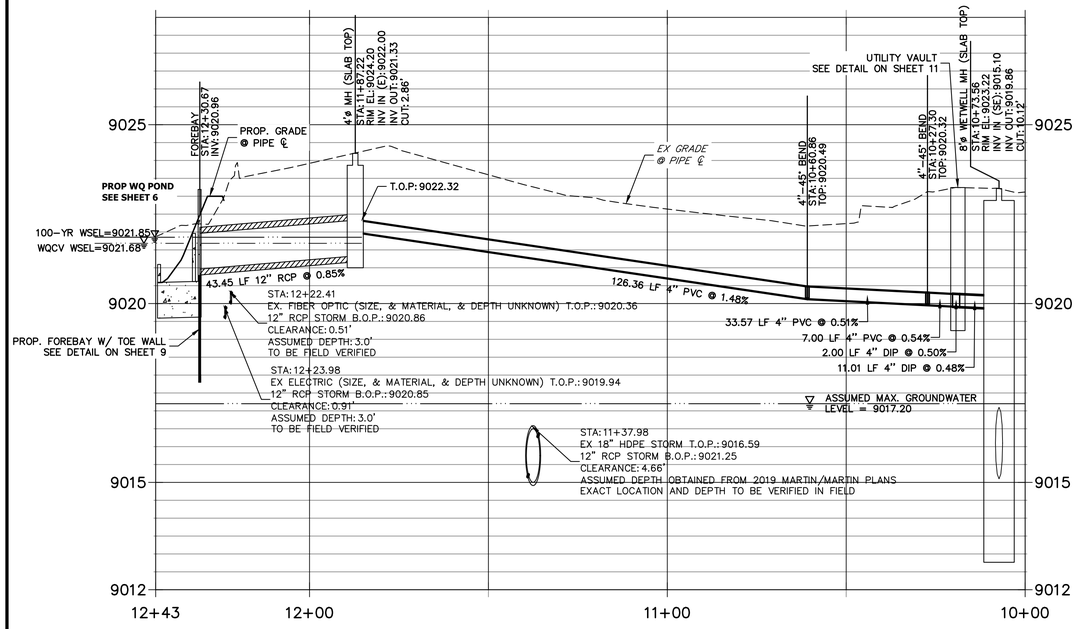

DP03 PROFILE
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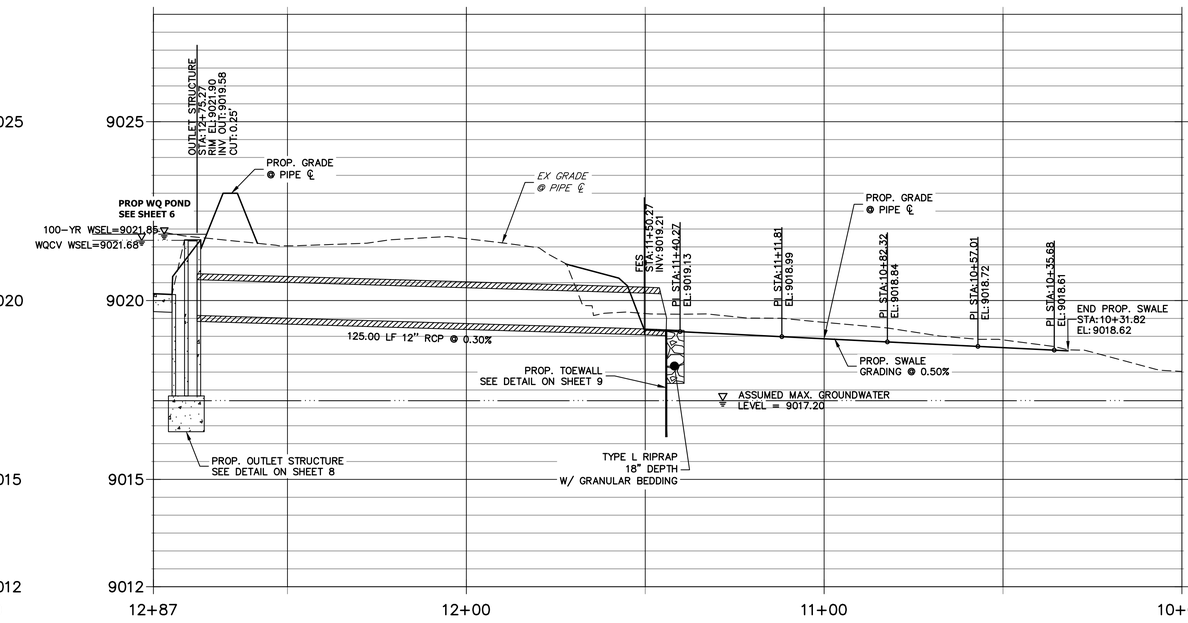

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FRISCO BAY MARINA STORM DRAINAGE IMPROVEMENTS

STORM SEWER PLAN AND PROFILE

SHEET 5 OF 15

JOB NO. 16113.00

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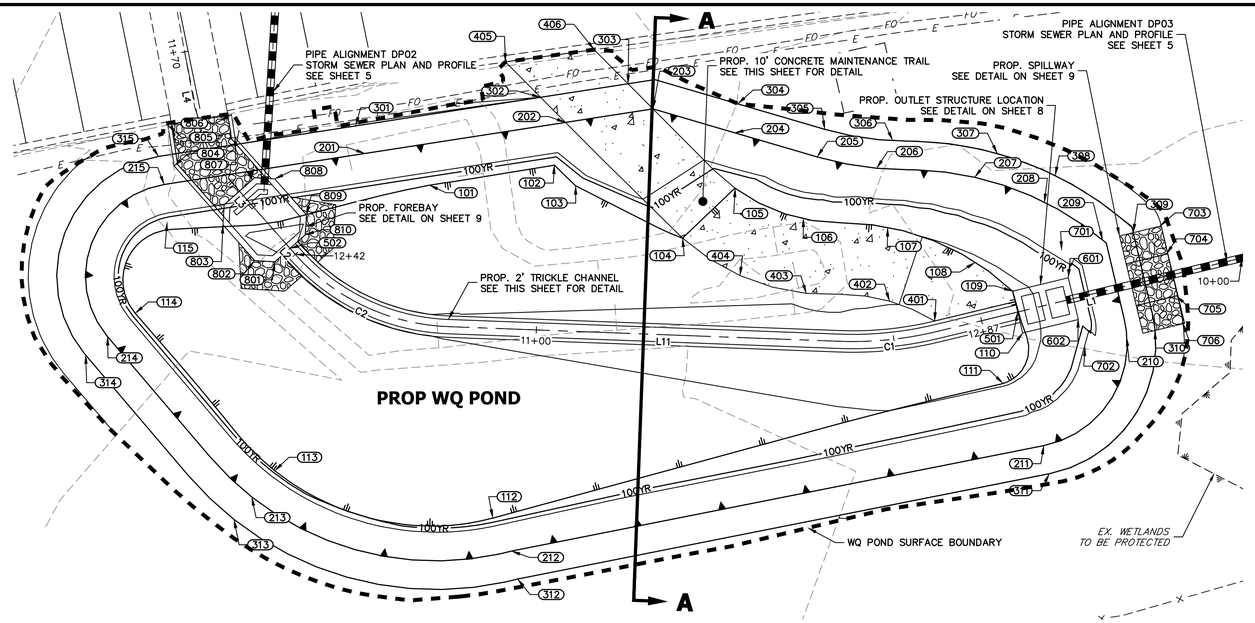
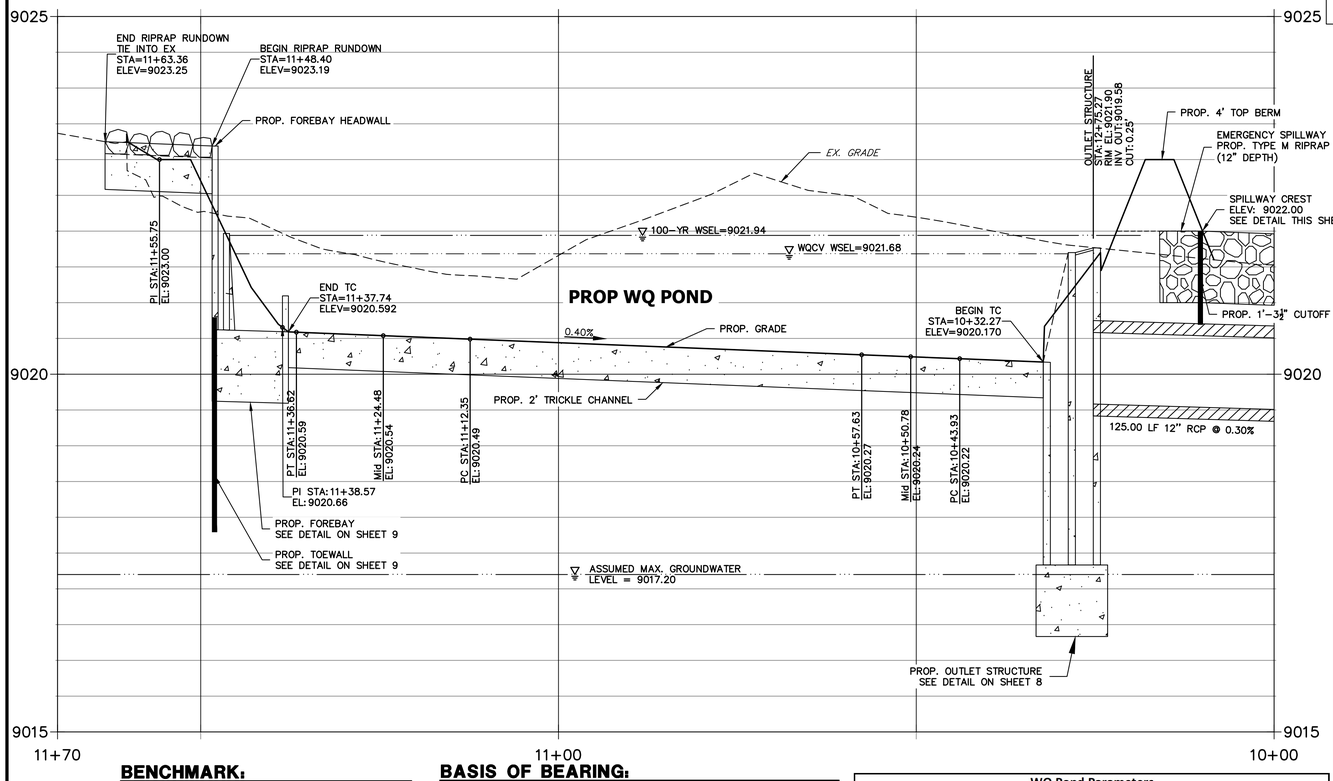


WQ POND PLAN VIEW

SCALE:1"=10'

TRICKLE CHANNEL PROFILE
STA 10+00.00 TO 11+70.00



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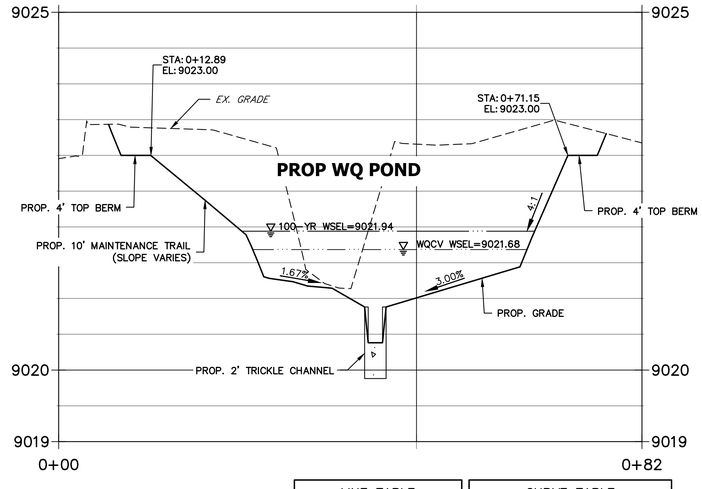
WQ Pond Parameters			
	Tributary Area (acres)	% Impervious	WQCV (acre-feet)
On-Site	0.68	85%	0.052
Off-Site	1.26	75%	
Total	1.94	79%	

HORIZONTAL CONTROL–STRUCTURES			
NAME	DESCRIPTION	NORTHING/EASTING	ELEVATION
101	TOE	N: 636393.52 E: 835515.07	9021.56
102	TOE	N: 636396.32 E: 835532.53	9021.58
103	TOE	N: 636393.43 E: 835535.50	9021.49
104	TOE	N: 636386.12 E: 835550.44	9021.22
105	TOE/MAINT. TRAIL	N: 636393.08 E: 835557.79	9021.41
106	TOE/MAINT. TRAIL	N: 636388.89 E: 835567.33	9021.29
107	TOE/MAINT. TRAIL	N: 636387.57 E: 835579.11	9021.10
108	TOE/MAINT. TRAIL	N: 636382.72 E: 835591.32	9020.84
109	TOE/MAINT. TRAIL/OS	N: 636378.71 E: 835596.57	9020.71
110	TOE/OS	N: 636372.87 E: 835597.98	9020.71
111	TOE	N: 636365.81 E: 835595.23	9020.92
112	TOE	N: 636346.99 E: 835523.93	9021.71
113	TOE	N: 636353.60 E: 835493.45	9021.78
114	TOE	N: 636375.62 E: 835473.94	9021.74
115	TOE	N: 636388.33 E: 835478.41	9021.69
201	TOP	N: 636397.96 E: 835506.05	9023.00
202	TOP/MAINT. TRAIL	N: 636402.30 E: 835534.09	9023.00
203	TOP/MAINT. TRAIL	N: 636404.19 E: 835546.31	9023.00
204	TOP	N: 636400.84 E: 835557.75	9023.00
205	TOP	N: 636397.47 E: 835569.26	9023.00
206	TOP	N: 636395.88 E: 835577.58	9023.00
207	TOP	N: 636394.63 E: 835591.29	9023.00
208	TOP	N: 636391.11 E: 835601.01	9023.00
209	TOP/SPILLWAY	N: 636385.85 E: 835609.14	9023.00

HORIZONTAL CONTROL–STRUCTURES			
NAME	DESCRIPTION	NORTHING/EASTING	ELEVATION
210	TOP/SPILLWAY	N: 636372.26 E: 835612.51	9023.00
211	TOP	N: 636357.12 E: 835600.92	9023.00
212	TOP	N: 636342.38 E: 835526.54	9023.00
213	TOP	N: 636349.94 E: 835490.24	9023.00
214	TOP	N: 636372.35 E: 835470.09	9023.00
215	TOP	N: 636393.62 E: 835478.01	9023.00
301	BERM	N: 636401.82 E: 835504.76	9023.00
302	BERM/MAINT. TRAIL	N: 636405.80 E: 835530.60	9023.00
303	BERM/MAINT. TRAIL	N: 636407.70 E: 835542.83	9023.00
304	BERM	N: 636404.91 E: 835558.17	9022.99
305	BERM	N: 636401.33 E: 835570.30	9023.00
306	BERM	N: 636399.78 E: 835579.80	9023.00
307	BERM	N: 636397.96 E: 835594.42	9023.00
308	BERM	N: 636394.88 E: 835602.52	9023.00
309	BERM/SPILLWAY	N: 636386.88 E: 835613.43	9023.00
310	BERM/SPILLWAY	N: 636373.22 E: 835616.48	9023.00
311	BERM	N: 636353.20 E: 835601.71	9023.00
312	BERM	N: 636338.47 E: 835527.40	9023.00
313	BERM	N: 636346.80 E: 835487.76	9023.01
314	BERM	N: 636369.77 E: 835467.03	9023.00
315	BERM	N: 636397.54 E: 835477.22	9023.00
401	MAINT. TRAIL	N: 636374.54 E: 835585.67	9020.85
402	MAINT. TRAIL	N: 636377.32 E: 835579.37	9021.04
403	MAINT. TRAIL	N: 636378.39 E: 835567.73	9021.22

HORIZONTAL CONTROL–STRUCTURES			
NAME	DESCRIPTION	NORTHING/EASTING	ELEVATION
404	MAINT. TRAIL	N: 636380.88 E: 835558.47	9021.22
405	MAINT. TRAIL	N: 636410.75 E: 835525.69	9023.42
406	MAINT. TRAIL	N: 636412.47 E: 835538.09	9023.17
501	BEGIN TC/OS	N: 636375.79 E: 835597.28	9020.17
502	END TC/FOREBAY	N: 636384.69 E: 835495.58	9020.59
601	OS/SPILLWAY	N: 636380.58 E: 835604.35	9021.70
602	OS/SPILLWAY	N: 636374.85 E: 835605.73	9021.70
701	SPILLWAY	N: 636384.47 E: 835603.41	9022.20
702	SPILLWAY	N: 636370.86 E: 835606.69	9022.02
703	SPILLWAY	N: 636387.78 E: 835617.13	9022.05
704	SPILLWAY	N: 636383.89 E: 835618.07	9022.04
705	SPILLWAY	N: 636378.05 E: 835619.47	9022.03
706	SPILLWAY	N: 636374.17 E: 835620.41	9022.00
801	FOREBAY	N: 636382.81 E: 835493.45	9021.13
802	FOREBAY	N: 636382.98 E: 835490.64	9021.20
803	FOREBAY	N: 636387.99 E: 835486.21	9021.30
804	FOREBAY	N: 636396.20 E: 835479.41	9023.00
805	FOREBAY	N: 636401.92 E: 835478.51	9023.45
806	FOREBAY	N: 636403.40 E: 835487.39	9023.20
807	FOREBAY	N: 636400.19 E: 835487.89	9023.01
808	FOREBAY	N: 636394.39 E: 835493.46	9022.60
809	FOREBAY	N: 636389.38 E: 835497.89	9021.19
810	FOREBAY	N: 636386.58 E: 835497.71	9021.13

SECTION A-A PROFILE
STA 0+00.00 TO 0+81.51



WQ Pond Stage-Storage Table				
Contour Elevation	Stage (ft)	Contour Area (sq. ft)	Cumulative Volume (cu. ft)	Cumulative Volume (ac. ft)
Micropool: 9,019.83	0.00	10	0	0
9,020.25	0.42	42	11	0
9,020.50	0.67	192	38	0.00
9,020.75	0.92	340	104	0.00
9,021.00	1.17	1,048	272	0.01
9,021.25	1.42	2,604	718	0.02
9,021.50	1.67	3,854	1,517	0.04
9,021.75	1.92	4,737	2,585	0.06
9,022.00	2.17	5,132	3,816	0.09
9,022.25	2.42	5,495	5,142	0.12
9,022.50	2.67	5,864	6,559	0.15
9,022.75	2.92	6,240	8,070	0.19
TOP: 9,023.00	3.17	6,648	9,678	0.22

LINE TABLE		
LINE	BEARING	DISTANCE
L1	S76°26'57"W	43.93'
L2	N41°29'38"W	1.95'
L3	N41°28'34"W	17.19'
L4	N11°19'25"W	14.25'
L11	N87°51'03"W	54.72'

CURVE TABLE			
CURVE	DELTA	RADIUS	LENGTH
C1	15°41'58"	50.00'	13.70'
C2	46°21'25"	30.00'	24.27'

10 5 0 10 20

HORIZONTAL
ORIGINAL SCALE: 1" = 10'
VERTICAL
ORIGINAL SCALE: 1" = 1'

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ENGINEER'S STATEMENT

PREPARED UNDER

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COLORADO P.E. 47602
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DATE	12/30/22	CHECKED BY	

FRISCO BAY MARINA STORM DRAINAGE IMPROVEMENTS

POND GRADING PLAN

SHEET 6 OF 15

JOB NO. 16113.00

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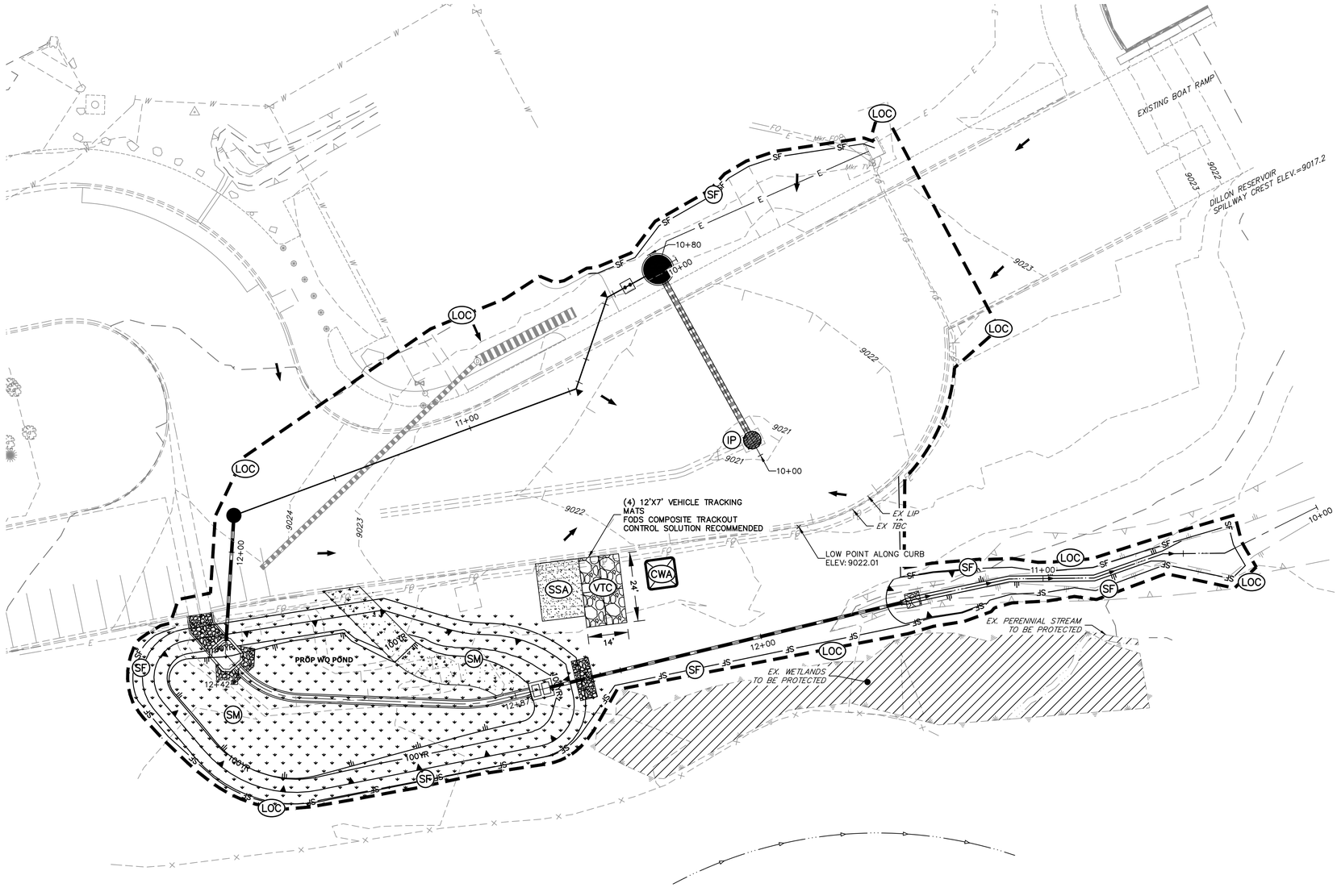
LEGEND

