

# CONSTRUCTION DRAWINGS

## TOWN OF RAMAH

### WASTEWATER SYSTEM IMPROVEMENTS

#### 0.015 MGD WASTEWATER TREATMENT PLANT

SECTION 1, TOWNSHIP 11S, RANGE 61W, 6TH PRINCIPAL MERIDIAN AND SECTION 1, TOWNSHIP 11S, RANGE 61W, 6TH P.M.

EL PASO COUNTY, COLORADO

PCD FILE NO. PPR2325

WWTP SITE APPROVAL NO. 06505

LIFT STATION SITE APPROVAL NO. 06507

#### DESIGN ENGINEER'S STATEMENT:

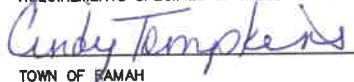
THESE DETAILED PLANS AND SPECIFICATIONS WERE PREPARED UNDER MY DIRECTION AND SUPERVISION. SAID PLANS AND SPECIFICATIONS HAVE BEEN PREPARED ACCORDING TO THE CRITERIA ESTABLISHED BY THE COUNTY FOR DETAILED ROADWAY, DRAINAGE, GRADING AND EROSION CONTROL PLANS AND SPECIFICATIONS, AND SAID PLANS AND SPECIFICATIONS ARE IN CONFORMITY WITH APPLICABLE MASTER DRAINAGE PLANS AND MASTER TRANSPORTATION PLANS. SAID PLANS AND SPECIFICATIONS MEET THE PURPOSES FOR WHICH THE PARTICULAR ROADWAY AND DRAINAGE FACILITIES ARE DESIGNED AND ARE CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. I ACCEPT RESPONSIBILITY FOR ANY LIABILITY CAUSED BY ANY NEGLIGENT ACTS, ERRORS OR OMISSIONS ON MY PART IN PREPARATION OF THESE DETAILED PLANS AND SPECIFICATIONS.

  
ALICE ARSENAULT, P.E. #53350

1/30/2024  
DATE

#### OWNER/DEVELOPER'S STATEMENT:

I, THE OWNER/DEVELOPER HAVE READ AND WILL COMPLY WITH ALL OF THE REQUIREMENTS SPECIFIED IN THESE DETAILED PLANS AND SPECIFICATIONS.

  
TOWN OF RAMAH  
113 S. COMMERCIAL STREET RAMAH, CO 80832

1-31-24  
DATE

#### EL PASO COUNTY:

COUNTY PLAN REVIEW IS PROVIDED ONLY FOR GENERAL CONFORMANCE WITH COUNTY DESIGN CRITERIA. THE COUNTY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, DIMENSIONS, AND/OR ELEVATIONS WHICH SHALL BE CONFIRMED AT THE JOB SITE. THE COUNTY THROUGH THE APPROVAL OF THEIR DOCUMENT ASSUMES NO RESPONSIBILITY FOR COMPLETENESS AND/OR ACCURACY OF THEIR DOCUMENT.

FILED IN ACCORDANCE WITH THE REQUIREMENTS OF THE EL PASO COUNTY LAND DEVELOPMENT CODE, DRAINAGE CRITERIA MANUAL, VOLUMES 1 AND 2, AND ENGINEERING CRITERIA MANUAL AS AMENDED.

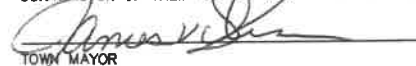
IN ACCORDANCE WITH ECM SECTION 1.12, THESE CONSTRUCTION DOCUMENTS WILL BE VALID FOR CONSTRUCTION FOR A PERIOD OF 2 YEARS FROM THE DATE SIGNED BY THE EL PASO COUNTY ENGINEER. IF CONSTRUCTION HAS NOT STARTED WITHIN THOSE 2 YEARS, THE PLANS WILL NEED TO BE RESUBMITTED FOR APPROVAL, INCLUDING PAYMENT OF REVIEW FEES AT THE PLANNING AND COMMUNITY DEVELOPMENT DIRECTORS DISCRETION.

JOSHUA PALMER, P.E.  
COUNTY ENGINEER / ECM ADMINISTRATOR

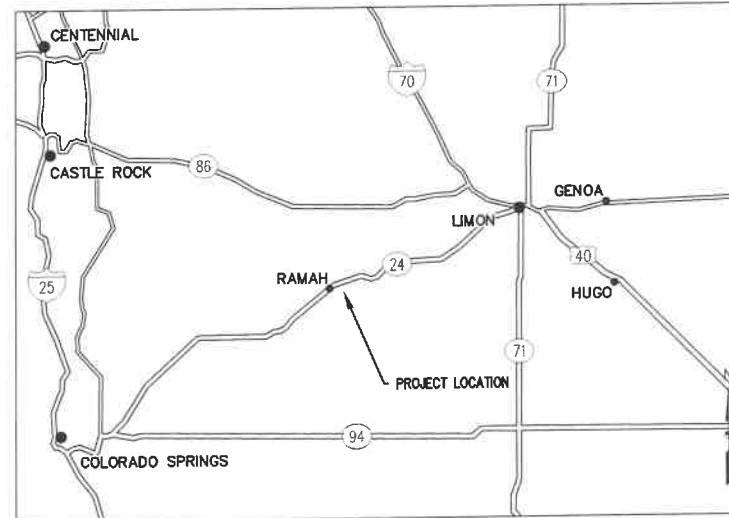
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#### TOWN OF RAMAH:

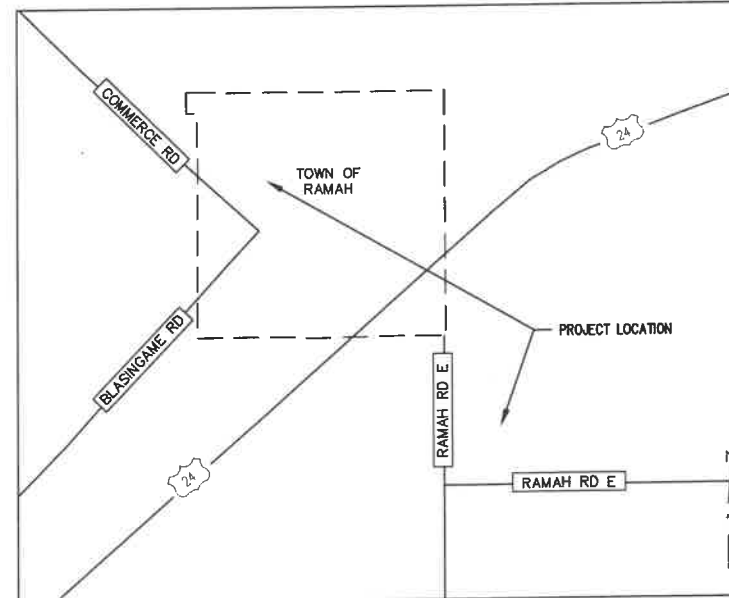
THESE PLANS HAVE BEEN APPROVED BY THE TOWN OF RAMAH. A TOWN REPRESENTATIVE WILL OBSERVE THE WORK FOR COMPLIANCE WITH THE APPROVED PLANS, BUT DOES NOT GUARANTEE THE CONTRACTOR'S PERFORMANCE. THE CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTION OF THE FACILITIES IN ACCORDANCE WITH THE APPROVED PLANS AND WITH APPLICABLE RULES AND REGULATIONS. WORK NOT PERFORMED IN ACCORDANCE WITH THE APPROVED PLANS WILL NOT BE ACCEPTED. ACCEPTANCE OF THE WORK DOES NOT RELIEVE THE CONTRACTOR OF THEIR OBLIGATIONS UNDER APPLICABLE WARRANTIES.

  
TOWN MAYOR

1-31-24  
DATE



LOCATION MAP  
NTS



VICINITY MAP  
NTS

#### PREPARED FOR

TOWN OF RAMAH  
CINDY TOMPKINS, TOWN ADMINISTRATOR  
719.541.2163  
113 S. COMMERCIAL STREET  
RAMAH, CO 80832

#### EMERGENCY CONTACT

CINDY TOMPKINS, TOWN  
ADMINISTRATOR  
719.541.2163

#### CIVIL ENGINEERING

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#### UTILITIES

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- ELECTRIC  
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FALCON, CO 80831  
719-495-2283

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S1.1	INFLUENT SCREEN DETAILS
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#### LEGAL DESCRIPTION

LOCATED WITHIN A PORTION OF SECTION 1, TOWNSHIP 11 SOUTH, RANGE 61 WEST OF THE 6TH P.M. TOWN OF RAMAH, COUNTY OF EL PASO, STATE OF COLORADO.

#### SURVEY INFORMATION

COORDINATE DATUM: COORDINATES ON THEIR PROJECT ARE FOR THE EXCLUSIVE USE FOR THE CONSTRUCTION OF THEIR PROJECT AND ARE CONSIDERED PROJECT COORDINATES ONLY. PROJECT COORDINATES ARE MODIFIED COLORADO STATE PLANE CENTRAL ZONE NAD83 COORDINATES. PLEASE CONTACT B.L. LAMAN, brad@interstatesurveygroup.com, FOR ANY QUESTIONS ABOUT CONTROL POINTS ON THEIR PROJECT. ELEVATIONS ARE BASED ON NAVD88, DERIVED FROM AN OPUS SOLUTION. CONTRACTOR TO VERIFY SURVEY INFORMATION AND REPORT ANY DISCREPANCIES BETWEEN SURVEY AND FIELD INFORMATION TO OWNER AND ENGINEER. OBSERVATIONS WERE COLLECTED USING GPS RTK BETWEEN SEPTEMBER 20, 2021 AND OCTOBER 7, 2021. NO RIGHT-OF-WAY DOCUMENTATION WAS FOUND FOR HWY 24 AND RAMAH ROAD EAST INTERSECTION. THE APPROXIMATE RIGHT-OF-WAY SHOWN WAS ESTABLISHED USING, AND BEST FIT TO, FOUND MONUMENTS.

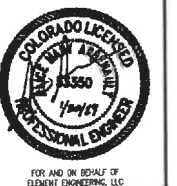
NO.	DESCRIPTION	DATE	BY

WASTEWATER TREATMENT PLANT PLANS FOR BID

COVER

TOWN OF RAMAH - PCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAMAH, CO 80832

PREPARED UNDER THE DIRECT SUPERVISION OF



DATE	JANUARY 2024
JOB NUMBER	0043.0001
SCALE	NTS
EDITION	BIDDING
SHEET	C1 of C31







SEWER BYPASS PUMPING

- IF SEWAGE BYPASS PUMPING IS NECESSARY, THE CONTRACTOR WILL SUPPLY AND MONITOR THE PUMP DURING THE ENTIRE PUMPING PERIOD. A BACK-UP PUMP WILL BE ONSITE FOR USE IF NECESSARY. BYPASS HOSE SHALL BE PROTECTED FROM TRAFFIC DAMAGE USING APPROVED APPARATUS. FOR ALL SEWAGE BYPASS PUMPING, THE CONTRACTOR WILL HAVE CONTINUOUS ON SITE MONITORING OF PUMPING OPERATIONS.
- FURNISH ALL LABOR, MATERIALS, EQUIPMENT, AND INCIDENTALS REQUIRED TO MAINTAIN CONTINUOUS AND RELIABLE WASTEWATER SERVICE IN ALL WASTEWATER LINES DURING CONSTRUCTION.
- DURING VARIOUS PHASES OF THE WORK, IT WILL BE NECESSARY TO CONSTRUCT AND MAINTAIN TEMPORARY BYPASS SEWERS TO MAINTAIN CONTINUOUS AND RELIABLE WASTEWATER FLOW IN ALL PIPES, INCLUDING INDIVIDUAL SERVICE CONNECTIONS. VARIOUS PHASES OF THE WORK THAT SHALL REQUIRE THE IMPLEMENTATION OF TEMPORARY BYPASS SEWERS INCLUDING, BUT ARE NOT LIMITED TO, SEWER MAIN AND MANHOLE REPLACEMENT, TRENCHLESS REHABILITATION OF EXISTING SEWERS, AND PIPELINE INSPECTION.
- CONTRACTOR SHALL CONSTRUCT AND MAINTAIN ALL TEMPORARY BYPASS SEWERS AND BE RESPONSIBLE FOR ALL BYPASS PUMPING OF SEWAGE THAT MAY BE REQUIRED TO PREVENT BACKING UP OF SEWAGE AND ALLOW APPROPRIATE CONDITIONS FOR PROPER INSPECTION, REHABILITATION, REPLACEMENT OR RECONNECTIONS TO EXISTING SEWERS. THE CONTRACTOR SHALL IMMEDIATELY REMOVE AND DISPOSE OF ALL OFFENSIVE MATTER SPILLED DURING THE BYPASS PUMPING AT THEIR OWN EXPENSE. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR PAYING ANY FINES IMPOSED AS A RESULT OF SPILLS OR OVERFLOWS THAT OCCUR AS A RESULT OF THE BYPASS PUMPING OPERATIONS.
- CONTRACTOR SHALL PROVIDE A REDUNDANT BYPASS PUMP, INTAKE AND DISCHARGE CONDUIT, AND OTHER EQUIPMENT NECESSARY TO PROVIDE CONTINUOUS WASTEWATER FLOW AND PREVENT THE BACKING UP OF SEWAGE IN THE CASE OF EMERGENCIES AT ALL TIMES.
- WHERE NO ALTERNATE SANITARY SEWER ROUTE IS AVAILABLE OR WHEN TWENTY-FOUR HOURS OF STORAGE IS NOT FEASIBLE, REDUNDANT BYPASS PUMPING SHALL BE INSTALLED.
- PRIMARY BYPASS PUMPS SHALL BE CRITICALLY SILENCED WHEN USED IN RESIDENTIAL SETTINGS OR AREAS WHERE EXCESSIVE NOISE LEVELS WOULD CREATE A DISTURBANCE. REDUNDANT BYPASS PUMPING DOES NOT HAVE TO BE CRITICALLY SILENCED.
- THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER A SCHEDULE TO COMPLETE THE WORK. IT WILL INCLUDE THE SEQUENCING AND COORDINATION OF CONNECTIONS TO EXISTING SEWERS, PIPELINE INSPECTION, TRENCHLESS REHABILITATION AND TESTING OF EXISTING SEWERS, AND THE HANDLING OF WASTEWATER FLOW DURING CONSTRUCTION. THE SCHEDULE OF WORK SHALL ALSO BE REVIEWED AND APPROVED BY THE OPERATOR IN RESPONSIBLE CHARGE (ORC).
- THE DESIGN, INSTALLATION, AND OPERATION OF THE TEMPORARY PUMPING SYSTEM SHALL BE THE CONTRACTOR'S RESPONSIBILITY. THE CONTRACTOR SHALL EITHER DEMONSTRATE, OR EMPLOY THE SERVICES OF A SUBCONTRACTOR WHO CAN DEMONSTRATE, TO THE ENGINEER AND ORC THAT THEY SPECIALIZES IN THE DESIGN AND OPERATION OF TEMPORARY BYPASS PUMPING SYSTEMS.
- THE CONTRACTOR SHALL PREPARE A SPECIFIC, DETAILED DESCRIPTION OF THE PROPOSED PUMPING SYSTEM (BYPASS PUMPING PLAN). THE BYPASS PUMPING PLAN SHALL BE SUBMITTED AND APPROVED PRIOR TO THE MOBILIZATION OF ANY OF THE EQUIPMENT INCLUDED IN THE BYPASS PUMPING PLAN. THE BYPASS PUMPING PLAN SHALL OUTLINE ALL PROVISIONS AND PRECAUTIONS TO BE TAKEN BY THE CONTRACTOR REGARDING HANDLING OF EXISTING WASTEWATER FLOWS. TTHEIR BYPASS PUMPING PLAN MUST BE SPECIFIC AND COMPLETE, INCLUDING SUCH ITEMS AS SCHEDULES, LOCATIONS, CAPACITIES OF EQUIPMENT, MATERIALS, AND ALL OTHER INCIDENTAL ITEMS NECESSARY AND/OR REQUIRED TO ENSURE PROPER PROTECTION OF THE FACILITIES, INCLUDING PROTECTION OF THE ACCESS AND BYPASS PUMPING LOCATIONS FOR DAMAGE DUE TO THE DISCHARGE FLOWS, AND COMPLIANCE WITH THE REQUIREMENTS AND PERMIT CONDITIONS SPECIFIED HEREIN. NO CONSTRUCTION SHALL BEGIN UNTIL ALL PROVISIONS AND REQUIREMENTS HAVE BEEN REVIEWED AND ACCEPTED BY THE ENGINEER AND ORC. THE PLAN SHALL INCLUDE BUT NOT LIMITED TO THE FOLLOWING DETAILS:

- SEWER PLUGGING METHOD AND TYPES OF PLUGS.
- SIZE OF SUCTION AND DISCHARGE HOSE OR PIPING.
- BYPASS PUMP SIZES (ONE STANDBY PUMP WILL BE REQUIRED AT EACH LOCATION IN CASE OF A PUMP FAILURE), CAPACITIES, AND NUMBER OF EACH SIZE TO BE PROVIDED ON- SITE INCLUDING ALL PRIMARY, SECONDARY, AND SPARE PUMPING UNITS.
- METHOD OF PROTECTING DISCHARGE MANHOLES OR STRUCTURES FROM EROSION AND DAMAGE.
- SECTIONS SHOWING SUCTION AND DISCHARGE PIPE DEPTH, EMBEDMENT, SELECT FILL AND SPECIAL BACKFILL, IF COVER IS NECESSARY.
- METHOD OF NOISE CONTROL FOR EACH PUMP AND ANY ADDITIONAL EQUIPMENT THAT IS INCLUDED IN THE BYPASS PUMPING PLAN.
- SCHEDULE FOR INSTALLATION OF AND MAINTENANCE OF BYPASS PUMPING LINES.
- PLAN INDICATING LOCATION OF BYPASS PUMPING PIPE LOCATIONS.
- CONTRACTORS PLAN FOR PROVIDING CONTINUOUS MONITORING OF THE BYPASS PUMPING OPERATION AS WELL AS THE MONITORING PERSONS' QUALIFICATIONS.

- THE CONTRACTOR SHALL SUPPLY PUMPS, CONDUITS, POWER, AND OTHER EQUIPMENT TO DIVERT THE FLOW OF SEWAGE AROUND THE SECTION IN WHICH WORK IS TO BE PERFORMED. THE BYPASS SYSTEM SHALL BE OF SUFFICIENT CAPACITY TO HANDLE THE WASTEWATER FLOWS. IT IS THE INTENT OF THESE SPECIFICATIONS TO REQUIRE THE CONTRACTOR TO ESTABLISH ADEQUATE BYPASS PUMPING AS REQUIRED REGARDLESS OF THE FLOW CONDITION.
- THE CONTRACTOR SHALL PERFORM LEAKAGE AND PRESSURE TESTS OF THE BYPASS PUMPING DISCHARGE PIPING USING CLEAN WATER PRIOR TO THE ACTUAL OPERATION. THE PRESSURE AND LEAKAGE TEST SHALL BE CONDUCTED AT ONE-AND-A-HALF TIMES THE MAXIMUM PRESSURE THE SYSTEM WILL EXPERIENCE BASED ON THE APPROVED BYPASS PUMPING PLAN FOR A PERIOD OF TWO HOURS. NO LEAKAGE IS PERMITTED DURING TTHEIR TEST. THE ENGINEER WILL BE GIVEN 24 HOURS NOTICE PRIOR TO TESTING. IN ADDITION, THE CONTRACTOR SHALL DEMONSTRATE THAT THE PUMPING SYSTEM IS IN GOOD WORKING ORDER AND IS SUFFICIENTLY SIZED TO SUCCESSFULLY HANDLE FLOWS BY PERFORMING A TEST RUN FOR A PERIOD OF 24 HOURS PRIOR TO BEGINNING THE WORK.
- THE CONTRACTOR SHALL BE REQUIRED TO REPAIR, AT THEIR OWN EXPENSE, ANY DAMAGE TO PUBLIC OR PRIVATE PROPERTY CAUSED BY THEIR OPERATIONS.
- SHOULD DAMAGE OF ANY KIND OCCUR TO THE EXISTING SEWERS, THE CONTRACTOR SHALL, AT THEIR OWN EXPENSE MAKE REPAIRS TO THE SATISFACTION OF THE ENGINEER AND THE ORC.
- THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE AUTHORITY SHOULD A SANITARY SEWER OVERFLOW (SSO) OCCUR AND TAKE THE NECESSARY ACTION TO CLEAN UP AND DISINFECT THE SPILLAGE TO THE SATISFACTION OF THE AUTHORITY AND/OR OTHER GOVERNMENTAL AGENCY. IF SEWAGE IS SPILLED ONTO PUBLIC OR PRIVATE PROPERTY, THE CONTRACTOR SHALL WASH DOWN, CLEAN UP, AND DISINFECT THE SPILLAGE TO THE SATISFACTION OF THE PROPERTY OWNER, AUTHORITY, AND/OR OTHER GOVERNMENTAL AGENCY.
- THE CONTRACTOR SHALL NOT BE PERMITTED TO OVERFLOW, BYPASS, PUMP OR BY ANY OTHER MEANS CONVEY DRAINAGE TO ANY LAND, STREET, STORM DRAIN OR WATER COURSE.
- THE CONTRACTOR SHALL CEASE BYPASS PUMPING OPERATIONS AND RETURN FLOWS TO THE NEW AND/OR EXISTING SEWER WHEN DIRECTED BY THE OWNER. DURING BYPASSING, NO WASTEWATER SHALL BE LEAKED, DUMPED, OR SPILLED IN OR ONTO ANY AREA OUTSIDE THE EXISTING WASTEWATER SYSTEM. WHEN BYPASS OPERATIONS ARE COMPLETE, ALL BYPASS PIPING SHALL BE FLUSHED WITH FRESH WATER AND DRAINED INTO THE WASTEWATER SYSTEM PRIOR TO DISASSEMBLY.
- CONTRACTOR MUST TAKE CARE TO PREVENT DAMAGE TO EXISTING STRUCTURES. DISCHARGE PIPING TO GRAVITY SEWER SYSTEMS SHALL BE DESIGNED IN SUCH A MANNER AS TO PREVENT DISCHARGE FROM CONTACTING MANHOLE WALLS OR BENCHING AND FULL DISCHARGE SHALL GO INTO DOWNSTREAM PIPE WITH AS MINIMAL TURBULENCE AS POSSIBLE. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO MANHOLES. IT MAY BE NECESSARY TO REMOVE THE MANHOLE CONE TO PROVIDE SUFFICIENT SPACE FOR THE BYPASS PIPING. IF TTHEIR IS REQUIRED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING MANHOLE COMPONENTS.
- THE 24-HOUR MONITORING PERSON SHALL BE PROPERLY TRAINED, EXPERIENCED, AND MECHANICALLY QUALIFIED SUCH THAT THEY CAN QUICKLY AND EFFECTIVELY ADDRESS ANY POTENTIAL EMERGENCY AND NON-EMERGENCY SITUATIONS ASSOCIATED WITH THE PUMPS AND BYPASS PUMPING SYSTEM THAT MUST REMAIN IN OPERATION FOR AN EXTENDED PERIOD.

BACKFILLING GENERAL

- ALL TRENCHES SHALL BE BACKFILLED AFTER PIPES, FITTINGS AND APPURTENANCES HAVE BEEN INSTALLED, INSPECTED AND APPROVED BY THE TOWN ENGINEER.
- WHENEVER A COMPACTION REQUIREMENT VALUE IS SPECIFIED HEREIN, THE OPTIMUM MOISTURE CONTENT AND STANDARD PROCTOR DENSITY SHALL BE DETERMINED IN ACCORDANCE WITH AASHTO T-99 FOR NINETY-FIVE PERCENT (95%).

DENSITY REQUIREMENTS IN TRENCH

THE CONTRACTOR SHALL OBTAIN A STANDARD PROCTOR DENSITY OF NINETY-FIVE (95%) STANDARD PROCTOR FOR THE TOTAL DEPTH OF ALL TRENCHES IN OPEN FIELDS AND IN DEDICATED ROWS. BACKFILLING SHALL BE DONE WITH GOOD SOUND EARTH, SAND OR GRAVEL, AND NO BITUMINOUS PAVEMENT, CONCRETE, ROCK OR OTHER LUMPY MATERIAL SHALL BE USED IN THE BACKFILL UNLESS THESE MATERIALS ARE SCATTERED AND DO NOT EXCEED SIX INCHES (6") IN ANY DIMENSION AND ARE NOT PLACED WITHIN ONE FOOT OF THE 2-1/2' LIMIT. MATERIAL OF PERISHABLE, SPONGY OR OTHERWISE IMPROPER NATURE SHALL NOT BE USED IN BACKFILLING AND NO MATERIAL GREATER THAN FOUR INCHES (4") IN ANY DIMENSION SHALL BE PLACED WITHIN ONE FOOT (1') OF ANY PIPE, MANHOLE OR STRUCTURE. BACKFILLING SHALL BE ACCOMPLISHED IN THE ZONE IN LAYERS NOT TO EXCEED TWO FEET (2') OR AS RECOMMENDED BY TESTER. ALL BACKFILL MATERIAL SHALL BE SUBJECT TO THE APPROVAL OF THE TOWN ENGINEER.

COMPACTED FILL

COMPACTION SHALL BE DONE BY USE OF VIBRATORY EQUIPMENT, TAMPING ROLLERS, PNEUMATIC TIRE ROLLERS OR OTHER MECHANICAL TAMPERS OF THE TYPE AND SIZE APPROVED BY THE TOWN ENGINEER. HAND TAMPERS SHALL BE USED AROUND ALL MANHOLES, VALVE BOXES, AND ANY SURFACE STRUCTURE. THE BACKFILL SHALL BE PLACED IN HORIZONTAL LAYERS OF SUCH DEPTHS AS ARE CONSIDERED PROPER FOR THE TYPE OF COMPACTING EQUIPMENT BEING USED IN RELATION TO THE BACKFILL MATERIAL BEING PLACED. EACH LAYER SHALL BE EVENLY SPREAD, PROPERLY MOISTENED AND COMPACTED. ANY DAMAGE TO THE PIPE AS A RESULT OF CONTRACTOR'S OPERATION SHALL BE REPAIRED AND/OR REPLACED.

COMPACTION TESTS

COMPACTION TESTS WILL BE TAKEN BY AN APPROVED TESTING LABORATORY AT LOCATIONS DESIGNATED BY THE TOWN ENGINEER. ALL EXPENSES INVOLVED IN THESE TESTS WILL BE BORNE BY THE CONTRACTOR. RESULTS OF THE TESTS WILL BE MADE AVAILABLE TO THE TOWN ENGINEER IMMEDIATELY AND COPIES OF TEST RESULTS WILL BE SUPPLIED TO THE TOWN ENGINEER ONCE PER WEEK. A FINAL TYPED BOUND COPY OF FINAL TEST RESULTS MUST BE SUBMITTED TO THE TOWN ENGINEER AT THE END OF THE PROJECT. IN ALL CASES WHERE THE TESTS INDICATE COMPACTION LESS THAN THAT REQUIRED IN THESE STANDARDS, ADDITIONAL COMPACTION AND TESTS WILL BE REQUIRED UNTIL THESE SPECIFICATIONS ARE MET. PROBATIONARY ACCEPTANCE OF THE LINES BY THE TOWN WILL BE CONTINGENT UPON SATISFACTORY COMPACTION RESULTS. NO HYDROSTATIC TESTING OF THE WATER MAIN WILL BE ALLOWED UNTIL SATISFACTORY COMPACTION IS OBTAINED. FREQUENCY OF TESTING WILL BE AS FOLLOWS:

- ONE (1) TEST AT EVERY ABOVE GROUND APPURTENANCE (I.E. VALVE BOX, MANHOLE) AT TWO-FOOT (2.0') VERTICAL INCREMENTS.
- ONE (1) TEST EVERY FOUR HUNDRED (400) LF OF MAINLINE FORCEMAIN TRENCH AT TWO-FOOT (2.0') VERTICAL INCREMENTS BEGINNING TWO FEET (2') ABOVE PIPE TO FINAL GRADE AND ONE TEST AT FINAL GRADE.
- SEE TECHNICAL SECTION 02200 FOR EMBANKMENT TESTING REQUIREMENTS.

ELEMENTENGINEERING LLC

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LAKEWOOD, CO 80228

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WASTEWATER TREATMENT PLANT PLANS FOR BID

GENERAL NOTES

TOWN OF RAWAH – PCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAWAH, CO 80832

FOR AND ON BEHALF OF  
ELEMENT ENGINEERING, LLC

FOR THE TOWN OF RAWAH

1/31/21

REGISTERED PROFESSIONAL ENGINEER

DATE  
JANUARY 2024

JOB NUMBER  
0043.0001

SCALE  
NTS

EDITION

BIDDING

SHEET  
C3 OF C31



STANDARD NOTES FOR EL PASO COUNTY CONSTRUCTION PLANS

- ALL DRAINAGE AND ROADWAY CONSTRUCTION SHALL MEET THE STANDARDS AND SPECIFICATIONS OF THE CITY OF COLORADO SPRINGS/EL PASO COUNTY DRAINAGE CRITERIA MANUAL, VOLUMES 1 AND 2, AND THE EL PASO COUNTY ENGINEERING CRITERIA MANUAL.
- CONTRACTOR SHALL BE RESPONSIBLE FOR THE NOTIFICATION AND FIELD NOTIFICATION OF ALL EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, BEFORE BEGINNING CONSTRUCTION. LOCATION OF EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. CALL 811 TO CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO (UNCC).
- CONTRACTOR SHALL KEEP A COPY OF THESE APPROVED PLANS, THE GRADING AND EROSION CONTROL PLAN, THE STORMWATER MANAGEMENT PLAN (SWMP), THE SOILS AND GEOTECHNICAL REPORT, AND THE APPROPRIATE DESIGN AND CONSTRUCTION STANDARDS AND SPECIFICATIONS AT THE JOB SITE AT ALL TIMES, INCLUDING THE FOLLOWING:
  - EL PASO COUNTY ENGINEERING CRITERIA MANUAL (ECM)
  - CITY OF COLORADO SPRINGS/EL PASO COUNTY DRAINAGE CRITERIA MANUAL, VOLUMES 1 AND 2
  - COLORADO DEPARTMENT OF TRANSPORTATION (CDOT) STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION
  - CDOT M & S STANDARDS
- NOTWITHSTANDING ANYTHING DEPICTED IN THESE PLANS IN WORDS OR GRAPHIC REPRESENTATION, ALL DESIGN AND CONSTRUCTION RELATED TO ROADS, STORM DRAINAGE AND EROSION CONTROL SHALL CONFORM TO THE STANDARDS AND REQUIREMENTS OF THE MOST RECENT VERSION OF THE RELEVANT ADOPTED EL PASO COUNTY STANDARDS, INCLUDING THE LAND DEVELOPMENT CODE, THE ENGINEERING CRITERIA MANUAL, THE DRAINAGE CRITERIA MANUAL, AND THE DRAINAGE CRITERIA MANUAL VOLUME 2. ANY DEVIATIONS FROM REGULATIONS AND STANDARDS MUST BE REQUESTED, AND APPROVED, IN WRITING. ANY MODIFICATIONS NECESSARY TO MEET CRITERIA AFTER-THE-FACT WILL BE ENTIRELY THE DEVELOPER'S RESPONSIBILITY TO RECTIFY.
- IT IS THE DESIGN ENGINEER'S RESPONSIBILITY TO ACCURATELY SHOW EXISTING CONDITIONS, BOTH ONSITE AND OFFSITE, ON THE CONSTRUCTION PLANS. ANY MODIFICATIONS NECESSARY DUE TO CONFLICTS, OMISSIONS, OR CHANGED CONDITIONS WILL BE ENTIRELY THE DEVELOPER'S RESPONSIBILITY TO RECTIFY.
- CONTRACTOR SHALL SCHEDULE A PRE-CONSTRUCTION MEETING WITH EL PASO COUNTY PLANNING AND COMMUNITY DEVELOPMENT (PCD) – INSPECTIONS, PRIOR TO STARTING CONSTRUCTION.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO UNDERSTAND THE REQUIREMENTS OF ALL JURISDICTIONAL AGENCIES AND TO OBTAIN ALL REQUIRED PERMITS, INCLUDING BUT NOT LIMITED TO EL PASO COUNTY EROSION AND STORMWATER QUALITY CONTROL PERMIT (ESQCP), REGIONAL BUILDING FLOODPLAIN DEVELOPMENT PERMIT, U.S. ARMY CORPS OF ENGINEERS-ISSUED 401 AND/OR 404 PERMITS, AND COUNTY AND STATE FUGITIVE DUST PERMITS.
- CONTRACTOR SHALL NOT DEVIATE FROM THE PLANS WITHOUT FIRST OBTAINING WRITTEN APPROVAL FROM THE DESIGN ENGINEER AND PCD. CONTRACTOR SHALL NOTIFY THE DESIGN ENGINEER IMMEDIATELY UPON DISCOVERY OF ANY ERRORS OR INCONSISTENCIES.
- ALL STORM DRAIN PIPE SHALL BE CLASS III RCP UNLESS OTHERWISE NOTED AND APPROVED BY PCD.
- CONTRACTOR SHALL COORDINATE GEOTECHNICAL TESTING PER ECM STANDARDS. PAVEMENT DESIGN SHALL BE APPROVED BY EL PASO COUNTY PCD PRIOR TO PLACEMENT OF CURB AND GUTTER AND PAVEMENT
- ALL CONSTRUCTION TRAFFIC MUST ENTER/EXIT THE SITE AT APPROVED CONSTRUCTION ACCESS POINTS.
- SIGHT VISIBILITY TRIANGLES AS IDENTIFIED IN THE PLANS SHALL BE PROVIDED AT ALL INTERSECTIONS. OBSTRUCTIONS GREATER THAN 18 INCHES ABOVE FLOWLINE ARE NOT ALLOWED WITHIN SIGHT TRIANGLES.
- SIGNING AND STRIPING SHALL COMPLY WITH EL PASO COUNTY DOT AND MUTCD CRITERIA. [IF APPLICABLE, ADDITIONAL SIGNING AND STRIPING NOTES WILL BE PROVIDED.]
- CONTRACTOR SHALL OBTAIN ANY PERMITS REQUIRED BY EL PASO COUNTY DOT, INCLUDING WORK WITHIN THE RIGHT-OF-WAY AND SPECIAL TRANSPORT PERMITS.
- THE LIMITS OF CONSTRUCTION SHALL REMAIN WITHIN THE PROPERTY LINE UNLESS OTHERWISE NOTED. THE OWNER/DEVELOPER SHALL OBTAIN WRITTEN PERMISSION AND EASEMENTS, WHERE REQUIRED, FROM ADJOINING PROPERTY OWNER(S) PRIOR TO ANY OFF-SITE DISTURBANCE, GRADING, OR CONSTRUCTION.

STANDARD NOTES FOR EL PASO COUNTY GRADING AND EROSION CONTROL PLANS

- STORMWATER DISCHARGES FROM CONSTRUCTION SITES SHALL NOT CAUSE OR THREATEN TO CAUSE POLLUTION, CONTAMINATION, OR DEGRADATION OF STATE WATERS. ALL WORK AND EARTH DISTURBANCE SHALL BE DONE IN A MANNER THAT MINIMIZES POLLUTION OF ANY ON-SITE OR OFFSITE WATERS, INCLUDING WETLANDS.
- NOTWITHSTANDING ANYTHING DEPICTED IN THESE PLANS IN WORDS OR GRAPHIC REPRESENTATION, ALL DESIGN AND CONSTRUCTION RELATED TO ROADS, STORM DRAINAGE AND EROSION CONTROL SHALL CONFORM TO THE STANDARDS AND REQUIREMENTS OF THE MOST RECENT VERSION OF THE RELEVANT ADOPTED EL PASO COUNTY STANDARDS, INCLUDING THE LAND DEVELOPMENT CODE, THE ENGINEERING CRITERIA MANUAL, THE DRAINAGE CRITERIA MANUAL, AND THE DRAINAGE CRITERIA MANUAL VOLUME 2. ANY DEVIATIONS TO REGULATIONS AND STANDARDS MUST BE REQUESTED, AND APPROVED, IN WRITING.
- A SEPARATE STORMWATER MANAGEMENT PLAN (SMWP) FOR TTHEIR PROJECT SHALL BE COMPLETED AND AN EROSION AND STORMWATER QUALITY CONTROL PERMIT (ESQCP) ISSUED PRIOR TO COMMENCING CONSTRUCTION. DURING CONSTRUCTION THE SWMP IS THE RESPONSIBILITY OF THE DESIGNATED

QUALIFIED STORMWATER MANAGER OR CERTIFIED EROSION CONTROL INSPECTOR AND SHALL BE LOCATED ON SITE AT ALL TIMES DURING CONSTRUCTION AND SHALL BE KEPT UP TO DATE WITH WORK PROGRESS AND CHANGES IN THE FIELD.

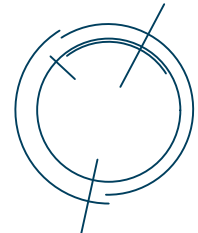
- ONCE THE ESQCP IS APPROVED AND A "NOTICE TO PROCEED" HAS BEEN ISSUED, THE CONTRACTOR MAY INSTALL THE INITIAL STAGE EROSION AND SEDIMENT CONTROL MEASURES AS INDICATED ON THE APPROVED GEC. A PRECONSTRUCTION MEETING BETWEEN THE CONTRACTOR, ENGINEER, AND EL PASO COUNTY WILL BE HELD PRIOR TO ANY CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE APPLICANT TO COORDINATE THE MEETING TIME AND PLACE WITH COUNTY STAFF.
- CONTROL MEASURES MUST BE INSTALLED PRIOR TO COMMENCEMENT OF ACTIVITIES THAT MAY CONTRIBUTE POLLUTANTS TO STORMWATER. TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES FOR ALL SLOPES, CHANNELS, DITCHES, OR ANY DISTURBED LAND AREA SHALL BE COMPLETED IMMEDIATELY UPON COMPLETION OF THE DISTURBANCE.
- ALL TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES SHALL BE MAINTAINED AND REMAIN IN EFFECTIVE OPERATING CONDITION UNTIL PERMANENT SOIL EROSION CONTROL MEASURES ARE IMPLEMENTED AND FINAL STABILIZATION IS ESTABLISHED. ALL PERSONS ENGAGED IN LAND DISTURBANCE ACTIVITIES SHALL ASSESS THE ADEQUACY OF CONTROL MEASURES AT THE SITE AND IDENTIFY IF CHANGES TO THOSE CONTROL MEASURES IS NEEDED TO ENSURE THE CONTINUED EFFECTIVE PERFORMANCE OF THE CONTROL MEASURES. ALL CHANGES TO TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES MUST BE INCORPORATED INTO THE STORMWATER MANAGEMENT PLAN PRIOR TO IMPLEMENTATION
- TEMPORARY STABILIZATION SHALL BE IMPLEMENTED ON DISTURBED AREAS AND STOCKPILES WHERE GROUND DISTURBING CONSTRUCTION ACTIVITY HAS PERMANENTLY CEASED OR TEMPORARILY CEASED FOR LONGER THAN 14 DAYS. AN AREA THAT IS GOING TO REMAIN IN AN INTERIM STATE FOR MORE THAN 60 DAYS SHALL ALSO BE STABILIZED.
- FINAL STABILIZATION MUST BE IMPLEMENTED AT ALL APPLICABLE CONSTRUCTION SITES. FINAL STABILIZATION IS ACHIEVED WHEN ALL GROUND DISTURBING ACTIVITIES ARE COMPLETE AND ALL DISTURBED AREAS EITHER HAVE A UNIFORM VEGETATIVE COVER WITH INDIVIDUAL PLAN DENSITY OF 70 PERCENT OF PRE-DISTURBANCE LEVELS ESTABLISHED OR EQUIVALENT PERMANENT ALTERNATIVE STABILIZATION METHOD IS IMPLEMENTED. ALL TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES SHALL BE REMOVED UPON FINAL STABILIZATION AND BEFORE PERMIT CLOSURE.
- ALL PERMANENT STORMWATER MANAGEMENT FACILITIES SHALL BE INSTALLED AS DEFINED IN THE APPROVED PLANS. ANY PROPOSED CHANGES THAT EFFECT THE HYDROLOGY OR HYDRAULICS OF A PERMANENT STORMWATER MANAGEMENT STRUCTURES MUST BE APPROVED BY THE ECM ADMINISTRATOR PRIOR TO IMPLEMENTATION.
- ANY EARTH DISTURBANCE SHALL BE CONDUCTED IN SUCH A MANNER SO AS TO EFFECTIVELY MINIMIZE ACCELERATED SOIL EROSION AND RESULTING SEDIMENTATION. ALL DISTURBANCES SHALL BE DESIGNED, CONSTRUCTED, AND COMPLETED SO THAT THE EXPOSED AREA OF ANY DISTURBED LAND SHALL BE LIMITED TO THE SHORTEST PRACTICAL PERIOD OF TIME. PRE-EXISTING VEGETATION SHALL BE PROTECTED AND MAINTAINED WITHIN 50 HORIZONTAL FEET OF A WATERS OF THE STATE, UNLESS INFEASIBLE.
- COMPACTION OF SOIL MUST BE PREVENTED IN AREAS DESIGNATED FOR INFILTRATION CONTROL MEASURES OR WHERE FINAL STABILIZATION WILL BE ACHIEVED BY VEGETATIVE COVER. AREAS DESIGNATED FOR INFILTRATION CONTROL SHALL ALSO BE PROTECTED FROM SEDIMENTATION DURING CONSTRUCTION UNTIL FINAL STABILIZATION IS ACHIEVED.
- ANY TEMPORARY OR PERMANENT FACILITY DESIGNED AND CONSTRUCTED FOR THE CONVEYANCE OF STORMWATER AROUND, THROUGH, OR FROM THE EARTH DISTURBANCE AREA SHALL BE A STABILIZED CONVEYANCE DESIGNED TO MINIMIZE EROSION AND THE DISCHARGE OF SEDIMENT OFF SITE.
- CONCRETE WASH WATER SHALL BE CONTAINED AND DISPOSED OF IN ACCORDANCE WITH THE SWMP. NO WASH WATER SHALL BE DISCHARGED TO OR ALLOWED TO RUNOFF TO STATE WATERS, INCLUDING ANY SURFACE OR SUBSURFACE STORM DRAINAGE SYSTEM OR FACILITIES. CONCRETE WASHOUT SHALL NOT BE LOCATED IN AN AREA WHERE SHALLOW GROUNDWATER MAY BE PRESENT, OR WITHIN 50 FEET OF A SURFACE WATER BODY.
- DEWATERING OPERATIONS: UNCONTAMINATED GROUND WATER MAY BE DISCHARGED ON SITE, BUT MAY NOT LEAVE THE SITE IN THE FORM OF SURFACE RUNOFF.
- EROSION CONTROL BLANKETING IS TO BE USED ON SLOPES STEEPER THAN 3:1.
- BUILDING, CONSTRUCTION, EXCAVATION, OR OTHER WASTE MATERIALS SHALL NOT BE TEMPORARILY PLACED OR STORED IN THE STREET, ALLEY, OR OTHER PUBLIC WAY, UNLESS IN ACCORDANCE WITH AN APPROVED TRAFFIC CONTROL PLAN. BMP'S MAY BE REQUIRED BY EL PASO COUNTY ENGINEERING IF DEEMED NECESSARY, BASED ON SPECIFIC CONDITIONS AND CIRCUMSTANCES.
- VEHICLE TRACKING OF SOILS AND CONSTRUCTION DEBRIS OFF-SITE SHALL BE MINIMIZED.MATERIALS TRACKED OFFSITE SHALL BE CLEANED UP AND PROPERLY DISPOSED OF IMMEDIATELY.
- CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL WASTES FROM THE CONSTRUCTION SITE FOR DISPOSAL IN ACCORDANCE WITH LOCAL AND STATE REGULATORY REQUIREMENTS. NO CONSTRUCTION DEBRIS, TREE SLASH, BUILDING MATERIAL WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURIED, DUMPED, OR DISCHARGED AT THE SITE.
- THE OWNER, SITE DEVELOPER, CONTRACTOR, AND/OR THEIR AUTHORIZED AGENTS SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL CONSTRUCTION DEBRIS, DIRT, TRASH, ROCK, SEDIMENT, AND SAND THAT MAY ACCUMULATE IN THE STORM SEWER OR OTHER DRAINAGE CONVEYANCE SYSTEM AND STORMWATER APPURTENANCES AS A RESULT OF SITE DEVELOPMENT.
- THE QUANTITY OF MATERIALS STORED ON THE PROJECT SITE SHALL BE LIMITED, AS MUCH AS PRACTICAL, TO THAT QUANTITY REQUIRED TO PERFORM THE WORK IN AN ORDERLY SEQUENCE. ALL MATERIALS STORED ON-SITE SHALL BE

STORED IN A NEAT, ORDERLY MANNER, IN THEIR ORIGINAL CONTAINERS, WITH ORIGINAL MANUFACTURER'S LABELS.

- NO CHEMICALS ARE TO BE USED BY THE CONTRACTOR, WHICH HAVE THE POTENTIAL TO BE RELEASED IN STORMWATER UNLESS PERMISSION FOR THE USE OF A SPECIFIC CHEMICAL IS GRANTED IN WRITING BY THE ECM ADMINISTRATOR. IN GRANTING THE USE OF SUCH CHEMICALS, SPECIAL CONDITIONS AND MONITORING MAY BE REQUIRED.
- BULK STORAGE OF PETROLEUM PRODUCTS OR OTHER LIQUID CHEMICALS IN EXCESS OF 55 GALLONS SHALL HAVE ADEQUATE SECONDARY CONTAINMENT PROTECTION TO CONTAIN ALL SPILLS AND PREVENT ANY SPILLED MATERIAL FROM ENTERING STATE WATERS, INCLUDING ANY SURFACE OR SUBSURFACE STORM DRAINAGE SYSTEM OR FACILITIES.
- NO PERSON SHALL CAUSE THE IMPEDIMENT OF STORMWATER FLOW IN THE FLOW LINE OF THE CURB AND GUTTER OR IN THE DITCH FLOW LINE.
- INDIVIDUALS SHALL COMPLY WITH THE "COLORADO WATER QUALITY CONTROL ACT" (TITLE 25, ARTICLE 8, CRS), AND THE "CLEAN WATER ACT" (33 USC 1344), IN ADDITION TO THE REQUIREMENTS INCLUDED IN THE DCM VOLUME II AND THE ECM APPENDIX I. ALL APPROPRIATE PERMITS MUST BE OBTAINED BY THE CONTRACTOR PRIOR TO CONSTRUCTION (NPDES, FLOODPLAIN, 404, FUGITIVE DUST, ETC.). IN THE EVENT OF CONFLICTS BETWEEN THESE REQUIREMENTS AND LAWS, RULES, OR REGULATIONS OF OTHER FEDERAL, STATE, OR COUNTY AGENCIES, THE MORE RESTRICTIVE LAWS, RULES, OR REGULATIONS SHALL APPLY.
- ALL CONSTRUCTION TRAFFIC MUST ENTER/EXIT THE SITE AT APPROVED CONSTRUCTION ACCESS POINTS.
- PRIOR TO ACTUAL CONSTRUCTION THE PERMITEE SHALL VERIFY THE LOCATION OF EXISTING UTILITIES.
- A WATER SOURCE SHALL BE AVAILABLE ON SITE DURING EARTHWORK OPERATIONS AND UTILIZED AS REQUIRED TO MINIMIZE DUST FROM EARTHWORK EQUIPMENT AND WIND.
- THE SOILS REPORT FOR TTHEIR SITE HAS BEEN PREPARED BY KUMAR AND ASSOCIATES, INC. AND SHALL BE CONSIDERED A PART OF THESE PLANS.
- AT LEAST TEN (10) DAYS PRIOR TO THE ANTICIPATED START OF CONSTRUCTION, FOR PROJECTS THAT WILL DISTURB 1 ACRE OR MORE, THE OWNER OR OPERATOR OF CONSTRUCTION ACTIVITY SHALL SUBMIT A PERMIT APPLICATION FOR STORMWATER DISCHARGE TO THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT, WATER QUALITY DIVISION. THE APPLICATION CONTAINS CERTIFICATION OF COMPLETION OF A STORMWATER MANAGEMENT PLAN (SWMP), OF WHICH TTHEIR GRADING AND EROSION CONTROL PLAN MAY BE A PART. FOR INFORMATION OR APPLICATION MATERIALS CONTACT:

COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT  
WATER QUALITY CONTROL DIVISION  
WQCD – PERMITS  
4300 CHERRY CREEK DRIVE SOUTH  
DENVER, CO 80246--1530  
ATTN:PERMITS UNIT

- THE PARTIES RESPONSIBLE FOR TTHEIR PLAN HAVE FAMILIARIZED THEMSELVES WITH ALL CURRENT ACCESSIBILITY CRITERIA AND SPECIFICATIONS AND THE PROPOSED PLAN REFLECTS ALL SITE ELEMENTS REQUIRED BY THE APPLICABLE ADA DESIGN STANDARDS AND GUIDELINES AS PUBLISHED BY THE UNITED STATES DEPARTMENT OF JUSTICE. APPROVAL OF TTHEIR PLAN BY EL PASO COUNTY DOES NOT ASSURE COMPLIANCE WITH THE ADA OR ANY REGULATIONS OR GUIDELINES ENACTED OR PROMULGATED UNDER OR WITH RESPECT TO SUCH LAWS.



REVISIONS	DESCRIPTION	NO	DATE				BY			

WASTEWATER TREATMENT PLANT PLANS FOR BID

GENERAL NOTES

TOWN OF RAWAH – PCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAWAH, CO 80832

PREPARED UNDER THE DIRECT SUPERVISION OF



FOR AND ON BEHALF OF  
ELEMENT ENGINEERING, LLC

DATE  
JANUARY 2024

JOB NUMBER  
0043.0001

SCALE

NTS

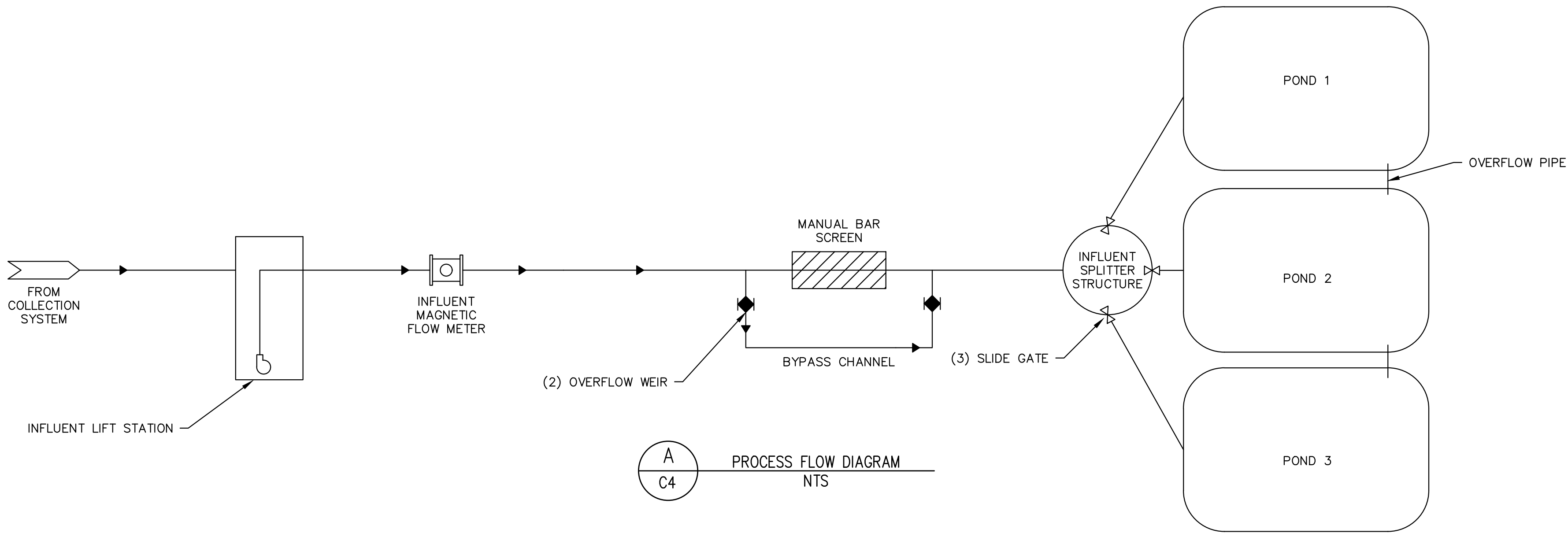
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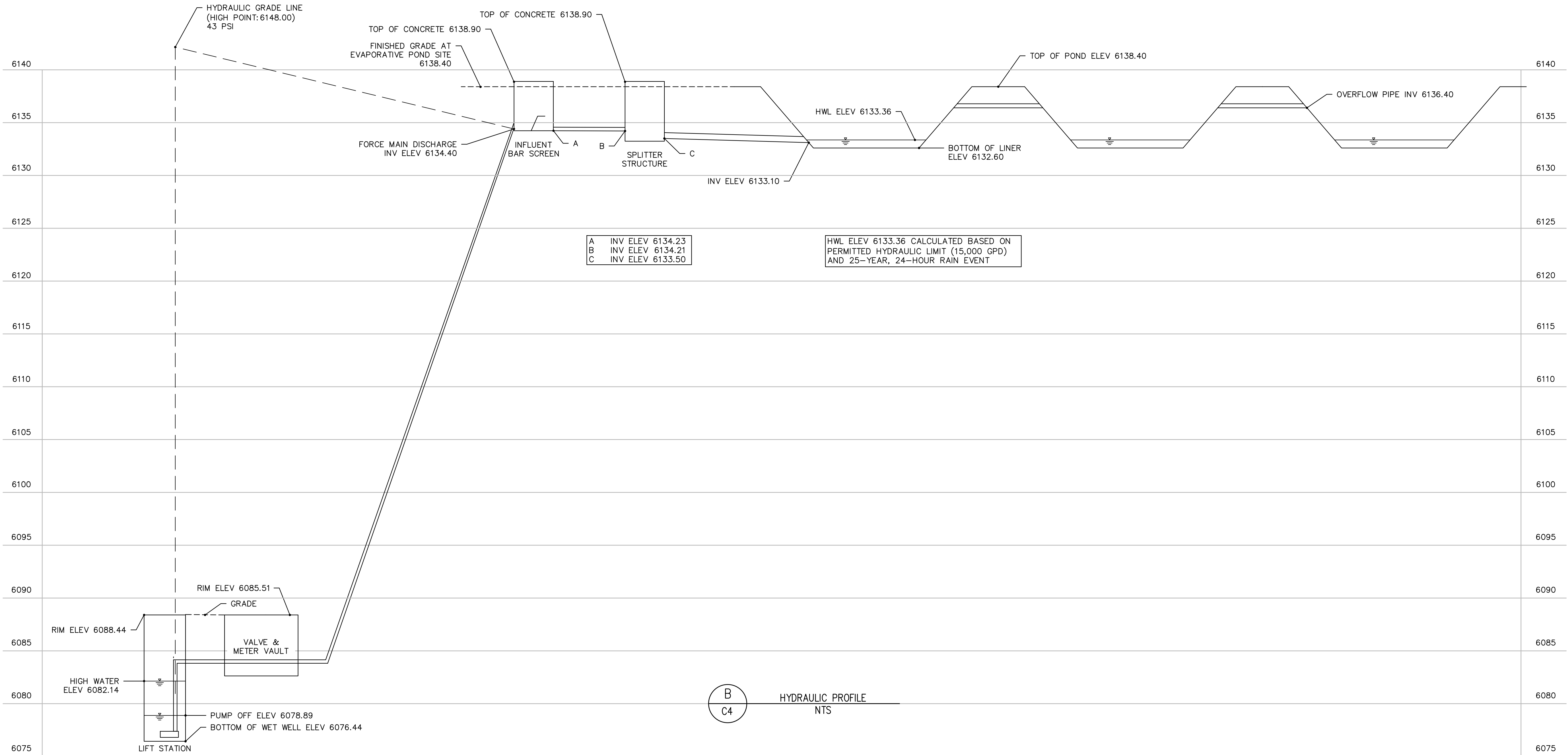
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C4 OF C31





DESIGN SUMMARY		
PERMITTED DESIGN FLOW	0.015	MGD
PERMITTED ORGANIC LOADING	32	LBS/DAY
EXISTING AVERAGE DAY FLOW (APPROX)	0.011	MGD
PEAK DAY FLOW (APPROX)	0.022	MGD
PEAK HOUR FLOW	0.060	MGD
LIFT STATION PERMITTED FLOW	42	GPM
TOTAL BOTTOM OF POND AREA	310,000	SF
TOTAL TOP OF POND AREA	372,049	SF



WASTEWATER TREATMENT PLANT PLANS FOR BID

PROCESS FLOW DIAGRAM  
& HYDRAULIC PROFILE

TOWN OF RAMAH - BCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAMAH, CO 80832

FOR AND ON BEHALF OF  
ELEMENT ENGINEERING, LLC

DATE  
JANUARY 2024

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C5 OF C31

REVISIONS

NO.	DATE	BY	DESCRIPTION

12687 W. CEDAR DRIVE, SUITE 300  
LAKEWOOD, CO 80228

720.749.4165  
WWW.ELEMENTENGINEERING.NET

FOR AND ON BEHALF OF  
ELEMENT ENGINEERING, LLC

DATE  
JANUARY 2024

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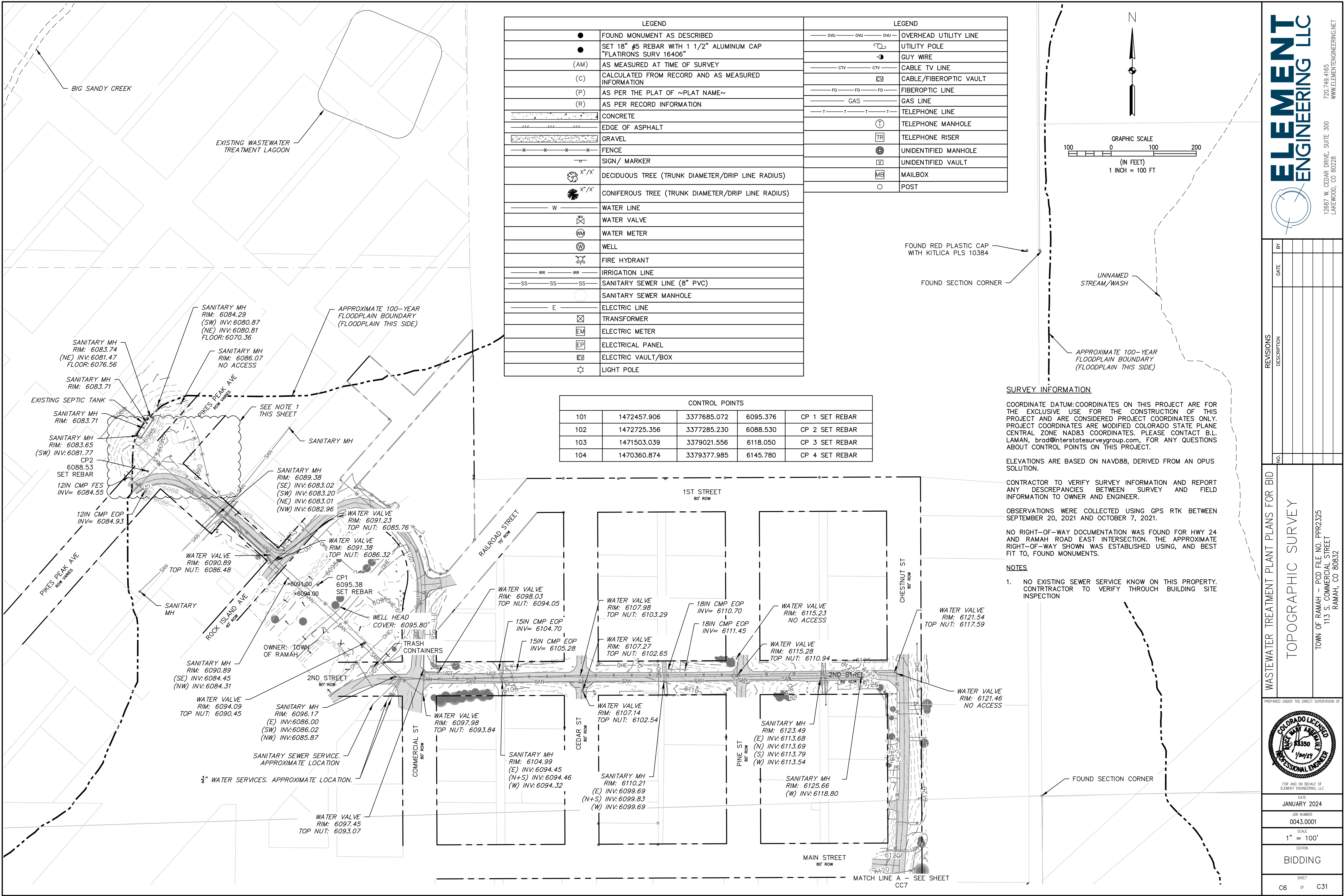
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C5 OF C31

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LEGEND	
●	FOUND MONUMENT AS DESCRIBED
●	SET 18" #5 REBAR WITH 1 1/2" ALUMINUM CAP "FLATIRONS SURV 16406"
(AM)	AS MEASURED AT TIME OF SURVEY
(C)	CALCULATED FROM RECORD AND AS MEASURED INFORMATION
(P)	AS PER THE PLAT OF ~PLAT NAME~
(R)	AS PER RECORD INFORMATION
CONCRETE	
EDGE OF ASPHALT	
GRAVEL	
FENCE	
SIGN / MARKER	
DECIDUOUS TREE (TRUNK DIAMETER/DRIP LINE RADIUS)	
CONIFEROUS TREE (TRUNK DIAMETER/DRIP LINE RADIUS)	
W	WATER LINE
WV	WATER VALVE
WM	WATER METER
W	WELL
FD	FIRE HYDRANT
IRR	IRRIGATION LINE
SS	SANITARY SEWER LINE (8" PVC)
	SANITARY SEWER MANHOLE
E	ELECTRIC LINE
TR	TRANSFORMER
EM	ELECTRIC METER
EP	ELECTRICAL PANEL
EV	ELECTRIC VAULT/BOX
LP	LIGHT POLE

LEGEND	
OVU	OVERHEAD UTILITY LINE
UP	UTILITY POLE
GW	GUY WIRE
CTV	CABLE TV LINE
CFV	CABLE/FIBEROPTIC VAULT
FO	FIBEROPTIC LINE
GAS	GAS LINE
T	TELEPHONE LINE
TM	TELEPHONE MANHOLE
TR	TELEPHONE RISER
UM	UNIDENTIFIED MANHOLE
UV	UNIDENTIFIED VAULT
MB	MAILBOX
P	POST

CONTROL POINTS					
101	1472457.906	3377685.072	6095.376	CP 1 SET REBAR	
102	1472725.356	3377285.230	6088.530	CP 2 SET REBAR	
103	1471503.039	3379021.556	6118.050	CP 3 SET REBAR	
104	1470360.874	3379377.985	6145.780	CP 4 SET REBAR	

SURVEY INFORMATION

COORDINATE DATUM: COORDINATES ON THIS PROJECT ARE FOR THE EXCLUSIVE USE FOR THE CONSTRUCTION OF THIS PROJECT AND ARE CONSIDERED PROJECT COORDINATES ONLY. PROJECT COORDINATES ARE MODIFIED COLORADO STATE PLANE CENTRAL ZONE NAD83 COORDINATES. PLEASE CONTACT B.L. LAMAN, brad@interstatesurveygroup.com, FOR ANY QUESTIONS ABOUT CONTROL POINTS ON THIS PROJECT.