EXISTING CONTOUR — 5210
PROPOSED CONTOUR — 5210
EXISTING STORM SEWER
PROPOSED STORM SEWER
PROPOSED TOP OF SLOPE
PROPOSED TOE OF SLOPE
EXISTING DRAINAGE ARROW
PROPOSED DRAINAGE ARROW

LIMITS OF CONSTRUCTION — LOC
DRAINAGE SWALE — DS
CONSTRUCTION FENCE — CF
SILT FENCE — SF
VEHICLE TRACKING CONTROL — VTC
STABILIZED STAGING AREA — SSA

INLET PROTECTION — IP
PERMANENT SEEDING AND MULCHING – NATIVE REVEGETATION SEED MIX* — SM
PERMANENT LANDSCAPING (DONE BY OTHERS) — LS
AREA TO BE PROTECTED
CONCRETE WASHOUT AREA — CWA



SUMMARY OF EROSION CONTROL QUANTITIES

1	EA	–	CONCRETE WASHOUT AREA (CWA)
1100	LF	–	CONSTRUCTION FENCE (CF)
1	EA	–	INLET PROTECTION (IP)
61	EA	–	SILT FENCE (SF)
1	EA	–	STABILIZED STAGING AREA (SSA)
1	EA	–	VEHICLE TRACKING CONTROL (VTC)
0.5	AC	–	SEEDING AND MULCHING (SM)

BMP PHASING

INITIAL
1) INSTALL VTC
2) LOCATE/INSTALL CWA
3) ESTABLISH SSA
4) INSTALL SILT FENCE
5) INSTALL CONSTRUCTION MARKERS

INTERIM
1) MAINTAIN ALL BMPS
2) INSTALL INLET AND OUTLET PROTECTION

FINAL
1) PERMANENT SEEDING AND MULCHING
2) REMOVE VTC, CWA, AND SSA
3) REMOVE TEMPORARY SILT FENCE AFTER STABILIZATION

GESC NOTES

1. APPROPRIATE CONTROL MEASURES MUST BE IMPLEMENTED PRIOR TO THE START OF LAND DISTURBANCE ACTIVITY, MUST CONTROL POTENTIAL POLLUTANTS DURING EACH PHASE OF CONSTRUCTION, AND MUST BE CONTINUED THROUGH FINAL STABILIZATION. APPROPRIATE STRUCTURAL AND NON-STRUCTURAL CONTROL MEASURES MUST BE MAINTAINED IN OPERATIONAL CONDITION.
2. SEE STANDARD NOTES AND DETAILS FOR LEGEND OF NAMES AND SYMBOLS.
3. ALL INTERIM CONTROL MEASURES, INCLUDING SEEDING AND MULCHING OR DISTURBED AREAS, MUST BE COMPLETED WITHIN 14 DAYS IF THE AREAS WILL REMAIN UNDISTURBED FOR A PERIOD GREATER THAN 30 DAYS.
4. ACCEPTANCE OF THE POST-CONSTRUCTION PERMANENT CONTROL MEASURES WILL NOT OCCUR UNTIL ALL TRIBUTARY AREAS TO THE PERMANENT CONTROL MEASURES ARE FINAL STABILIZED.
5. SEEDING AREAS ARE EXPECTED TO BE BLANKETED VS. USING A STRAW MULCH AND TACKIFIER DUE TO STEEP SLOPES.

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PREPARED FOR
TOWN OF FRISCO
PO BOX 4100
FRISCO, CO 80443
CONTACT: ADDISON CANINO
(970) 668-9150

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H-SCALE	1"=20'
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FRISCO BAY MARINA STORM DRAINAGE IMPROVEMENTS

EROSION CONTROL PLAN

SHEET 7 OF 15

JOB NO. 16113.00

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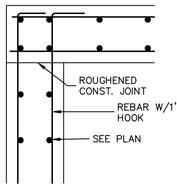
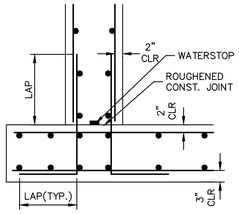
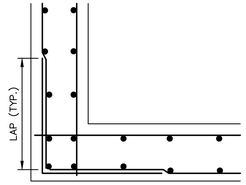


TYPICAL TOP CORNER WALL SECTION DETAIL



TYPICAL BOTTOM CORNER WALL SECTION DETAIL



TYPICAL WALL CORNER PLAN VIEW

DRAINAGE STRUCTURE STRUCTURAL NOTES:

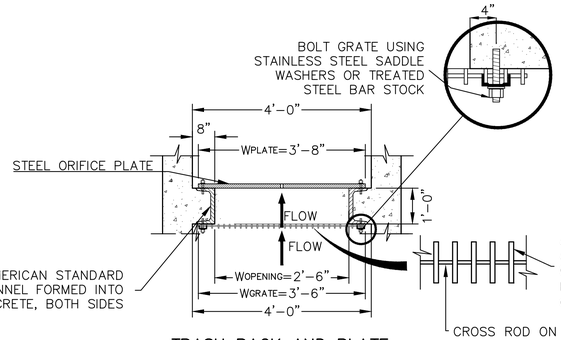
1. ALL CONCRETE SHALL BE CLASS D IN ACCORDANCE WITH CDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.
2. ALL CONSTRUCTION JOINTS SHALL BE THOROUGHLY CLEANED BEFORE FRESH CONCRETE IS POURED.
3. ALL CONSTRUCTION JOINTS NOT SHOWN ON THE PLANS SHALL BE APPROVED BY THE ENGINEER.
4. THE CONTRACTOR IS RESPONSIBLE FOR THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION.
5. STRUCTURE EXCAVATION AND BACKFILL SHALL BE IN ACCORDANCE WITH CDOT STD. M-206-1.
6. DO NOT BACKFILL UNTIL CONCRETE HAS REACHED DESIGN STRENGTH, F'c.
7. GRADE 60 REINFORCING STEEL AND EPOXY COATED ARE REQUIRED.
8. THE MINIMUM LAP SPLICE LENGTH FOR EPOXY COATED REINFORCING BARS SHALL BE:

BAR SIZE:	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH:	1'-3"	1'-6"	1'-10"	2'-2"	3'-8"	4'-8"	5'-11"	7'-3"

9. THE MINIMUM LAP SPLICE LENGTH FOR BLACK REINFORCING BARS SHALL BE:

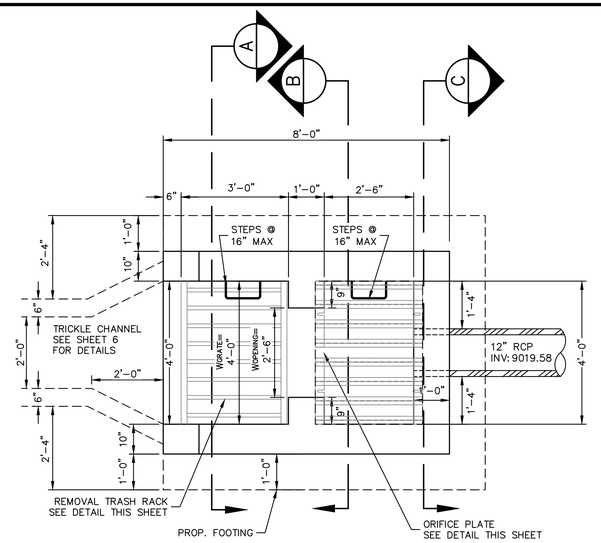
BAR SIZE:	#4	#5	#6	#7	#8	#9	#10	#11
SPLICE LENGTH:	1'-0"	1'-4"	1'-7"	1'-10"	2'-5"	3'-1"	3'-11"	4'-10"

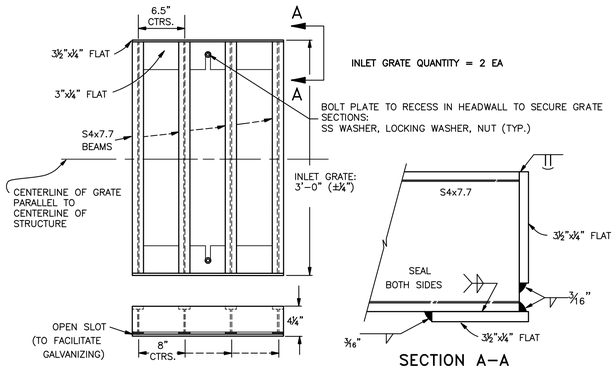
10. REINFORCING BARS SHALL BE DEFORMED AND SHALL HAVE A MINIMUM OF 2" CLEARANCE.
11. ALL EXPOSED CONCRETE CORNERS SHALL BE CHAMFERED ¾".
12. STEPS SHALL BE PROVIDED WHEN STRUCTURE INTERIOR HEIGHT EXCEEDS 3'-6" AND SHALL BE IN ACCORDANCE WITH AASHTO M 199.
13. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE LOCATIONS OF EXISTING STRUCTURES AND EXISTING UTILITIES, PRIOR TO CONSTRUCTION OF THE CAST-IN-PLACE STRUCTURES. FIELD MODIFICATIONS OF PRECAST UNITS TO ACCOMMODATE CAST-IN-PLACE STRUCTURES WILL ONLY BE ACCEPTABLE WITH THE ENGINEER'S APPROVAL.
14. CONTRACTOR SHALL SUBMIT STEEL REINFORCING SHOP DRAWINGS FOR ALL CAST-IN-PLACE STRUCTURES FOR ENGINEER'S APPROVAL PRIOR TO CONSTRUCTION.
15. CONCRETE WORK SHALL CONFORM TO ACI 301, ACI 350.
16. ALL REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO ASTM-615, GRADE 60.
17. ALL EXPOSED CONCRETE SHALL HAVE A CDOT CLASS 2 OR 5 FINISH.
18. ALL EXPOSED CONCRETE CORNERS SHALL HAVE ¾"CHAMFERS.
19. DETAILING, FABRICATION, AND PLACING OF REBAR SHALL BE IN ACCORDANCE WITH ACI 315.
20. CONSTRUCTION TOLERANCES SHALL BE IN ACCORDANCE WITH ACI 347.



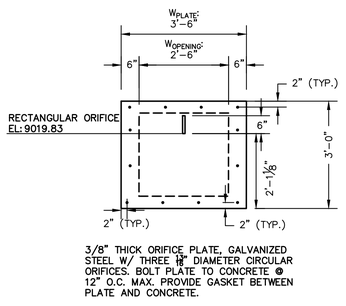
TRASH RACK AND PLATE DETAIL (PLAN)
N.T.S.

TRASH RACK DETAIL
N.T.S.





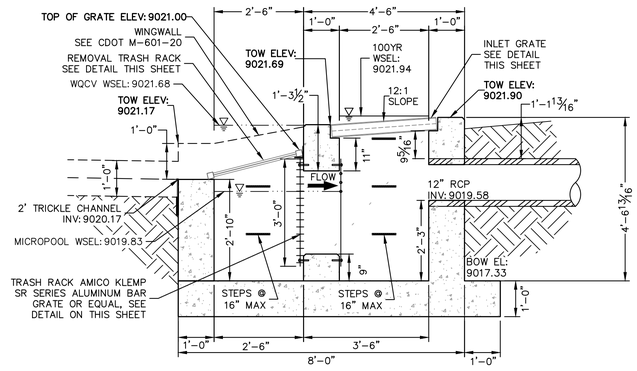
MODIFIED INLET GRATE DETAILS
N.T.S.



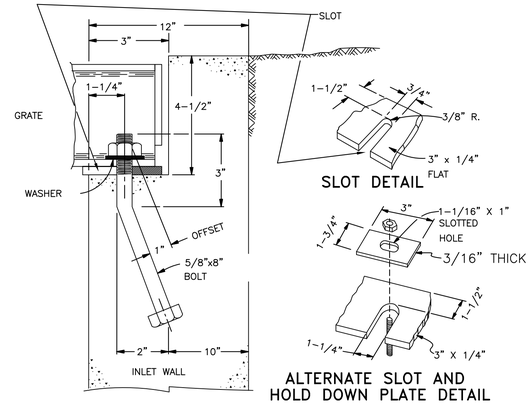
3/8" THICK ORIFICE PLATE, GALVANIZED STEEL W/ THREE 12" DIAMETER CIRCULAR ORIFICES. BOLT PLATE TO CONCRETE @ 12" O.C. MAX. PROVIDE GASKET BETWEEN PLATE AND CONCRETE.

WQ POND-ORIFICE PLATE
SCALE: 1/2" = 1'-0"

WQ POND OUTLET STRUCTURE PLAN
SCALE: 1/2"=1'

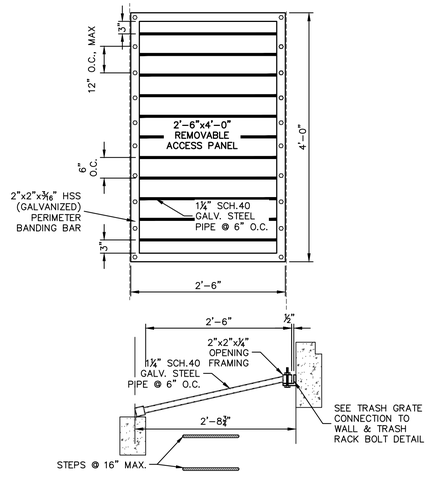


WQ POND OUTLET STRUCTURE PROFILE
SCALE: 1/2"=1'

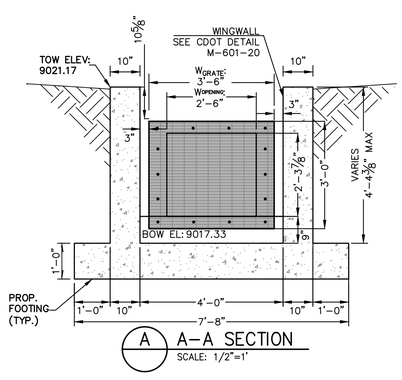


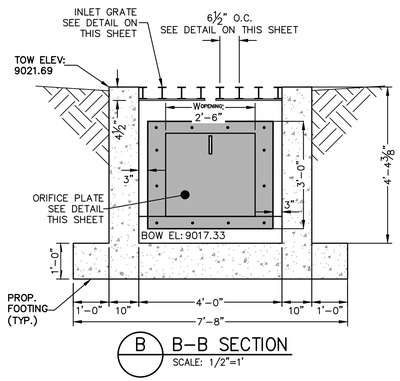
TRASH GRATE CONNECTION TO WALLS
N.T.S.

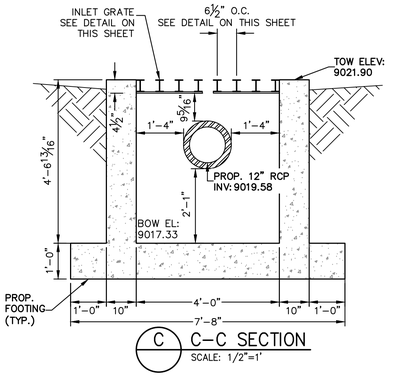
OVERFLOW GRATE INSTALLATION DETAIL
N.T.S.



REMOVABLE TRASH GRATE DETAIL
N.T.S.







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TRISTAN BONSER, COLORADO P.E. 47602
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FRISCO BAY MARINA STORM DRAINAGE IMPROVEMENTS
OULET STRUCTURE DETAILS

SHEET 8 OF 15
JOB NO. 16113.00

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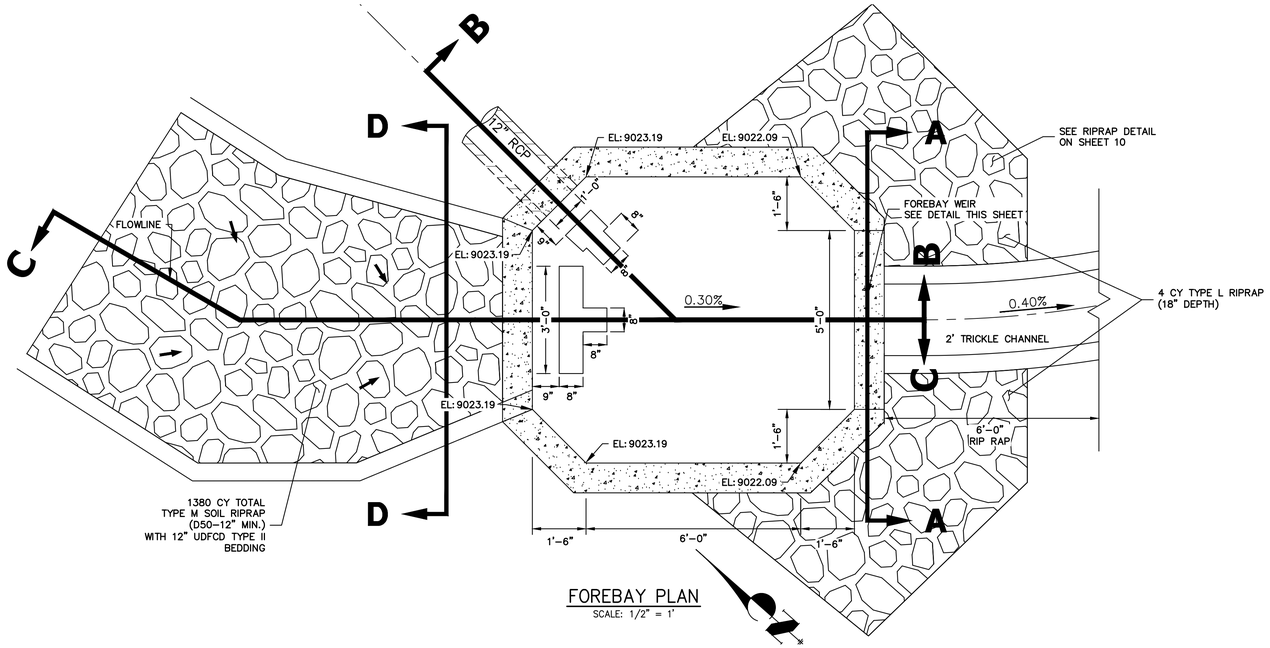
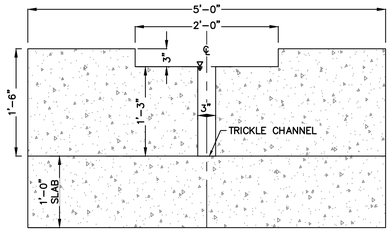
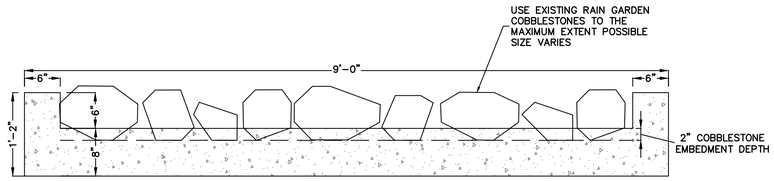


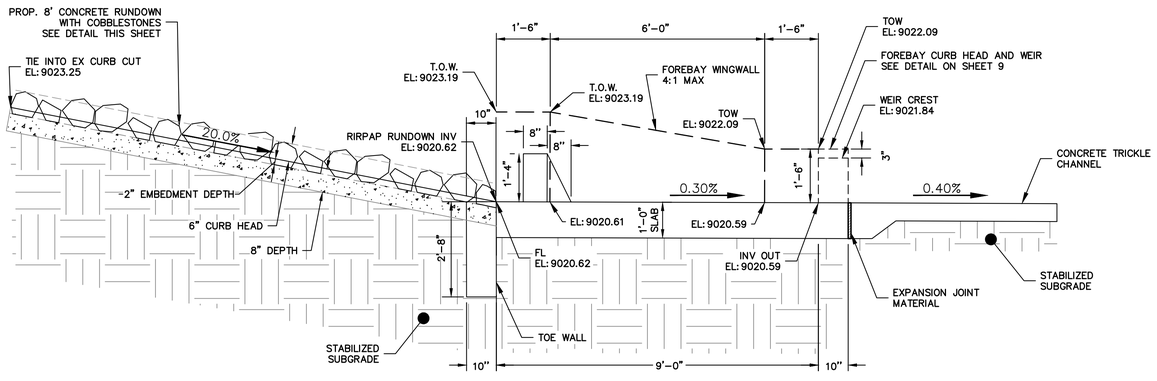
FOREBAY PLAN
SCALE: 1/2" = 1'



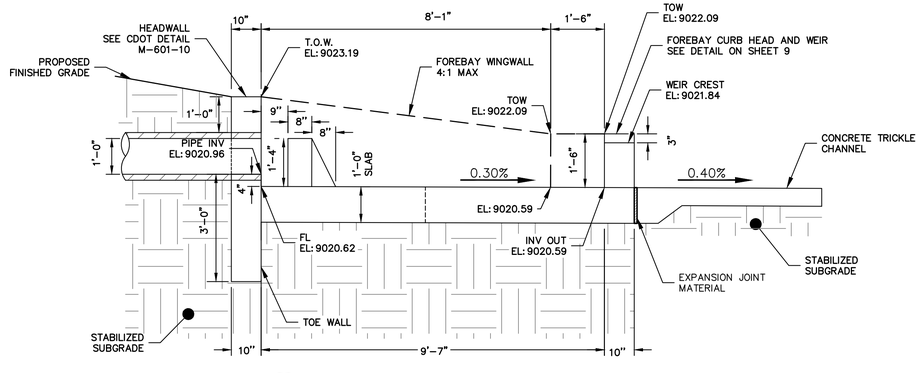
A FOREBAY WEIR SECTION
SCALE: 1" = 1'