ELEVATIONS ARE BASED ON NAVD88, DERIVED FROM AN OPUS SOLUTION.

CONTRACTOR TO VERIFY SURVEY INFORMATION AND REPORT ANY DISCREPANCIES BETWEEN SURVEY AND FIELD INFORMATION TO OWNER AND ENGINEER.

OBSERVATIONS WERE COLLECTED USING GPS RTK BETWEEN SEPTEMBER 20, 2021 AND OCTOBER 7, 2021.

NO RIGHT-OF-WAY DOCUMENTATION WAS FOUND FOR HWY 24 AND RAMAH ROAD EAST INTERSECTION. THE APPROXIMATE RIGHT-OF-WAY SHOWN WAS ESTABLISHED USING, AND BEST FIT TO, FOUND MONUMENTS.

NOTES

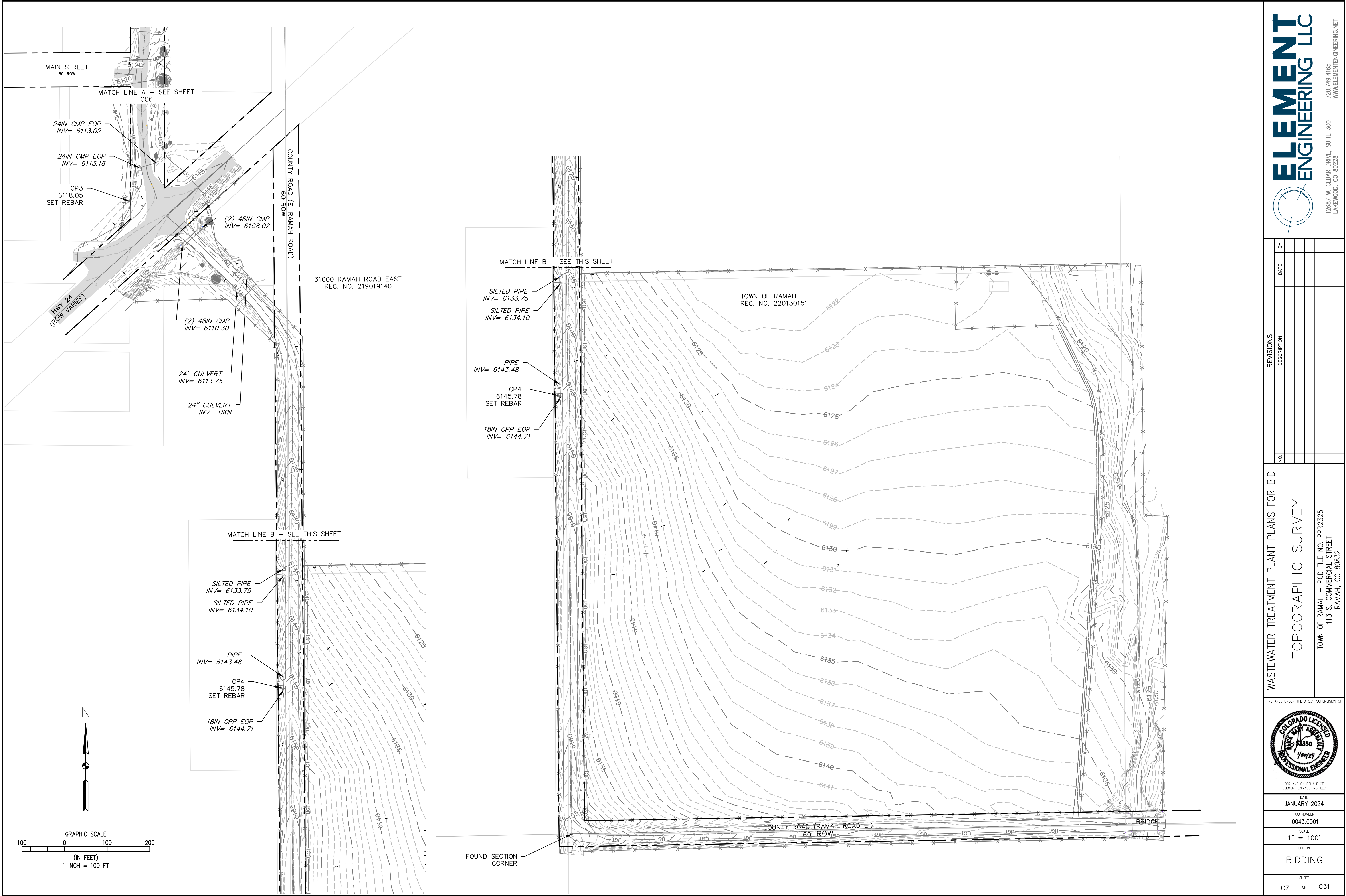
- NO EXISTING SEWER SERVICE KNOWN ON THIS PROPERTY. CONTRACTOR TO VERIFY THROUGH BUILDING SITE INSPECTION

REVISIONS	NO.	DESCRIPTION	DATE	BY

WASTEWATER TREATMENT PLANT PLANS FOR BID	
TOPOGRAPHIC SURVEY	
TOWN OF RAMAH -- PCD FILE NO. PPR2325 113 S. COMMERCIAL STREET RAMAH, CO 80832	

PREPARED UNDER THE DIRECT SUPERVISION OF	
FOR AND ON BEHALF OF ELEMENT ENGINEERING, LLC	
DATE	JANUARY 2024
JOB NUMBER	0043.0001
SCALE	1" = 100'
EDITION	BIDDING
SHEET	C6 OF C31





12687 W. CEDAR DRIVE, SUITE 300  
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LAKEWOOD, CO 80226

TOPOGRAPHIC SURVEY

TOWN OF RAMAH -- PCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAMAH, CO 80832

FOR AND ON BEHALF OF  
ELEMENT ENGINEERING, LLC

COLORADO LICENSED  
PROFESSIONAL ENGINEER  
13350  
1/24/21

DATE:  
JANUARY 2024

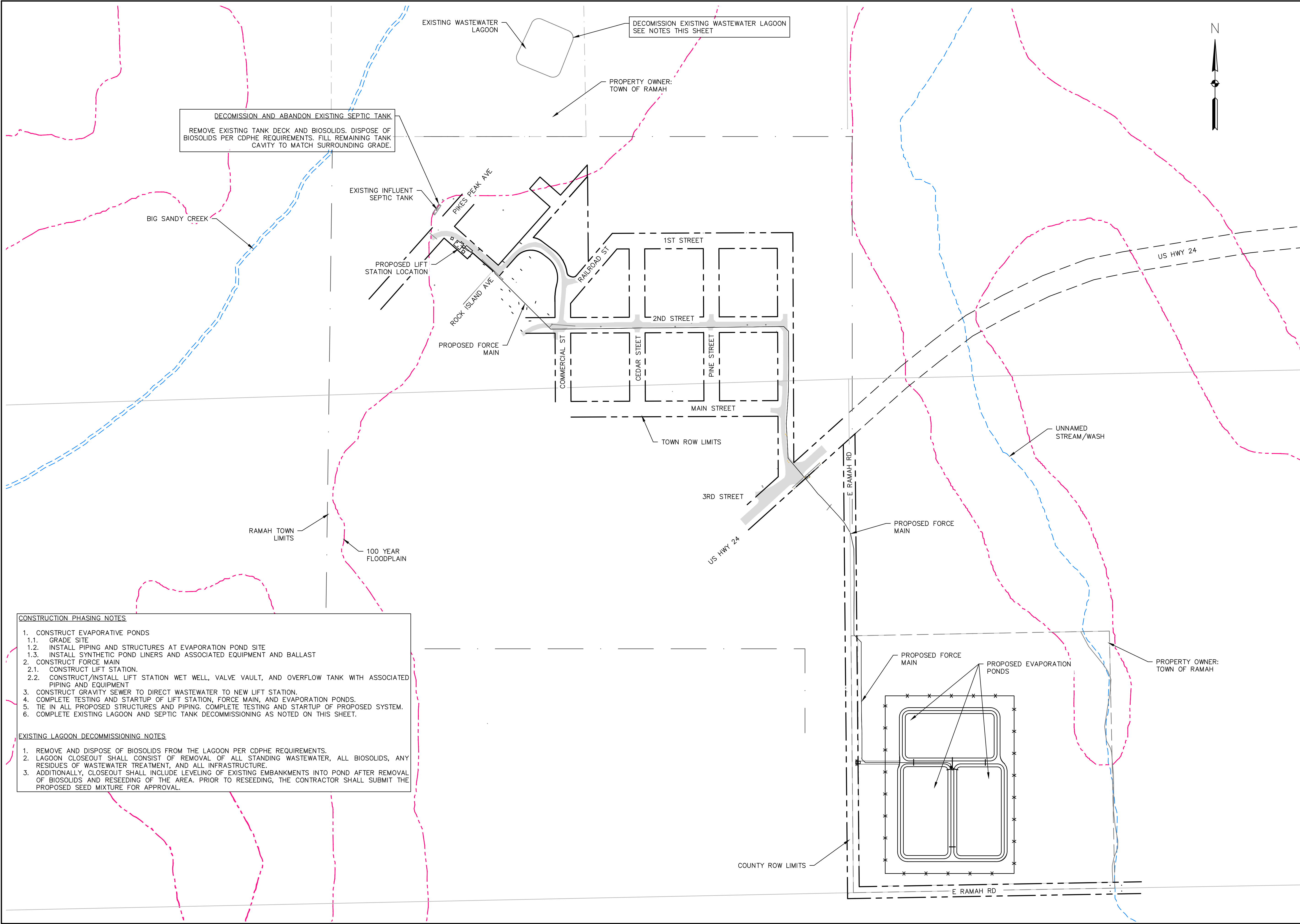
JOB NUMBER:  
0043.0001

SCALE:  
1" = 100'

EDITION:  
BIDDING

SHEET:  
C7 OF C31





**DECOMMISSION AND ABANDON EXISTING SEPTIC TANK**  
REMOVE EXISTING TANK DECK AND BIOSOLIDS. DISPOSE OF BIOSOLIDS PER CDPHE REQUIREMENTS. FILL REMAINING TANK CAVITY TO MATCH SURROUNDING GRADE.

DECOMMISSION EXISTING WASTEWATER LAGOON  
SEE NOTES THIS SHEET

PROPERTY OWNER:  
TOWN OF RAMAH

EXISTING INFLUENT  
SEPTIC TANK

PROPOSED LIFT  
STATION LOCATION

PROPOSED FORCE  
MAIN

PROPOSED FORCE  
MAIN

PROPOSED FORCE  
MAIN

PROPOSED EVAPORATION  
PONDS

PROPERTY OWNER:  
TOWN OF RAMAH

**CONSTRUCTION PHASING NOTES**

1. CONSTRUCT EVAPORATIVE PONDS
  - 1.1. GRADE SITE
  - 1.2. INSTALL PIPING AND STRUCTURES AT EVAPORATION POND SITE
  - 1.3. INSTALL SYNTHETIC POND LINERS AND ASSOCIATED EQUIPMENT AND BALLAST
2. CONSTRUCT FORCE MAIN
  - 2.1. CONSTRUCT LIFT STATION.
  - 2.2. CONSTRUCT/INSTALL LIFT STATION WET WELL, VALVE VAULT, AND OVERFLOW TANK WITH ASSOCIATED PIPING AND EQUIPMENT
3. CONSTRUCT GRAVITY SEWER TO DIRECT WASTEWATER TO NEW LIFT STATION.
4. COMPLETE TESTING AND STARTUP OF LIFT STATION, FORCE MAIN, AND EVAPORATION PONDS.
5. TIE IN ALL PROPOSED STRUCTURES AND PIPING. COMPLETE TESTING AND STARTUP OF PROPOSED SYSTEM.
6. COMPLETE EXISTING LAGOON AND SEPTIC TANK DECOMMISSIONING AS NOTED ON THIS SHEET.

**EXISTING LAGOON DECOMMISSIONING NOTES**

1. REMOVE AND DISPOSE OF BIOSOLIDS FROM THE LAGOON PER CDPHE REQUIREMENTS.
2. LAGOON CLOSEOUT SHALL CONSIST OF REMOVAL OF ALL STANDING WASTEWATER, ALL BIOSOLIDS, ANY RESIDUES OF WASTEWATER TREATMENT, AND ALL INFRASTRUCTURE.
3. ADDITIONALLY, CLOSEOUT SHALL INCLUDE LEVELING OF EXISTING EMBANKMENTS INTO POND AFTER REMOVAL OF BIOSOLIDS AND RESEEDING OF THE AREA. PRIOR TO RESEEDING, THE CONTRACTOR SHALL SUBMIT THE PROPOSED SEED MIXTURE FOR APPROVAL.

**ELEMENT**  
ENGINEERING LLC

12687 W. CEDAR DRIVE, SUITE 300  
LAKEWOOD, CO 80226

720.749.4165  
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REVISIONS	
NO.	DESCRIPTION

WASTEWATER TREATMENT PLANT PLANS FOR BID

**PROPOSED IMPROVEMENTS,  
CONST. PHASING, AND DEMO**

TOWN OF RAMAH – PCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAMAH, CO 80832

PREPARED UNDER THE DIRECT SUPERVISION OF

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ELEMENT ENGINEERING, LLC

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JANUARY 2024

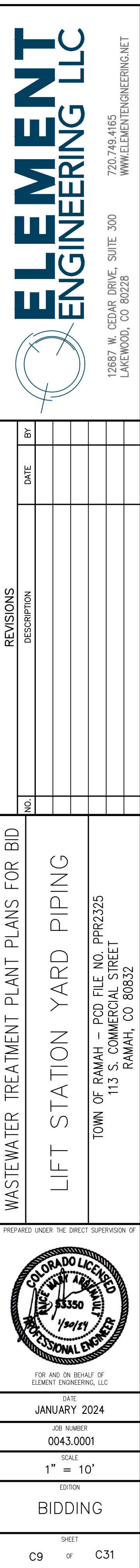
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0043.0001

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C8 OF C31





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[illegible]

WASTEWATER TREATMENT PLANT PLANS FOR BID

---

LIFT STATION YARD PIPING

---

TOWN OF RAMAH – PCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAMAH, CO 80832

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JANUARY 2024

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SCALE  
1" = 10'

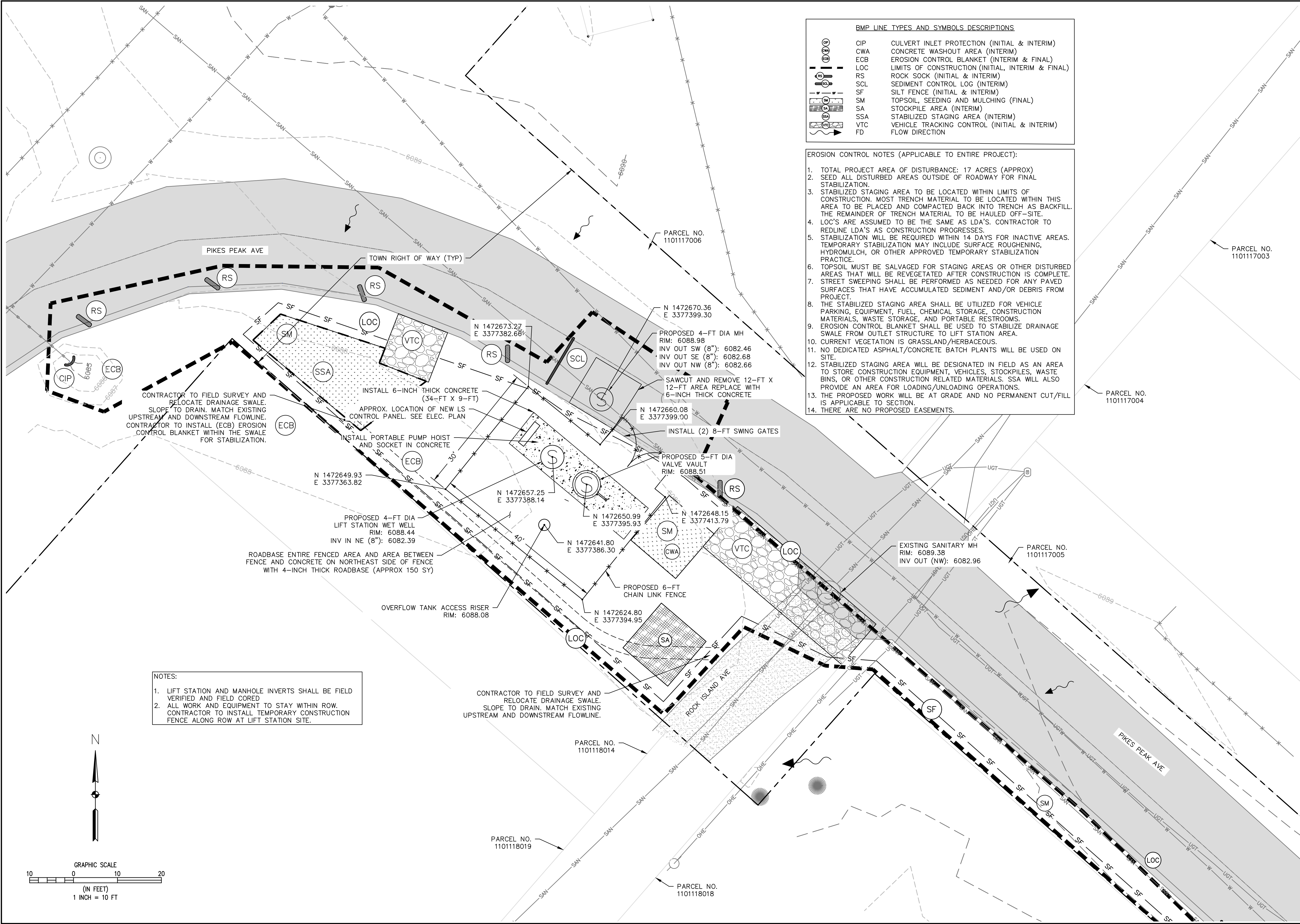
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# BIDDING

SHEET

C9 OF C31

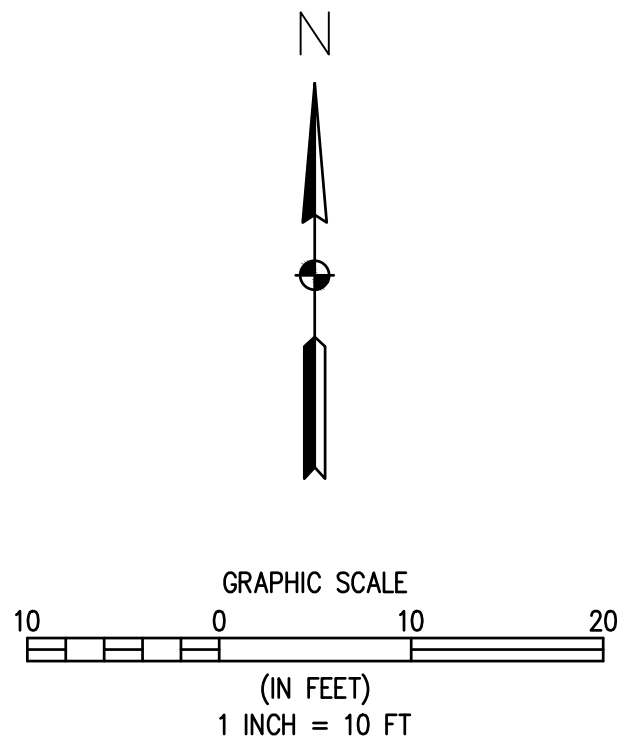




BMP LINE TYPES AND SYMBOLS DESCRIPTIONS		
	CIP	CULVERT INLET PROTECTION (INITIAL & INTERIM)
	CWA	CONCRETE WASHOUT AREA (INTERIM)
	ECB	EROSION CONTROL BLANKET (INTERIM & FINAL)
	LOC	LIMITS OF CONSTRUCTION (INITIAL, INTERIM & FINAL)
	RS	ROCK SOCK (INITIAL & INTERIM)
	SCL	SEDIMENT CONTROL LOG (INTERIM)
	SF	SILT FENCE (INITIAL & INTERIM)
	SM	TOPSOIL, SEEDING AND MULCHING (FINAL)
	SA	STOCKPILE AREA (INTERIM)
	SSA	STABILIZED STAGING AREA (INTERIM)
	VTC	VEHICLE TRACKING CONTROL (INITIAL & INTERIM)
	FD	FLOW DIRECTION

- EROSION CONTROL NOTES (APPLICABLE TO ENTIRE PROJECT):
- TOTAL PROJECT AREA OF DISTURBANCE: 17 ACRES (APPROX)
  - SEED ALL DISTURBED AREAS OUTSIDE OF ROADWAY FOR FINAL STABILIZATION.
  - STABILIZED STAGING AREA TO BE LOCATED WITHIN LIMITS OF CONSTRUCTION. MOST TRENCH MATERIAL TO BE LOCATED WITHIN THIS AREA TO BE PLACED AND COMPACTED BACK INTO TRENCH AS BACKFILL. THE REMAINDER OF TRENCH MATERIAL TO BE HAULED OFF-SITE.
  - LOC'S ARE ASSUMED TO BE THE SAME AS LDA'S. CONTRACTOR TO REDLINE LDA'S AS CONSTRUCTION PROGRESSES.
  - STABILIZATION WILL BE REQUIRED WITHIN 14 DAYS FOR INACTIVE AREAS. TEMPORARY STABILIZATION MAY INCLUDE SURFACE ROUGHENING, HYDROMULCH, OR OTHER APPROVED TEMPORARY STABILIZATION PRACTICE.
  - TOPSOIL MUST BE SALVAGED FOR STAGING AREAS OR OTHER DISTURBED AREAS THAT WILL BE REVEGETATED AFTER CONSTRUCTION IS COMPLETE. STREET SWEEPING SHALL BE PERFORMED AS NEEDED FOR ANY PAVED SURFACES THAT HAVE ACCUMULATED SEDIMENT AND/OR DEBRIS FROM PROJECT.
  - THE STABILIZED STAGING AREA SHALL BE UTILIZED FOR VEHICLE PARKING, EQUIPMENT, FUEL, CHEMICAL STORAGE, CONSTRUCTION MATERIALS, WASTE STORAGE, AND PORTABLE RESTROOMS.
  - EROSION CONTROL BLANKET SHALL BE USED TO STABILIZE DRAINAGE SWALE FROM OUTLET STRUCTURE TO LIFT STATION AREA.
  - CURRENT VEGETATION IS GRASSLAND/HERBACEOUS.
  - NO DEDICATED ASPHALT/CONCRETE BATCH PLANTS WILL BE USED ON SITE.
  - STABILIZED STAGING AREA WILL BE DESIGNATED IN FIELD AS AN AREA TO STORE CONSTRUCTION EQUIPMENT, VEHICLES, STOCKPILES, WASTE BINS, OR OTHER CONSTRUCTION RELATED MATERIALS. SSA WILL ALSO PROVIDE AN AREA FOR LOADING/UNLOADING OPERATIONS.
  - THE PROPOSED WORK WILL BE AT GRADE AND NO PERMANENT CUT/FILL IS APPLICABLE TO SECTION.
  - THERE ARE NO PROPOSED EASEMENTS.

- NOTES:
- LIFT STATION AND MANHOLE INVERTS SHALL BE FIELD VERIFIED AND FIELD CORED
  - ALL WORK AND EQUIPMENT TO STAY WITHIN ROW. CONTRACTOR TO INSTALL TEMPORARY CONSTRUCTION FENCE ALONG ROW AT LIFT STATION SITE.



12687 W. CEDAR DRIVE, SUITE 300  
LAKEWOOD, CO 80228

720.749.4165  
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1101117003

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1101118018

BY

DATE

NO

DESCRIPTION

WASTEWATER TREATMENT PLANT PLANS FOR BID

LIFT STATION SITE PLAN  
& EROSION CONTROL

TOWN OF RAWAH - BCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAWAH, CO 80832

PREPARED UNDER THE DIRECT SUPERVISION OF

FOR AND ON BEHALF OF  
ELEMENT ENGINEERING, LLC

DATE  
JANUARY 2024

JOB NUMBER  
0043.0001

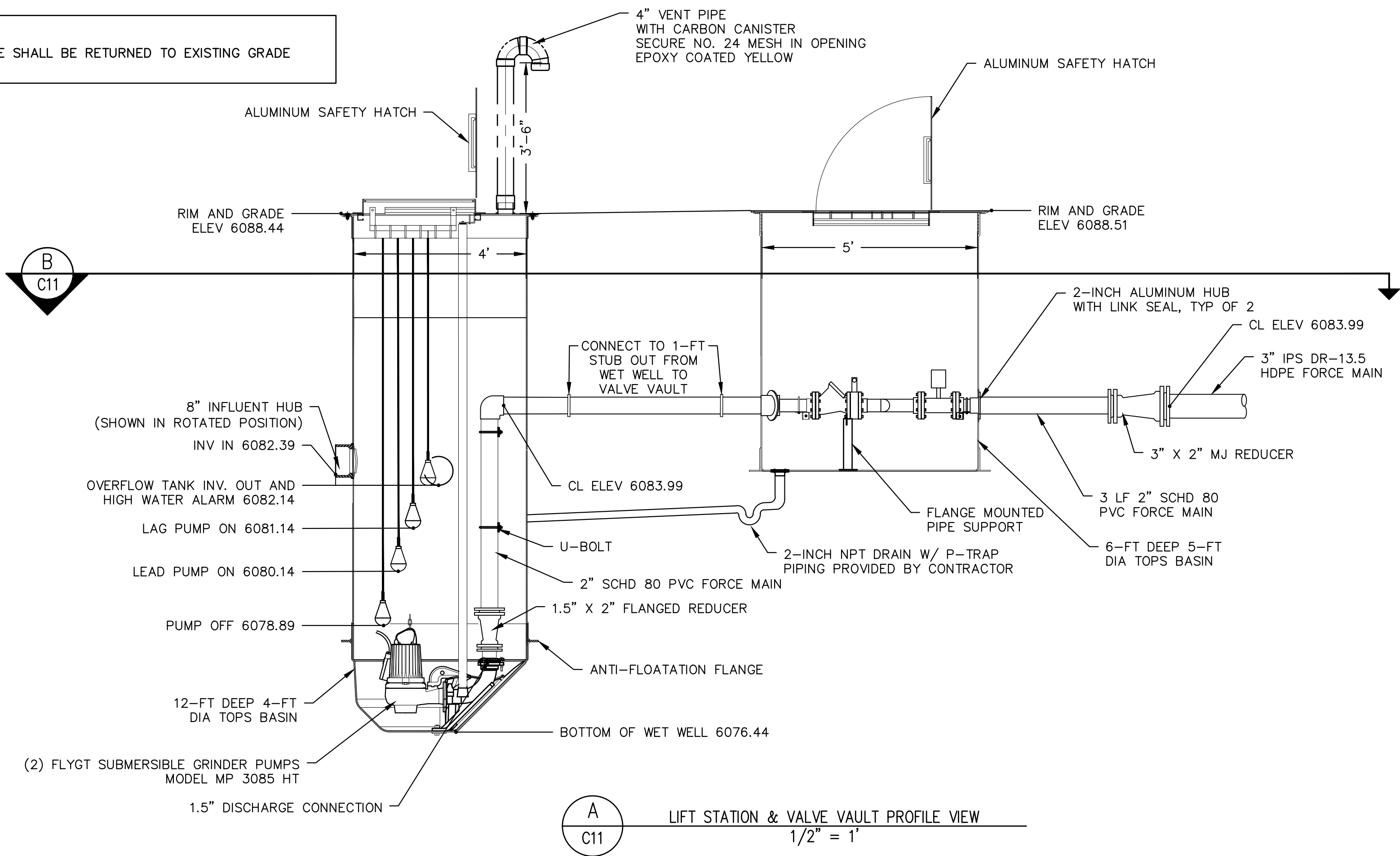
SCALE  
1" = 10'

EDITION  
BIDDING

SHEET  
C10 OF C31

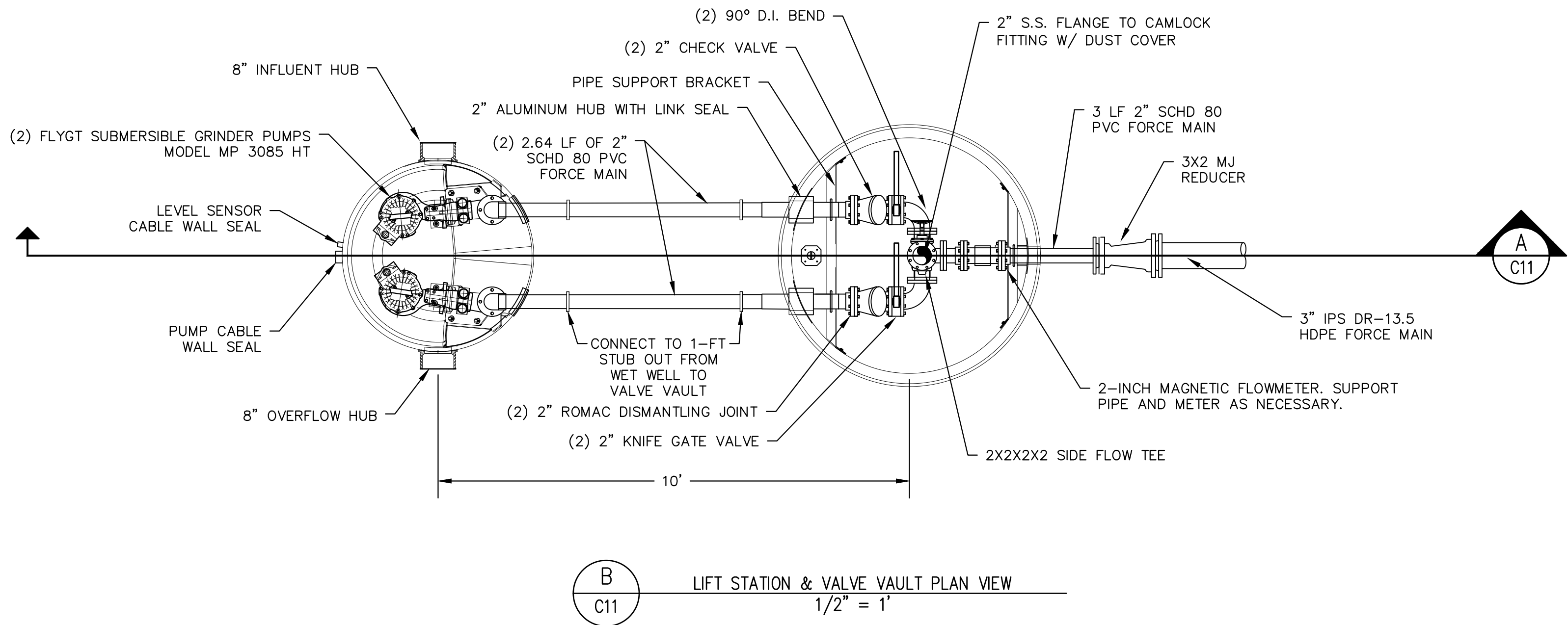


GRADE NOTES:  
1. FINAL GRADE SHALL BE RETURNED TO EXISTING GRADE ELEVATION



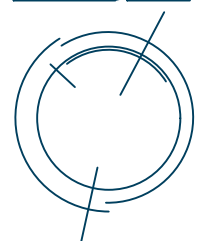
LIFT STATION DESIGN POINT: 42 GPM  
ADJUST KNIFE GATE TO CREATE ARTIFICIAL SYSTEM HEAD TO ALLOW DESIGN POINT OPERATION (APPROX 99 FT TDH)

INFLUENT PUMP & MOTOR INFORMATION		
PUMP MAKE	FLYGT SUBMERSIBLE GRINDER	
PUMP MODEL	MP 3085 HT	
DISCHARGE DIAMETER	1.5	IN
IMPELLER DIAMETER	150	MM
RATED POWER	4	HP
FREQUENCY	60	HZ
RATED VOLTAGE	200	V
NO. POLES	2	
RATED CURRENT	12.0	AMP
STARTING CURRENT	63.0	AMP
RATED SPEED	3395	RPM



- LIFT STATION NOTES:
- DISCHARGE CL MUST BE AT LEAST 18" FROM BOTTOM OF VALVE VAULT
  - DISCHARGE CL OF VAULT MUST EQUAL DISCHARGE CL OF ORDERED STATION
  - ALL BOLT PENETRATIONS THRU WALLS MUST BE SEALED WITH SILICONE SEALANT
  - ALL 2-INCH FORCE MAIN PIPING SHALL BE SCHD 80 PVC
  - ALL 3-INCH FORCE MAIN PIPING SHALL BE IPSS DR-13.5 HDPE
  - ALL 8-INCH GRAVITY PIPING SHALL BE SDR 35 PVC
  - PIPE COATING/COLORING AND LABELING PER SPECIFICATIONS
  - PIPE AND STRUCTURE PRESSURE TESTING PER SPECIFICATIONS
  - PIPE FITTINGS SHALL MATCH PIPE REQUIREMENTS INCLUDING INTERIOR COATING
  - FLOATS SHALL BE PLACED AS FAR AWAY FROM THE INFLUENT INVERT AS ALLOWABLE BASED ON THE GEOMETRY OF THE BASIN. THE PUMP OFF FLOAT SHALL BE LOCATED AT THE FURTHEST ALLOWABLE POSITION. FLOATS SHALL BE LOCATED IN INCREASING HEIGHT AS THEY GET CLOSER TO THE INFLUENT INVERT, WITH THE HIGH-WATER ALARM FLOAT BEING CLOSEST TO THE INVERT. FLOAT LOCATIONS SHOWN ON THESE PLANS ARE FOR ILLUSTRATIVE PURPOSES ONLY.

**ELEMENT**  
ENGINEERING LLC



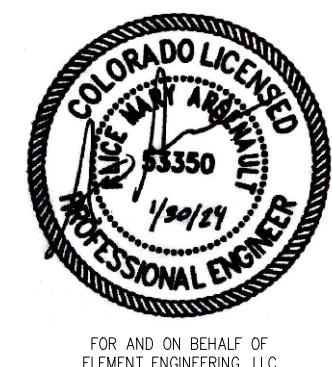
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LAKEWOOD, CO 80228  
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WASTEWATER TREATMENT PLANT PLANS FOR BID

LIFT STATION DETAILS

TOWN OF RAWAH - BCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAWAH, CO 80832

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C11 OF C31

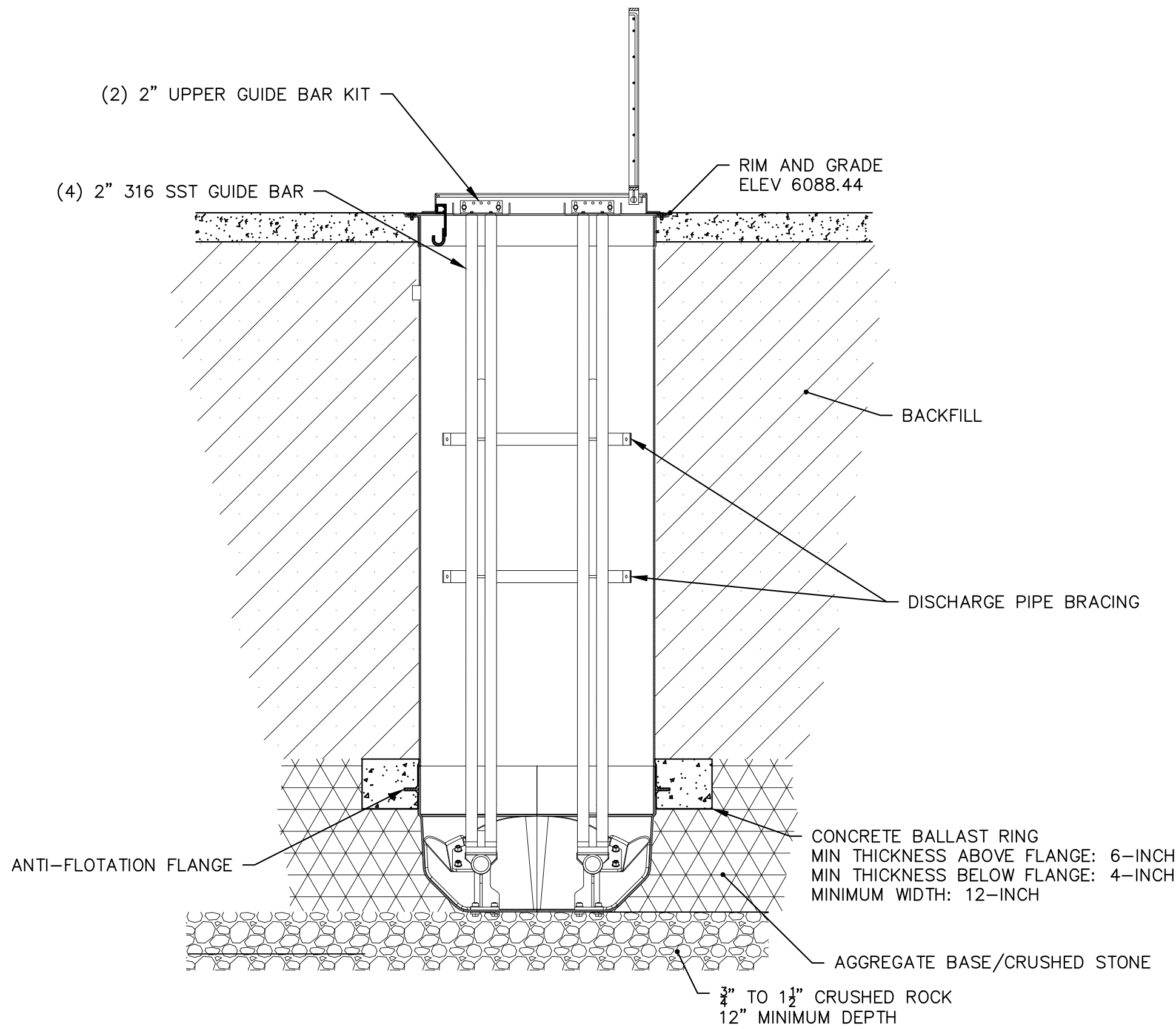


LIFT STATION CONSTRUCTION NOTES:

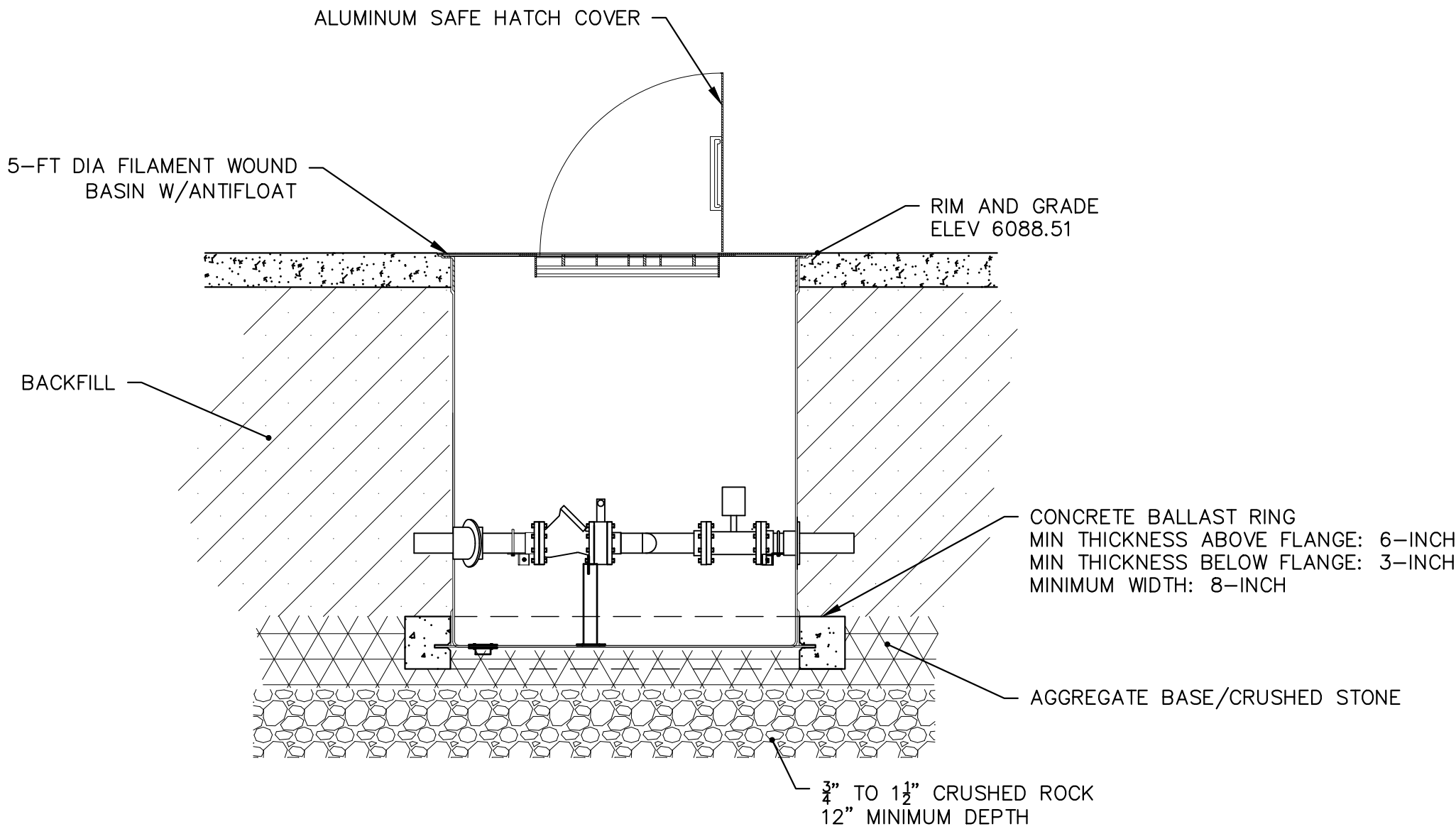
- CONTRACTOR TO SUBMIT A CONSTRUCTION PHASING PLAN TO ENGINEER FOR APPROVAL PRIOR TO BEGINNING CONSTRUCTION. AN EXAMPLE CONSTRUCTION PHASING PLAN IS AS FOLLOWS:
  - CONSTRUCT THE PROPOSED LIFT STATION INCLUDING INSTALLING ALL PUMPS, RAILS, PANELS, ETC.
  - CONSTRUCT ALL YARD PIPING UP TO THE PROPOSED TIE IN LOCATIONS.
  - TEST THE PROPOSED LIFT STATION PUMPS AND EQUIPMENT.
  - INSTALL PROPOSED SANITARY SEWER MANHOLE.
  - COMPLETE CONSTRUCTION OF ALL YARD PIPING. FINALIZE GRADING AND INSTALLATION OF ALL REQUIRED CONCRETE, BOLLARDS, ETC.
- BYPASS PUMPING WILL BE REQUIRED DURING CONSTRUCTION. THE CONTRACTOR MUST SUBMIT A BYPASS PUMPING PLAN TO THE ENGINEER FOUR (4) WORKING DAYS PRIOR TO BEGINNING BYPASS PUMPING. NO BYPASS PUMPING SHALL BE ALLOWED UNTIL THE BYPASS PUMPING PLAN IS APPROVED BY THE ENGINEER IN WRITING. THE BYPASS PUMPING PLAN SHALL INCLUDE THE FOLLOWING ITEMS AT A MINIMUM:
  - NUMBER OF PUMPS PROVIDED
  - BASIC LAYOUT OF BYPASS PUMPS AND PIPE
  - BYPASS PUMPING STAFFING PLAN
  - EMERGENCY RESPONSE PLAN INCLUDING EMERGENCY CONTACT NUMBERS SHOULD A SANITARY SEWER OVERFLOW (SSO) OCCUR. NOTE THAT ANY REPORTING AND FINES RELATING TO A SSO SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- CONTRACTOR TO LOCATE ALL PROPOSED TIE IN LOCATIONS TO VERIFY DEPTH AND LOCATION. CONTRACTOR TO PROVIDE ANY MATERIALS, FITTINGS, BENDS AND PIPE NECESSARY TO TIE INTO EXISTING PIPES AND STRUCTURES. ANY DISCREPANCIES IN TIE IN LOCATIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ENGINEER.
- PUMPS, RAILS, FLOATS, VALVES AND ALL ANCILLARY EQUIPMENT SHALL BE INSTALLED PER MANUFACTURER RECOMMENDATIONS AND SPECIFICATIONS.
- AN ADDITIONAL 5 FEET OF WIRE FROM THE CONTROL BOX TO THE FLOATS SHALL BE ASSUMED TO ENSURE SLACK IN THE WIRE.
- VENT PIPING SHALL BE 4-INCH DUCTILE IRON COATED YELLOW WITH EXTERIOR RATED EPOXY COATING PRODUCT. SECURE NO. 24 MESH IN OPENING. INSTALL CARBON CANISTER FOR ODOR CONTROL.
- ALL CONCRETE STRUCTURES SHALL BE PRE-CAST. ALL HATCHES SHALL BE CAST INTO THE MANHOLE TOP.
- PUMP STARTUP AND TRAINING TO BE COMPLETED BY A MANUFACTURER TRAINED AND APPROVED REPRESENTATIVE.
- PUMP TESTING SHALL BE COMPLETED WITH CLEAN WATER WHICH MAY BE OBTAINED FROM THE TOWN. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ANY CONSTRUCTION WATER DISCHARGE PERMITS NECESSARY.
- FOUR (4) HOURS OF OPERATOR ON SITE TRAINING SHALL BE INCLUDED DURING PUMP STARTUP AND AUTO-DIALER STARTUP. ALL STARTUP AND TRAINING COSTS SHALL BE AT THE CONTRACTOR'S EXPENSE.
- CONTRACTOR IS RESPONSIBLE FOR PROTECTING EXISTING EQUIPMENT AND STRUCTURES FROM DAMAGE. ANY DAMAGE WILL BE REPAIRED AT THE CONTRACTOR'S EXPENSE IN A MANNER ACCEPTABLE TO THE TOWN.
- ALL MANHOLE CORES AND PENETRATIONS SHALL BE FIELD CORED AFTER VERIFYING EXISTING UTILITY INFORMATION.
- CONTRACTOR TO POTHOLE ALL UTILITY CROSSINGS PRIOR TO CONSTRUCTION.

LIFT STATION EXCAVATION AND BALLASTING NOTES:

- PRE-PACKAGED LIFT STATION:
  - EXCAVATION AREA SHALL PROVIDE ADEQUATE WORKING ROOM AROUND THE PUMP STATION. SEE PUMP STATION INSTALLATION, CARE AND MAINTENANCE MANUAL FOR HANDLING, INSTALLATION, AND BALLASTING INSTRUCTIONS.
  - CONCRETE BALLAST DESIGN SHALL BE SUFFICIENT TO RESIST HEAD PRESSURE AND SOIL LOADING WITH PUMP STATION COMPLETELY EMPTY AND WATER TO GRADE. THE DETAIL SHOWN HEREIN SATISFIES THIS CONDITION.
  - DO NOT LET CONCRETE FREE FALL TO BOTTOM OF HOLE MORE THAN 3 TO 4 FEET. PLACE CONCRETE USING A TREMMY CHUTE TO HELP PRECLUDE SEGREGATION OF AGGREGATE FROM THE MATRIX. ENSURE THAT CONCRETE FLOWS UNDER THE FIBERGLASS ANTI-FLOTATION FLANGE. CONSOLIDATE CONCRETE WITH PROPER VIBRATION PER THE RECOMMENDED PRACTICE OF ACI 318-05 SECTION 5.10.
  - BACKFILL AND COMPACTION SHALL MEET OR EXCEED THE REQUIREMENTS SET FORTH IN THE INSTALLATION, CARE, AND MAINTENANCE MANUAL FOR THE PACKAGE PUMP STATION.
  - SLINGING, INSTALLATION, AND HANDLING SHALL FOLLOW ALL MANUFACTURERS REQUIREMENTS.



1  
CC12 LIFT STATION BALLAST AND BACKFILL DETAILS  
1/2" = 1'



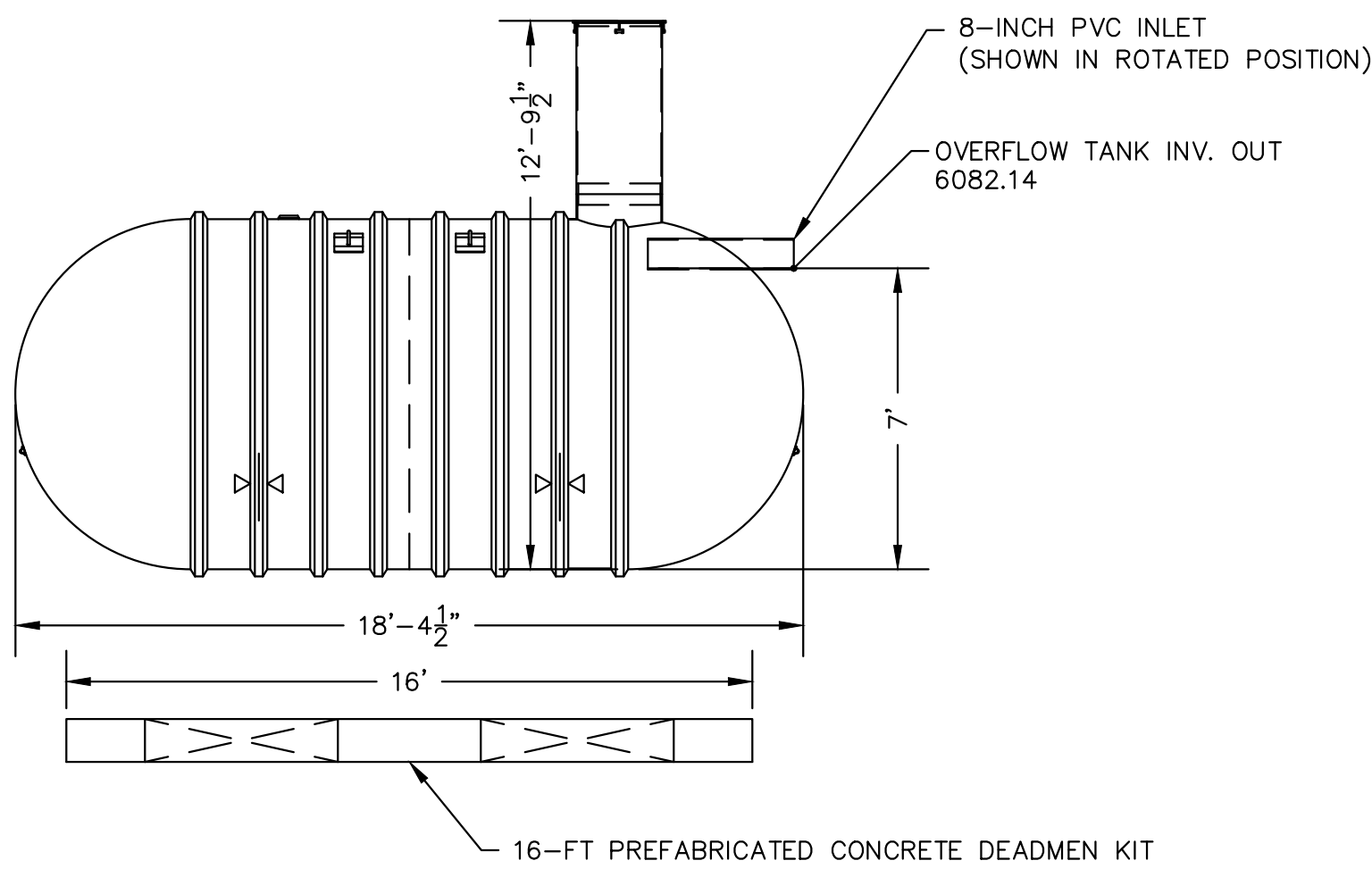
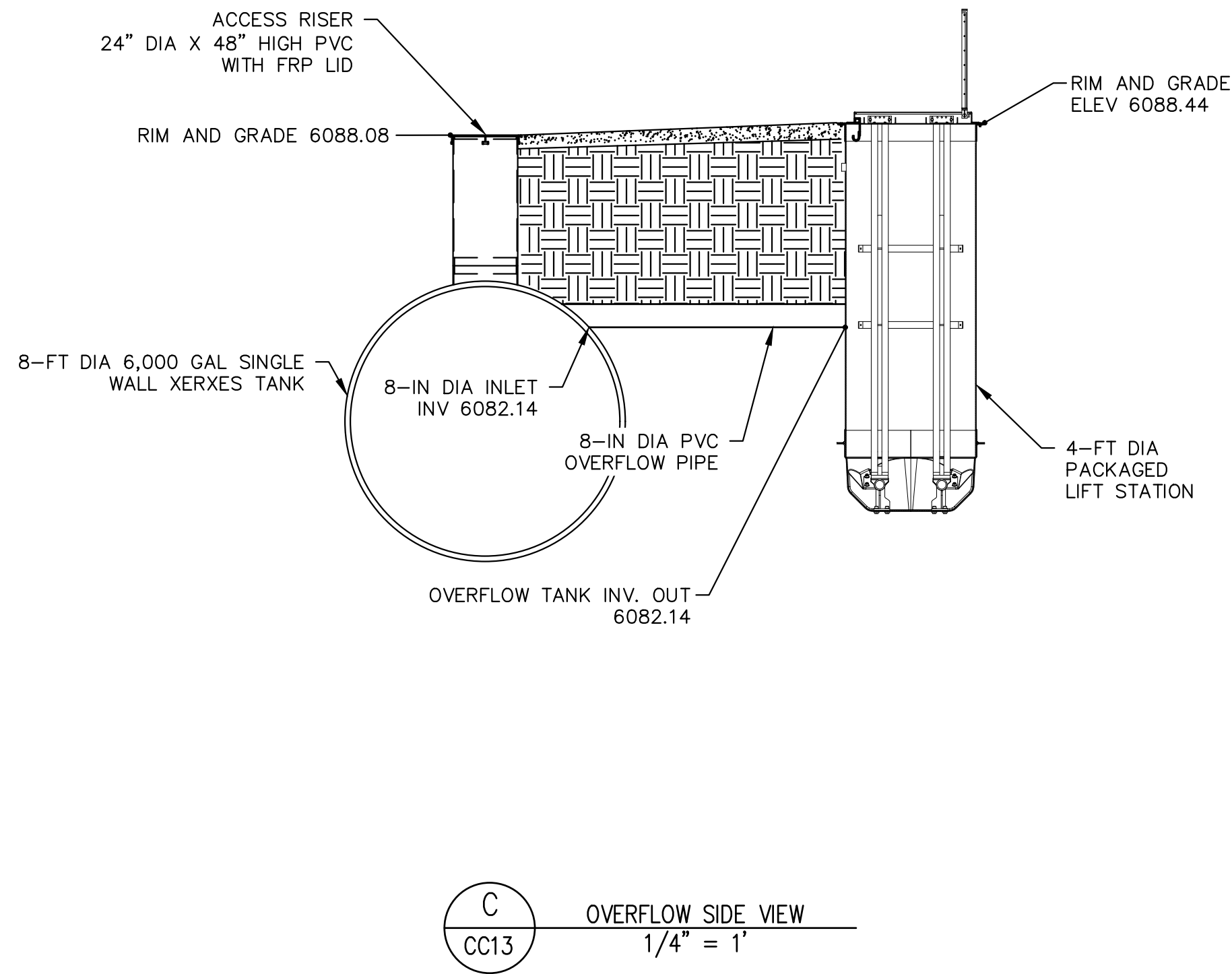
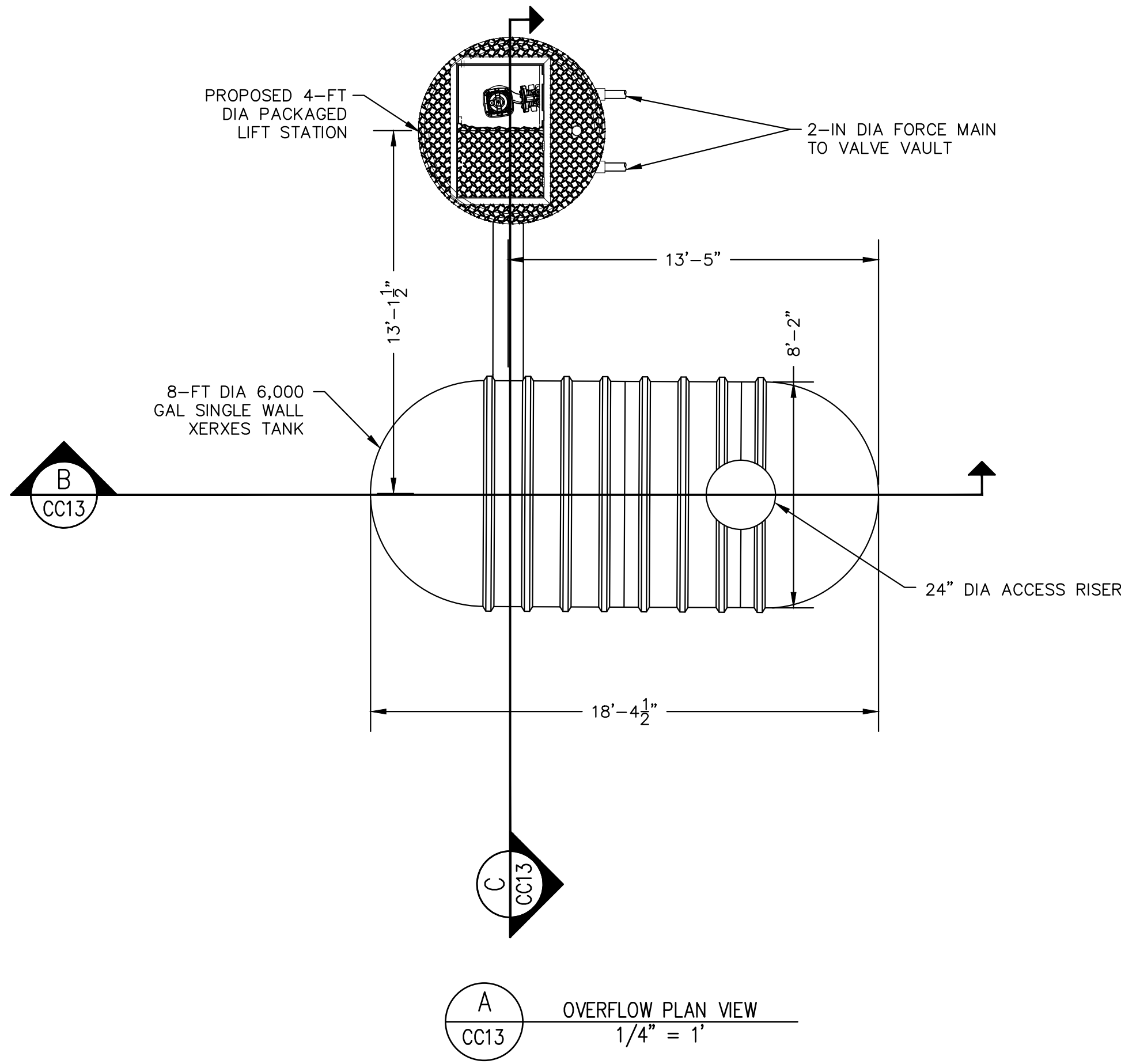
2  
CC12 VALVE VAULT BALLAST AND BACKFILL DETAILS  
1/2" = 1'

GRADE NOTES:

- FINAL GRADE SHALL BE RETURNED TO EXISTING GRADE ELEVATION

REVISIONS	DESCRIPTION	DATE	BY	NO





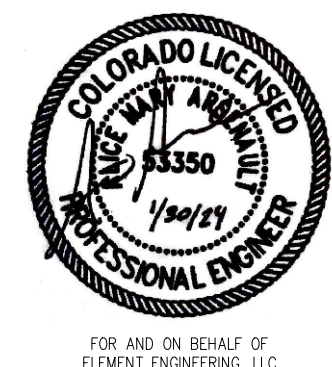
NOTE: ALL EQUIPMENT SHOWN IN OVERFLOW PROFILE VIEW PROVIDED BY MANUFACTURER

8-FT DIAMETER 6,000 GALLON TANK	
QTY	DESCRIPTION
1	4" NPT SERVICE FITTING
1	8" DIA PVC INLET HORIZONTAL PIPE
1	23 1/2" IS FIBERGLASS ACCESS OPENING WITH 23 1/2" OD ALIGNMENT RING
1	24" DIA X 48" HIGH PVC RISER WITH FRP LID WITH GASKET
2	LIFTING LUG (10" X 8") 25", 25"
2	16-FT PREFABRICATED CONCRETE DEADMENT
2	HOLD DOWN STRAP

REVISIONS	DESCRIPTION	NO.	DATE	BY

WASTEWATER TREATMENT PLANT PLANS FOR BID
OVERFLOW DETAILS
TOWN OF RAWAH - BCD FILE NO. PPR2325 113 S. COMMERCIAL STREET RAWAH, CO 80832