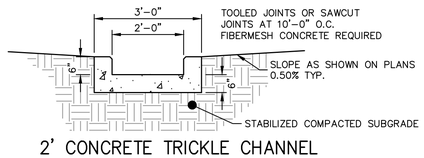
D CONCRETE RUNDOWN W/ COBBLESTONES
SCALE: 1" = 1'



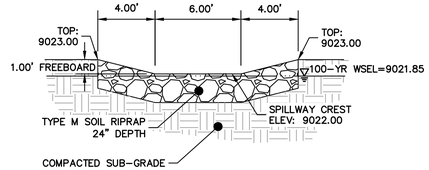
C FOREBAY SECTION C
SCALE: 1/2"=1'



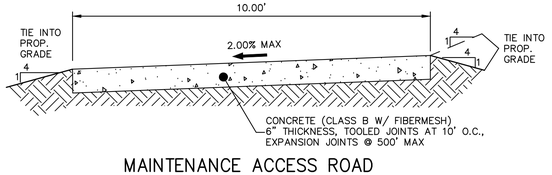
B FOREBAY SECTION B
SCALE: 1/2"=1'



2' CONCRETE TRICKLE CHANNEL TYPICAL SECTION
SCALE: 1"=2'



WQ POND EMERGENCY SPILLWAY
SCALE: 1"=5'



MAINTENANCE ACCESS ROAD CONCRETE TYPICAL SECTION
SCALE: 1" = 2'

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FRISCO BAY MARINA STORM DRAINAGE IMPROVEMENTS

FOREBAY DETAILS

SHEET 9 OF 15

JOB NO. 16113.00

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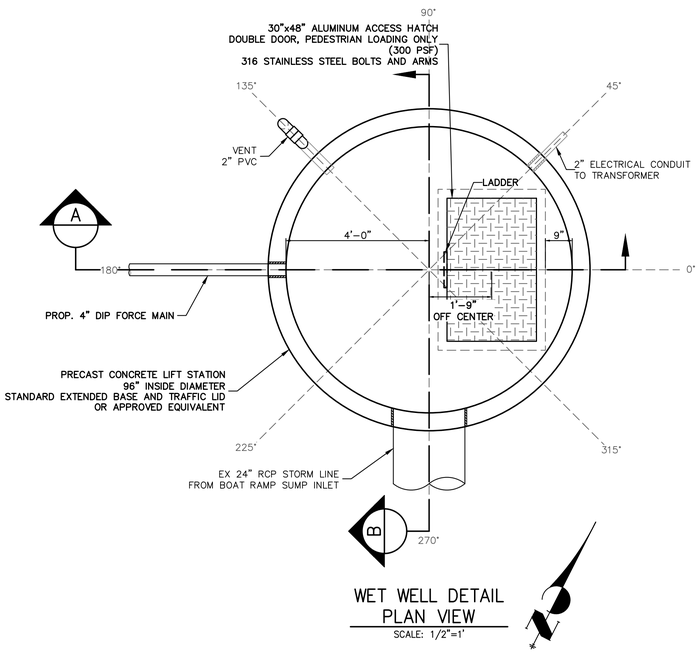
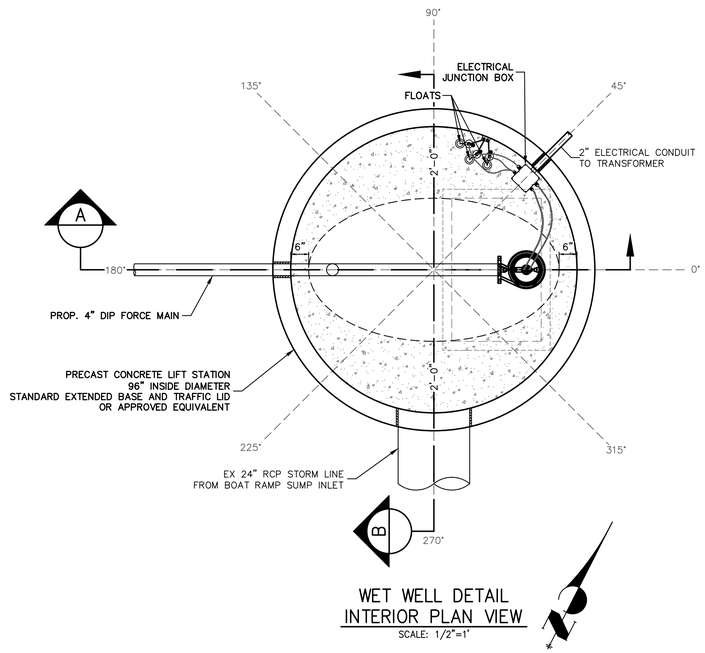
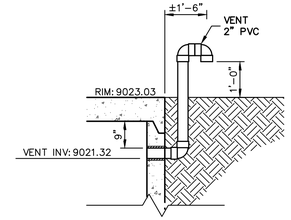


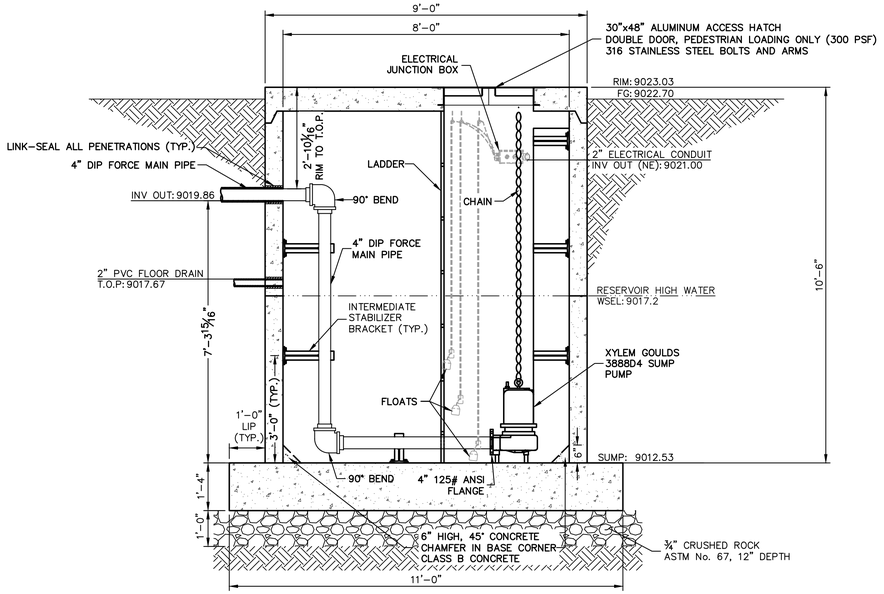
WET WELL DETAIL
PLAN VIEW
SCALE: 1/2"=1'



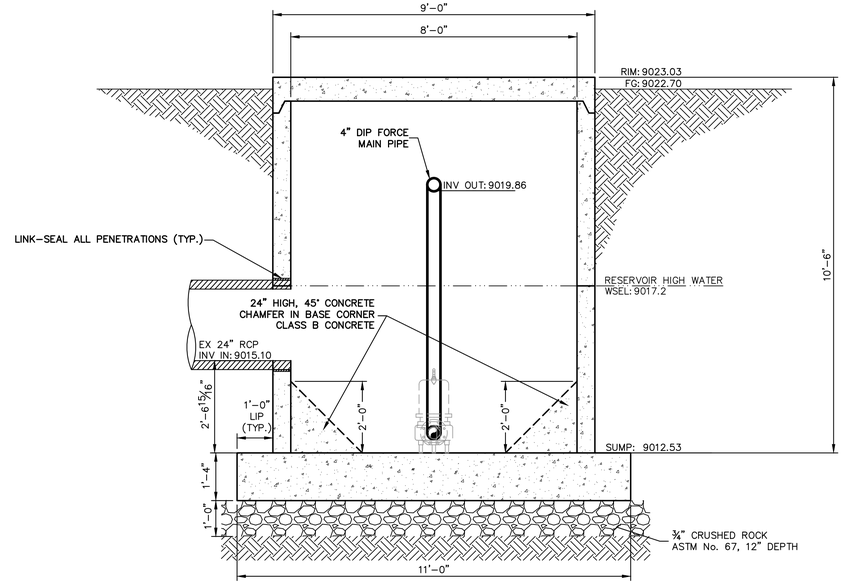
WET WELL DETAIL
INTERIOR PLAN VIEW
SCALE: 1/2"=1'



WET WELL
VENT DETAIL
SCALE: 1/2"=1'



WET WELL DETAIL
SECTION A
SCALE: 1/2"=1'



WET WELL DETAIL
SECTION B
SCALE: 1/2"=1'

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FRISCO BAY MARINA STORM
DRAINAGE IMPROVEMENTS

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SHEET 10 OF 15

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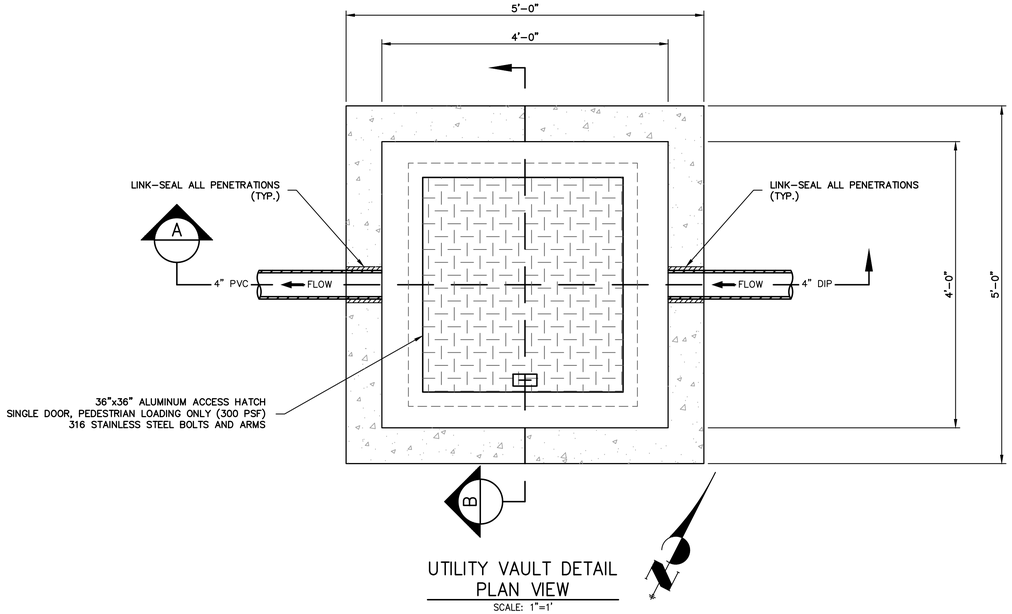
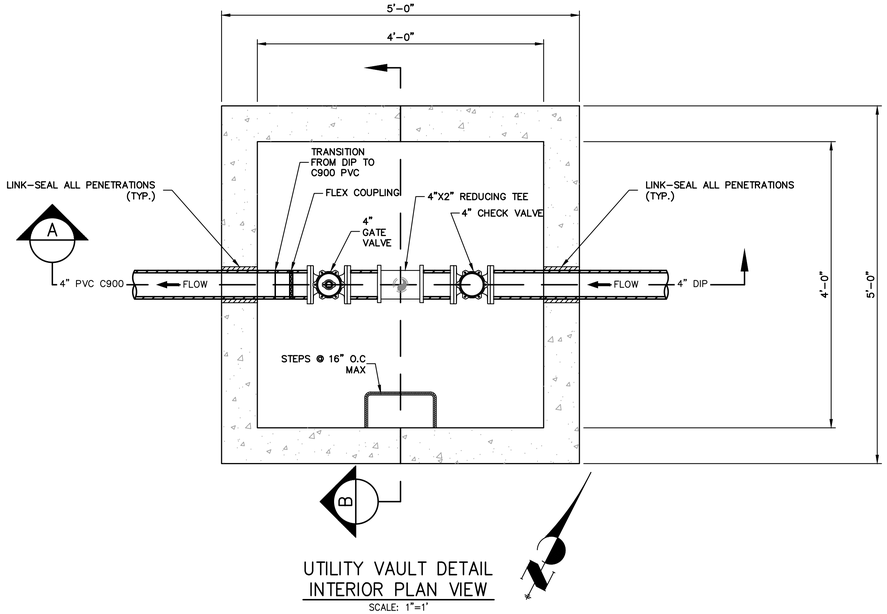
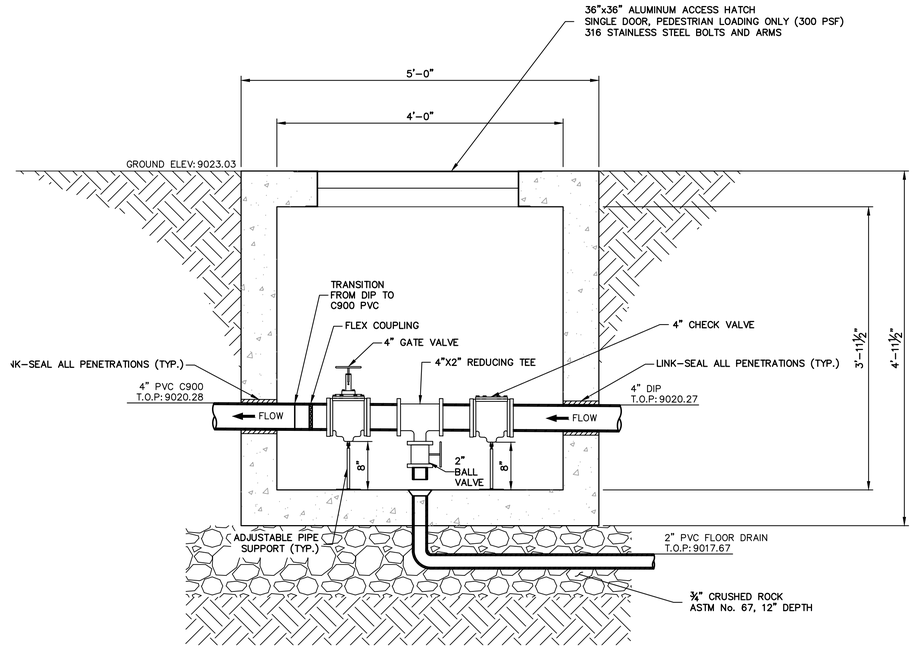


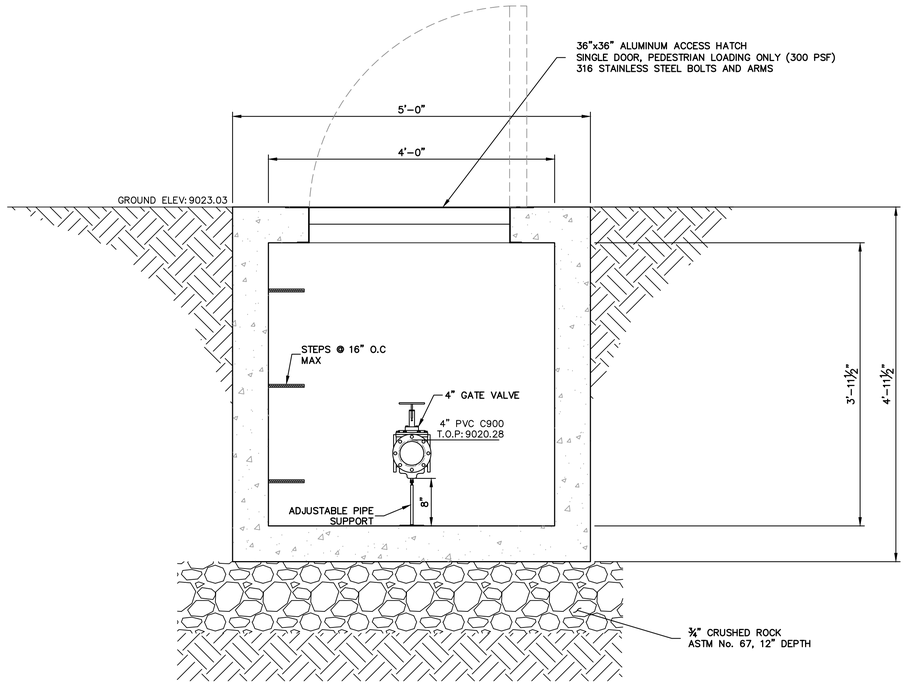
UTILITY VAULT DETAIL
PLAN VIEW
SCALE: 1"=1'



UTILITY VAULT DETAIL
INTERIOR PLAN VIEW
SCALE: 1"=1'



A UTILITY VAULT DETAIL
SECTION A
SCALE: 1"=1'



B UTILITY VAULT DETAIL
SECTION B
SCALE: 1"=1'

UTILITY VAULT NOTES:

1. PROVIDE 10" CAST-OUT HOLES IN VAULT WALLS & ANCHOR THE PIPE TO WALLS
2. RESTRAIN FITTING ENDS WITH MEGALUGS OR EQUAL.
3. ALL PIPING FOR METER VAULTS SHALL BE DUCTILE IRON (DIP) & RESTRAINED.
4. TRACER WIRE SHALL BE TERMINATED IN EACH METER VAULT BY WRAPPING THE WIRE THREE TIMES AROUND THE GATE VALVE.
5. ALUMINUM HATCH TO BE SECURED (BOLTED & LOCKABLE) WITH DIAMOND TREAD FINISH. HALLIDAY S1R OR APPROVED EQUIVALENT
6. ALL HOLE PENETRATIONS TO BE CAST-OUT W/ LINK-SEAL OR APPROVED EQUAL.
7. CONTRACTOR TO SUBMIT SHOP DRAWINGS PRIOR TO ORDERING ANY ITEMS FOR CONSTRUCTION.
8. CONTRACTOR TO COORDINATE CONNECTION TO POWER SOURCE.
9. CHECK VALVE SHALL BE VALMATIC SURGEBUSTER OR APPROVED EQUIVALENT.

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UTILITY VAULT DETAILS

SHEET 11 OF 15

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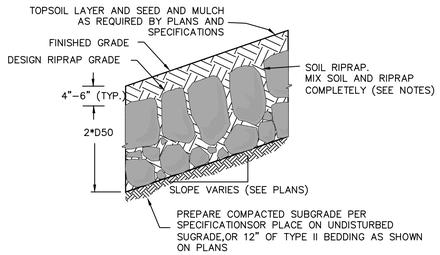


SOIL RIPRAP EMBANKMENT PROTECTION WITH MULCH TYP. SECTION

N.T.S.

TYPE M RIPRAP

INTERMEDIATE ROCK DIMENSION (IN.)	PERCENT PASSING (%)
21	70-100
18	50-70
12	35-50
4	2-10

*TYPE M RIPRAP D_{50}=12".
D_{50} = MEAN PARTICLE SIZE (INTERMEDIATE DIMENSION) BY WEIGHT.

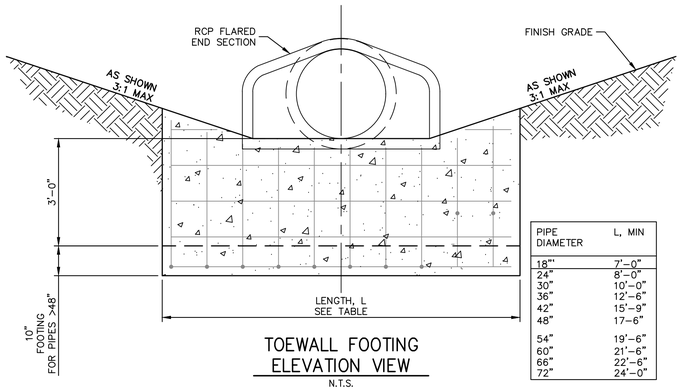
TYPE L RIPRAP

INTERMEDIATE ROCK DIMENSION (IN.)	PERCENT PASSING (%)
15	70-100
12	50-70
9	35-50
3	2-10

*TYPE L RIPRAP D_{50}=9".
D_{50} = MEAN PARTICLE SIZE (INTERMEDIATE DIMENSION) BY WEIGHT.

RIPRAP NOTES:

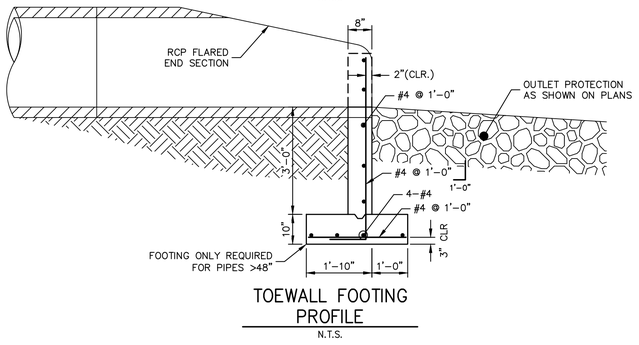
1. SOIL RIPRAP DETAILS ARE APPLICABLE TO SLOPED AREAS. REFER TO THE SITE PLAN ACTUAL LOCATION AND LIMITS.
2. MIX UNIFORMLY 65% RIPRAP BY VOLUME WITH 35% OF APPROVED SOIL BY VOLUME PRIOR TO PLACEMENT.
3. PLACE STONE-SOIL MIX TO RESULT IN SECURELY INTERLOCKED ROCK AT THE DESIGN THICKNESS AND GRADE. COMPACT AND LEVEL TO ELIMINATE ALL VOIDS AND ROCKS PROJECTING ABOVE DESIGN RIPRAP TOP GRADE.
4. CRIMP OR TACKIFY MULCH OR USE APPROVED HYDROMULCH AS CALLED FOR IN THE PLANS AND SPECIFICATIONS.
5. ROCK SHALL BE HARD, DURABLE, ANGULAR IN SHAPE, AND FREE FROM CRACKS, OVERBURDEN, SHALE, AND ORGANIC MATTER.
6. NEITHER BREADTH NOR THICKNESS OF A SINGLE STONE SHOULD BE LESS THAN ONE-THIRD ITS LENGTH, AND ROUNDED STONE SHOULD BE AVOIDED.
7. THE ROCK SHOULD SUSTAIN A LOSS OF NOT MORE THAN 40% AFTER 500 REVOLUTIONS IN AN ABRASION TEST (LOS ANGELES MACHINE ASTM C-535-69) AND SHOULD SUSTAIN A LOSS OF NOT MORE THAN 10% AFTER 12 CYCLES OF FREEZING AND THAWING (AASHTO TEST 103 FOR LEDGE ROCK PROCEDURE A).
8. ROCK HAVING A MINIMUM SPECIFIC GRAVITY OF 2.65 IS PREFERRED; HOWEVER, IN NO CASE SHOULD ROCK HAVE A SPECIFIC GRAVITY LESS THAN 2.50.