PREPARED UNDER THE DIRECT SUPERVISION OF

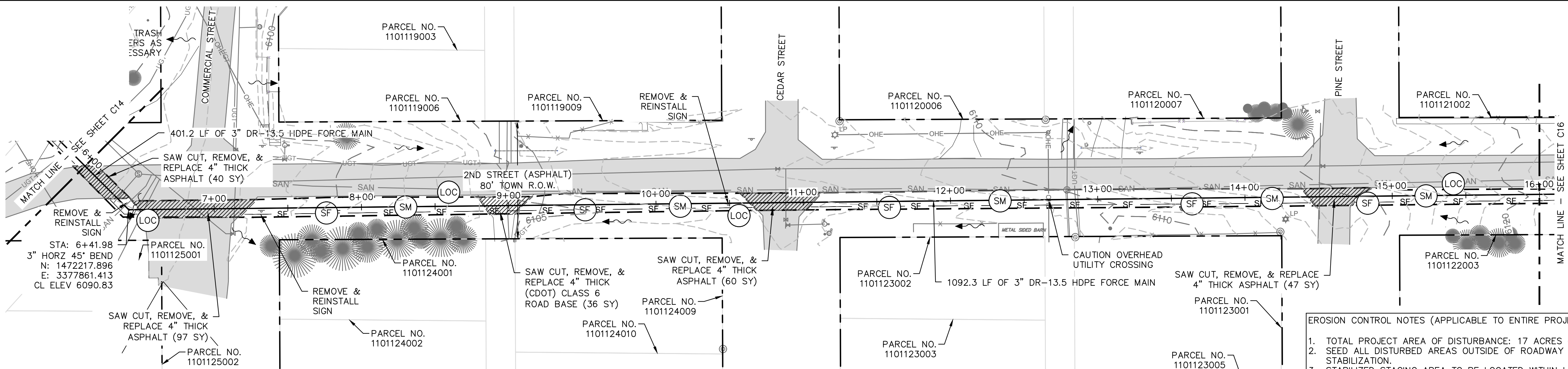


DATE JANUARY 2024
JOB NUMBER 0043.0001
SCALE AS SHOWN
EDITION BIDDING
SHEET C13 OF C31





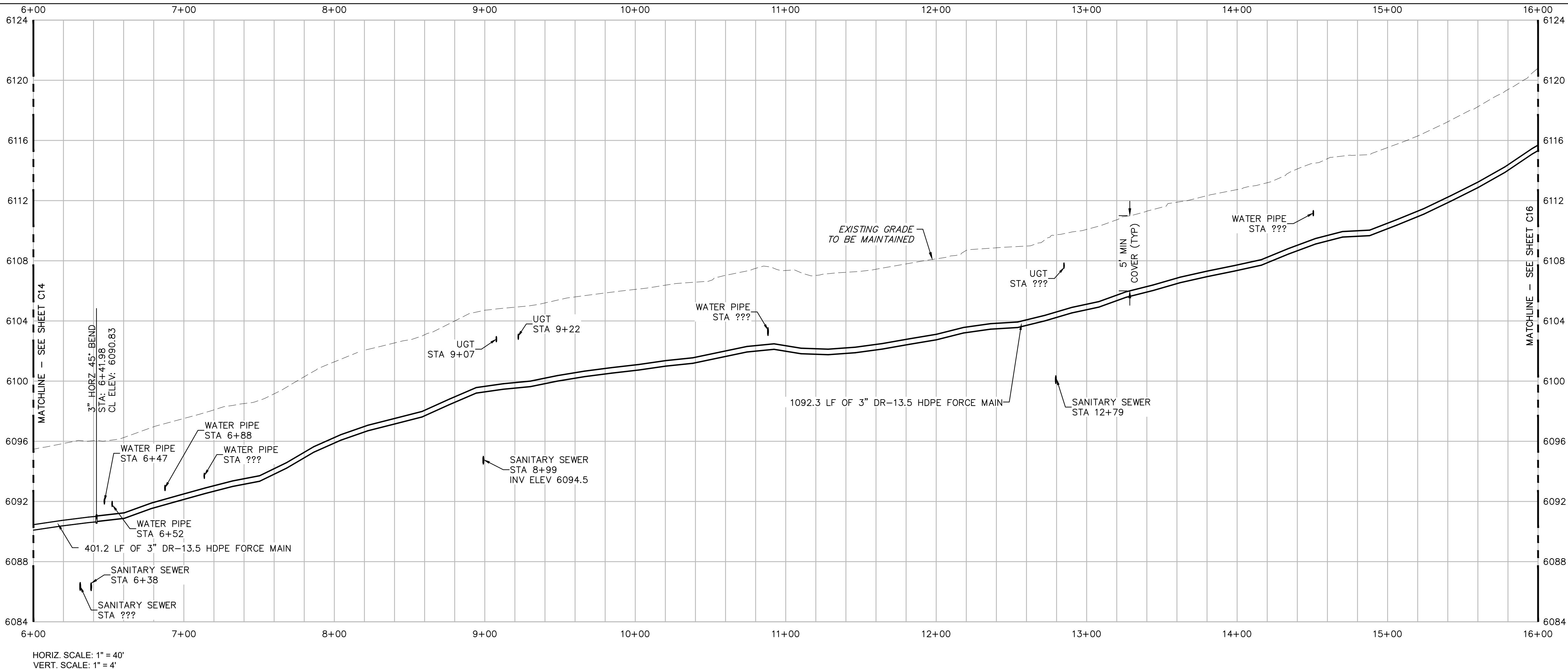




- NOTES:
1. INSTALL 3" IPS DR-13.5 HDPE FORCE MAIN TO MAINTAIN 5-FT TO 6-FT BURY DEPTH WITH TRACER WIRE. INSTALL VERTICAL BENDS AS NECESSARY.
  2. TRACER WIRE LOCATE BOXES WITH MARKER POST SHALL BE OFFSET, AND PLACED EVERY 1000 FEET AT THE RIGHT-OF-WAY LINE.
  3. FORCE MAIN BENDS SHOWN MAY BE ACCOMPLISHED BY MANUFACTURER ACCEPTABLE DEFLECTION IN PIPE RATHER THAN A BUTT WELD FITTING.
  4. AVOID HIGH POINTS IN THE FORCE MAIN WHERE POSSIBLE. AIR VAC VAULTS SHALL BE REQUIRED AT ALL HIGH POINTS.
  5. CONTRACTOR TO SURVEY AND MARK RIGHT-OF-WAY.
  6. ALL WORK IN EL PASO COUNTY RIGHT-OF-WAY SHALL FOLLOW EL PASO COUNTY UTILITY PERMIT REQUIREMENTS. CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS PRIOR TO BEGINNING WORK.
  7. CONTRACTOR TO REMOVE TREES AND BRUSH AND HAUL AWAY MATERIAL AS NECESSARY THROUGH WORK AREAS. DO NOT REMOVE OR DISTURB TREES UNNECESSARILY.
  8. CONTRACTOR TO POT HOLE UTILITIES AT ALL CROSSINGS. EXISTING UTILITY PROFILE DEPTHS ARE ESTIMATED, NO POT HOLING WAS PERFORMED AS PART OF THE DESIGN PHASE.
  9. MAINTAIN 18-INCH MINIMUM VERTICAL SEPARATION AT ALL UTILITY CROSSINGS.

BMP LINE TYPES AND SYMBOLS DESCRIPTIONS		
	CIP	CULVERT INLET PROTECTION (INITIAL & INTERIM)
	CWA	CONCRETE WASHOUT AREA (INTERIM)
	ECB	EROSION CONTROL BLANKET (INTERIM & FINAL)
	LOC	LIMITS OF CONSTRUCTION (INITIAL, INTERIM & FINAL)
	RS	ROCK SOCK (INITIAL & INTERIM)
	SCL	SEDIMENT CONTROL LOG (INTERIM)
	SF	SILT FENCE (INITIAL & INTERIM)
	SM	TOPSOIL, SEEDING AND MULCHING (FINAL)
	SP	STOCKPILE AREA (INTERIM)
	SSA	STABILIZED STAGING AREA (INTERIM)
	VTC	VEHICLE TRACKING CONTROL (INITIAL & INTERIM)

- EROSION CONTROL NOTES (APPLICABLE TO ENTIRE PROJECT):
1. TOTAL PROJECT AREA OF DISTURBANCE: 17 ACRES (APPROX)
  2. SEED ALL DISTURBED AREAS OUTSIDE OF ROADWAY FOR FINAL STABILIZATION.
  3. STABILIZED STAGING AREA TO BE LOCATED WITHIN LIMITS OF CONSTRUCTION. MOST TRENCH MATERIAL TO BE LOCATED WITHIN THIS AREA TO BE PLACED AND COMPACTED BACK INTO TRENCH AS BACKFILL. THE REMAINDER OF TRENCH MATERIAL TO BE HAULED OFF-SITE.
  4. LOC'S ARE ASSUMED TO BE THE SAME AS LDA'S. CONTRACTOR TO REDLINE LDA'S AS CONSTRUCTION PROGRESSES.
  5. STABILIZATION WILL BE REQUIRED WITHIN 14 DAYS FOR INACTIVE AREAS. TEMPORARY STABILIZATION MAY INCLUDE SURFACE ROUGHENING, HYDROMULCH, OR OTHER APPROVED TEMPORARY STABILIZATION PRACTICE.
  6. TOPSOIL MUST BE SALVAGED FOR STAGING AREAS OR OTHER DISTURBED AREAS THAT WILL BE REVEGETATED AFTER CONSTRUCTION IS COMPLETE.
  7. STREET SWEEPING SHALL BE PERFORMED AS NEEDED FOR ANY PAVED SURFACES THAT HAVE ACCUMULATED SEDIMENT AND/OR DEBRIS FROM PROJECT.
  8. THE STABILIZED STAGING AREA SHALL BE UTILIZED FOR VEHICLE PARKING, EQUIPMENT, FUEL, CHEMICAL STORAGE, CONSTRUCTION MATERIALS, WASTE STORAGE, AND PORTABLE RESTROOMS.
  13. THE PROPOSED WORK WILL BE AT GRADE AND NO PERMANENT CUT/FILL IS APPLICABLE TO SECTION.
  14. THERE ARE NO PROPOSED EASEMENTS.



REVISIONS			
NO.	DESCRIPTION	DATE	BY

WASTEWATER TREATMENT PLANT PLANS FOR BID

FORCE MAIN PLAN & PROFILE STA 6+00  
- 16+00 & EROSION AND CONTROL

TOWN OF RAMAH - BCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAMAH, CO 80832

PREPARED UNDER THE DIRECT SUPERVISION OF

FOR AND ON BEHALF OF  
ELEMENT ENGINEERING, LLC

DATE  
JANUARY 2024

JOB NUMBER  
0043.0001

SCALE  
1" = 40'

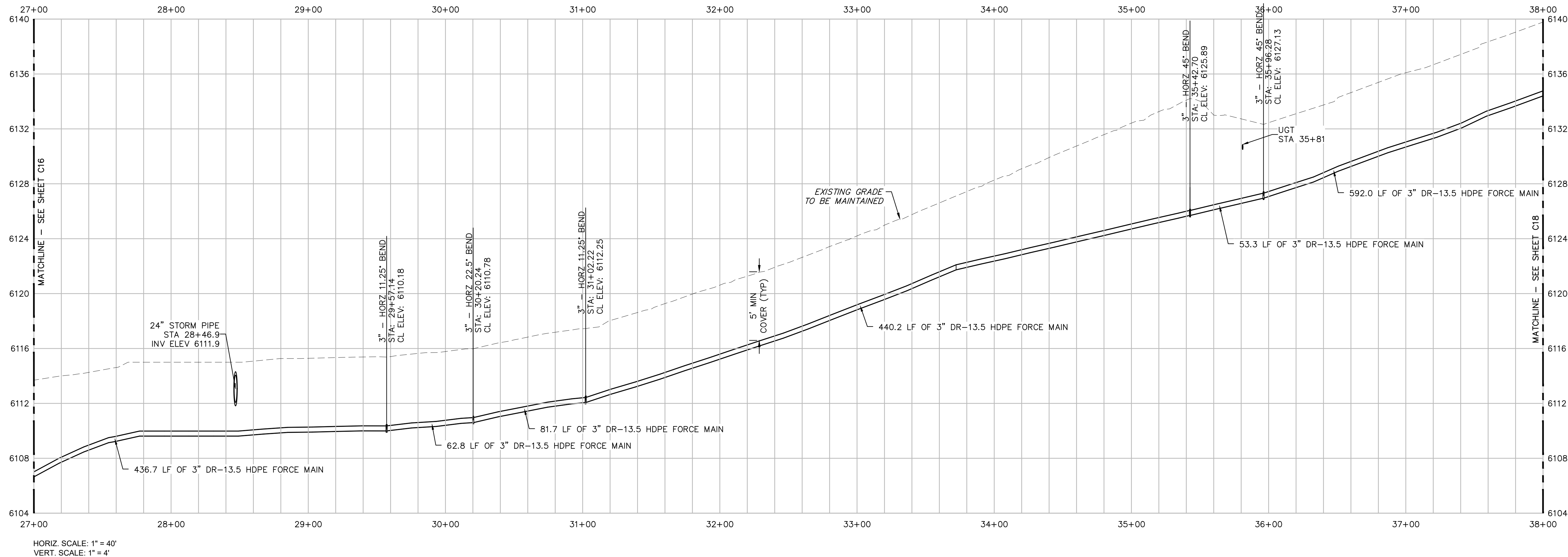
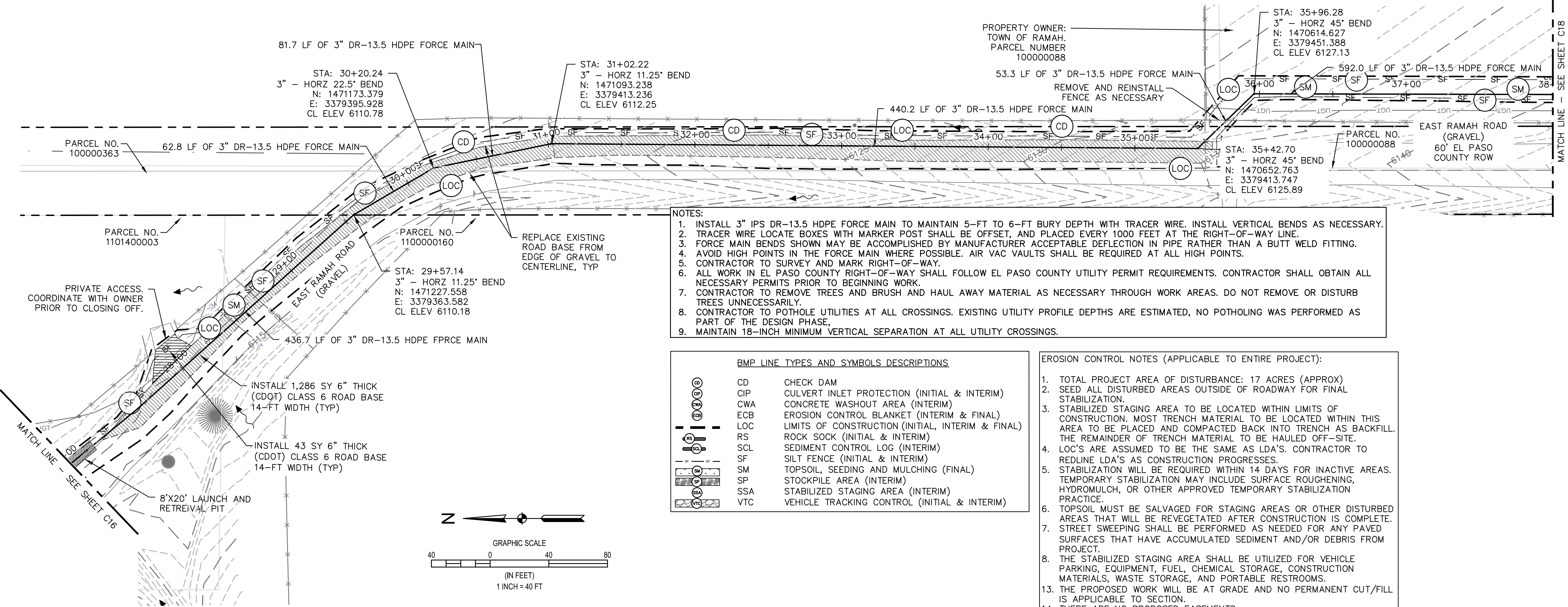
EDITION  
BIDDING

SHEET  
C15 OF C31









REVISIONS	NO.	DATE	DESCRIPTION

WASTEWATER TREATMENT PLANT PLANS FOR BID

FORCE MAIN PLAN & PROFILE STA  
27+00 - 38+00 & EROSION CONTROL

TOWN OF RAMAH - RCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAMAH, CO 80832

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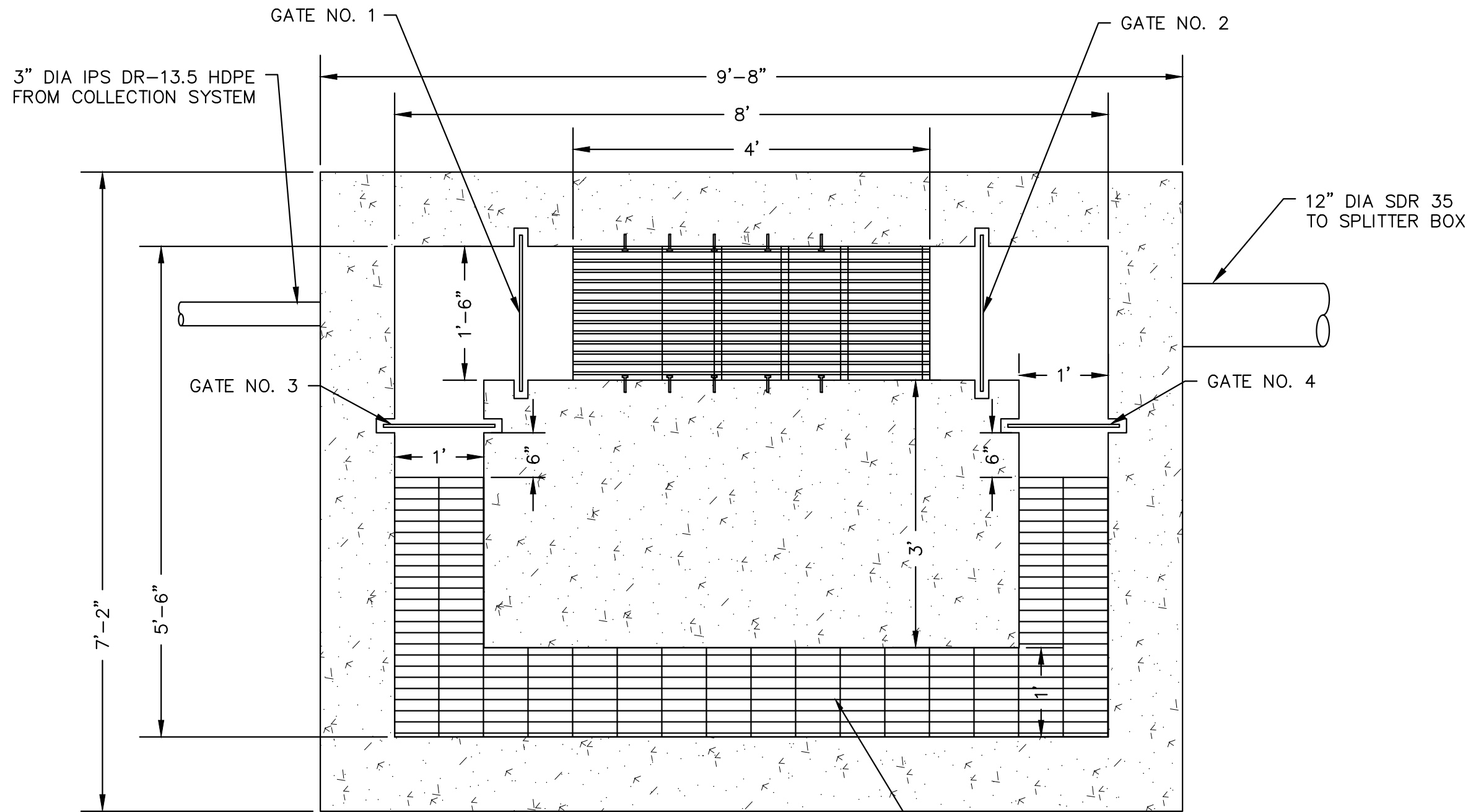


DATE	JANUARY 2024
JOB NUMBER	0043.0001
SCALE	1" = 40'
EDITION	BIDDING
SHEET	C17 OF C31

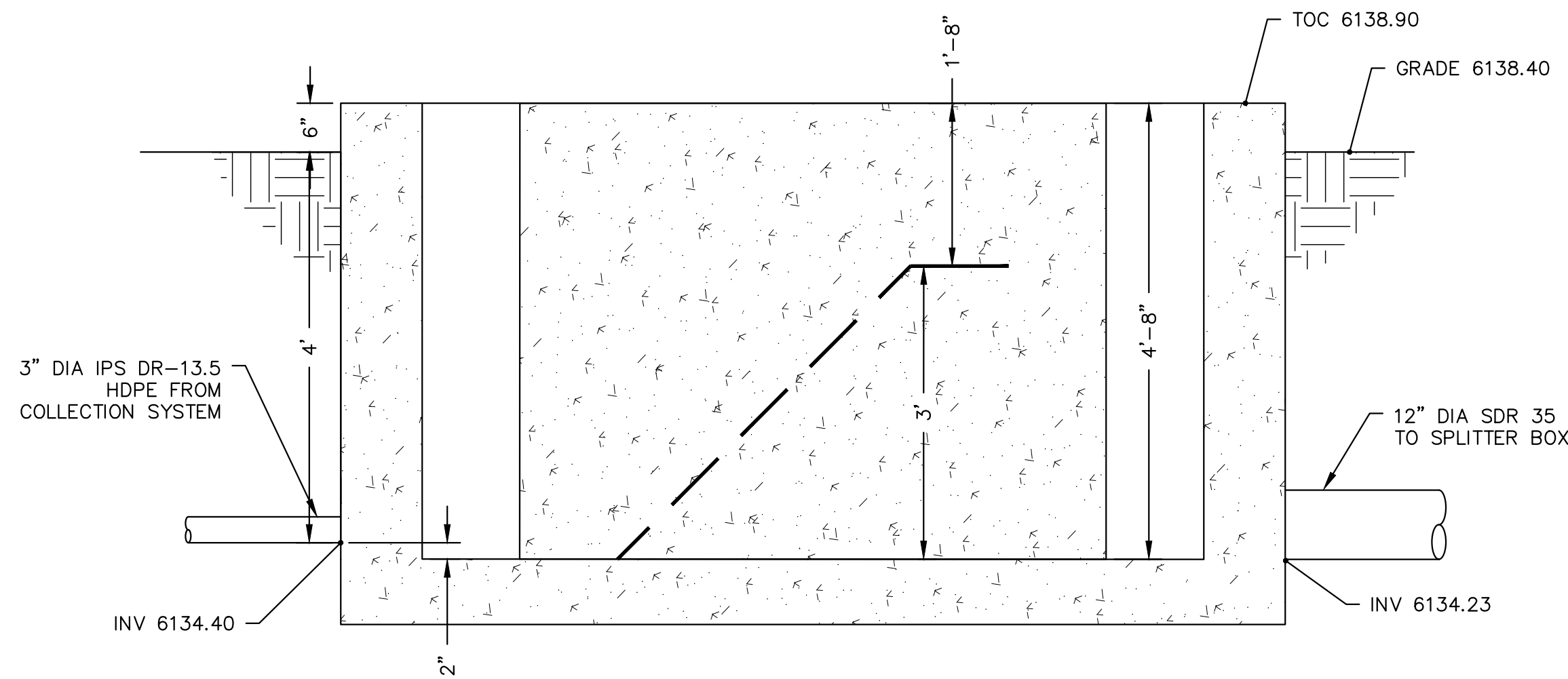








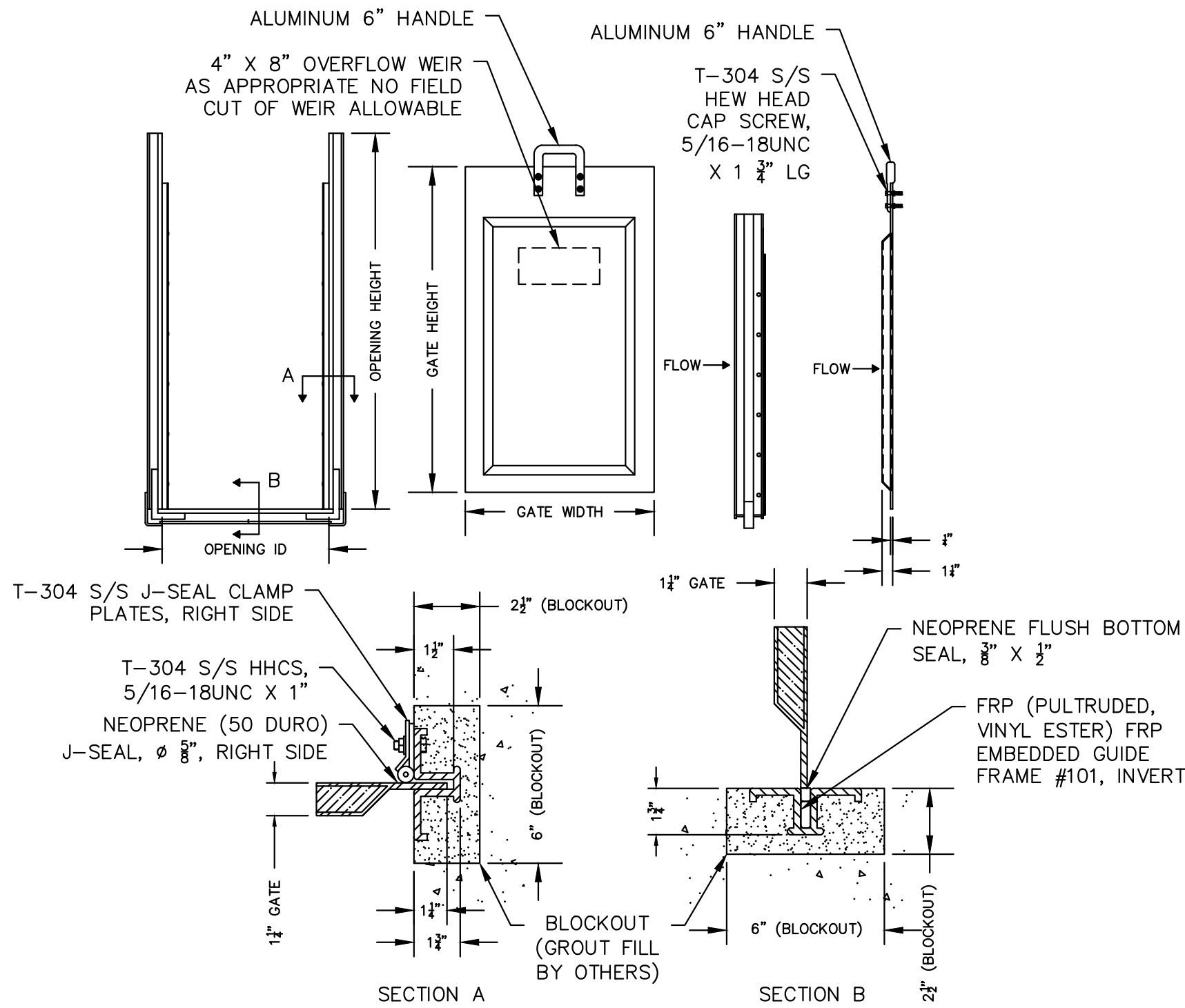
A  
C19 INFLUENT BAR SCREEN PLAN  
3/4" = 1'



B  
C19 INFLUENT BAR SCREEN PROFILE  
3/4" = 1'

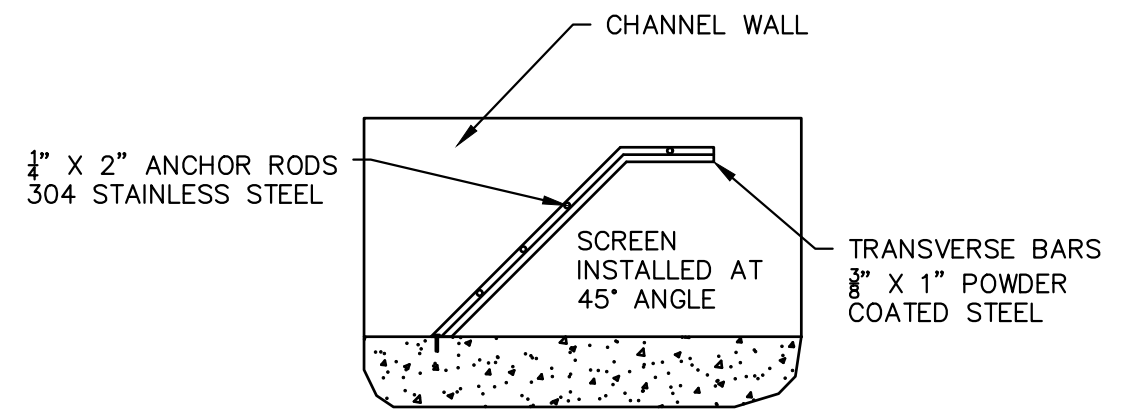
GATE TABLE				
GATE NUMBER	GATE TYPE	MOUNTING TYPE	CHANNEL DIMENSIONS (H' X W')	NOTES
1	MANUAL STOP GATE	FE	3'-6" X 1'-6"	
2	MANUAL STOP GATE	FE	3'-6" X 1'-6"	
3	MANUAL STOP GATE	FE	3'-6" X 1'	EMERGENCY OVERFLOW WEIR
4	MANUAL STOP GATE	FE	3'-6" X 1'	EMERGENCY OVERFLOW WEIR

FE FRAME EMBEDDED INSIDE CHANNEL  
H HEIGHT  
W WIDTH

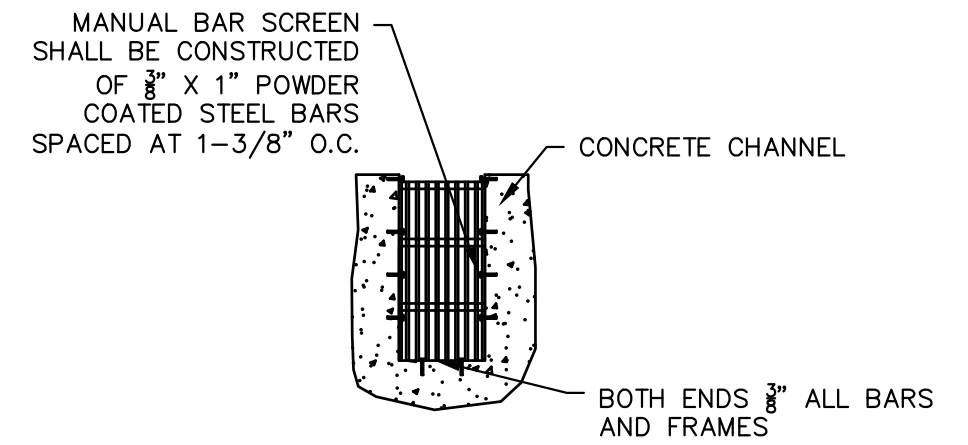


- NOTES:
- STOP GATES TO BE MANUFACTURED BY PLASTI-FAB OR ENGINEER APPROVED EQUAL
  - SEE PLANS FOR OPENING AND GATE DIMENSIONS
  - STOP GATE IS SANDWICH CONSTRUCTION W/ FRP SKINS, FOAM CORE, AND INTERNAL STRUCTURAL STEEL
  - STOP GATE COLOR IS GREY
  - RESIN: MCWHORTER 712-3765
  - GUIDE FRAME IS PULTRUDED FRP (VINYL-ESTER)
  - ALL JOINTS ARE BONDED WITH PLEXUS MA-300
  - ALL HARDWARE MATERIAL IS T-304 S/S
  - APPROXIMATE WEIGHT OF GATE ALONE IS 14 LBS

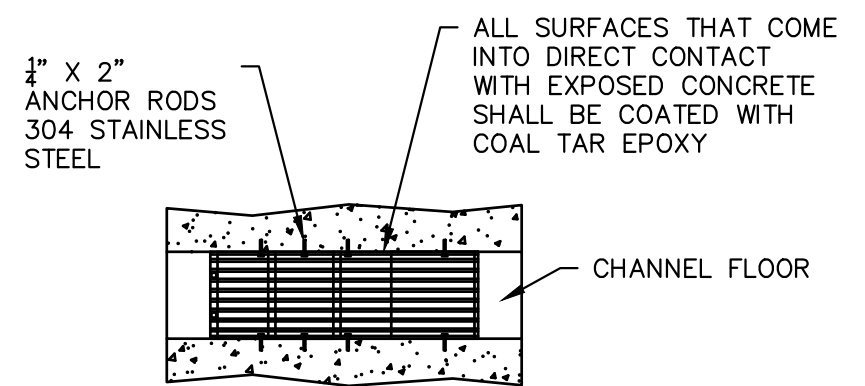
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C19 STOP GATE DETAIL  
NTS



2  
C19 MANUAL BAR SCREEN SECTION  
NTS



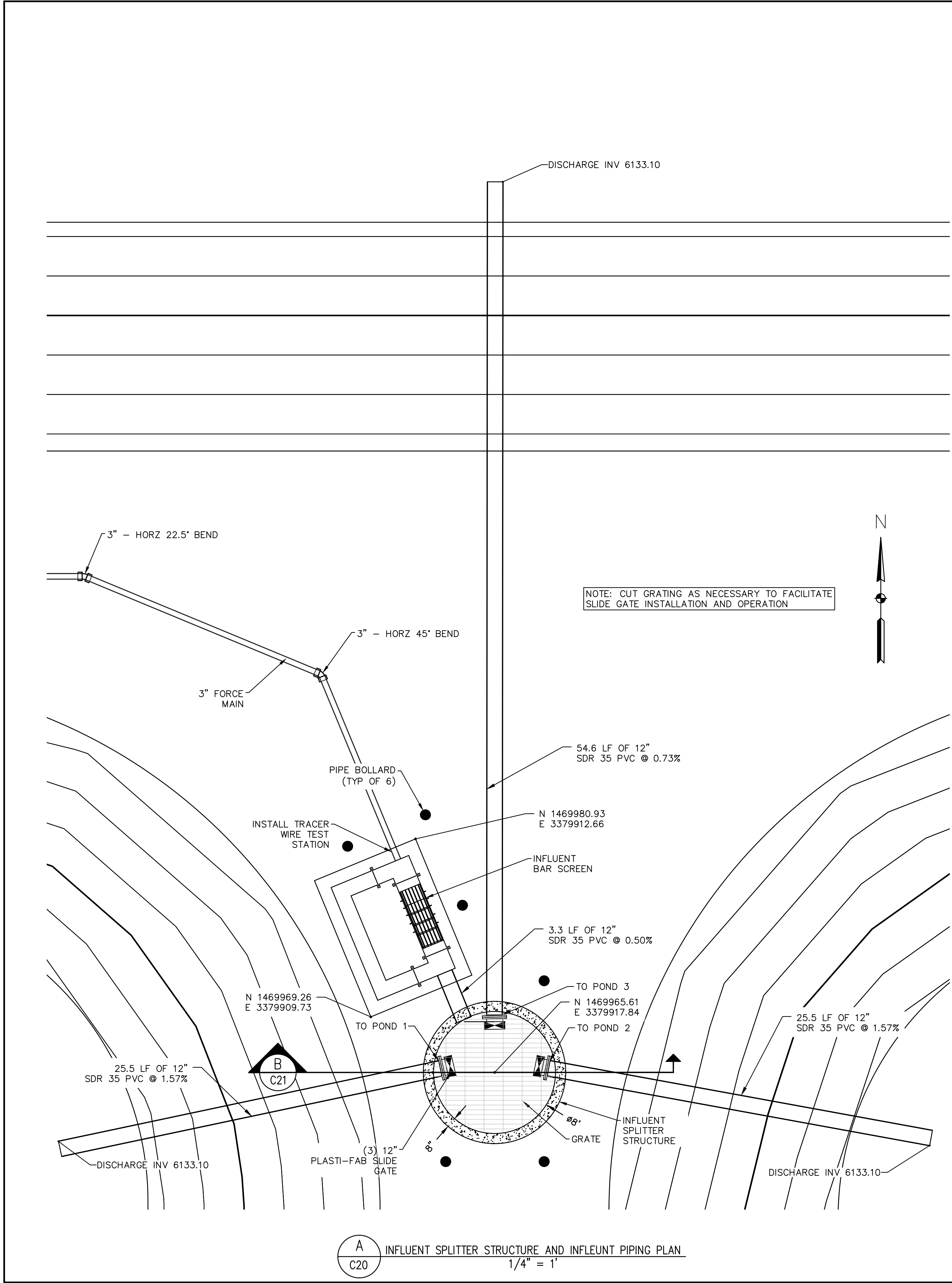
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C19 MANUAL BAR SCREEN FRONT VIEW  
NTS



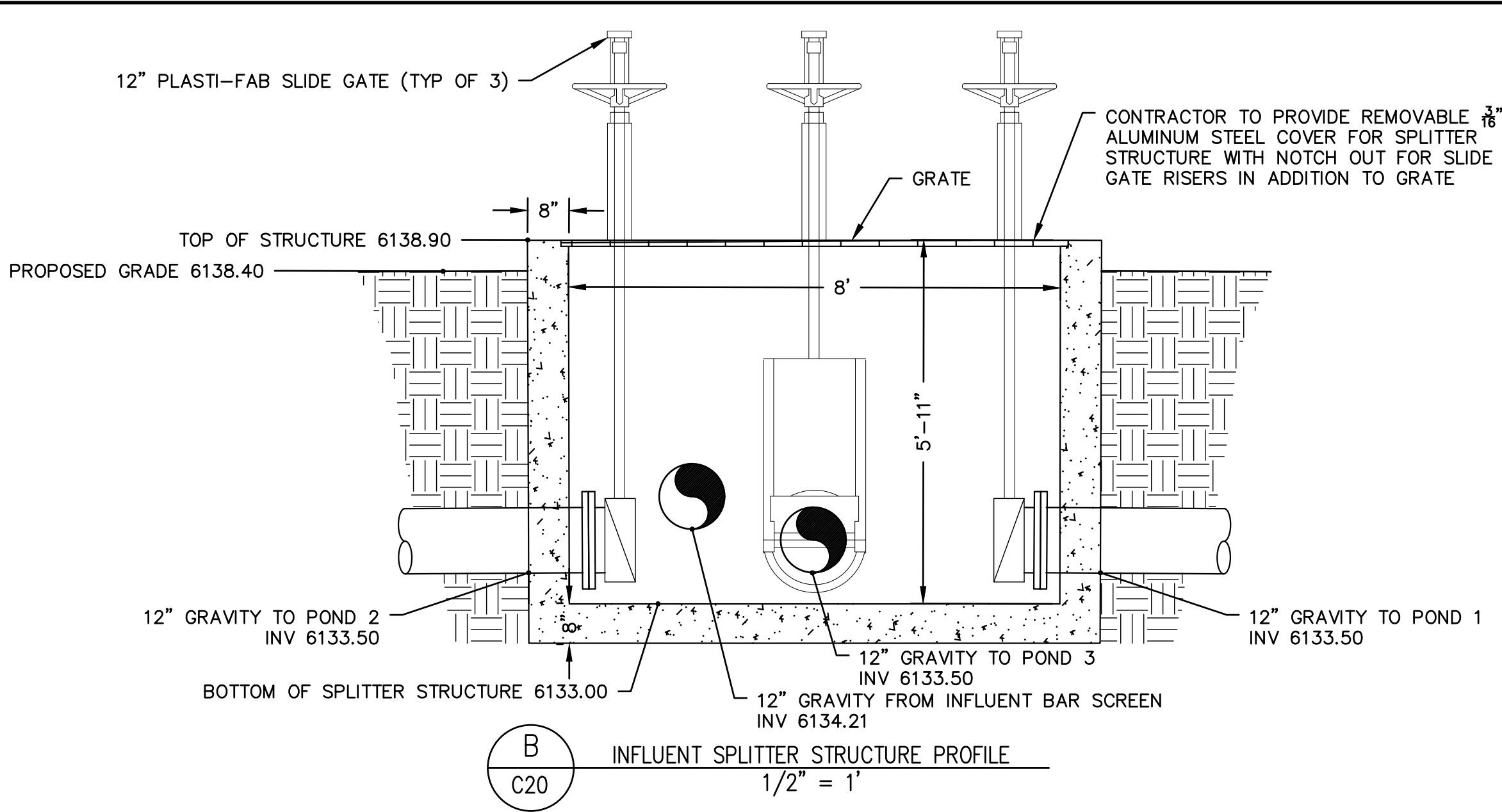
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C19 MANUAL BAR SCREEN TOP VIEW  
NTS

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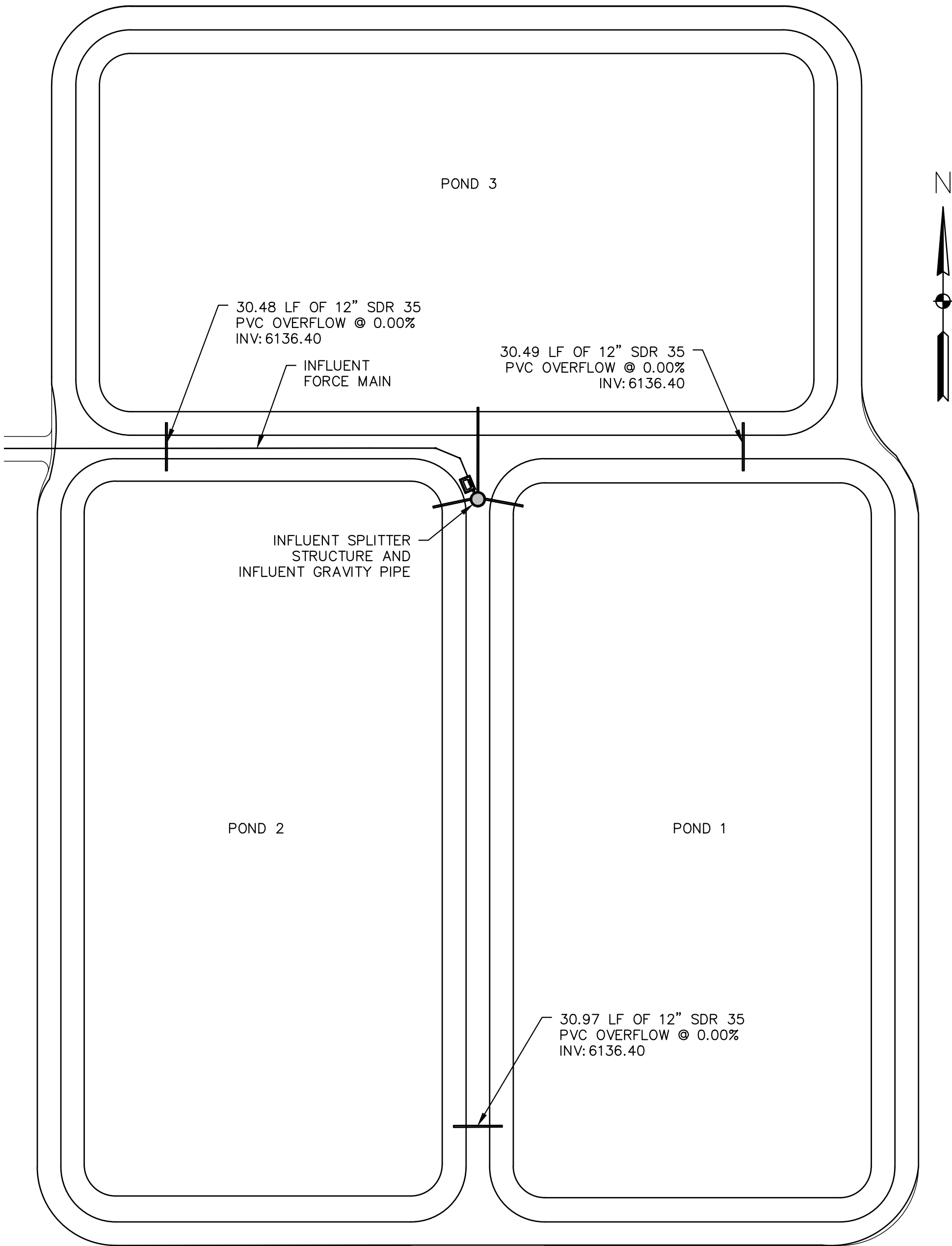




**A**  
C20  
INFLUENT SPLITTER STRUCTURE AND INFLEUNT PIPING PLAN  
1/4" = 1'

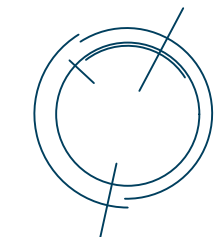


**B**  
C20  
INFLUENT SPLITTER STRUCTURE PROFILE  
1/2" = 1'



**C**  
C20  
OVERFLOW PIPING  
1" = 60'

**ELEMENT**  
ENGINEERING LLC



12687 W. CEDAR DRIVE, SUITE 300  
LAKEWOOD, CO 80228  
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WWW.ELEMENTENGINEERING.NET

REVISIONS	NO.	DATE	BY	DESCRIPTION

WASTEWATER TREATMENT PLANT PLANS FOR BID	
SPLITTER BOX & POND OVERFLOW PIPING	
TOWN OF RAWAH - BCD FILE NO. PPR2325 113 S. COMMERCIAL STREET RAWAH, CO 80832	

PREPARED UNDER THE DIRECT SUPERVISION OF



DATE	JANUARY 2024
JOB NUMBER	0043.0001
SCALE	AS SHOWN
EDITION	BIDDING
SHEET	C20 OF C31



NOTES:  
1. CONTRACTOR TO STRIP TOP 6" OF EXISTING MATERIAL AND VEGETATION AND DISPOSE OF OFF-SITE.

CURVE TABLE					
CURVE	LENGTH	RADIUS	DELTA	CHORD BEARING	CHORD
C1	65.97'	42.00'	90°00'00"	N43°52'52"E	59.50'
C2	65.97'	42.00'	90°00'00"	S46°07'08"E	59.50'
C3	49.59'	56.00'	50°44'10"	S25°22'05"E	47.98'
C4	66.76'	42.50'	90°00'00"	S45°00'00"E	60.10'
C5	65.97'	42.00'	90°00'00"	S43°52'52"W	59.50'
C6	65.97'	42.00'	90°00'00"	S46°07'08"W	59.50'
C7	65.97'	42.00'	90°00'00"	S43°52'52"W	59.50'
C8	65.97'	42.00'	90°00'00"	S46°07'08"W	59.50'
C9	65.97'	42.00'	90°00'00"	S46°07'08"W	59.50'

ESTIMATED CUT/FILL QUANTITIES  
CUT (EST): 49,781 CY  
FILL (EST): 38,341 CY (1.15 COMPACTION FACTOR)  
TOP SOIL REMOVAL (EST): 9,916 CY

ESTIMATED POND LINER  
POND LINER (EST): 402,446 SF

NOTE: CUT, FILL, AND POND LINER ARE BID AS LUMP SUM. LINER LUMP SUM TO INCLUDE ANCHOR TRENCH, ETC. CONTRACTOR TO VERIFY QUANTITIES FROM CAD FILES PRIOR TO BIDDING.

PARCEL NO. 1101400007

28 LF 24" CORRUGATED HDPE CULVERT AT PONDS ENTRANCE.

15' WIDE ACCESS ROAD TO PONDS

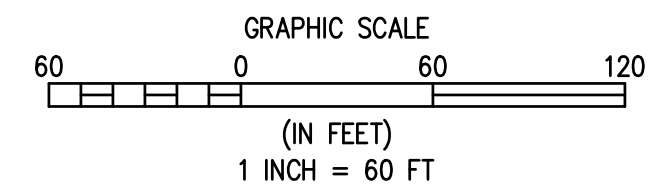
INSTALL 16" WIDE BARB WIRE GATE, ADD CROSS BRACE POST ON EACH SIDE

PARCEL NO. 100000088

15' SITE ACCESS ROAD

START OF DRAINAGE SWALE (DS) SLOPE 1% TO SOUTH

PARCEL NO. 100000111

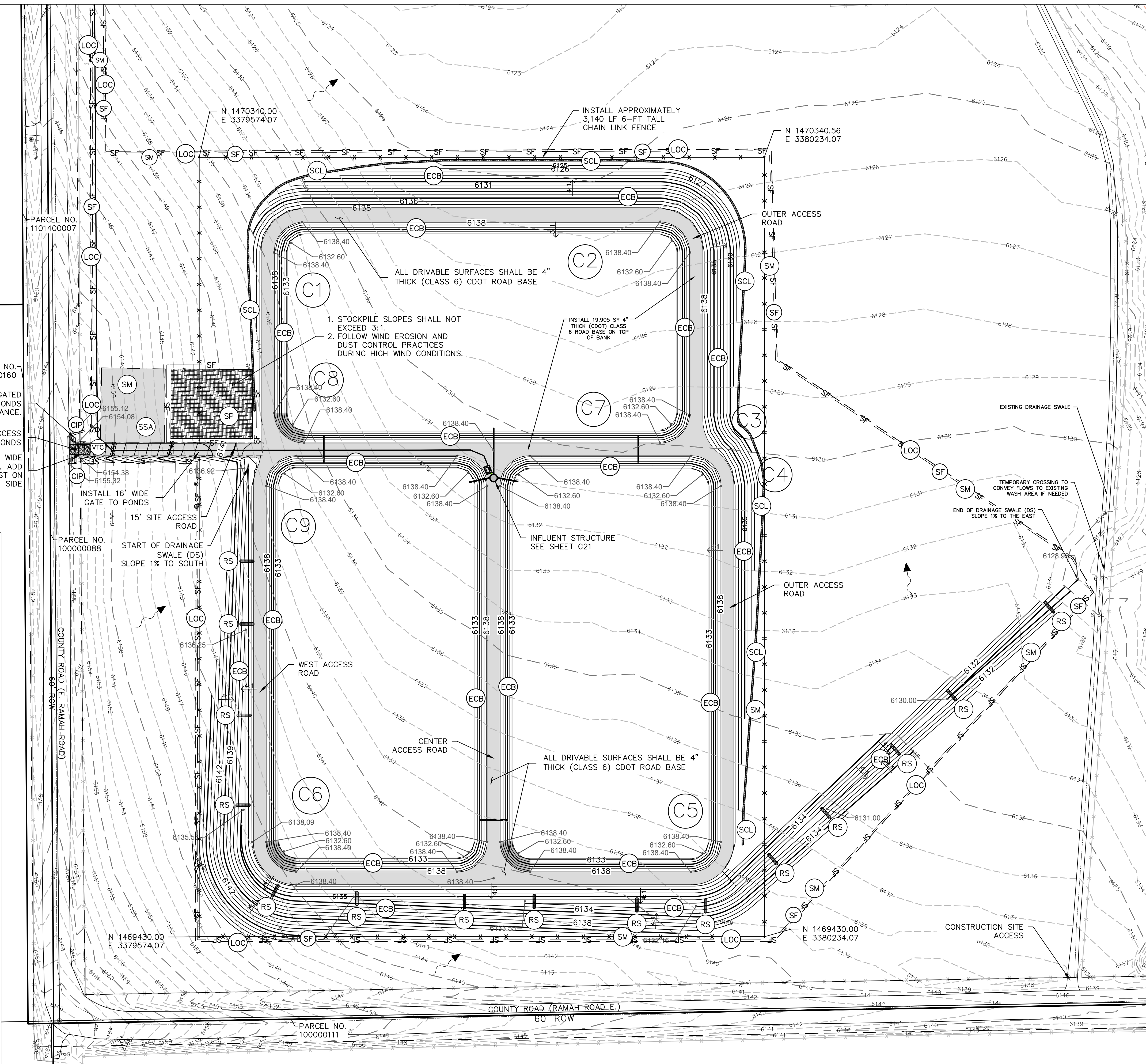


BMP LINE TYPES AND SYMBOLS DESCRIPTIONS

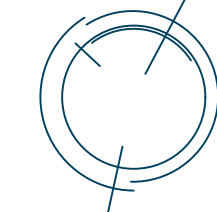
CIP	CULVERT INLET PROTECTION (INITIAL & INTERIM)
CWA	CONCRETE WASHOUT AREA (INTERIM)
ECB	EROSION CONTROL BLANKET (INTERIM & FINAL)
LOC	LIMITS OF CONSTRUCTION (INITIAL, INTERIM & FINAL)
RS	ROCK SOCK (INITIAL & INTERIM)
SCL	SEDIMENT CONTROL LOG (INTERIM)
SF	SILT FENCE (INITIAL & INTERIM)
SM	TOPSOIL, SEEDING AND MULCHING (FINAL)
SA	STOCKPILE AREA (INTERIM)
SSA	STABILIZED STAGING AREA (INTERIM)
VTC	VEHICLE TRACKING CONTROL (INITIAL & INTERIM)
FD	FLOW DIRECTION

EROSION CONTROL NOTES (APPLICABLE TO ENTIRE PROJECT):

- TOTAL PROJECT AREA OF DISTURBANCE: 17 ACRES (APPROX)
- SEED ALL DISTURBED AREAS OUTSIDE OF ROADWAY FOR FINAL STABILIZATION.
- STABILIZED STAGING AREA TO BE LOCATED WITHIN LIMITS OF CONSTRUCTION. MOST TRENCH MATERIAL TO BE LOCATED WITHIN THIS AREA TO BE PLACED AND COMPACTED BACK INTO TRENCH AS BACKFILL. THE REMAINDER OF TRENCH MATERIAL TO BE HAULED OFF-SITE.
- LOC'S ARE ASSUMED TO BE THE SAME AS LDA'S. CONTRACTOR TO REDLINE LDA'S AS CONSTRUCTION PROGRESSES.
- STABILIZATION WILL BE REQUIRED WITHIN 14 DAYS FOR INACTIVE AREAS. TEMPORARY STABILIZATION MAY INCLUDE SURFACE ROUGHENING, HYDROMULCH, OR OTHER APPROVED TEMPORARY STABILIZATION PRACTICE.
- TOPSOIL MUST BE SALVAGED FOR STAGING AREAS OR OTHER DISTURBED AREAS THAT WILL BE REVEGETATED AFTER CONSTRUCTION IS COMPLETE.
- STREET SWEEPING SHALL BE PERFORMED AS NEEDED FOR ANY PAVED SURFACES THAT HAVE ACCUMULATED SEDIMENT AND/OR DEBRIS FROM PROJECT.
- THE STABILIZED STAGING AREA SHALL BE UTILIZED FOR VEHICLE PARKING, EQUIPMENT, FUEL, CHEMICAL STORAGE, CONSTRUCTION MATERIALS, WASTE STORAGE, AND PORTABLE RESTROOMS.
- EROSION CONTROL BLANKET SHALL BE USED TO STABILIZE DRAINAGE SWALE FROM OUTLET STRUCTURE TO LIFT STATION AREA.
- CURRENT VEGETATION IS GRASSLAND/HERBACEOUS.
- NO DEDICATED ASPHALT/CONCRETE BATCH PLANTS WILL BE USED ON SITE.
- STABILIZED STAGING AREA WILL BE DESIGNATED IN FIELD AS AN AREA TO STORE CONSTRUCTION EQUIPMENT, VEHICLES, STOCKPILES, WASTE BINS, OR OTHER CONSTRUCTION RELATED MATERIALS. SSA WILL ALSO PROVIDE AN AREA FOR LOADING/UNLOADING OPERATIONS.



ELEMENT  
ENGINEERING LLC



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10687 W. CEDAR DRIVE, SUITE 300  
LAKEWOOD, CO 80228

REVISIONS	DATE	DESCRIPTION
NO		

WASTEWATER TREATMENT PLANT PLANS FOR BID  
HORIZONTAL CONTROL &  
GRADING & EROSION CONTROL  
TOWN OF RAMAH - PCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAMAH, CO 80832

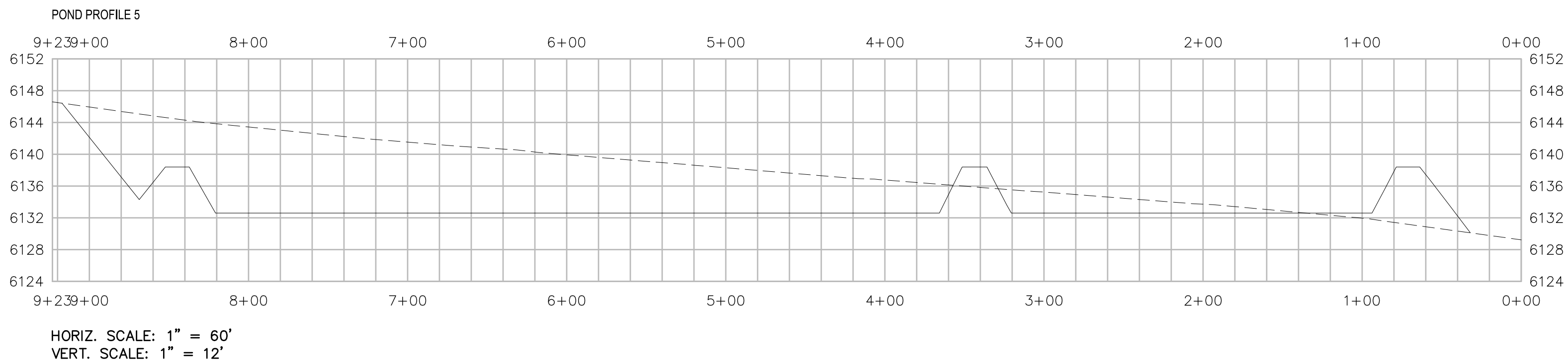
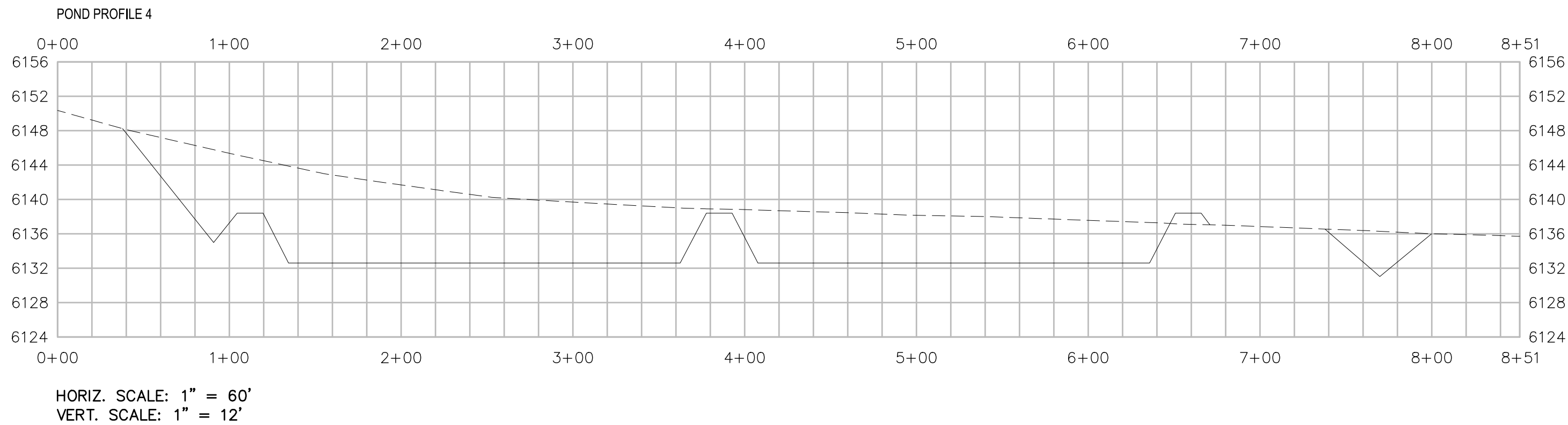
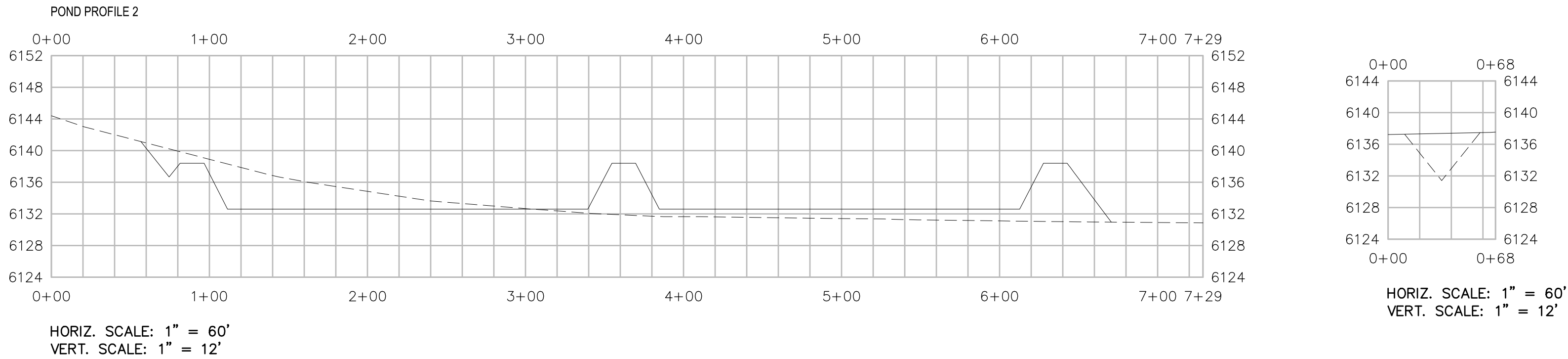
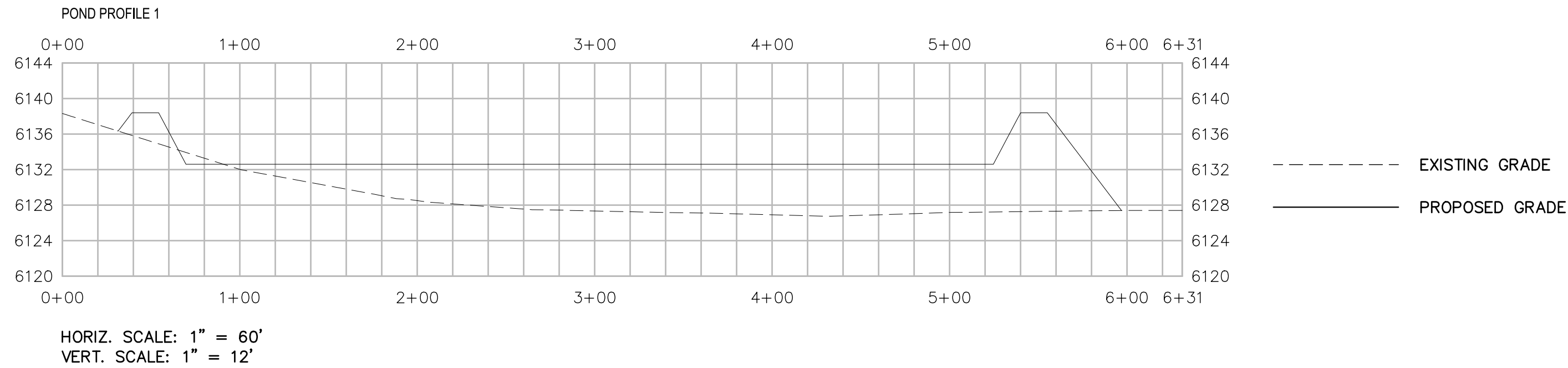
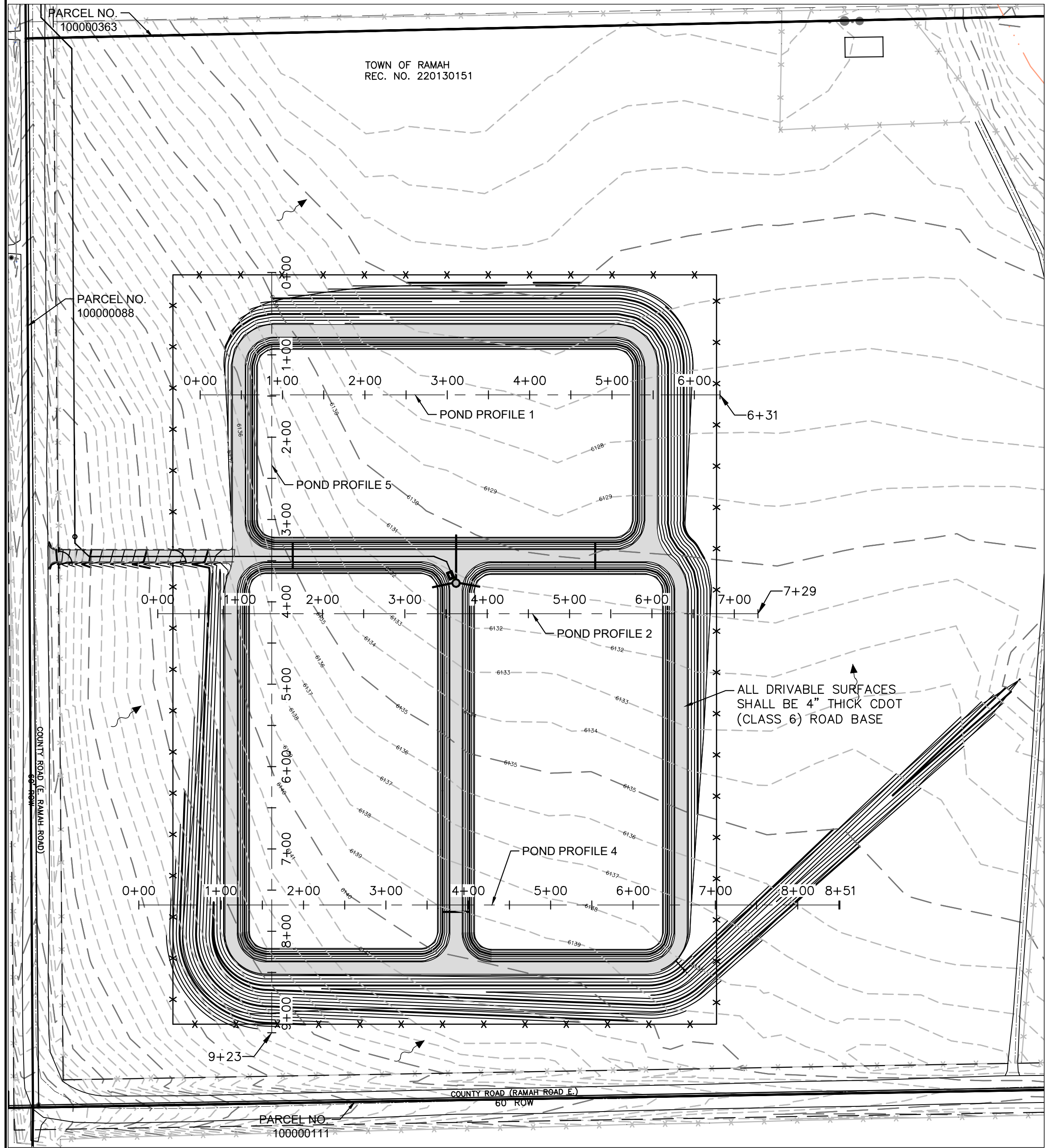
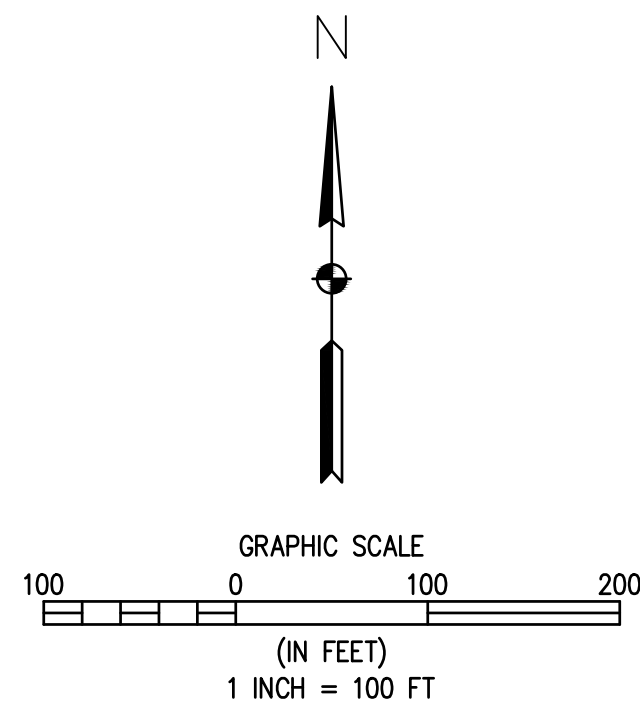
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FOR AND ON BEHALF OF  
ELEMENT ENGINEERING, LLC