PIPE DIAMETER	L, MIN
18"'	7'-0"
24"	8'-0"
30"	10'-0"
36"	12'-6"
42"	15'-9"
48"	17'-6"
54"	19'-6"
60"	21'-6"
66"	22'-6"
72"	24'-0"

TOEWALL FOOTING ELEVATION VIEW

N.T.S.



TOEWALL FOOTING PROFILE

N.T.S.

Know what's below. Call before you dig.

ENGINEER'S STATEMENT

STANDARD NOTES ONLY AS TO THE

PRELIMINARY NOT FOR CONSTRUCTION

TRISTAN BONSER, COLORADO P.E. 47602
FOR AND ON BEHALF OF JR ENGINEERING, LLC

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Centennial 303-740-9393 • Colorado Springs 719-593-2593
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No.	REVISION	BY	DATE

H-SCALE	AS SHOWN	DESIGNED BY	AHC
V-SCALE	AS SHOWN	DRAWN BY	AHC
DATE	12/30/22	CHECKED BY	

FRISCO BAY MARINA STORM DRAINAGE IMPROVEMENTS

STANDARD DETAILS

SHEET 12 OF 15

JOB NO. 16113.00

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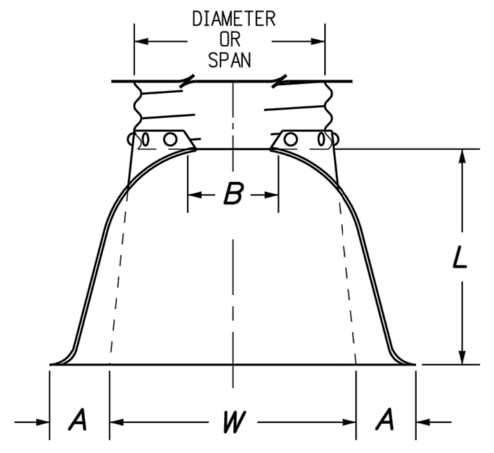
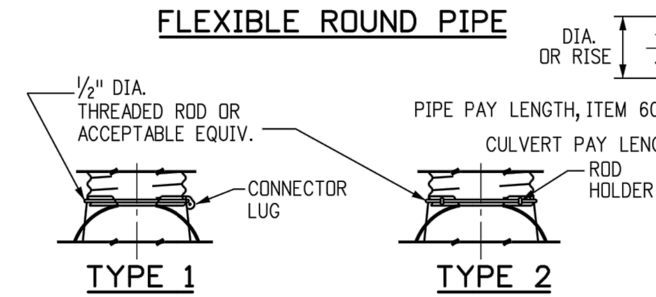
END SECTION AND CONNECTION DETAILS FOR ROUND AND ARCH METAL PIPES

FLEXIBLE ROUND PIPE

PIPE DIA.	THICKNESS	A	B	H	L	W	T
		IN.					
12	0.064	6	6	6	21	24	34
18	0.064	8	10	6	31	36	46
21	0.064	9	12	6	36	42	52
24	0.064	10	13	6	41	48	58
30	0.079	12	16	8	51	60	70
36	0.079	14	19	9	60	72	94
42	0.109	16	22	11	69	84	106
48	0.109	18	27	12	78	90	112
54	0.109	18	30	12	84	102	124
60	0.109	18	33	12	87	114	136
66	0.109	18	36	12	87	120	142
72	0.109	18	39	12	87	126	148
78	0.109	18	42	12	87	132	154
84	0.109	18	45	12	87	138	160


PLAN VIEW


TYPE 1
FOR 18 IN. THRU 24 IN. ROUND PIPE WITH ANNULAR CORRUGATIONS. NOT TO BE USED ON HELICALLY-FORMED PIPE UNLESS RECORRUGATED.

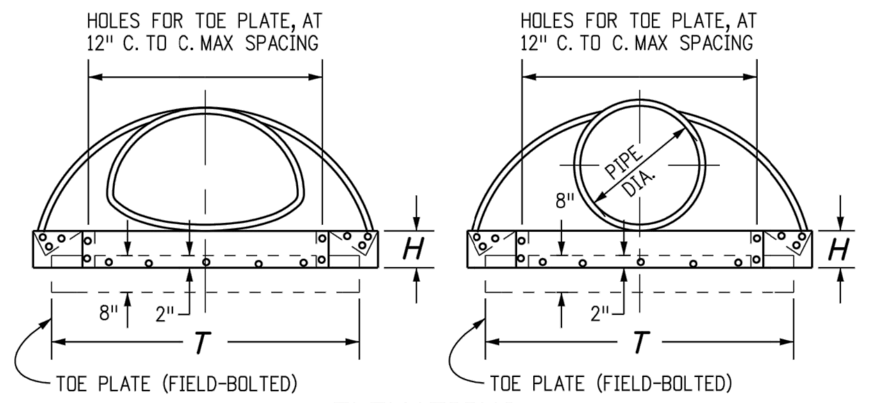
TYPE 2
FOR 30 IN. THRU 36 IN. ROUND PIPE WITH ANNULAR CORRUGATIONS. NOT TO BE USED ON HELICALLY-FORMED PIPE UNLESS RECORRUGATED.

TYPE 3
FOR 42 IN. THRU 84 IN. ROUND PIPE WITH ANNULAR CORRUGATIONS AND ALL SIZES WITH HELICAL CORRUGATIONS AND FOR ALL METAL PIPE ARCH CULVERTS. SHOP ATTACH A 24 IN. MIN. LENGTH OF ANNULAR PIPE WITH GALV. RIVETS OR BOLTS, SPOT WELDS, OR 2 IN. LONG SKIP WELDS ON 8 IN. CTRS. REPAIR BURNT GALVANIZING IN ACCORDANCE WITH SUBSECTION 707.09.

TYPICAL CONNECTIONS

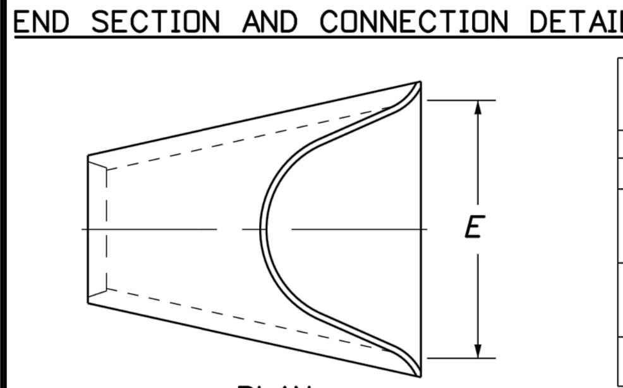
FLEXIBLE PIPE ARCH

PIPE ARCH SPAN x RISE	THICK-NESS	A (±1")	B (MAX.)	H (±1")	L (±1.5")	W (±2")	T
		IN.					
21 x 15	0.064	7	10	6	23	36	46
24 x 18	0.064	8	12	6	28	42	52
28 x 20	0.064	9	14	6	32	48	58
35 x 24	0.079	10	16	6	39	60	70
42 x 29	0.079	12	18	8	46	75	85
49 x 33	0.109	13	21	9	53	85	103
57 x 38	0.109	18	26	12	63	90	108
64 x 43	0.109	18	30	12	70	102	120
71 x 47	0.109	18	33	12	77	114	132


ELEVATIONS

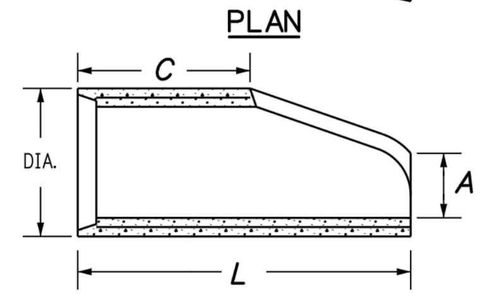
GENERAL NOTES

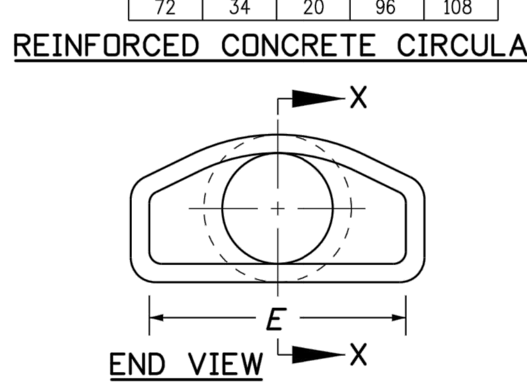
1. DIMENSIONS OF END SECTIONS MAY VARY SLIGHTLY FROM THOSE SHOWN ON THE TABLES DUE TO DIFFERENT MANUFACTURERS' CONFIGURATIONS.
2. CONCRETE END SECTIONS SHALL BE FURNISHED WITH TONGUE OR GROOVE AS REQUIRED.
3. DESIGN LENGTH OF PIPE OR SIDE DRAIN IS BASED ON LENGTH OF END SECTION SHOWN IN TABLE. ANY ADDITIONAL PIPE REQUIRED TO PROVIDE THE DESIGN LENGTH SHALL BE FURNISHED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE PROJECT.
4. THE INSIDE CONFIGURATION AND THE JOINT OF CONCRETE END SECTION AND PIPE SHALL MATCH.
5. END SECTIONS FOR CMP ARCH PIPE SHALL MATCH THE DIMENSIONS OF THE PIPE SHOWN ON THE PLANS.
6. GALVANIZED TOE PLATE AS SHOWN IS REQUIRED ON END SECTIONS FOR CORRUGATED STEEL PIPE AND SHALL BE THE SAME THICKNESS AS END SECTIONS. TOE PLATE SHALL BE FIELD-BOLTED TO END SECTION WITH 3/8 IN. GALVANIZED BOLTS, NUTS AND WASHERS.
7. GALVANIZED STEEL SHALL CONFORM TO AASHTO M 111, M 218 OR M 232.
8. CONCRETE PIPE JOINT FASTENERS, WHERE SHOWN ON PLANS, SHALL BE INSTALLED SO THAT A MINIMUM OF 15 LINEAR FEET OF THE OUTLET END OF THE PIPE ARE MECHANICALLY LOCKED TOGETHER. END SECTION LENGTHS WHEN USED, SHALL BE INCLUDED IN THE 15 LF REQUIREMENT.
9. CONNECTIONS OF METAL END SECTIONS TO PLASTIC PIPE SHALL BE APPROVED BY THE ENGINEER. PLASTIC END SECTIONS SHALL NOT BE USED.
10. THE END SECTION STYLE, EITHER REGULAR OR SAFETY, SHALL BE AS SHOWN ON THE PLANS.
11. AT THE OPTION OF THE CONTRACTOR AND APPROVAL OF THE CDOT PROJECT ENGINNER, REINFORCED CONCRETE END SECTIONS MAY BE MADE WITH SYNTHETIC FIBERS INSTEAD OF STEEL FOR PIPES 36 INCHES IN DIAMETER AND SMALLER, AND CONFORM TO AASHTO M 86 AND SUBSECTION 601.03.


PLAN

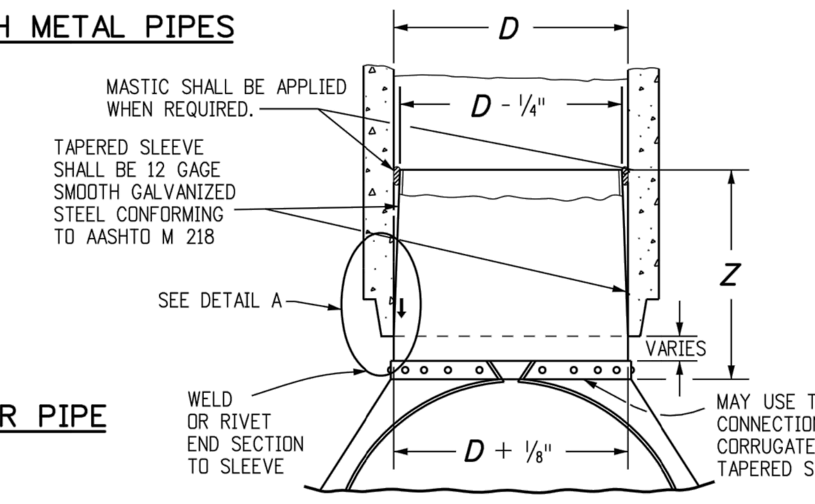
REINFORCED CONCRETE CIRCULAR PIPE

PIPE I.D.	A	C	L	E
	IN.			
18	10	48	78	36
24	10	48	78	48
30	14	36	96	60
36	18	36	96	72
42	24	36	96	78
48	28	24	96	84
54	30	36	96	90
60	36	36	96	96
72	34	20	96	108


SECTION X-X


END VIEW

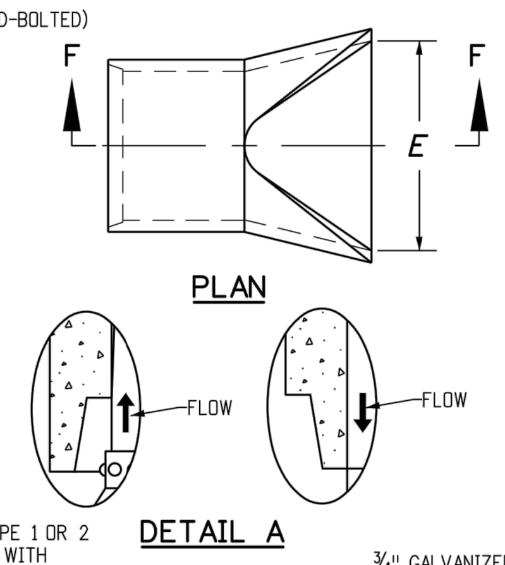
END SECTION FOR REINFORCED CONCRETE CIRCULAR PIPE



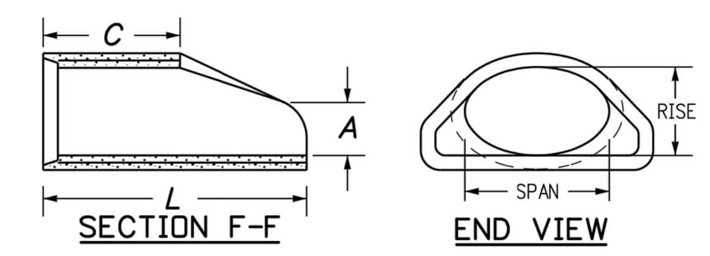
D	Z (MIN.)
IN.	
18 - 24	12
30 AND 36	16
42 AND LARGER	24

NOTE: METAL END SECTION SHALL BE FIRMLY WEDGED INTO PIPE END BEFORE BACKFILLING.

STEEL END SECTION FOR CONCRETE CIRCULAR PIPE
(ALTERNATIVE FOR CONCRETE END SECTION)


PLAN

DETAIL A


SECTION F-F

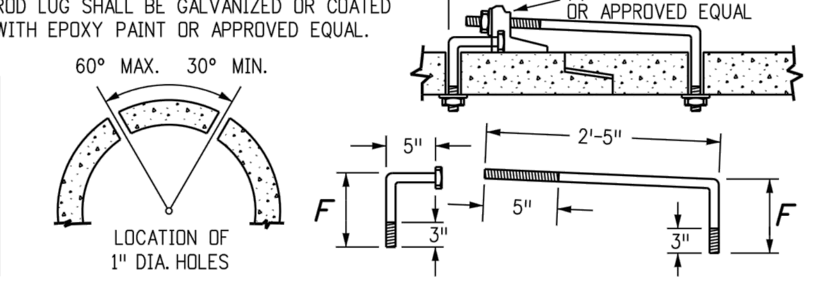
END VIEW

EQUIVALENT CIRCULAR DIA.	NOMINAL SPAN x RISE		A	C	L	E
	IN.					
24	30	19	9	33	72	48
30	38	24	10	18	72	60
36	45	29	12	24	84	72
42	53	34	16	36	96	78
48	60	38	21	36	96	84
54	68	43	26	36	96	90
60	76	48	30	36	96	96

END SECTION FOR REINFORCED CONCRETE ELLIPTICAL PIPE

PIPE DIAMETER	F
IN.	
18 - 30	5
36 - 42	6
48 - 60	7
72 - 84	9

3/4" GALVANIZED ANCHOR BOLTS, NUTS AND WASHERS, MILD STEEL, ASTM A 307. ROD LUG SHALL BE GALVANIZED OR COATED WITH EPOXY PAINT OR APPROVED EQUAL.



CONCRETE JOINT FASTENER (TWO PER JOINT)

Computer File Information		Sheet Revisions	
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Last Modification Date: 07/31/19	(R-X)		
Detailer Initials: LTA	(R-X)		
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)		

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CONCRETE AND METAL END SECTIONS

STANDARD PLAN NO. M-603-10
Standard Sheet No. 1 of 1
Issued by the Project Development Branch: July 31, 2019
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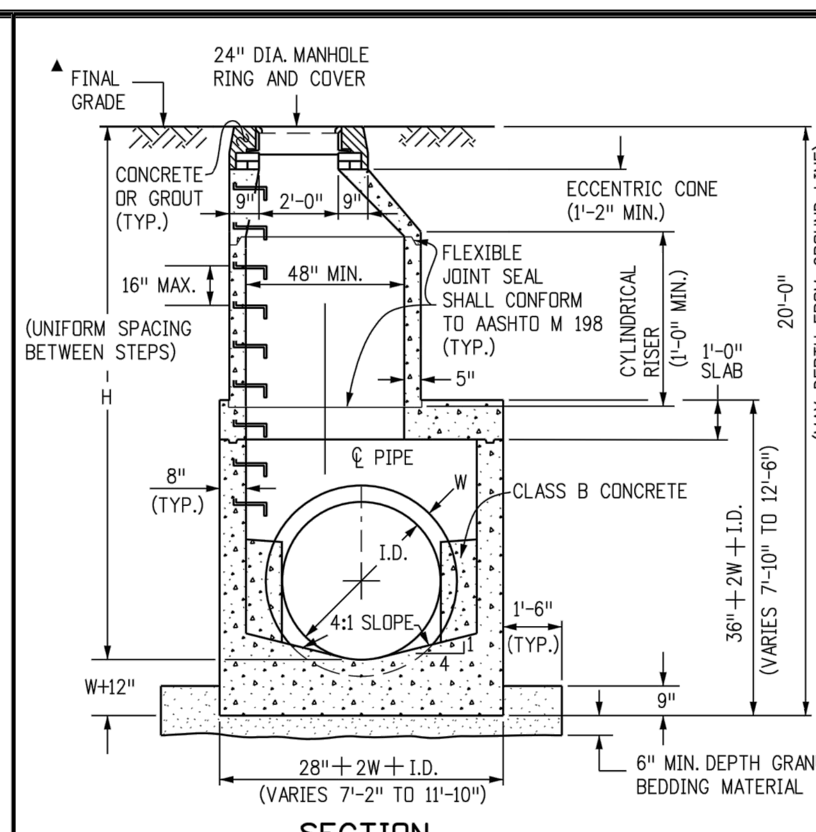
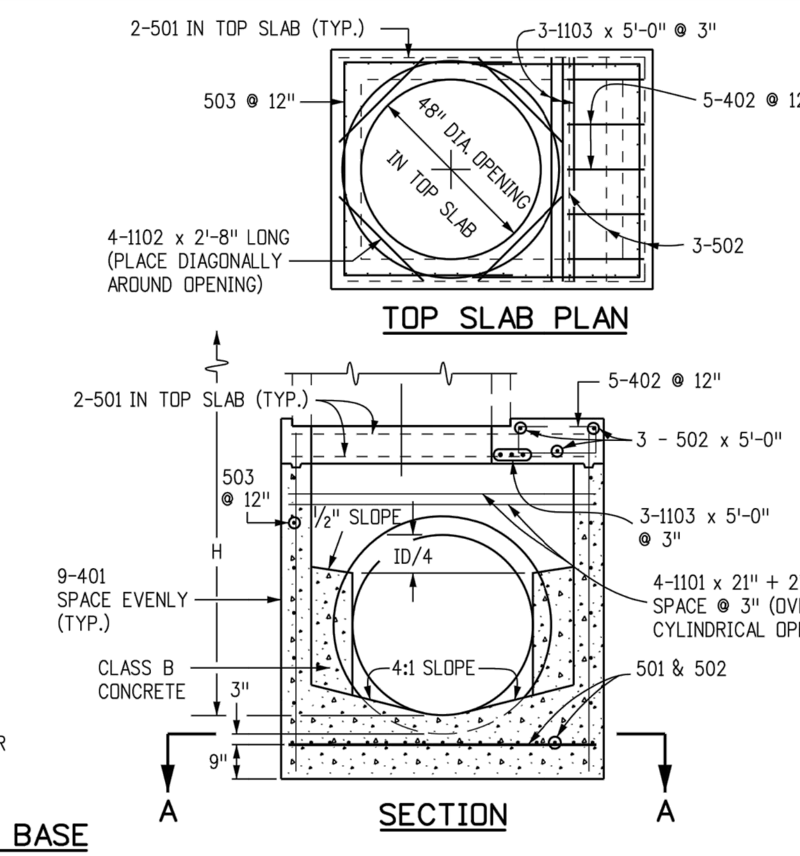
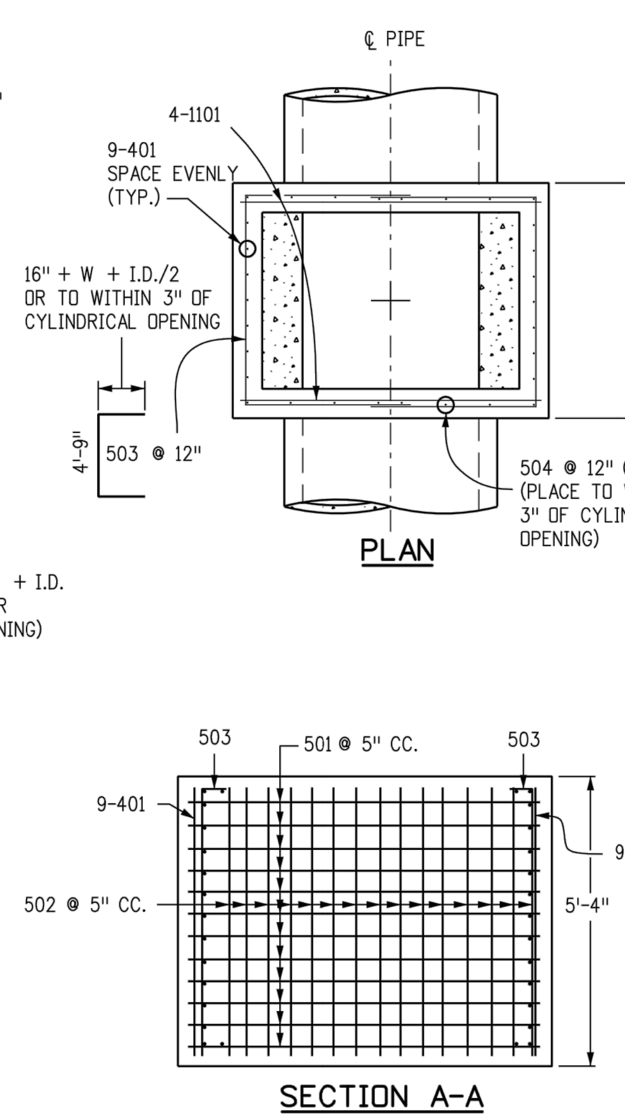