DATE	JANUARY 2024
JOB NUMBER	0043.0001
SCALE	1" = 60'
EDITION	BIDDING
SHEET	C21 OF C31





REVISIONS			
NO.	DESCRIPTION	DATE	BY

WASTEWATER TREATMENT PLANT PLANS FOR BID	
POND GRADING PROFILES	
TOWN OF RAMAH - BCD FILE NO. PPR2325 113 S. COMMERCIAL STREET RAMAH, CO 80832	

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FOR AND ON BEHALF OF  
ELEMENT ENGINEERING, LLC

DATE	JANUARY 2024
JOB NUMBER	0043.0001
SCALE	1" = 100'
EDITION	BIDDING
SHEET	C22 OF C31







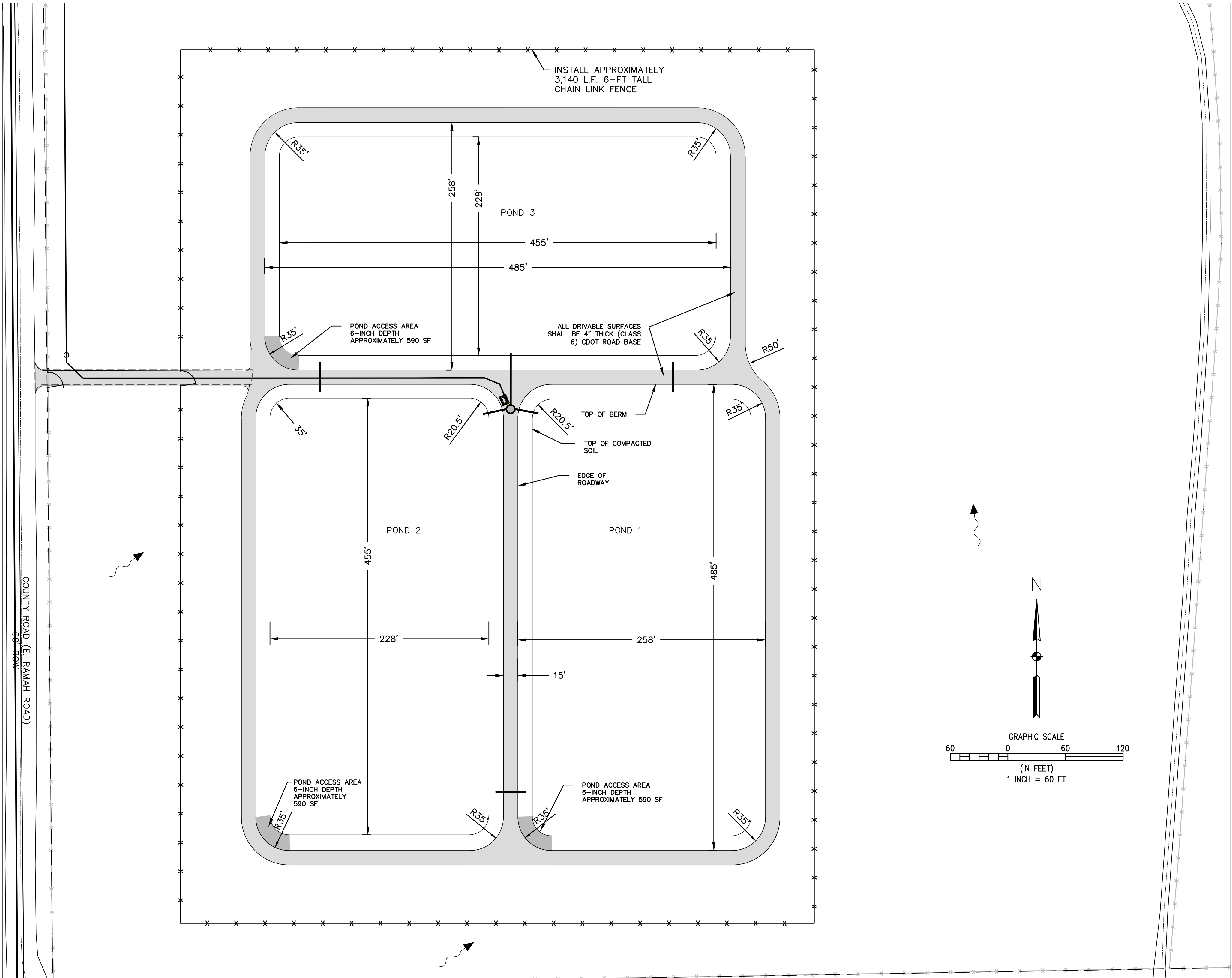
LINER MATERIAL:	45-MIL FPP-R (FLEXIBLE REINFORCED POLYPROPYLENE) OR 45-MIL LLDPE-R (LINEAR LOW DENSITY REINFORCED POLYETHYLENE)
AIR/GAS VENT STRIP:	DIMPLED STRIP AT 45-FT ON CENTER BOTH DIRECTIONS (SEE DETAIL)
AIR/GAS VENTS:	ON SIDE SLOPE WITH EACH VENT STRIP (SEE DETAIL)
SPECIFICATIONS:	SEE TECHNICAL SPECIFICATIONS FOR SPECIFIC MATERIAL PROPERTIES AND REQUIREMENTS.

POND BOTTOM SURFACE AREA (PER POND):	103,333 SF (2.37 ACRES)	RADIUS OF CORNER AT BOTTOM:	20-FT
POND TOP SURFACE AREA (PER POND):	124,016 SF (2.85 ACRES)	RADIUS OF CORNER AT TOP:	35-FT
ASSUMED SLUDGE DEPTH:	6-INCHES	WIDTH OF POND AT BOTTOM:	228-FT
MAX OPERATING WATER LEVEL:	3- FEET	LENGTH OF POND AT BOTTOM:	455-FT
FREEBOARD:	2- FEET	WIDTH OF POND AT TOP:	258-FT
SIDE SLOPE RATIO:	3:1	LENGTH OF POND AT TOP:	485-FT
POND LENGTH TO WIDTH RATIO:	2:1	ROADWAY WIDTH:	15-FT
NO. PONDS	3		

1. CONTRACTOR TO REMOVE ANY DIRT AND DEBRIS WHICH MAY DAMAGE LINER SYSTEM. ANY DEBRIS GREATER THAN  $\frac{3}{8}$ " DIAMETER TO BE REMOVED PRIOR TO INSTALLATION.
2. CONTRACTOR RESPONSIBLE FOR LOCATION AND PROTECTION OF ALL UTILITIES PRIOR TO AND DURING CONSTRUCTION.
3. AIR/GAS VENTING STRIP TO BE INSTALLED AFTER SUBGRADE IS COMPACTED AND AT FINAL GRADE.
4. CONTRACTOR TO FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS FOR HAULING, STOCKPILING, STAGING, UNLOADING, AND INSTALLATION OF LINER SYSTEM.
5. PROTECT EXISTING ASPHALT, STRUCTURES, AND CURB AND GUTTER FROM DAMAGE. THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR ANY DAMAGE TO EXISTING INFRASTRUCTURE.
6. PRIOR TO INSTALLATION OF LINER, ENGINEER'S REPRESENTATIVE SHALL APPROVE THE INSTALLATION OF AIR/GAS VENTING STRIPS.
7. PRIOR TO INSTALLATION OF BALLAST, ENGINEER'S REPRESENTATIVE SHALL APPROVE THE LINER AND AIR/GAS VENT.
8. AIR/GAS VENTING STRIP TO MEET THE FOLLOWING SPECIFICATIONS:
  - 8.1. STRUCTURE: SIMPLED STRIP
  - 8.2. POLYMER: PS
  - 8.3. THICKNESS: 1-INCH
  - 8.4. THRU-FLOW: YES
  - 8.5. COMPRESSIVE STRENGTH (ASTM D 1621): 9,500 PSF
  - 8.6. FLOW (ASTM D 4716): 30 GPM/FT
  - 8.7. FABRIC/BACKING: CORE ENCAPSULATED W/ 4 OZ NW
  - 8.8. WIDTH: 12-INCH
9. INSTALL AIR/GAS VENT 6-INCHES BELOW CREST OF LINER ABOVE EACH AIR/GAS VENTING STRIP. SEE DETAILS FOR INSTALLATION INFORMATION.
10. ENGINEER AND LINER MANUFACTURER REPRESENTATIVE TO APPROVE SUBGRADE PREPARATION PRIOR TO LINER INSTALLATION.
11. LINER AND MESH UNDER-LINER TO BE INSTALLED BY MANUFACTURER CERTIFIED INSTALLATION TECHNICIANS.
12. RESTORE AND RE-SEED SITE PER SPECIFICATIONS.
13. BALLAST INSTALLATION REQUIREMENTS (PER POND)

TOE OF SLOPE WILL REQUIRE PERMANENT TOE BALLAST IN THE FORM OF UV RESISTANT SAND TUBES. TOE BALLAST MINIMUM REQUIREMENTS ARE ONE 45 KG SAND TUBE SPACED 5.2 M CENTER TO CENTER ALONG THE TOE OR APPROXIMATELY 80 BALLAST TUBES ALONG THE TOE. IN ADDITION, ALL SLOPE AREAS OF THE CONTAINMENT SHOULD BE BALLASTED ON THE SLOPE WITH A MINIMUM OF 3 SAND TUBES PER CABLE SUPPORTED STRING WITH RESTRAINING CABLE TIE-OFF AT THE TOP OF SLOPE WITHIN THE ANCHOR TRENCH. SPACING OF BALLAST TUBES ALONG THE SLOPE SHOULD BE AT 10.2 (33 FT) INTERVALS ALONG THE INSIDE SLOPE, WHICH RESULTS IN APPROXIMATELY 40 BALLAST TUBES PER INSIDE SLOPE. TUBES FOR THE BOTTOM OPEN AREA, THE TUBES SHALL BE PLACED IN OFFSET STRINGS PARALLEL TO THE POND LONG DIMENSION OR WIDTH DIMENSION IN SO FAR AS PRACTICAL BUT POSITIONED TO APPROXIMATE ONE TUBE PER 16.4 SQM (176 SF) OR A TOTAL OF 430 BOTTOM SAND TUBES. TOTAL NUMBER OF SAND TUBES PER POND IS ESTIMATED TO BE 630.

3H:1V SLOPES	120 (40 BALLAST STRINGS WITH 3 EACH)
TOE OF SLOPE	80 (2 BALLAST TUBES BETWEEN SLOPE TUBES)
BOTTOM	430 (1 BALLAST TUBE PER 16.4 SQM)
TOTAL	630

[illegible]

# WASTEWATER TREATMENT PLANT PLANS FOR BID

## POND DETAILS

TOWN OF RAMAH – PCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAMAH, CO 80832

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FOR AND ON BEHALF OF  
ELEMENT ENGINEERING, LLC

DATE  
JANUARY 2024

JOB NUMBER  
0043.0001

SCALE  
1" = 60'

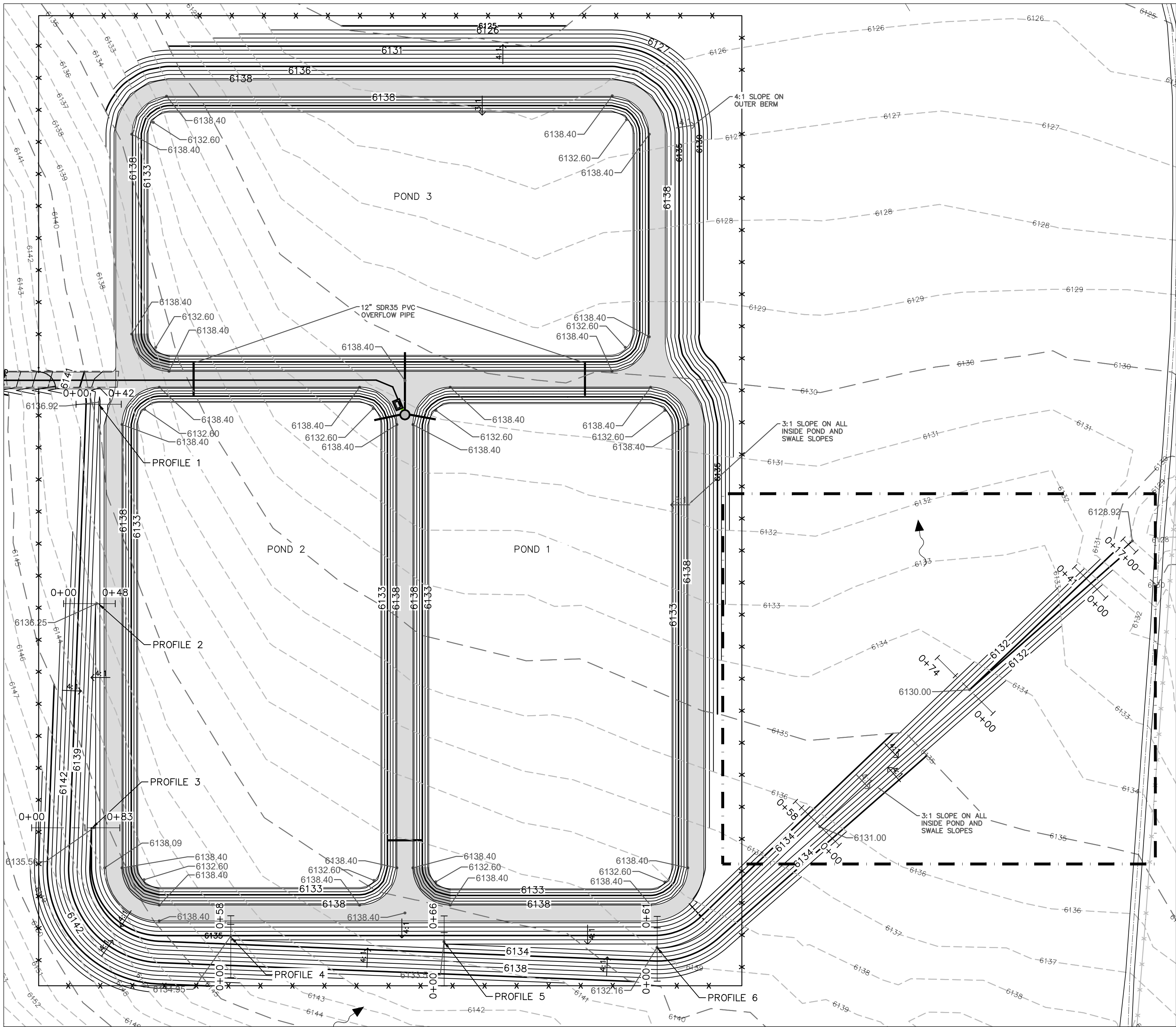
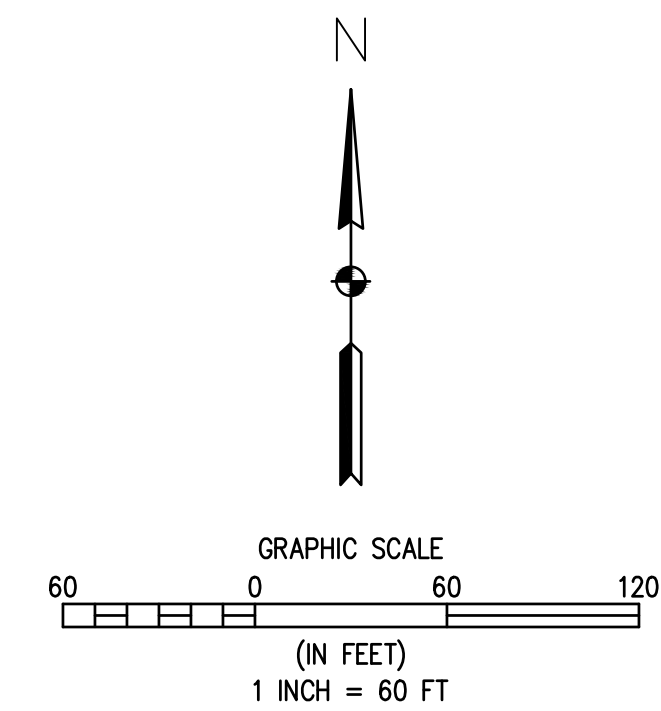
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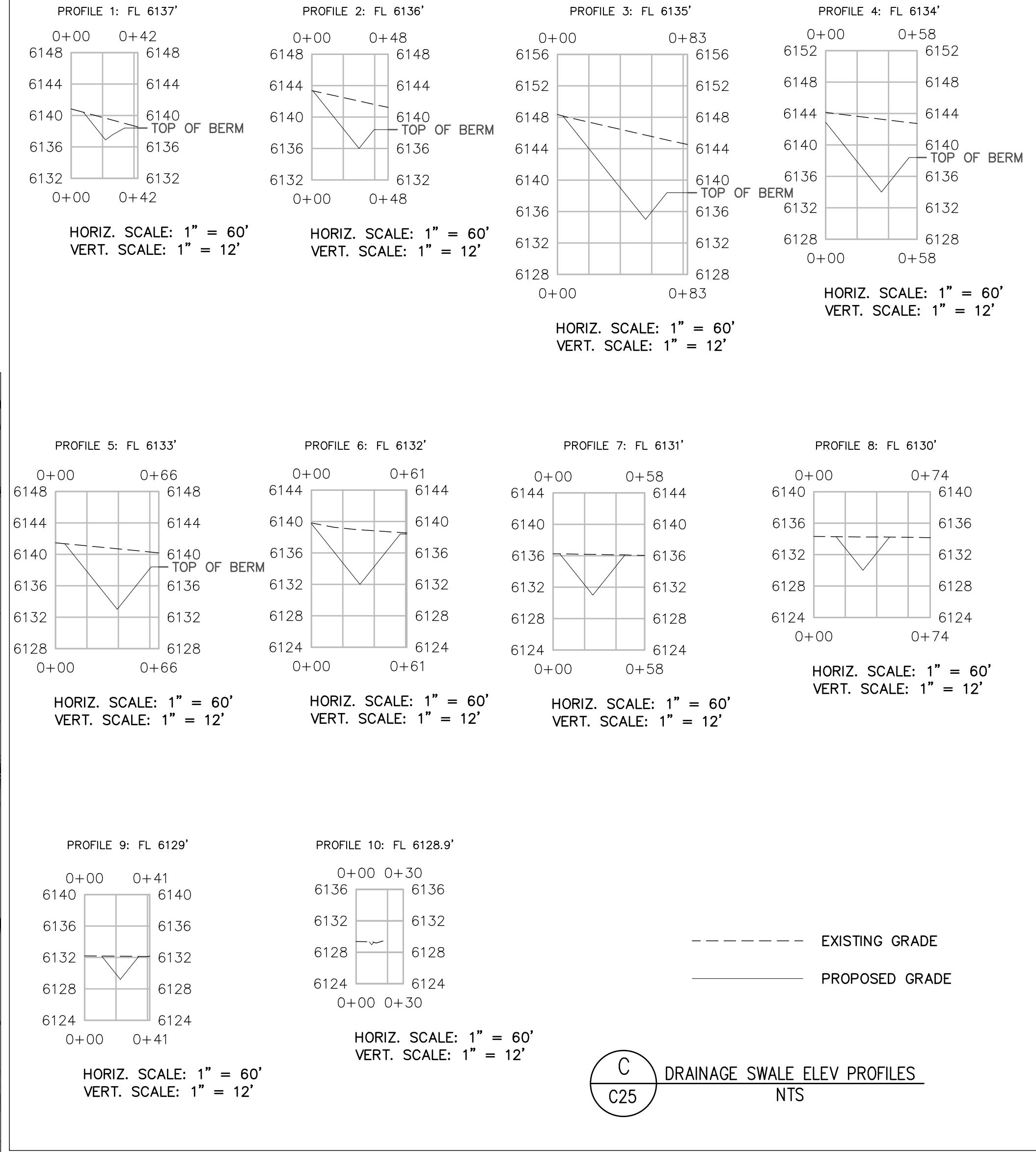
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C24 OF C31

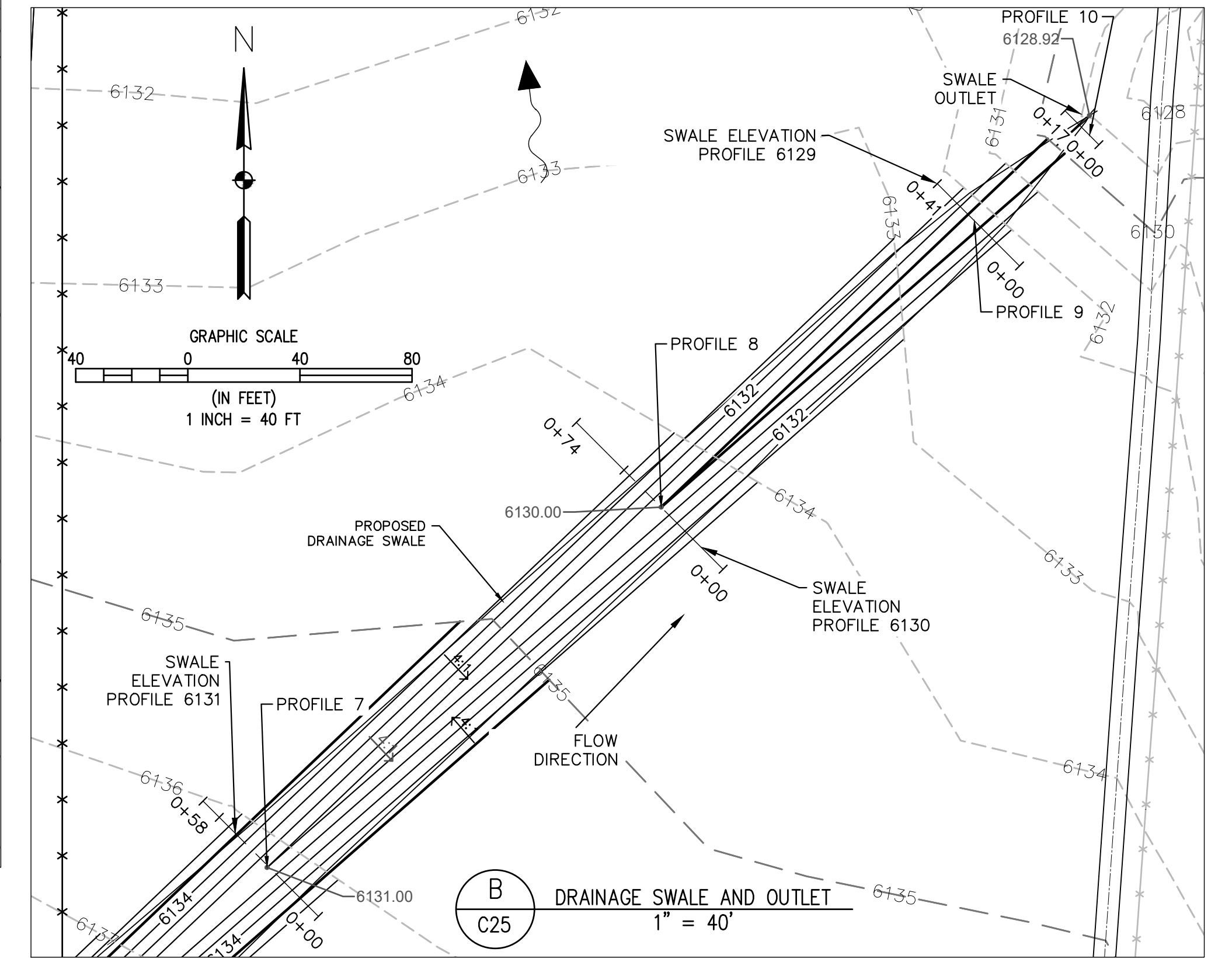




A  
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EVAPORATIVE PONDS DRAINAGE PLAN  
1" = 60'



C  
C25  
DRAINAGE SWALE ELEV PROFILES  
NTS

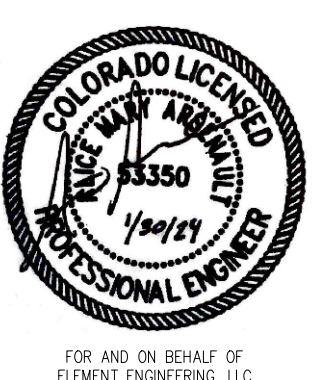


B  
C25  
DRAINAGE SWALE AND OUTLET  
1" = 40'