SECTION

MAHHOLE BOX BASE


TOP SLAB PLAN

SECTION


PLAN

SECTION A-A
(STEEL IN BOTTOM OF BASE)

GENERAL NOTES

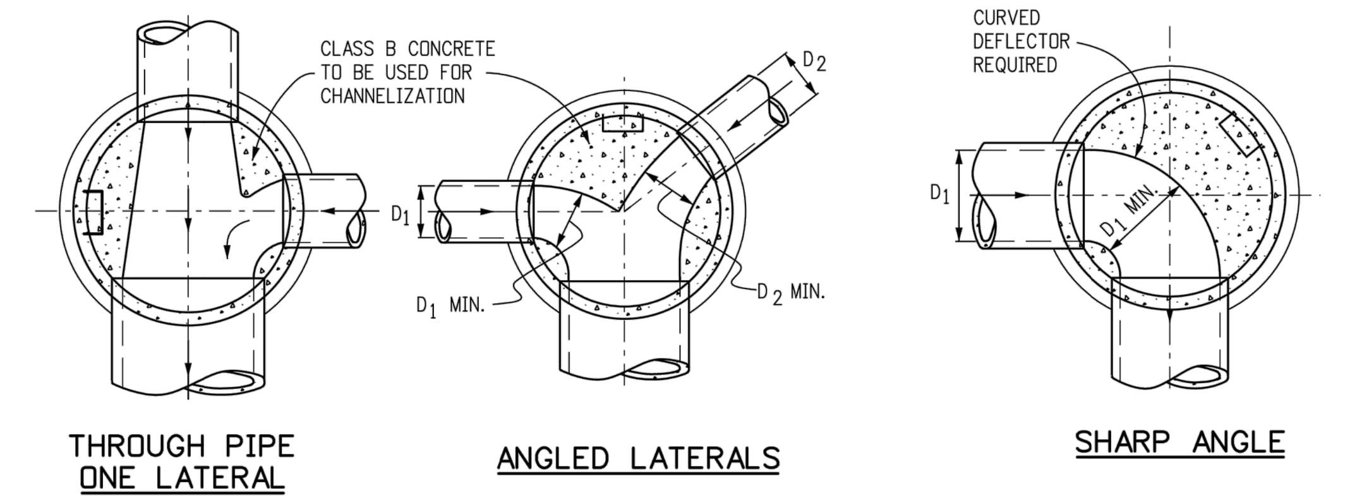
1. SINCE ALL PIPE ENTRIES INTO THE BASE ARE VARIABLE, THE DIMENSIONS SHOWN ARE TYPICAL. ACTUAL DIMENSIONS AND QUANTITIES FOR CONCRETE AND REINFORCEMENT SHALL BE AS REQUIRED IN THE WORK.
2. THE PRECAST FLAT TOP MAY BE USED ON ANY MANHOLE. THE ECCENTRIC CONE MAY BE USED WHEN THE MANHOLE "H" HEIGHT IS AT LEAST 8 FT.
3. THE MANHOLE RING FRAME SHALL BE SET IN A BED OF GROUT. THE FRAME SHALL BE SURROUNDED WITH A CEMENT GROUT IN UNPAVED AREA, OR A CONCRETE COLLAR IN PAVED AREA. SEE DETAILS ON SHEETS 2 AND 3.
4. DESIGN OF BOX BASE IS BASED ON STRAIGHT RUNS OF PIPE OR CHANGE IN DIRECTION OF LESS THAN 45°. SPECIAL DESIGN IS REQUIRED FOR 45° OR GREATER.
5. PRECAST MANHOLES AND REINFORCEMENT SHALL CONFORM TO AASHTO M 199 (ASTM C 478).
6. CAST-IN-PLACE MANHOLES SHALL BE CLASS B CONCRETE.
7. STEPS SHALL BE REQUIRED WHEN THE MANHOLE DEPTH EXCEEDS 3 FT.-6 IN. AND SHALL CONFORM TO AASHTO M 199.
8. ALL REINFORCING STEEL SHALL BE GRADE 60 AND EPOXY COATED. VERTICAL STEEL SHALL BE PLACED AT CENTERLINE OF WALL. ALL BARS SHALL HAVE A 2 IN. MINIMUM CLEARANCE.
9. ALL PIPE ENTRIES INTO THE BASE OF MANHOLE SHALL BE CONNECTED BY OPEN CHANNELIZATION ADJUSTED FOR PIPE SIZE, SHAPE, SLOPE, AND DIRECTION OF FLOW. DETAILS SHOWN ARE TYPICAL FOR INSTALLATIONS WITH ALL INVERTS OF SAME RELATIVE ELEVATION. FOR EXCESSIVE ELEVATION DIFFERENCE BETWEEN INVERTS, SPECIAL BASE/CHANNEL DETAILS WILL BE SHOWN ON THE PLANS.
10. FLOW CHANNELS AND INVERTS SHALL BE FORMED BY SHAPING WITH CLASS B CONCRETE OR APPROVED GROUT.
11. STUB-OUTS SHALL EXTEND 2 FT. MINIMUM BEYOND OUTSIDE WALL SURFACE OF MANHOLE AND BE SATISFACTORILY PLUGGED.
12. THE SLOPE OF THE MANHOLE COVER SHALL MATCH THE ROADWAY PROFILE AND CROSS SLOPE.

▲ WHEN FINAL GRADE IS PAVEMENT SURFACE, RECESS MANHOLE RING AND COVER 1/4" MIN. TO 1/2" MAX.

MARK	SIZE	TYPE	WT. #/FT.	BARS	I.D. 54"	60"	66"	72"	84"	96"	FORMULAS
401	4	I	0.668	NO. REQ'D.	18	18	18	18	18	18	401
				LENGTH	8'-1"	8'-8"	9'-3"	9'-10"	11'-0"	12'-2"	BAR LENGTH = 32" + 2W + I.D.
				WEIGHT *	97.2	104.2	111.2	118.2	132.3	146.3	
402	4	III	0.668	NO. REQ'D.	5	5	5	5	5	5	402
				LENGTH	5'-5"	6'-0"	6'-7"	7'-2"	8'-4"	9'-6"	BAR LENGTH = I.D. + 2W
				WEIGHT *	18.1	20.0	22.0	23.9	27.8	31.7	
501	5	I	1.043	NO. REQ'D.	17	17	17	17	17	17	501
				LENGTH	7'-5"	8'-0"	8'-7"	9'-2"	10'-4"	11'-6"	BAR LENGTH = 24" + I.D. + 2W
				WEIGHT *	131.5	141.8	152.2	162.5	183.2	203.9	
502	5	I	1.043	NO. REQ'D.	22	23	25	26	29	32	502
				LENGTH	5'-0"	5'-0"	5'-0"	5'-0"	5'-0"	5'-0"	NUMBER BARS REQ'D. = $3 + \left(\frac{24+I.D.+2W}{@\ 5"} + 1\right)$
				WEIGHT *	114.7	119.9	130.4	135.6	151.2	166.9	
503	5	II	1.043	NO. REQ'D.	16	16	18	18	20	24	503
				LENGTH	12'-10"	13'-5"	14'-0"	14'-7"	15'-9"	16'-11"	NUMBER BARS REQ'D. = $2\left(\frac{13+I.D.+2W}{@\ 12"} + 1\right)$
				WEIGHT *	214.2	223.9	262.8	273.8	328.5	423.5	BAR LENGTH = 4'-9"+2(16+W+I.D./2)
504	5	I	1.043	NO. REQ'D.	12	14	14	16	18	20	504
				LENGTH	8'-1"	8'-8"	9'-3"	9'-10"	11'-0"	12'-2"	NUMBER BARS REQ'D. = $2\left(\frac{2W+I.D.-4}{@\ 12"} + 1\right)$
				WEIGHT *	101.2	126.6	135.1	164.1	206.5	253.8	BAR LENGTH = 32"+2W+I.D.
1101	11	I	5.313	NO. REQ'D.	4	4	4	4	4	4	1101
				LENGTH	7'-2"	7'-9"	8'-4"	8'-11"	10'-1"	11'-3"	BAR LENGTH = 21" + I.D. + 2W
				WEIGHT *	152.3	164.7	177.1	189.5	214.3	239.1	
1102	11	I	5.313	NO. REQ'D.	4	4	4	4	4	4	BENDING
				LENGTH	2'-8"	2'-8"	2'-8"	2'-8"	2'-8"	56.7	TYPE I STRAIGHT
				WEIGHT *	56.7	56.7	56.7	56.7	56.7	2'-8"	
1103	11	I	5.313	NO. REQ'D.	3	3	3	3	3	3	TYPE II 4'-9" 16"+W+I.D./2
				LENGTH	5'-0"	5'-0"	5'-0"	5'-0"	5'-0"	5'-0"	
				WEIGHT *	79.7	79.7	79.7	79.7	79.7	79.7	
* REINFORCING STEEL TOTAL					965.6	1,037.5	1,127.2	1,204.0	1,380.2	1,601.6	TYPE III 12" 12" 7" I.D.+2W-38"
CONCRETE - CUBIC YARDS - TOTAL					6.0	6.6	7.3	8.0	9.5	11.1	

NOTE: QUANTITIES ARE BASED ON SAME SIZE PIPE ENTRANCE TO AND EXIT FROM, BASE AND A 4 FT. MANHOLE ENTRANCE INTO TOP SLAB OF BASE.

QUANTITIES FOR CONCRETE MANHOLE BOX BASE


THROUGH PIPE ONE LATERAL

ANGLED LATERALS

SHARP ANGLE

TYPICAL CHANNELIZATION DETAILS

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MANHOLES

STANDARD PLAN NO. M-604-20
Standard Sheet No. 1 of 3
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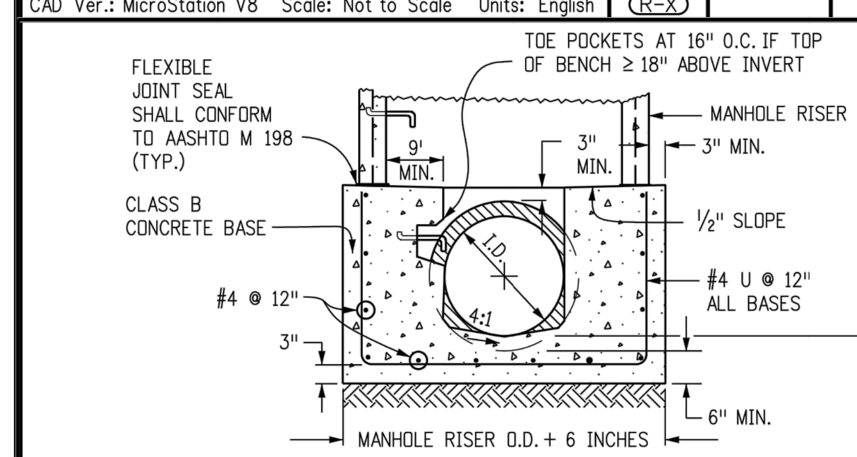
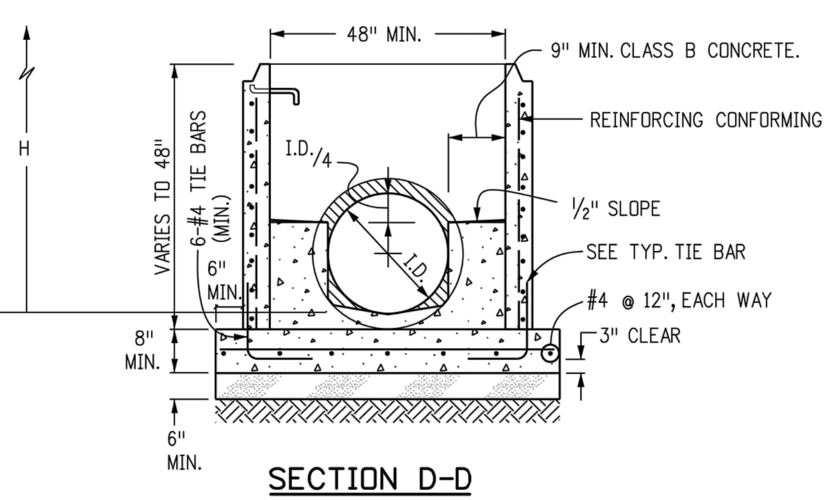

SECTION B-B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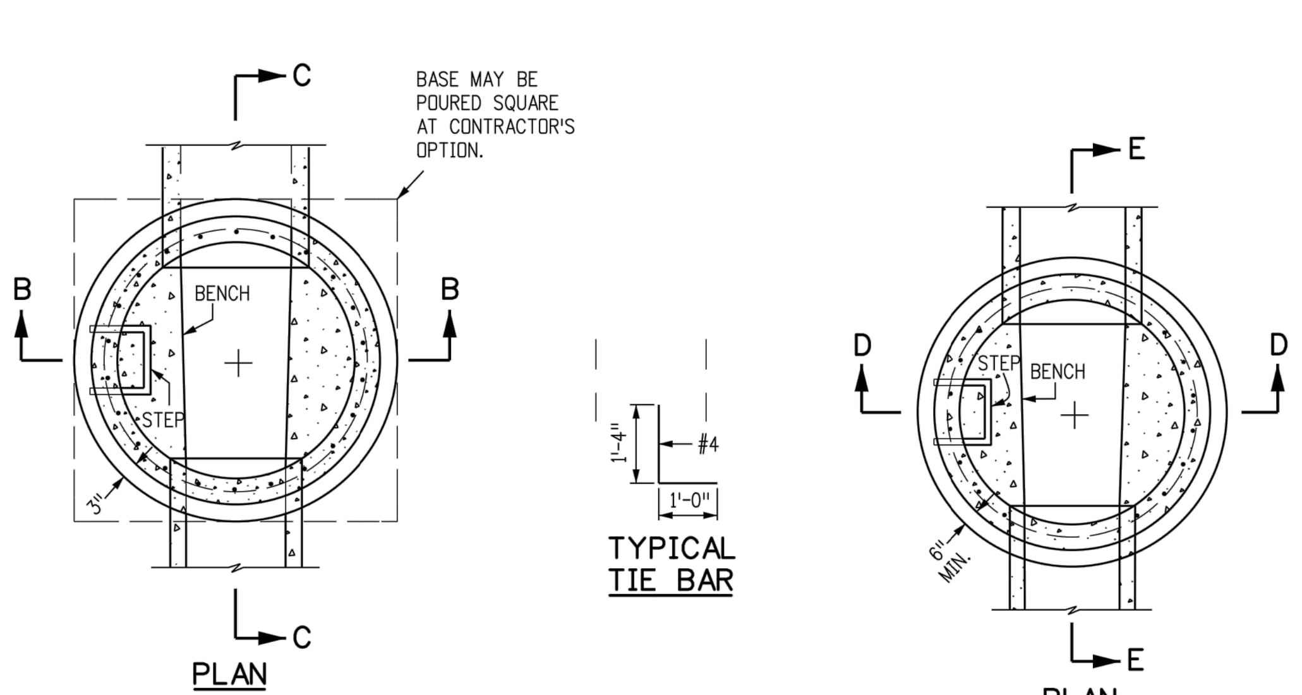
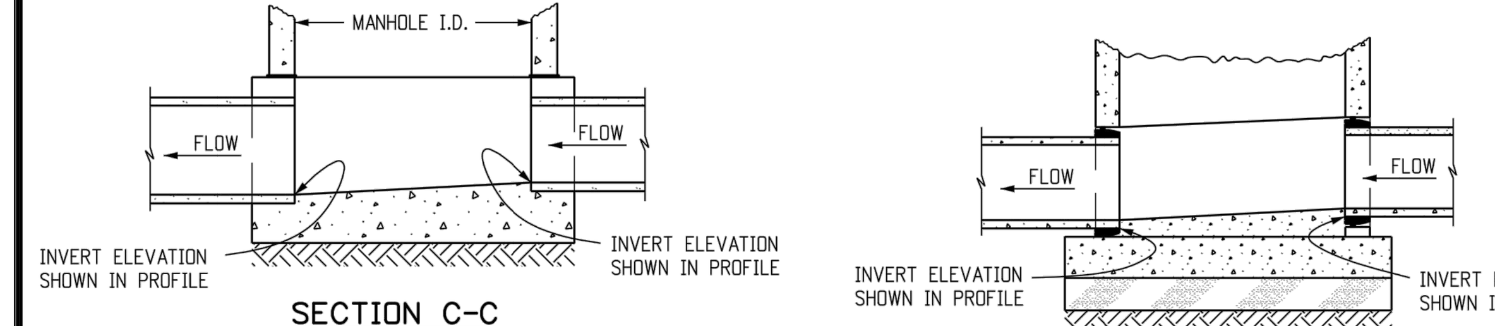
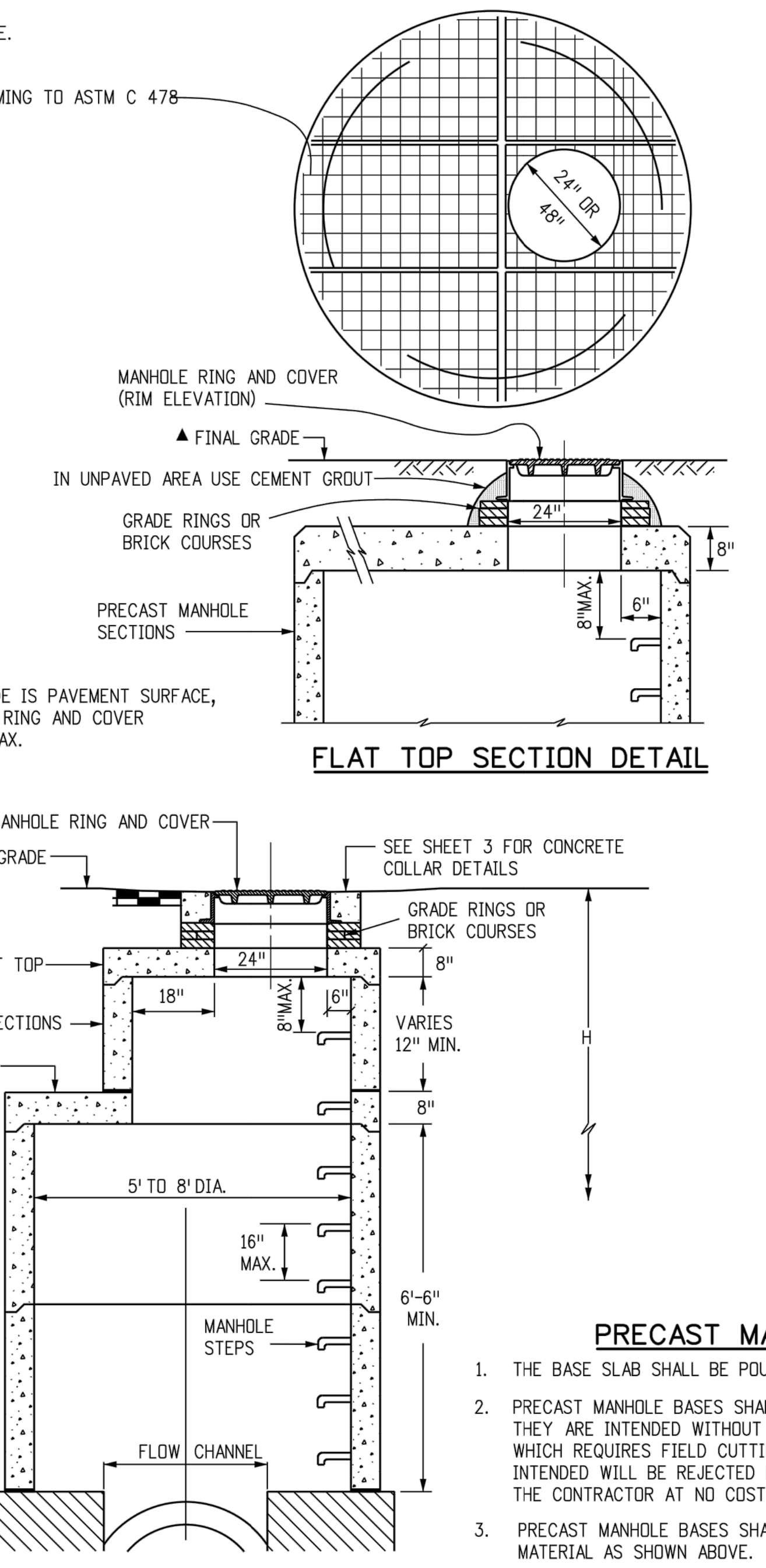

PLAN

TYPICAL TIE BAR

PLAN


SECTION C-C
CAST-IN-PLACE SLAB BASE

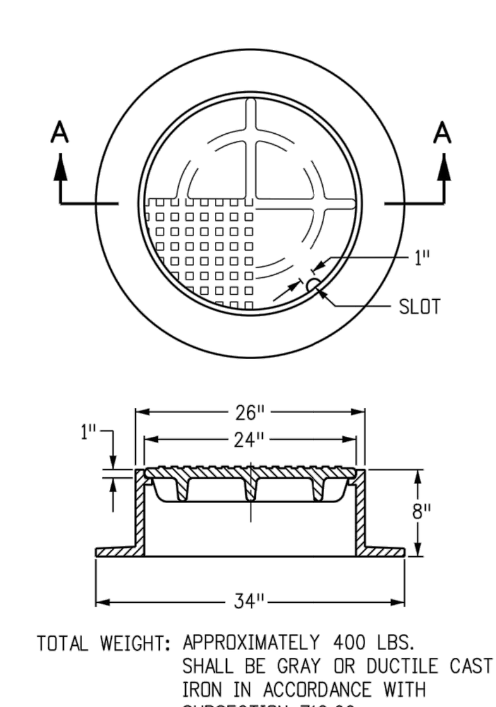
SECTION E-E
PRECAST SLAB BASE



▲ WHEN FINAL GRADE IS PAVEMENT SURFACE, RECESS MANHOLE RING AND COVER 1/4" MIN. TO 1/2" MAX.

FLAT TOP SECTION DETAIL

MANHOLE RISER DETAIL


TOTAL WEIGHT: APPROXIMATELY 400 LBS. SHALL BE GRAY OR DUCTILE CAST IRON IN ACCORDANCE WITH SUBSECTION 712.06.

SECTION A-A
MANHOLE RING AND COVER

LEGEND


- SUITABLE SUBGRADE
- GRANULAR BEDDING MATERIAL
- CONCRETE

PRECAST MANHOLE BASES NOTES:

1. THE BASE SLAB SHALL BE POURED MONOLITHICALLY WITH BOTTOM RISER SECTION.
2. PRECAST MANHOLE BASES SHALL FIT THE CONDITIONS AND LOCATIONS FOR WHICH THEY ARE INTENDED WITHOUT ANY FIELD MODIFICATIONS. ANY MANHOLE BASE WHICH REQUIRES FIELD CUTTING OR MODIFICATION IN ORDER TO FIT THE LOCATIONS INTENDED WILL BE REJECTED BY THE ENGINEER AND REMOVED AND REPLACED BY THE CONTRACTOR AT NO COST TO THE DEPARTMENT.
3. PRECAST MANHOLE BASES SHALL BE BEDDED ON AN APPROVED GRANULAR BEDDING MATERIAL AS SHOWN ABOVE.

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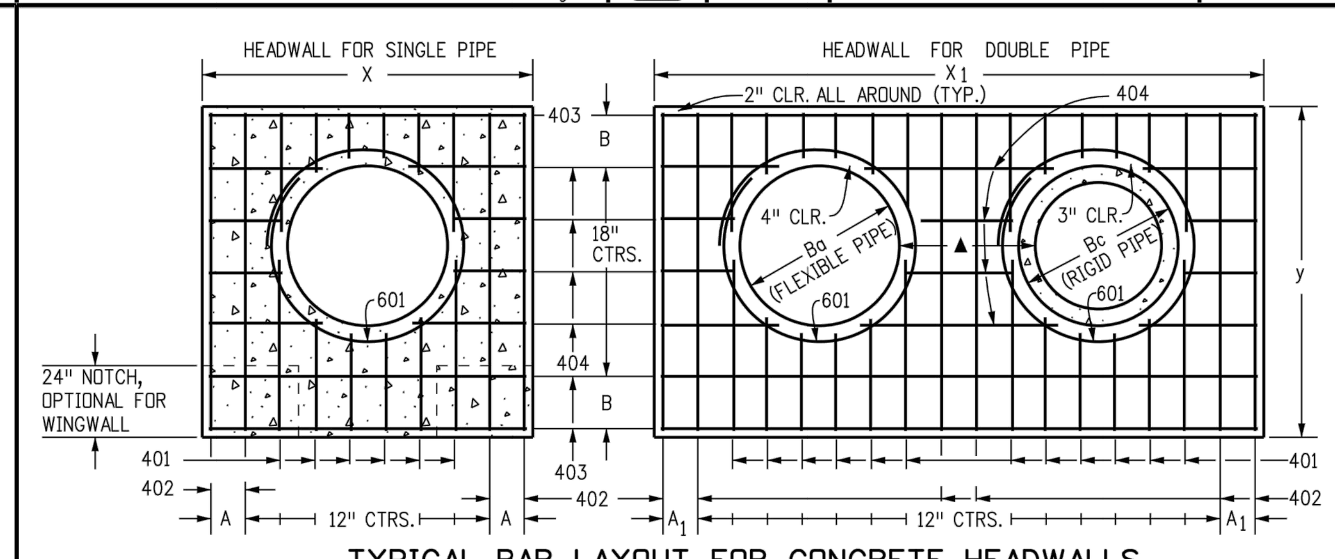
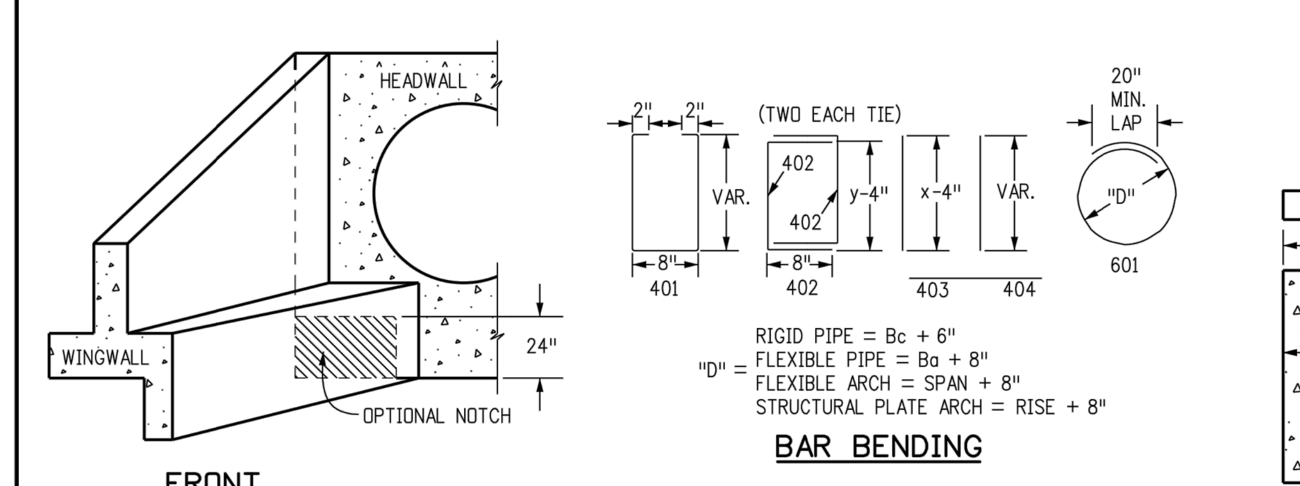
MANHOLES

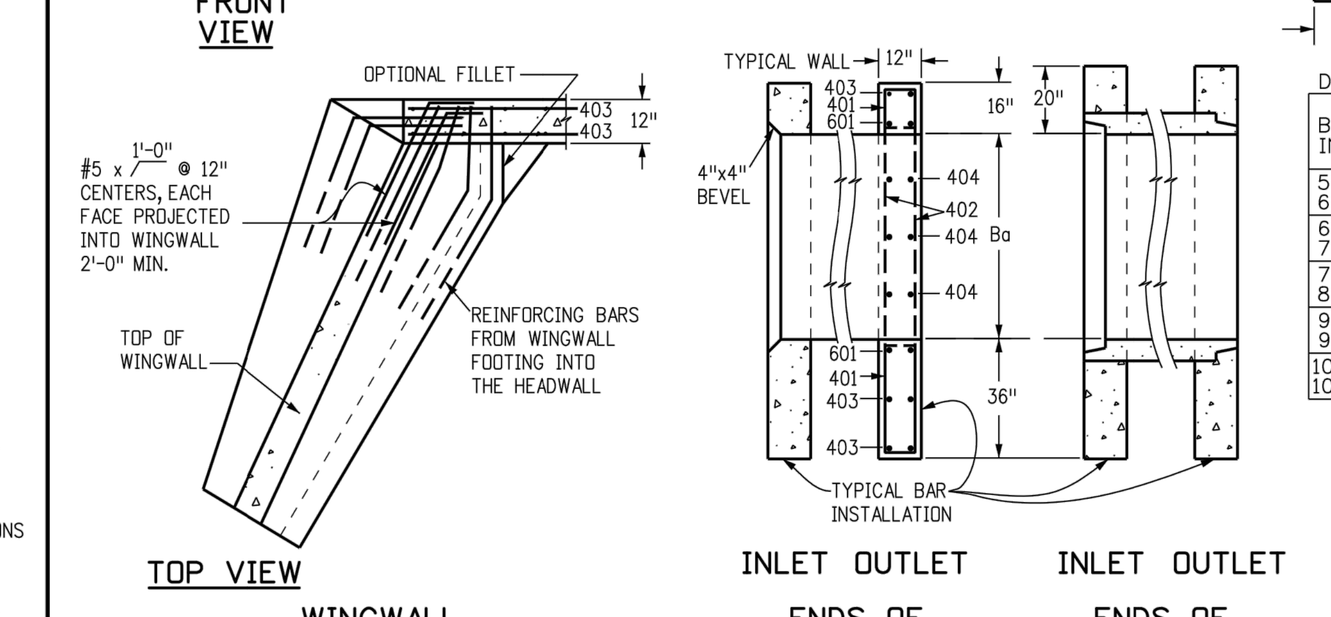
STANDARD PLAN NO. M-604-20
Standard Sheet No. 2 of 3
Issued by the Project Development Branch: July 31, 2019
Project Sheet Number:


TYPICAL BAR LAYOUT FOR CONCRETE HEADWALLS


FRONT VIEW

"D" = RIGID PIPE = Bc + 6"; FLEXIBLE PIPE = Ba + 8"; FLEXIBLE ARCH = SPAN + 8"; STRUCTURAL PLATE ARCH = RISE + 8"

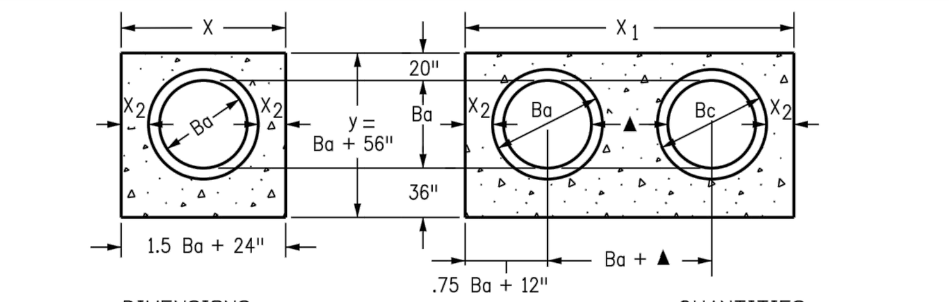
BAR BENDING


TOP VIEW

WINGWALL CONNECTION

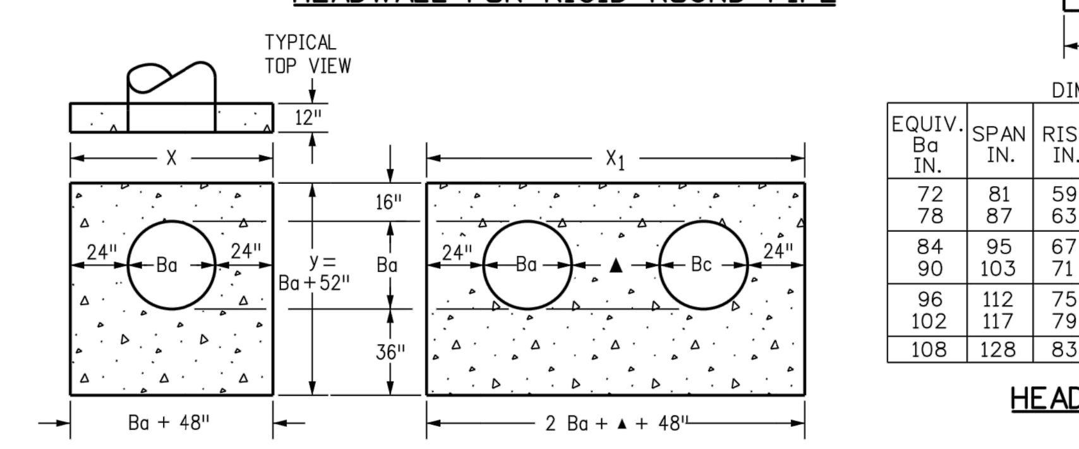
INLET OUTLET
ENDS OF FLEXIBLE PIPE

INLET OUTLET
ENDS OF RIGID PIPE



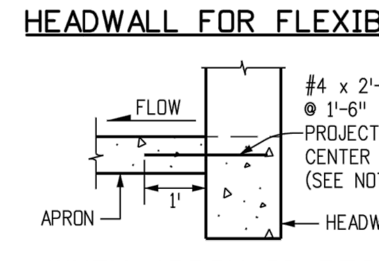
Ba IN.	Bc IN.	X FT.-IN.	A IN.	X1 FT.-IN.	A1 IN.	y FT.-IN.	B IN.	X2 IN.	CONCRETE SGL CU.YD.	CONCRETE DBL CU.YD.	STEEL ■ SGL LBS.	STEEL ■ DBL LBS.
54	65	8-9	8½	15-6	7	9-2	17	20	2.12	3.55	209	364
60	72	9-6	7	17-0	10	9-8	11	21	2.35	3.99	236	414
66	79	10-3	11½	18-6	7	10-2	14	22	2.60	4.44	249	453
72	86	11-0	10	20-0	10	10-8	17	23	2.85	4.91	270	476
78	93	11-9	8½	21-3	11	11-2	11	24	3.11	5.29	306	527
84	100	12-6	7	22-6	7	11-8	14	25	3.38	5.68	333	572
90	107	13-3	11½	23-9	8½	12-2	17	26	3.66	6.08	335	593
96	114	14-0	10	25-0	10	12-8	11	27	3.94	6.48	379	649
102	121	14-9	8½	26-3	11½	13-2	14	28	4.24	6.89	400	664
108	128	15-6	7	27-6	7	13-8	17	29	4.54	7.30	424	707

HEADWALL FOR RIGID ROUND PIPE



Ba IN.	X FT.-IN.	A IN.	X1 FT.-IN.	A1 IN.	y FT.-IN.	B IN.	CONCRETE SGL CU.YD.	CONCRETE DBL CU.YD.	STEEL ■ SGL LBS.	STEEL ■ DBL LBS.
54	8-6	7	15-3	11½	8-10	15	2.19	3.81	211	358
60	9-0	10	16-6	7	9-4	18	2.38	4.25	217	396
66	9-6	7	17-9	8½	9-10	12	2.58	4.70	252	454
72	10-0	10	19-0	10	10-4	15	2.78	5.17	255	472
78	10-6	7	20-0	10	10-10	18	2.98	5.56	276	499
84	11-0	10	21-0	10	11-4	12	3.19	5.95	297	553
90	11-6	7	22-0	10	11-10	15	3.40	6.36	317	517
96	12-0	10	23-0	10	12-4	18	3.62	6.79	321	597
102	12-6	7	24-0	10	12-10	12	3.84	7.21	364	663
108	13-0	10	25-0	10	13-4	15	4.06	7.63	362	678

HEADWALL FOR FLEXIBLE ROUND PIPE

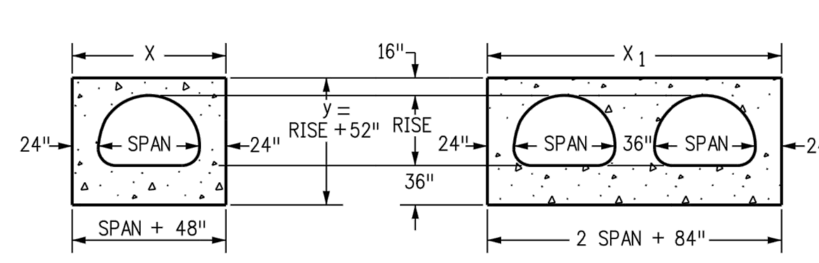

WHEN APRON IS REQUIRED

GENERAL NOTES

1. CONCRETE SHALL BE CLASS B.
2. HEADWALL SHALL BE PERPENDICULAR TO THE PIPE ℄ UNLESS OTHERWISE SHOWN ON THE PLANS. TABULATED DIMENSIONS AND QUANTITIES MUST BE ADJUSTED FOR SKEWED INSTALLATIONS.
3. FOR WINGWALL DETAILS, SEE STANDARD PLAN M-601-20.
4. VOLUME OCCUPIED BY PIPE HAS BEEN DEDUCTED FROM STEEL AND CONCRETE QUANTITIES.
5. EXPOSED CONCRETE CORNERS SHALL BE CHAMFERED 3/4 IN.
6. ALL REINFORCING BARS SHALL HAVE A 2 IN. MINIMUM CLEARANCE.

▲ WHEN TWO OR MORE PIPES ARE LAID SIDE BY SIDE, THEY SHALL BE PLACED SO THAT THE ADJACENT PIPES WILL BE 1/2 INSIDE DIAMETER APART, OR 1/2 INSIDE SPAN APART, OR 3 FT. APART (INCLUDING WALL THICKNESS), WHICHEVER IS LESS.

■ ADD 0.89 x (X OR X1) (LB.) WHEN APRON IS REQUIRED.



EQUIV. Ba IN.	SPAN IN.	RISE IN.	X FT.-IN.	A IN.	X1 FT.-IN.	A1 IN.	y FT.-IN.	B IN.	CONCRETE SGL CU. YD.	CONCRETE DBL CU. YD.	STEEL ■ SGL LBS.	STEEL ■ DBL LBS.
72	81	59	10-9	8½	20-6	7	9-3	17½	2.72	5.10	250	467
78	87	63	11-3	11½	21-6	7	9-7	10½	2.85	5.34	275	531
84	95	67	11-9	8½	22-10	9	9-11	12½	3.08	5.79	290	547
90	103	71	12-7	7½	24-2	11	10-3	15	3.30	6.21	321	591
96	112	75	13-4	12	25-8	8	10-7	16½	3.52	6.65	314	606
102	117	79	13-9	8½	26-6	7	10-11	9½	3.63	6.86	356	672
108	128	83	14-8	8	28-4	12	11-3	11½	3.96	7.51	376	699

HEADWALL FOR FLEXIBLE PIPE ARCH

EQUIV. Ba IN.	SPAN FT.-IN.	RISE FT.-IN.	X FT.-IN.	A IN.	X1 FT.-IN.	A1 IN.	y FT.-IN.	B IN.	CONCRETE SGL CU. YD.	CONCRETE DBL CU. YD.	STEEL ■ SGL LBS.	STEEL ■ DBL LBS.
66	6-1	4-7	10-1	10½	19-2	11	8-11	15½	2.52	4.70	232	424
75	7-0	5-1	11-0	10	21-0	10	9-5	9½	2.80	5.25	282	509
84	7-11	5-7	11-11	9½	22-10	9	9-11	12½	3.08	5.79	291	540
93	8-10	6-1	12-10	9	24-8	8	10-5	15½	3.36	6.33	309	622
102	9-9	6-7	13-9	8½	26-6	7	10-11	9½	3.63	6.86	379	673
111	10-11	7-1	14-11	9½	28-10	9	11-5	12½	4.05	7.67	377	711
120	11-10	7-7	15-10	9	30-8	8	11-11	15½	4.36	8.28	395	731
132	12-10	8-4	16-10	9	32-8	8	12-8	11	4.75	9.03	441	839
141	14-1	8-9	18-1	10½	35-2	11	13-1	13½	5.17	9.86	448	931
150	15-4	9-3	19-4	12	37-8	8	13-7	16½	5.69	10.88	490	953
159	15-10	9-10	19-10	9	38-8	8	14-2	11	5.89	11.25	534	1019

HEADWALL FOR STRUCTURAL PLATE ARCH

SKEW ANGLE A°	90	85	80	75	70	65	60	55	50	45	40	35	30
FACTOR (cosecA°)	1.000	1.004	1.015	1.035	1.064	1.103	1.155	1.221	1.305	1.414	1.556	1.743	2.000

SKEW FACTOR TABLE

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HEADWALL FOR PIPES

STANDARD PLAN NO. M-601-10
Standard Sheet No. 1 of 1
Issued by the Project Development Branch: July 31, 2019
Project Sheet Number:

Know what's below. Call before you dig.

ENGINEER'S STATEMENT
STANDARD NOTES ... ONLY AS TO THE ...
TRISTAN BONSER, ...
COLORADO P.E. 47602
FOR AND ON BEHALF OF JR ENGINEERING, LLC

PRELIMINARY NOT FOR CONSTRUCTION

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Fort Collins 970-491-9888 • www.jrengineering.com

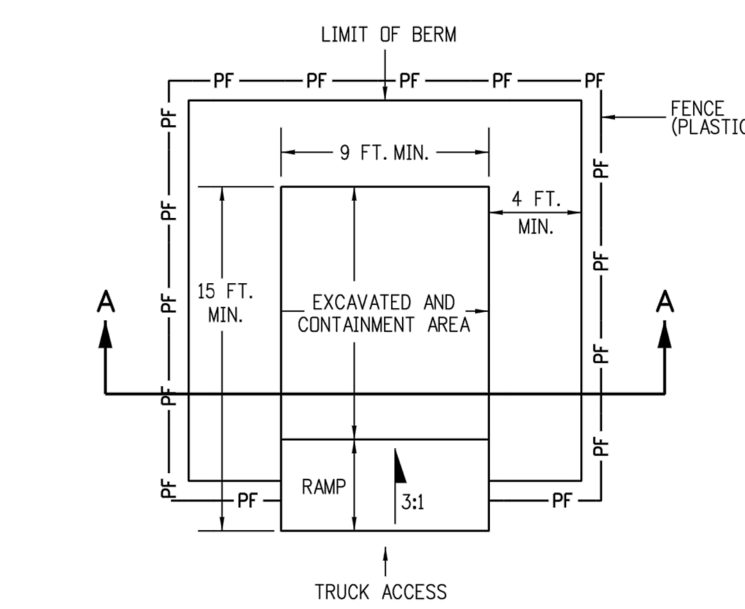
No.	REVISION	BY	DATE

H-SCALE	V-SCALE	DATE	DESIGNED BY	DRAWN BY	CHECKED BY
N/A	N/A	12/30/22	AHC	AHC	

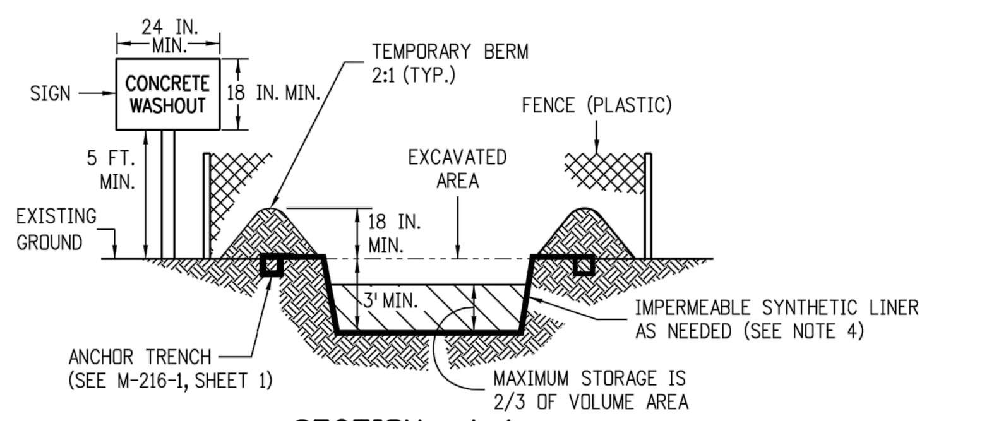
FRISCO BAY MARINA STORM DRAINAGE IMPROVEMENTS
STANDARD DETAILS

SHEET 13 OF 15
JOB NO. 16113.00

X:\1610000.all\1611300\Drawings\Sheet Dwgs\60% Plans\8. Details\1611300 Details.dwg, DT06, 12/30/2022 8:45:15 AM, CiaccoA



PLAN VIEW

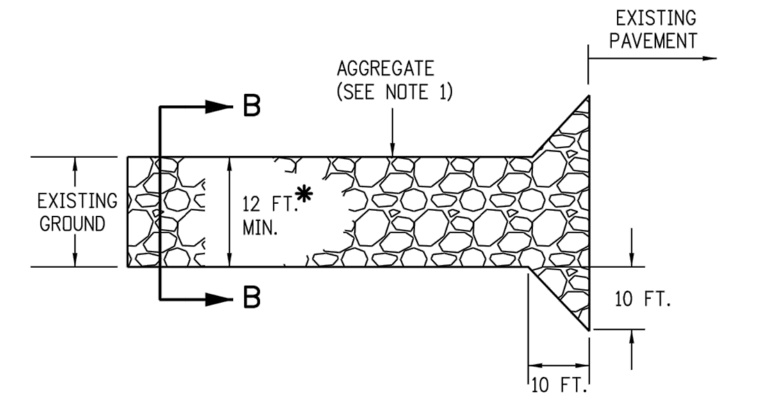


SECTION A-A

NOTES:

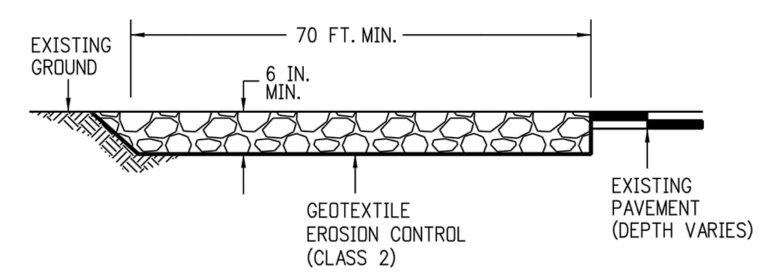
1. A FENCE (PLASTIC) CONFORMING TO SECTION 607 SHALL BE INSTALLED AROUND THE CONCRETE WASHOUT AREA, EXCEPT AT THE OPENING.
2. THE CONCRETE WASHOUT SIGN SHALL HAVE LETTERS AT LEAST 3 INCHES HIGH AND CONFORM TO SUBSECTION 630.02.
3. ALL MATERIALS AND LABOR TO COMPLETE THE CONCRETE WASHOUT STRUCTURE SHALL BE INCLUDED IN THE COST OF WORK AND NOT PAID FOR SEPARATELY.
4. THE BOTTOM OF EXCAVATION SHALL BE A MINIMUM OF FIVE FEET ABOVE GROUND WATER. IF NOT, THE BOTTOM OF EXCAVATION SHALL BE IN ACCORDANCE WITH 208.02 (j).
5. THE PAY ITEM NUMBER FOR CONCRETE WASHOUT STRUCTURE (EACH) IS 208-00045.

CONCRETE WASHOUT STRUCTURE

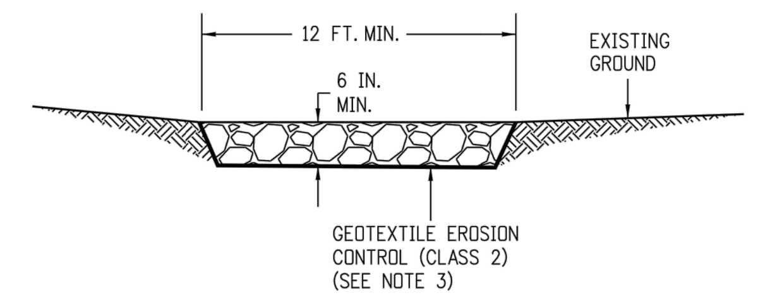


PLAN VIEW

* SHALL EXTEND FULL WIDTH OF INGRESS AND EGRESS OPERATION.



ELEVATION SECTION



SECTION B-B

NOTES:

1. AGGREGATE SHALL CONFORM TO SUBSECTION 208.02 (I).
2. THE CONTRACTOR SHALL PROTECT CURB AND GUTTER THAT CROSSES THE ENTRANCE FROM DAMAGE, WHILE NOT BLOCKING FLOW OF WATER THRU STRUCTURE. PROTECTION OF THE CURB AND GUTTER SHALL BE INCLUDED IN THE COST OF WORK AND NOT PAID FOR SEPARATELY.
3. GEOTEXTILE SHALL CONFORM TO SUBSECTION 712.08.
4. ALL MATERIALS AND LABOR TO COMPLETE THE VEHICLE TRACKING PAD SHALL BE INCLUDED IN THE COST OF WORK AND NOT PAID FOR SEPARATELY.
5. THE PAY ITEM NUMBER FOR VEHICLE TRACKING PAD (EACH) IS 208-00070.

VEHICLE TRACKING PAD

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TEMPORARY EROSION CONTROL

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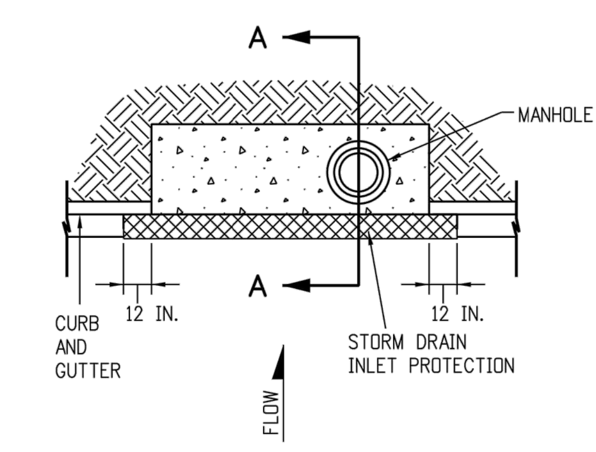
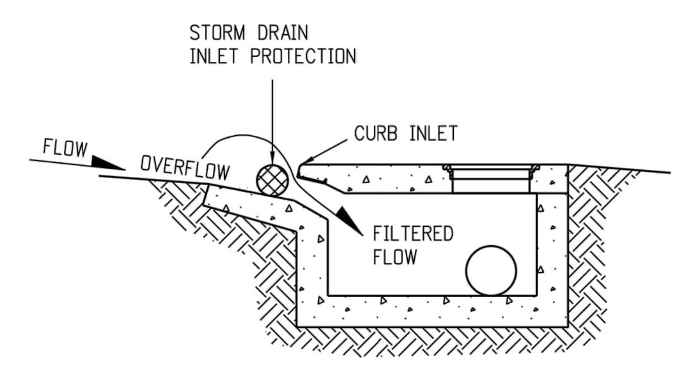
STANDARD PLAN NO. M-208-1
Standard Sheet No. 1 of 11
Project Sheet Number:



PLAN VIEW

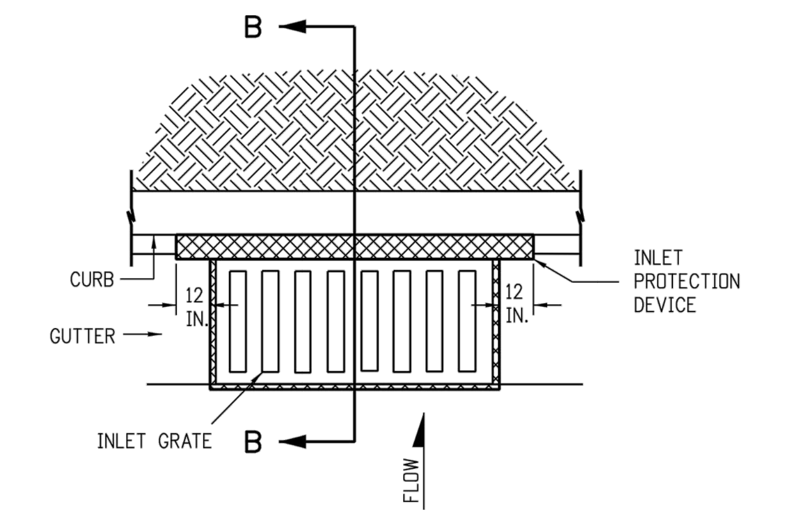


SECTION A-A

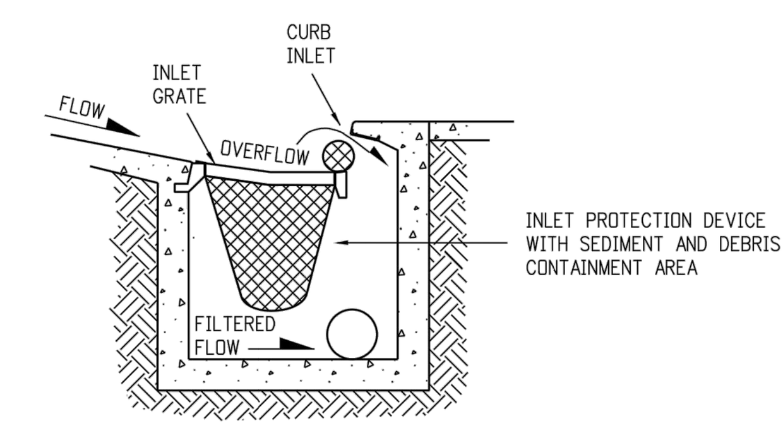
STORM DRAIN INLET PROTECTION (TYPE I)

NOTES:

1. INLET PROTECTION DEVICE SHALL EXTEND 12 INCHES PAST EACH END OF THE INLET.
2. THE PAY ITEM NUMBERS FOR STORM DRAIN INLET PROTECTION (TYPE I) ARE 208-00051 (LF), 208-00053 84 INCHES (EACH), 208-00057 144 INCHES (EACH), AND 208-00058 204 INCHES (EACH).
3. FOR STORM DRAIN INLET TYPES I AND II, IF THERE IS A MINIMUM CLEARANCE OF 3 FEET FROM THE EDGE OF THE TRAVELED WAY TO THE FACE OF CURB, USE THE AGGREGATE BAGS AT STORM DRAIN INLET (TYPE I) DETAIL ON SHEET 4 INSTEAD.



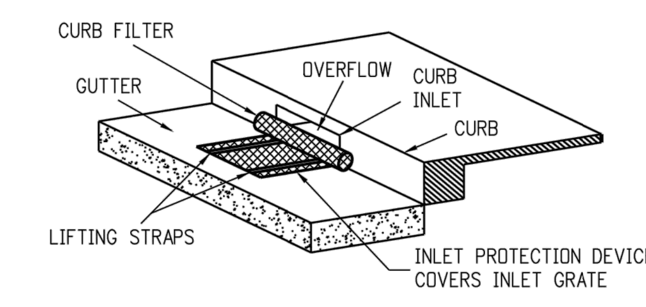
PLAN VIEW



SECTION B-B

OPTION A

STORM DRAIN INLET PROTECTION (TYPE II)

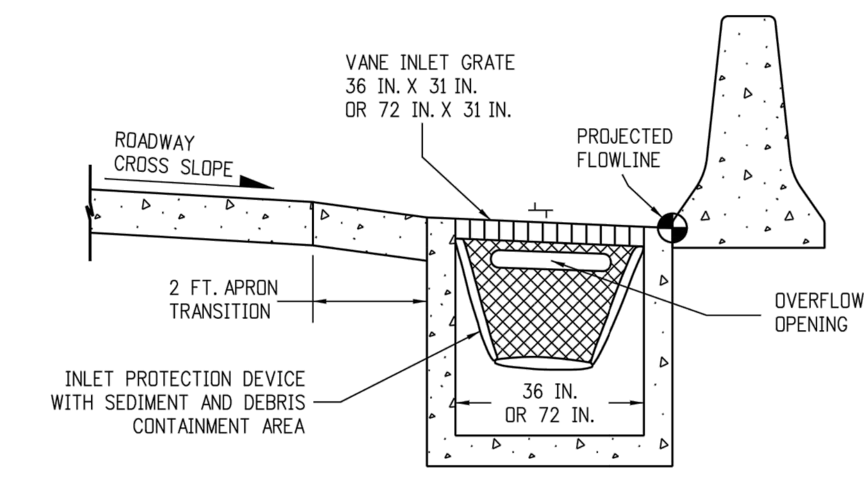


ISOMETRIC VIEW

OPTION B

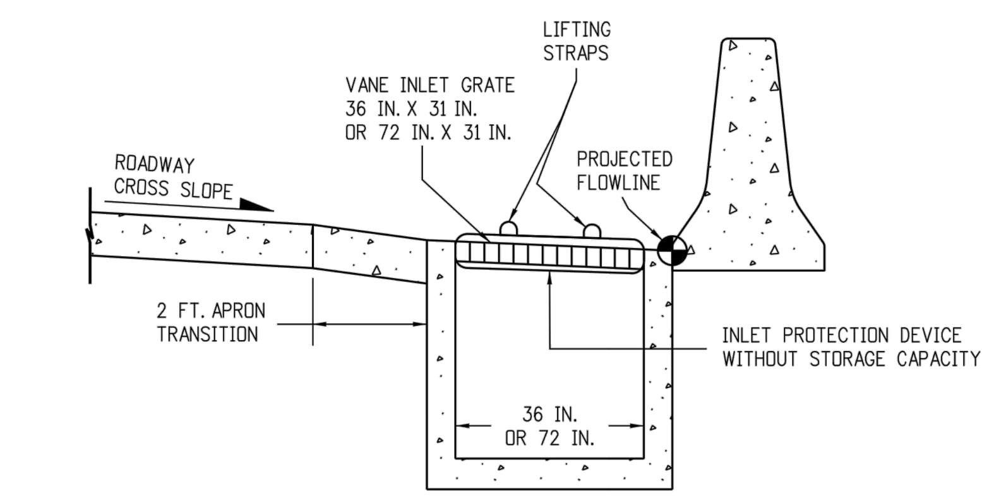
STORM DRAIN INLET PROTECTION (TYPE II)

NOTE: THE PAY ITEM NUMBERS FOR STORM DRAIN INLET PROTECTION (TYPE II) ARE 208-00054 (EACH).



OPTION A

STORM DRAIN INLET PROTECTION (TYPE III)



OPTION B

STORM DRAIN INLET PROTECTION (TYPE III)

NOTE: THE PAY ITEM NUMBER FOR STORM DRAIN INLET PROTECTION (TYPE III) (EACH) IS 208-00056.

STORM DRAIN INLET PROTECTION TYPES

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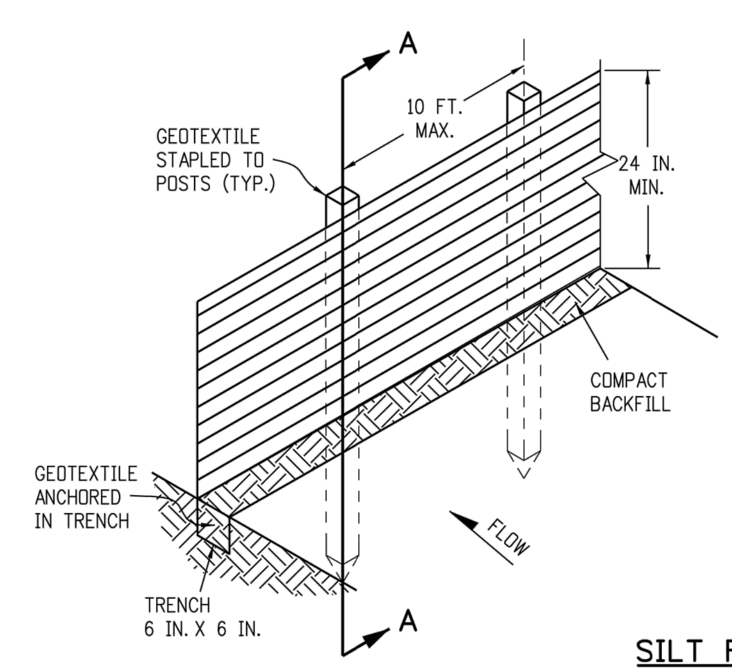
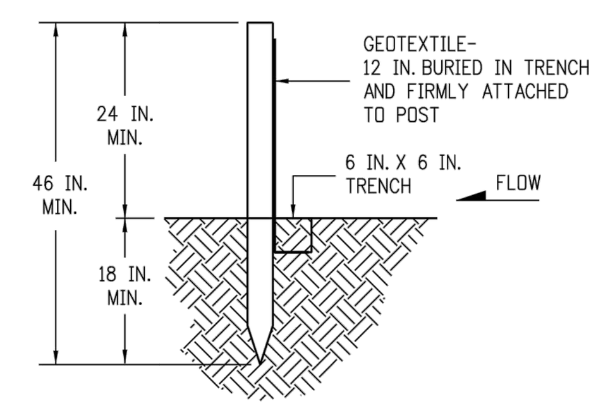
STANDARD PLAN NO. M-208-1
Standard Sheet No. 5 of 11
Project Sheet Number:



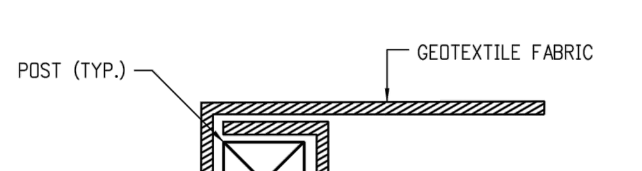
SILT FENCE



SECTION A-A

NOTES:

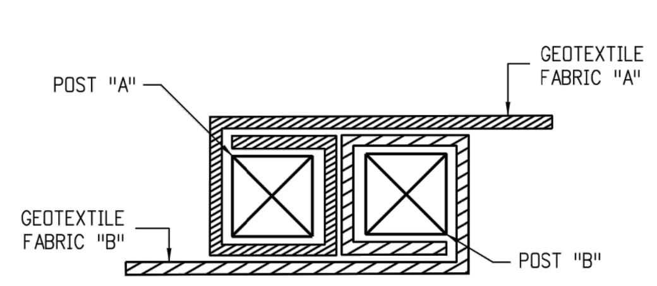
1. GEOTEXTILE SHALL BE ATTACHED TO WOOD POSTS WITH THREE OR MORE STAPLES PER POST. STAPLES SHALL BE HEAVY DUTY WIRE AND AT LEAST 1 INCH LONG.
2. WOOD POST SHALL BE 1 IN. X 1 IN. NOMINAL.
3. THE PAY ITEM NUMBER FOR SILT FENCE (LF) IS 208-00020.
4. THE SILT FENCE SHALL BE PLACED ON THE CONTOUR (AT THE SAME ELEVATION ±6 IN.). THE ENDS SHALL BE FLARED UP SLOPE (MINIMUM ELEVATION GAIN OF 18 IN.).



END SECTION DETAIL (PLAN VIEW)

NOTE:

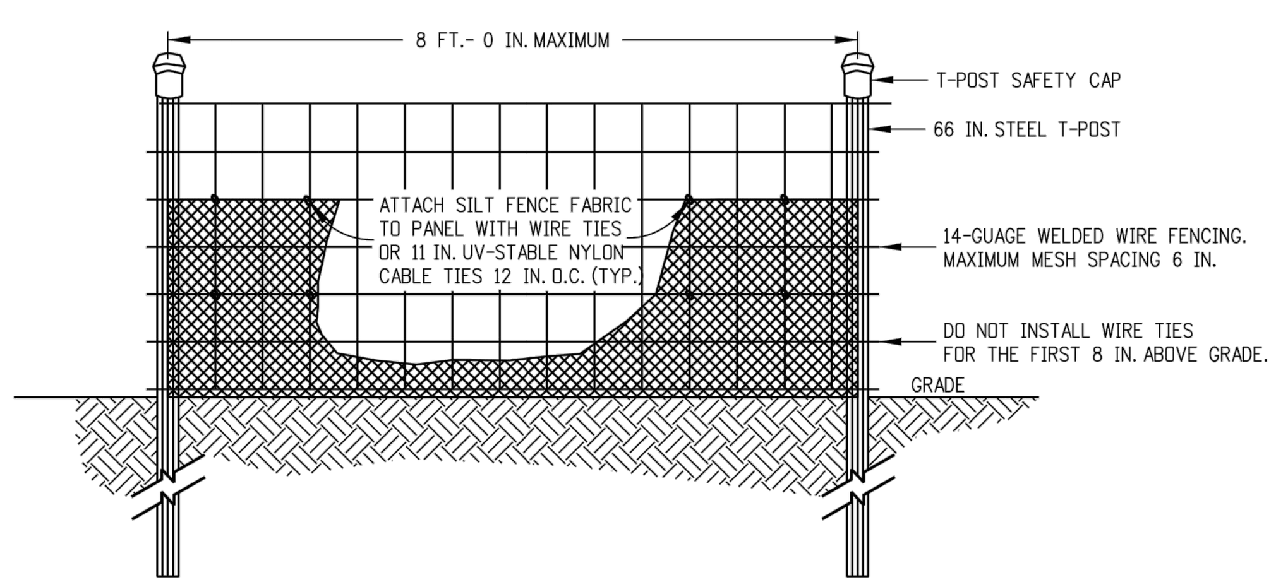
1. THE END OF THE SILT FENCE FABRIC SHALL BE WRAPPED APPROX. 6 INCHES AROUND A WOODEN POST ONE FULL TURN, THEN SECURED ALONG THE POST WITH 6 HEAVY DUTY WIRE STAPLES AT LEAST 1 INCH LONG.



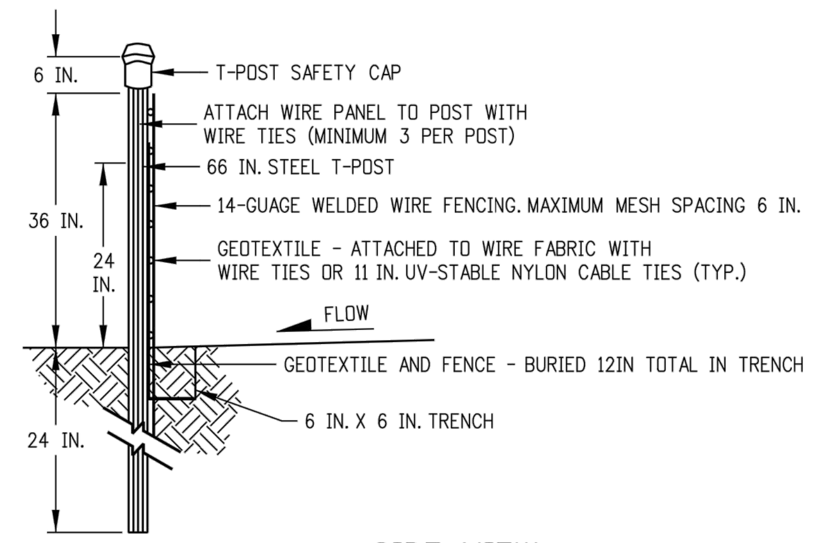
JOINING SECTION DETAIL (PLAN VIEW)

NOTES:

1. THE ENDS OF THE SILT FENCE FABRIC SHALL BE JOINED TOGETHER BY WRAPPING APPROX. 6 INCHES OF EACH END AROUND A WOODEN POST ONE FULL TURN, THEN SECURED ALONG THE POST WITH 6 HEAVY DUTY WIRE STAPLES AT LEAST 1 INCH LONG.
2. POSTS SHALL BE TIGHTLY ABUTTED WITH NO GAPS TO PREVENT POTENTIAL FLOW-THROUGH OF SEDIMENT AT JOINT.



ELEVATION VIEW



SIDE VIEW

NOTES:

1. THE ENDS OF THE SILT FENCE FABRIC SHALL BE JOINED TOGETHER BY WRAPPING APPROX. 6 INCHES OF EACH END AROUND A STEEL T-POST, THEN SECURED ALONG THE POST WITH WIRE TIES (MINIMUM 3 PER POST).
2. POSTS SHALL BE TIGHTLY ABUTTED WITH NO GAPS TO PREVENT POTENTIAL FLOW-THROUGH OF SEDIMENT AT JOINT.
3. SILT FENCES SHALL NOT BE USED FOR CHECK DAMS.
4. THE PAY ITEM NUMBER FOR SILT FENCE (REINFORCED) (LF) IS 208-00021.

SILT FENCE (REINFORCED)

SILT FENCE APPLICATIONS

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TEMPORARY EROSION CONTROL

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STANDARD PLAN NO. M-208-1
Standard Sheet No. 8 of 11
Project Sheet Number:

SEEDING AND MULCHING INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - AREA OF SEEDING AND MULCHING.
   - TYPE OF SEED MIX (PERMANENT, TEMPORARY, OR LOW-GROWTH).
2. ALL BRANDS FURNISHED SHALL BE FREE FROM SUCH NOXIOUS SEEDS AS RUSSIAN OR CANADIAN THISTLE, COARSE FESCUE, EUROPEAN BINDWEED, JOHNSON GRASS, KNAP WEED AND LEAFY SPURGE.
3. THE SEEDER SHALL FURNISH TO THE CONTRACTOR A SIGNED STATEMENT CERTIFYING THAT THE SEED FURNISHED IS FROM A LOT THAT HAS BEEN TESTED BY A RECOGNIZED LABORATORY. SEED WHICH HAS BECOME WET, MOLDY, OR OTHERWISE DAMAGED IN TRANSIT OR IN STORAGE WILL NOT BE ACCEPTABLE. SEED TICKETS SHALL BE PROVIDED TO THE CITY UPON REQUEST.
4. DRILL SEEDING MIX SHALL CONFORM TO THE TABLE ON THE RIGHT:
5. IF THE SEED AVAILABLE ON THE MARKET DOES NOT MEET THE MINIMUM PURITY AND GERMINATION PERCENTAGES SPECIFIED, THE SUBCONTRACTOR MUST COMPENSATE FOR A LESSER PERCENTAGE OF PURITY OR GERMINATION BY FURNISHING SUFFICIENT ADDITIONAL SEED TO EQUAL THE SPECIFIED PRODUCT. THE TAGS FROM THE SEED MIXES MUST BE SUPPLIED TO CONTRACTOR AND FORWARDED TO THE CITY INSPECTOR.
6. THE FORMULA USED FOR DETERMINING THE QUANTITY OF PURE LIVE SEED (PLS) SHALL BE (POUNDS OF SEED) X (PURITY) X (GERMINATION) = POUNDS OF PURE LIVE SEED (PLS).
7. PERMANENT SEED MIX SHALL BE USED UNLESS OTHERWISE APPROVED BY THE CITY.
8. ALL AREAS TO BE SEEDED AND MULCHED SHALL HAVE NATIVE TOPSOIL OR APPROVED SOIL AMENDMENTS SPREAD TO A DEPTH OF AT LEAST 6 INCHES (LOOSE DEPTH). HAUL ROADS AND OTHER COMPACTED AREAS SHALL BE LOOSENED TO A DEPTH OF 6 INCHES PRIOR TO SPREADING TOPSOIL.
9. SOIL IS TO BE THOROUGHLY LOOSENED (TILLED) TO A DEPTH OF AT LEAST 6 INCHES PRIOR TO SEEDING. THE TOP 6 INCHES OF THE SEED BED SHALL BE FREE OF ROCKS GREATER THAN 4 INCHES AND SOIL CLODS GREATER THAN 2 INCHES. SEEDING OVER ANY COMPACTED AREAS THAT HAVEN'T BEEN THOROUGHLY LOOSENED SHALL BE REJECTED.
10. SEED IS TO BE APPLIED USING A MECHANICAL DRILL TO A DEPTH OF 1/4 INCH. ROW SPACING SHALL BE NO MORE THAN 6 INCHES. MATERIAL USED FOR MULCH SHALL CONSIST OF LONG-STEMMED STRAW. AT LEAST 50 PERCENT OF THE MULCH, BY WEIGHT, SHALL BE 10 INCHES OR MORE IN LENGTH. MULCH SHALL BE APPLIED AND MECHANICALLY ANCHORED TO A DEPTH OF AT LEAST 2 INCHES. MULCH SHALL BE APPLIED AT A RATE OF 4000 LB. OF STRAW PER ACRE.
11. IF THE PERMITTEE DEMONSTRATES TO THE CITY THAT IT IS NOT POSSIBLE TO DRILL SEED, SEED IS TO BE UNIFORMLY BROADCAST AT TWO TIMES THE DRILLED RATE, THEN LIGHTLY HARROWED TO PROVIDE A SEED DEPTH OF APPROXIMATELY 1/4 INCH, THEN ROLLED TO COMPACT, THEN MULCHED AS SPECIFIED ABOVE.
12. SEEDING AND MULCHING SHALL BE COMPLETED WITHIN 30 DAYS OF INITIAL EXPOSURE OR 7 DAYS AFTER GRADING IS SUBSTANTIALLY COMPLETE IN A GIVEN AREA (AS DEFINED BY THE CITY. THIS MAY REQUIRE MULTIPLE MOBILIZATIONS FOR SEEDING AND MULCHING.
13. MULCH SHALL BE APPLIED WITHIN 24-HOURS OF SEEDING.
14. TACKIFIER SHOULD BE UTILIZED TO HELP WITH STRAW DISPLACEMENT.

SEEDING AND MULCHING MAINTENANCE NOTES

1. SEEDED AND MULCHED AREAS SHALL BE INSPECTED FOR REQUIRED COVERAGE MONTHLY FOR A PERIOD OF TWO YEARS FOLLOWING INITIAL SEEDING. REPAIRS AND RE-SEEDING AND MULCHING SHALL BE UNDERTAKEN AFTER THE FIRST GROWING SEASON FOR ANY AREAS FAILING TO MEET THE REQUIRED COVERAGE.
2. REQUIRED COVERAGE FOR STANDARD, OPEN SPACE AND LOW GROWTH SEED MIXES SHALL BE DEFINED AS FOLLOWS:
   1. THREE (3) PLANTS PER SQUARE FOOT WITH A MINIMUM HEIGHT OF 3 INCHES. THE 3 PLANTS PER SQUARE FOOT SHALL BE OF THE VARIETY AND SPECIES FOUND IN THE CITY APPROVED MIX.
   2. NO BARE AREAS LARGER THAN 4 SQUARE FEET (TWO-FEET BY TWO-FEET OR EQUIVALENT).
   3. FREE OF ERODED AREAS.
   4. FREE FROM INFESTATION OF NOXIOUS WEEDS IN ACCORDANCE WITH SECTION 6.4 OF THE GESC CRITERIA MANUAL.
3. REQUIRED COVERAGE FOR TURF GRASS AREAS SHALL BE DEFINED AS FOLLOWS:
   1. AT LEAST 80% VEGETATIVE COVER OF GRASS SPECIES PLANTED.
   2. NO BARE AREAS LARGER THAN 4 SQUARE FEET (TWO-FEET BY TWO-FEET OR EQUIVALENT).
   3. FREE OF ERODED AREAS.
   4. FREE FROM INFESTATION OF NOXIOUS WEEDS IN ACCORDANCE WITH SECTION 6.4 OF THE GESC CRITERIA MANUAL.
4. RILL AND GULLY EROSION SHALL BE FILLED WITH TOPSOIL PRIOR TO RESEEDING. THE RESEEDING METHOD SHALL BE APPROVED BY THE CITY.

PERMANENT DRILL SEEDING MIX

SPECIES	VARIETY	NOTES	% IN MIX	POUNDS OF PLS PER ACRE
BIG BLUESTEM	KAW	PNWS	10	1.1
YELLOW INDIANGRASS	CHEYENNE	PNWS	10	1
SWITCHGRASS	BLACKWELL	PNWS	10	0.4
SIDEOATS GRAMA	VAUGHN	PNWB	10	0.9
WESTERN WHEATGRASS	ARRIBA	PNCS	10	1.6
BLUE GRAMA	HACHITA	PNWB	10	0.3
THICKSPIKE WHEATGRASS	CRITANA	PNCS	10	1
PRAIRIE SANDREED	GOSHEN	PNWS	10	0.7
GREEN NEEDLEGRASS	LODORM	PNCB	10	1
SLENDER WHEATGRASS	PRYOR	PNCB	5	0.6
STREAMBANK WHEATGRASS	SODAR	PNCS	5	0.6
			TOTAL	9.2

TEMPORARY DRILL SEEDING MIX

SPECIES	VARIETY	NOTES	% IN MIX	POUNDS OF PLS PER ACRE
SMOOTH BROMEGRASS	LINCOLN	PICS	30	3.9
INTERMEDIATE WHEATGRASS	OAHE	PICS	30	4.5
PUBESCENT WHEATGRASS	LUNA	PICS	30	4.2
ANNUAL RYEGRASS	N/A	AICB	10	0.8
			TOTAL	13.4

LOW-GROWTH DRILL SEEDING MIX

SPECIES	VARIETY	NOTES	% IN MIX	POUNDS OF PLS PER ACRE
BUFFALOGRASS	TEXOKA	PNWS	20	3.2
BLUE GRAMA	HACHITA	PNWB	20	0.6
WESTERN WHEATGRASS	ARRIBA	PNCS	20	3.2
SIDEOATS GRAMA	VAUGHN	PNWB	20	1.8
THICKSPIKE WHEATGRASS	CRITANA	PNCS	10	1
STREAMBANK WHEATGRASS	SODAR	PNCS	10	1.2
			TOTAL	11.0

SM SEEDING AND MULCHING 17

811 Know what's below. Call before you dig.

ENGINEER'S STATEMENT

STANDARD NOTES ... ONLY AS TO THE ...

TRISTAN BONSER, ...
COLORADO P.E. 47602
FOR AND ON BEHALF OF JR ENGINEERING, LLC

PRELIMINARY NOT FOR CONSTRUCTION

UNTIL SUCH TIME AS THESE DRAWINGS ARE APPROVED BY THE APPROPRIATE REVIEWING AGENCIES, JR ENGINEERING APPROVES THEIR USE ONLY FOR THE PURPOSES DESIGNATED BY WRITTEN AUTHORIZATION.

PREPARED FOR
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Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com

No.	REVISION	BY	DATE

H-SCALE	N/A
V-SCALE	N/A
DATE	12/30/22
DESIGNED BY	AHC
DRAWN BY	AHC
CHECKED BY	

FRISCO BAY MARINA STORM DRAINAGE IMPROVEMENTS

STANDARD DETAILS

SHEET 14 OF 15

JOB NO. 16113.00

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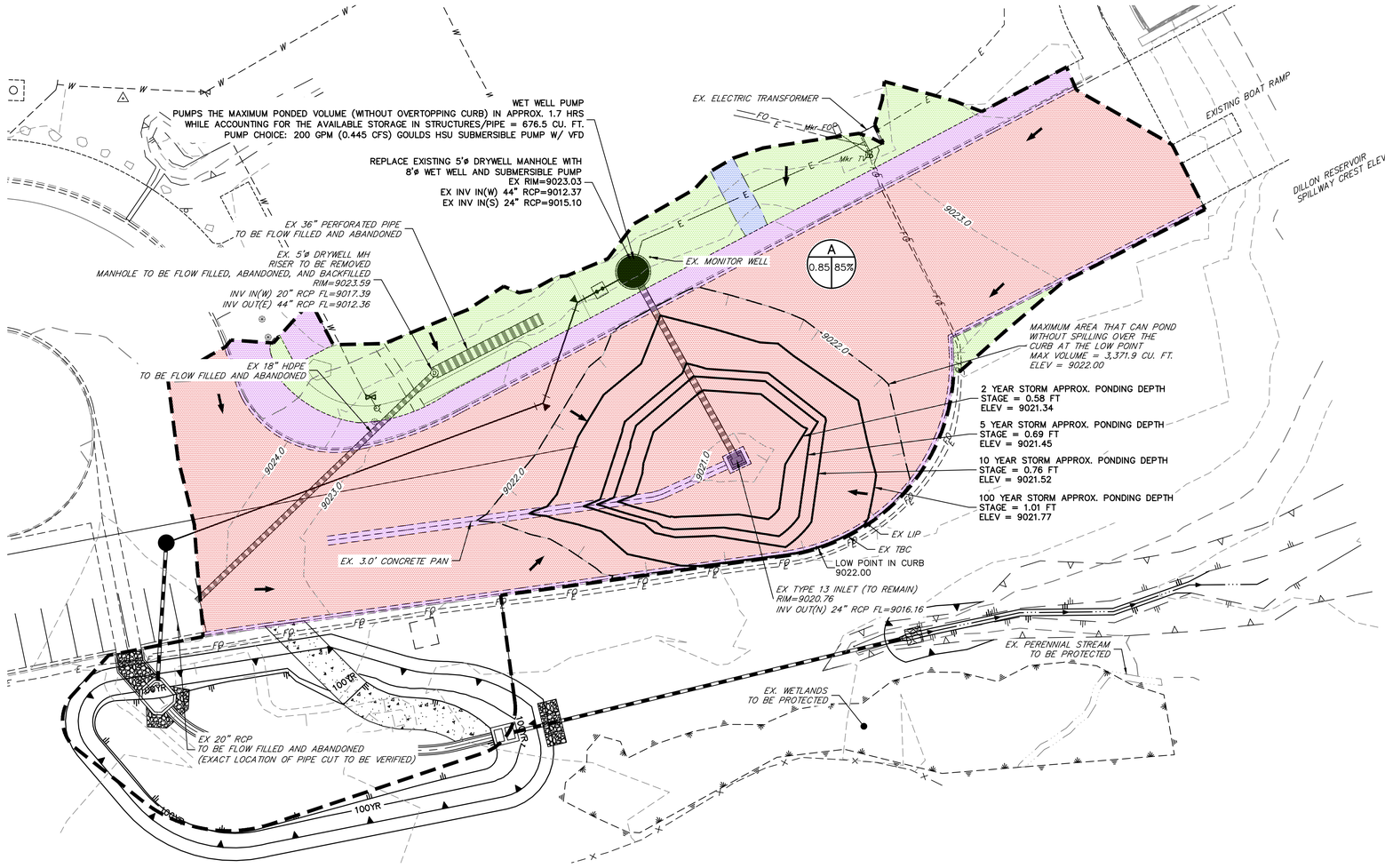

Boat Ramp Storage				
Elevation	Stage (ft)	Area (ft^2)	Incremental Volume (ft^3)	Cumulative Volume (ft^3)
9,020.76	0.00	0.0	0.0	0.0
9,020.8	0.04	3.7	0.05	0.05
9,021.0	0.24	258.2	19.5	19.6
9,021.2	0.44	888.6	108.4	128.0
9,021.4	0.64	2,037.8	284.8	412.8
9,021.6	0.84	3,870.0	581.1	993.8
9,021.8	1.04	5,988.6	978.2	1,972.0
9,022.0	1.24	8,061.6	1,399.9	3,371.9

IMPERVIOUS AREAS:

- ASPHALT (100%) = 0.4893 AC
- CONCRETE (100%) = 0.0837 AC
- GRAVEL (40%) = 0.0045 AC
- LANDSCAPING (2%) = 0.1014 AC

LEGEND

- DRAINAGE BASIN ID (A; X = AREA (AC), X% = IMPERVIOUS %)
- DESIGN POINT (1)
- DRAINAGE BASIN BOUNDARY
- DRAINAGE ARROW

NOTE:

THE PONDED DEPTH ANALYSIS DID NOT ACCOUNT FOR THE 676.5 CU. FT. OF STORAGE IN THE PIPE, INLET OR MANHOLE

20 10 0 20 40

ORIGINAL SCALE: 1" = 20'

BENCHMARK:

THE BENCHMARK USED FOR THIS SITE IS NGS BM OVERLOOK, 3-1/4" ALUMINUM CAP IN CONCRETE, EAST OF ORANGE CARSONITE POST AND NORTH OF GREEN CARSONITE POST, EL=9183.16 (NAVD88).

BASIS OF BEARING:

THE EAST LINE OF SECTION 35, TOWNSHIP 5 SOUTH, RANGE 78 WEST OF THE 6TH PRINCIPAL MERIDIAN, BEING MONUMENTED BY A 3-1/4" BRASS CAP STAMPED " DMWW CO S16" AT THE NORTH END AND BY 3-1/4" BRASS CAP STAMPED "US CADASTRAL SURVEY BUREAU OF LAND MANAGEMENT T5S R78W 1/4 S35/36 1959" AT THE SOUTH END, BEARING S00°14'49"W AS REFERENCED TO COLORADO STATE PLANE CENTRAL ZONE.

Know what's below. Call before you dig.

FOR INFORMATION ONLY

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FRISCO BAY MARINA STORM DRAINAGE IMPROVEMENTS

DRAINAGE PLAN

SHEET 15 OF 15

JOB NO. 16113.00

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Town of Frisco

Frisco Bay Marina Boat Ramp Turnaround Drainage Improvements

Bid Schedule January 4, 2023

NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
1	Mobilization	1	LS	$	$
2	Survey	1	LS	$	$
3	Dewatering	1	LS	$	$
4	Removal of Pipe	45	LF	$	$
5	Removal of Concrete Sidewalk	4	SY	$	$
6	Removal of Asphalt (Full Depth)	77	SY	$	$
7	Removal of Manhole (Dry Well)	1	EA	$	$
8	Unclassified Excavation (CIP)	350	CY	$	$
9	Electrical Connection and Distribution	1	LS	$	$
10	2" PVC Conduit (Electrical Power Supply)	82	LF	$	$
11	Xylem Goulds Sump Pump (Install Only)	1	LS	$	$
12	Pump Rail Sytem and Appurtenances	1	LS	$	$
13	331-SV Control Panel with 2 Floats and Starter (Install Only)	1	LS	$	$
14	2" Valves and Appurtenances	2	EA	$	$
15	4" Valves and Appurtenances	7	EA	$	$
16	2" PVC C900 (Class 150)	10	LF	$	$
17	4" PVC C900 (Class 150) Force Main	170	LF	$	$
18	4" DIP Force Main	20	LF	$	$
19	12" RCP	170	LF	$	$
20	Manhole, Storm (4 Feet Dia) (5-10 Foot)	1	EA	$	$
21	Manhole, Storm (8 Feet Dia) (10-15 Foot) [Wet Well]	1	LS	$	$
22	Utility Vault (4'x4')	1	LS	$	$
23	Water Quality Pond Outlet Structure	1	LS	$	$
24	2' Trickle Channel	106	LF	$	$
25	Riprap, Type M (24") [Spillway and Forebay]	30	CY	$	$
26	Riprap, Type L (18") [Outfall]	5	CY	$	$
27	Concrete Sidewalk	4	SY	$	$
28	Forebay and Headwall Concrete	20	CY	$	$
29	Run-Down Concrete	10	CY	$	$
30	Concrete Maintenance Trail	80	SY	$	$
31	Concrete (Flow-Fill 18" and 36" Pipe)	17	CY	$	$
32	Concrete, Class B (WQ Wier Crest Wall)	1	LS	$	$
33	HMA (Grading SX)(75)(PG 58-28)	20	TN	$	$
34	Concrete Washout Structure	1	EA	$	$
35	Seeding and Mulching [Native]	0.5	AC	$	$
36	Street Sweeping	1	LS	$	$
37	Stabilized Staging Area	1	LS	$	$
38	Silt Fence	730	LF	$	$
39	Landscape Restoration	846	SF	$	$
				TOTAL BID:	$

TOTAL BID WRITTEN IN WORDS:

Contractor Name:

Address:

Phone:

1/4/2023