REVISIONS	DATE	BY	DESCRIPTION

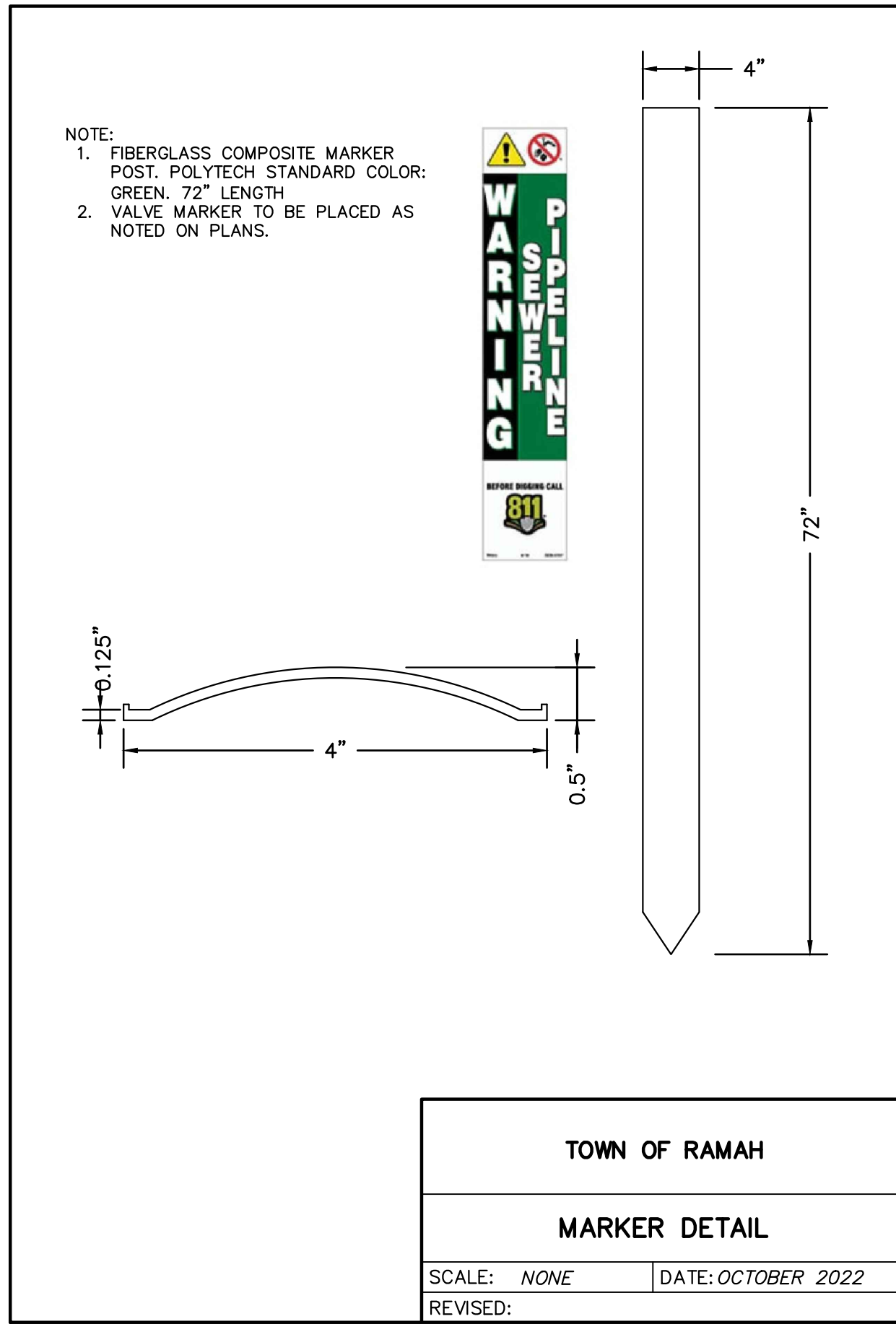
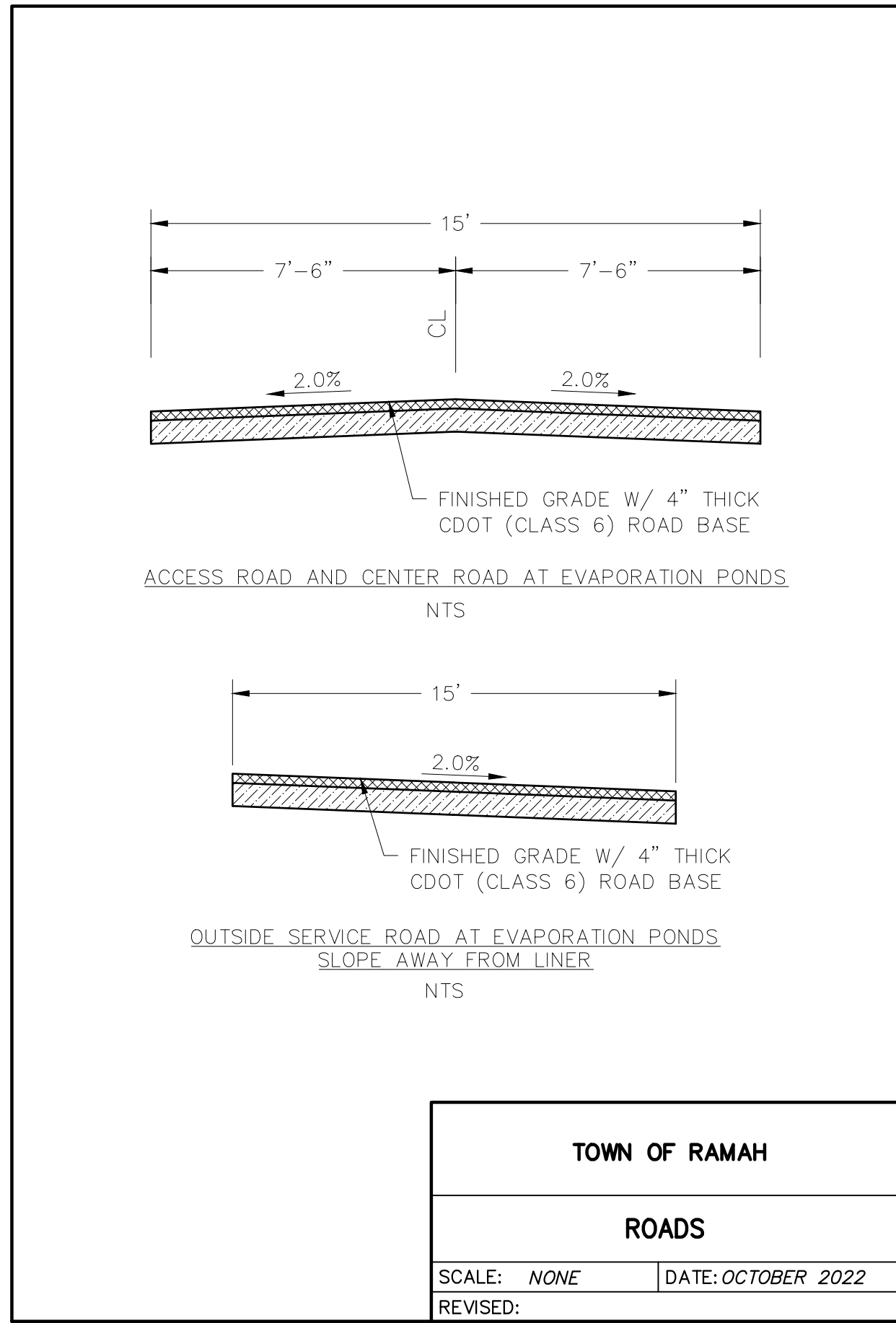
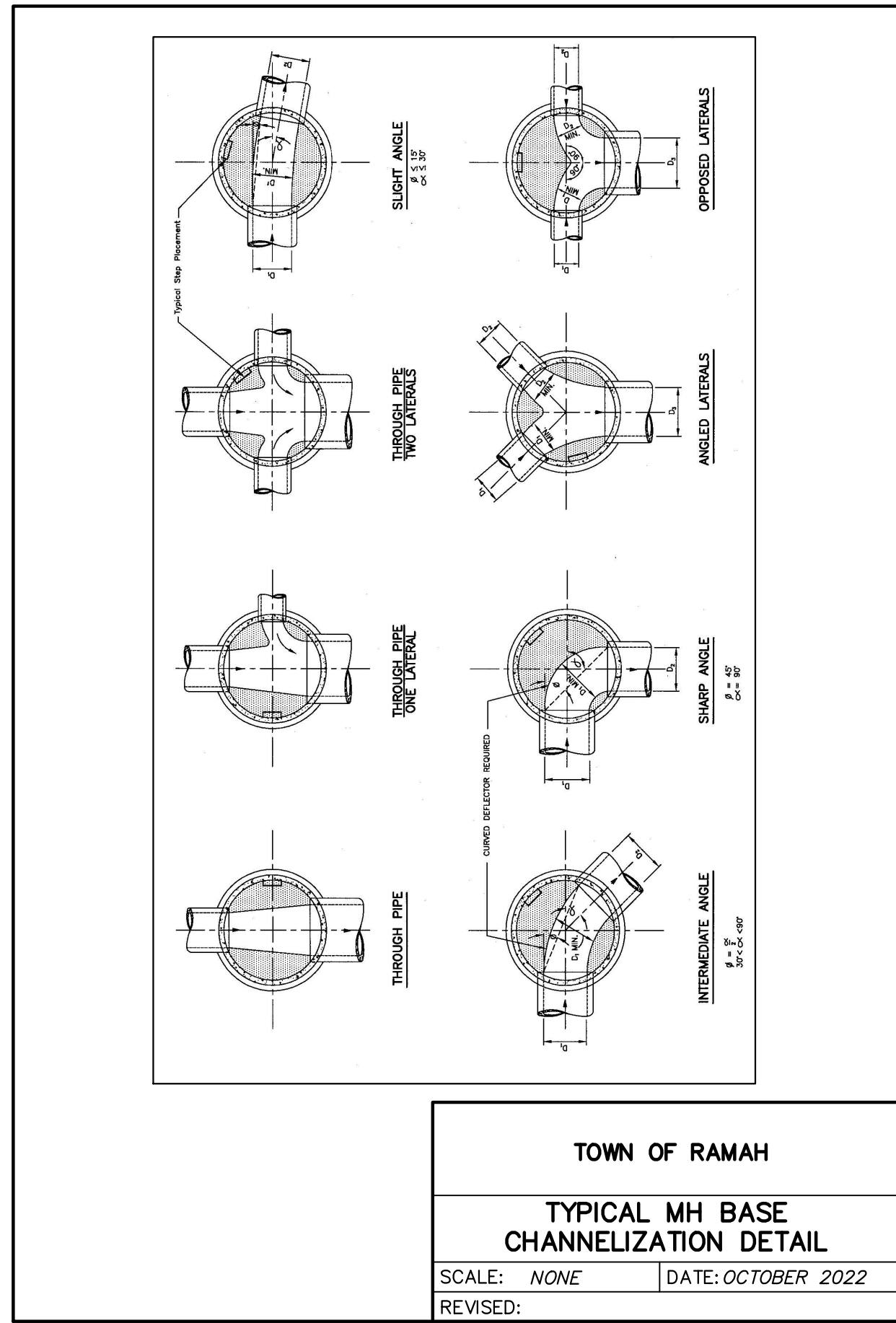
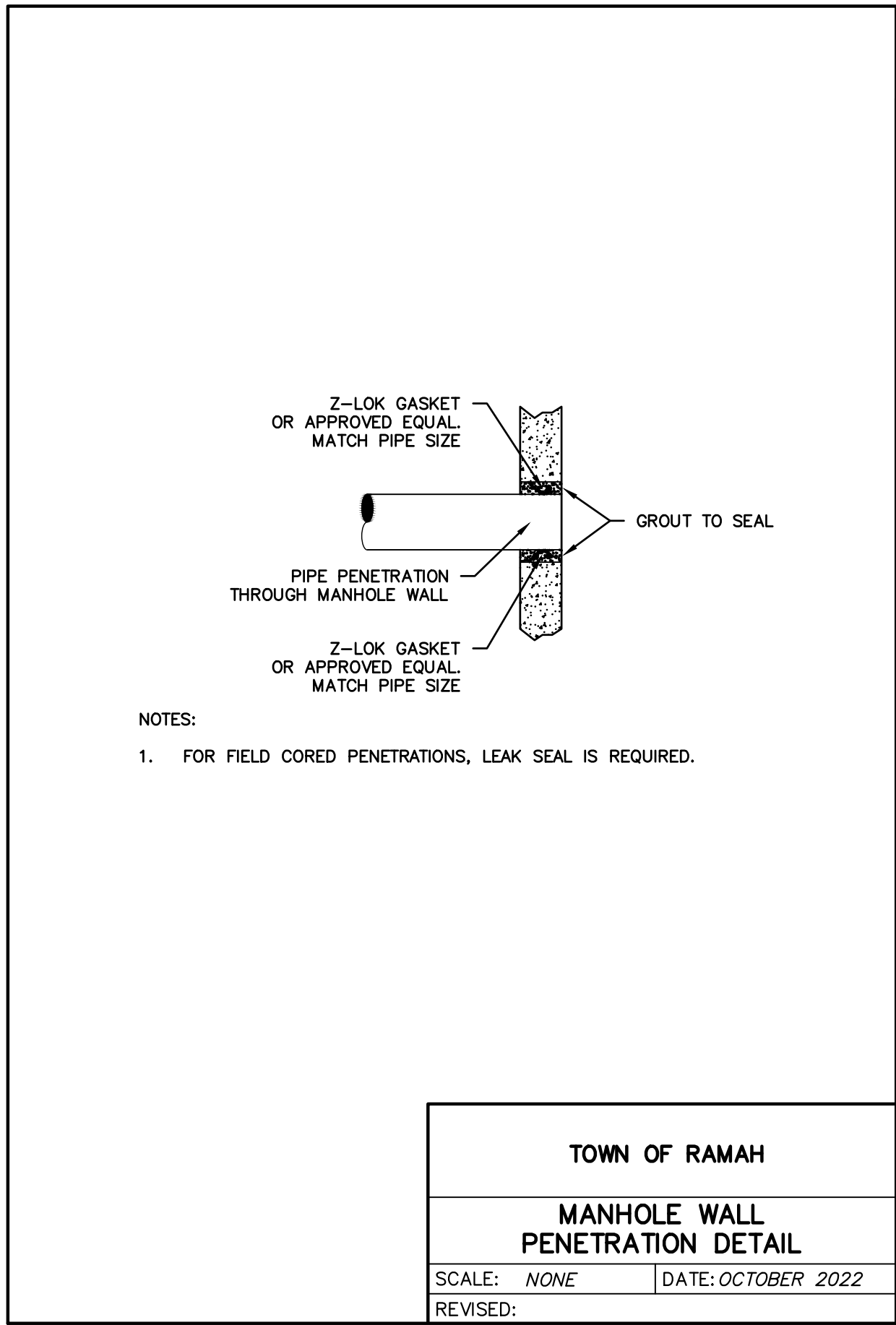
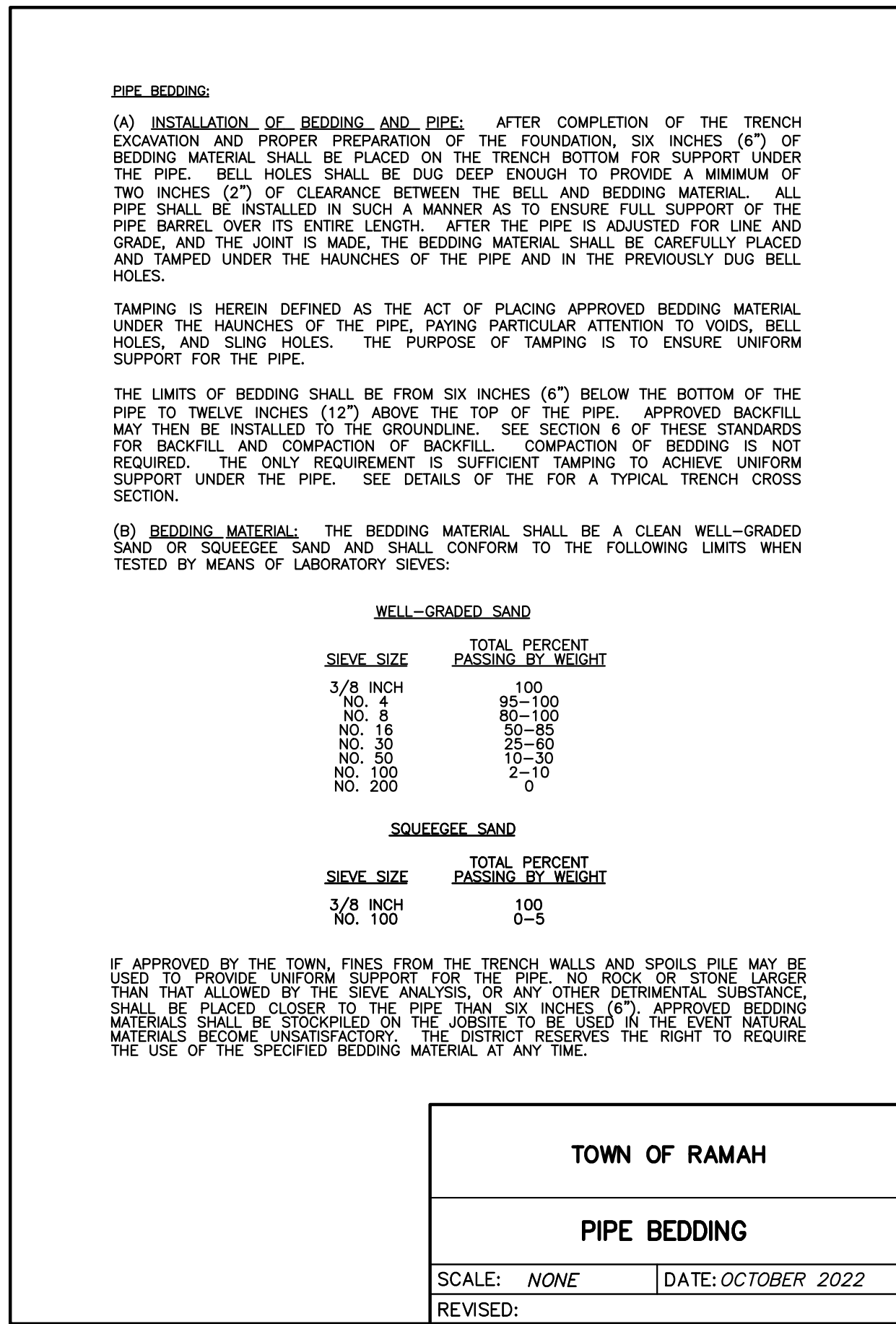
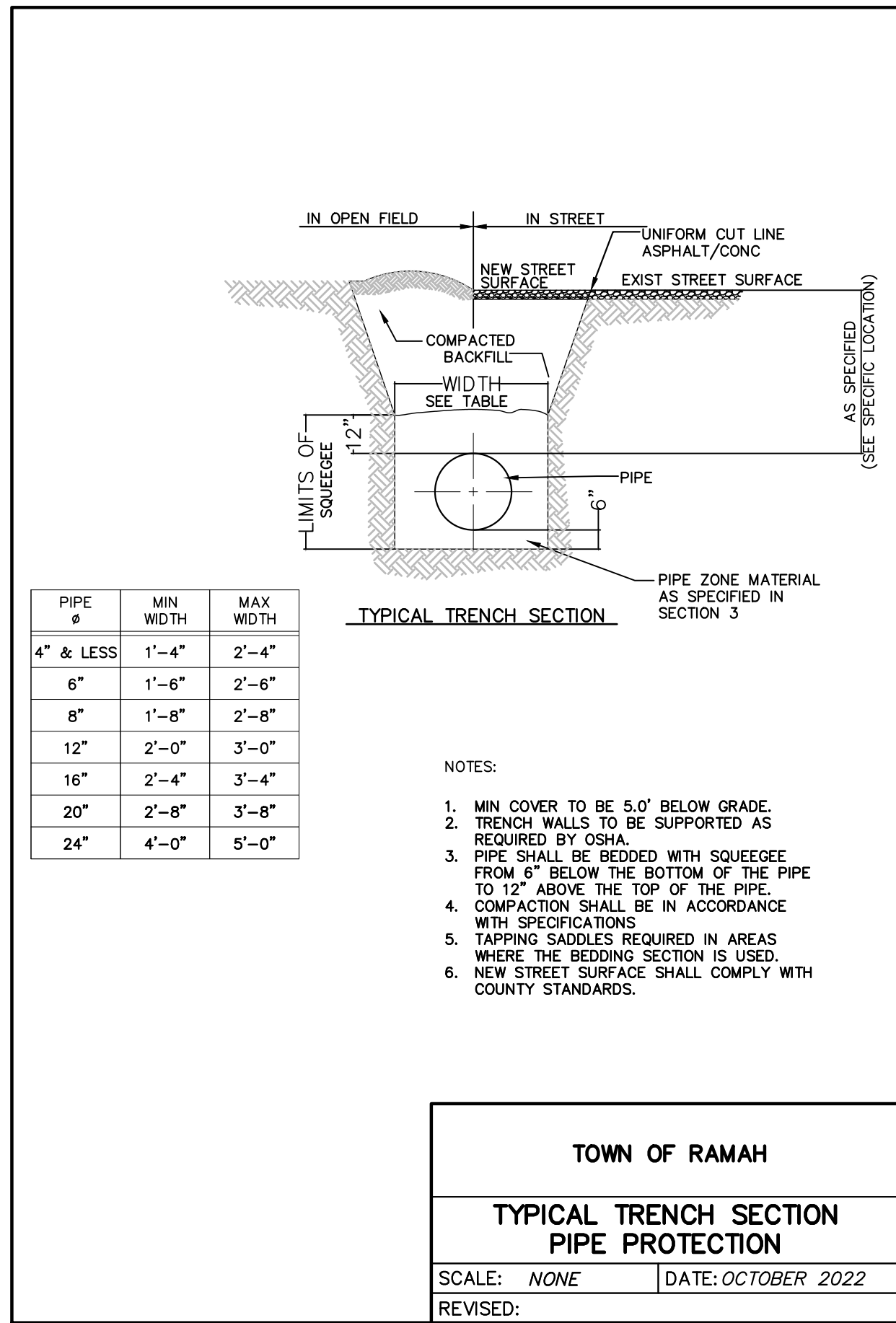
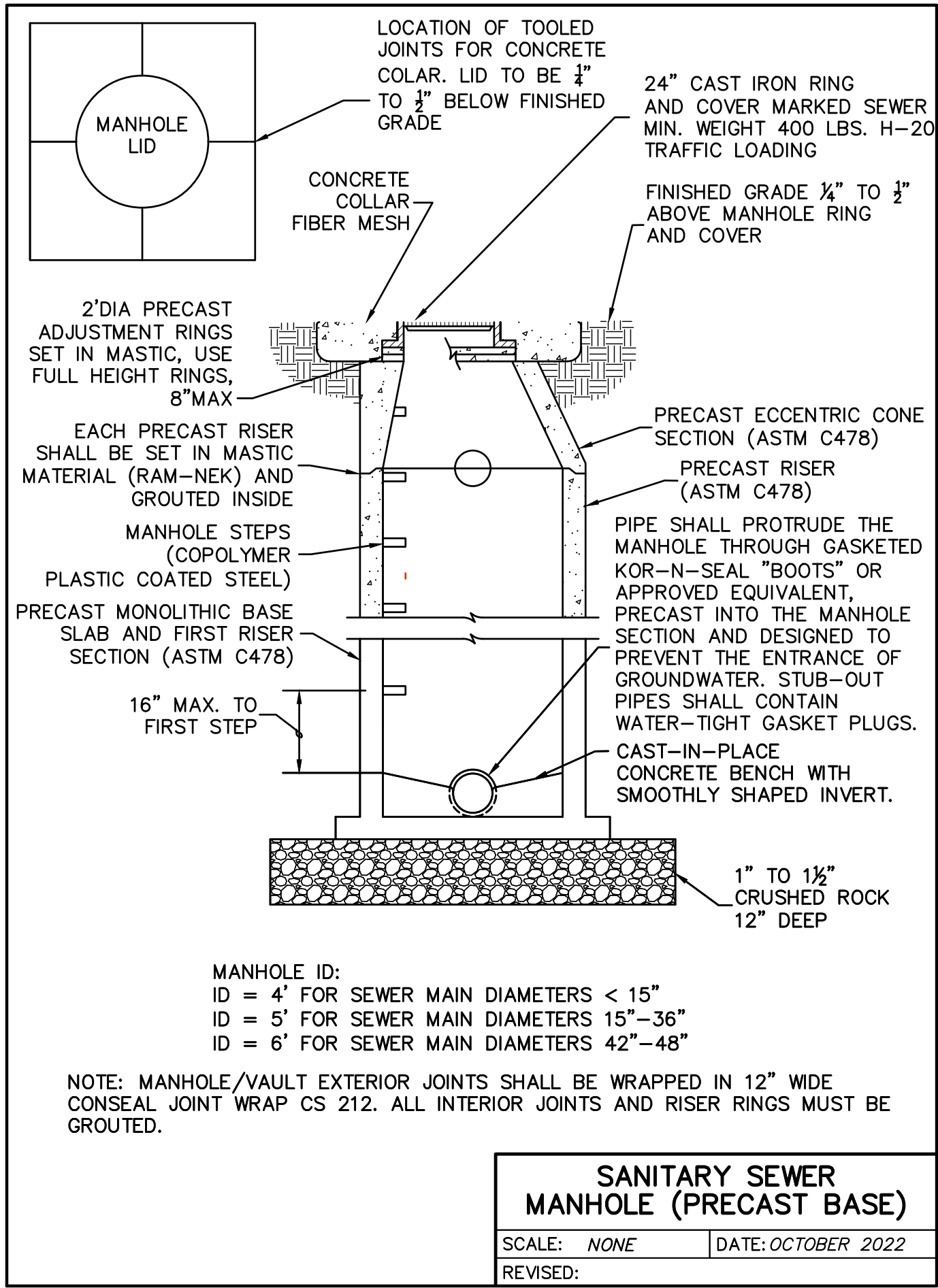
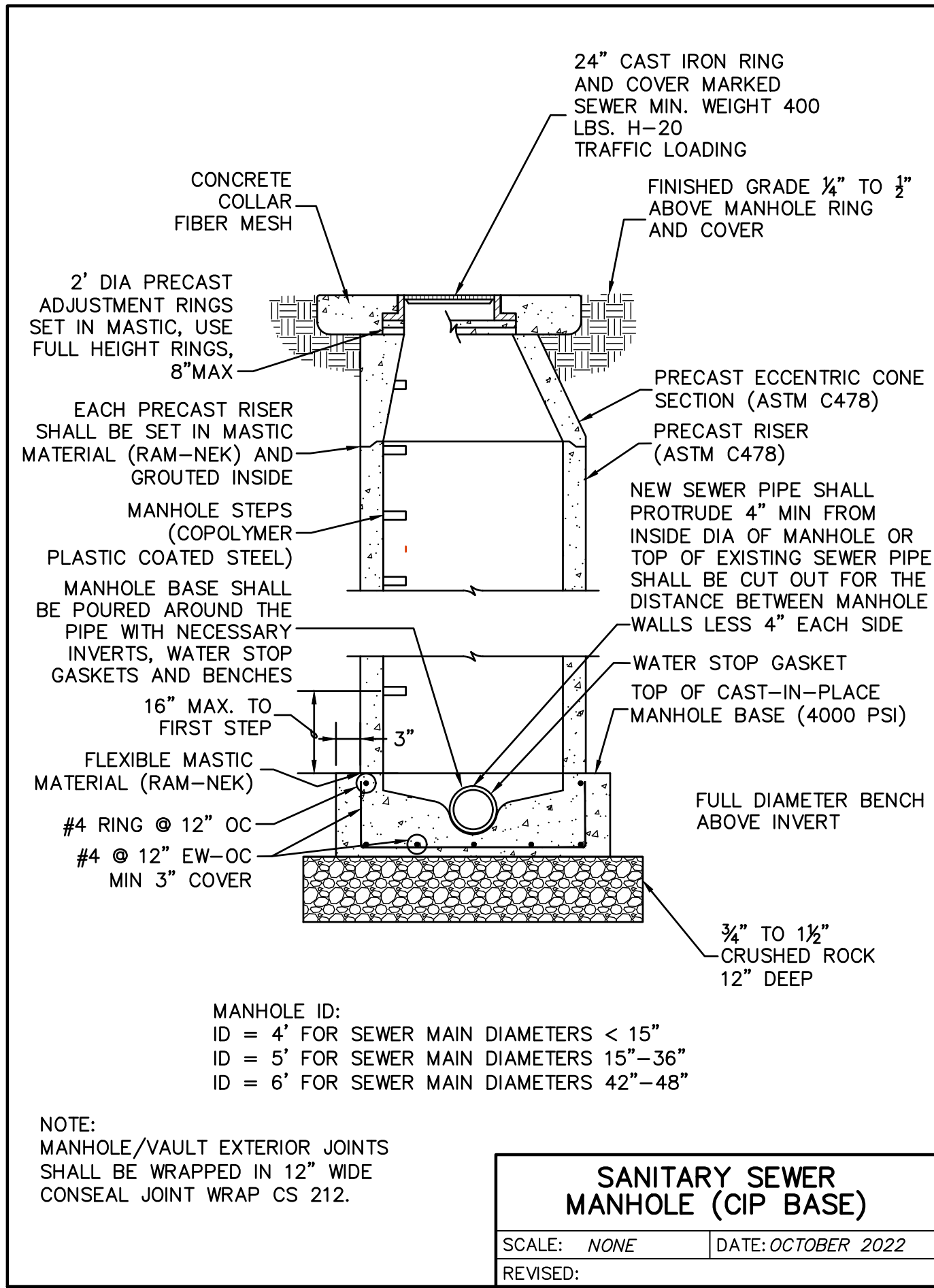
WASTEWATER TREATMENT PLANT PLANS FOR BID  
DRAINAGE SWALE PLAN &  
PROFILE  
TOWN OF RAVAH - PCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAVAH, CO 80832

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**ELEMENT ENGINEERING LLC**

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12687 W. CEDAR DRIVE, SUITE 300  
LAKEWOOD, CO 80228

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WASTEWATER TREATMENT PLANT PLANS FOR BID

**GENERAL DETAILS**

TOWN OF RAMAH - PCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAMAH, CO 80832

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**COLORADO LICENSED PROFESSIONAL ENGINEER**  
13350  
1/24/21

FOR AND ON BEHALF OF  
ELEMENT ENGINEERING, LLC

DATE:  
JANUARY 2024

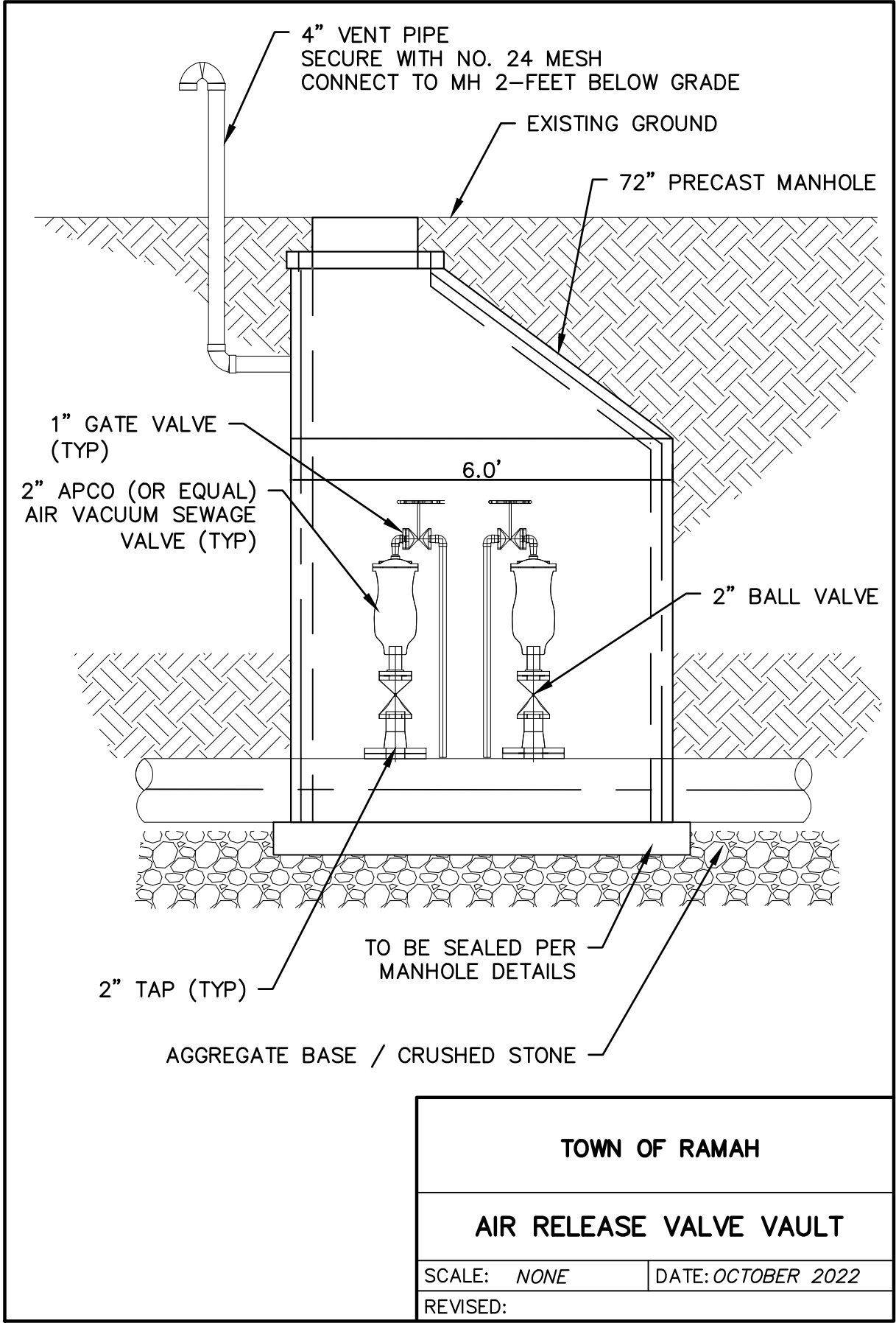
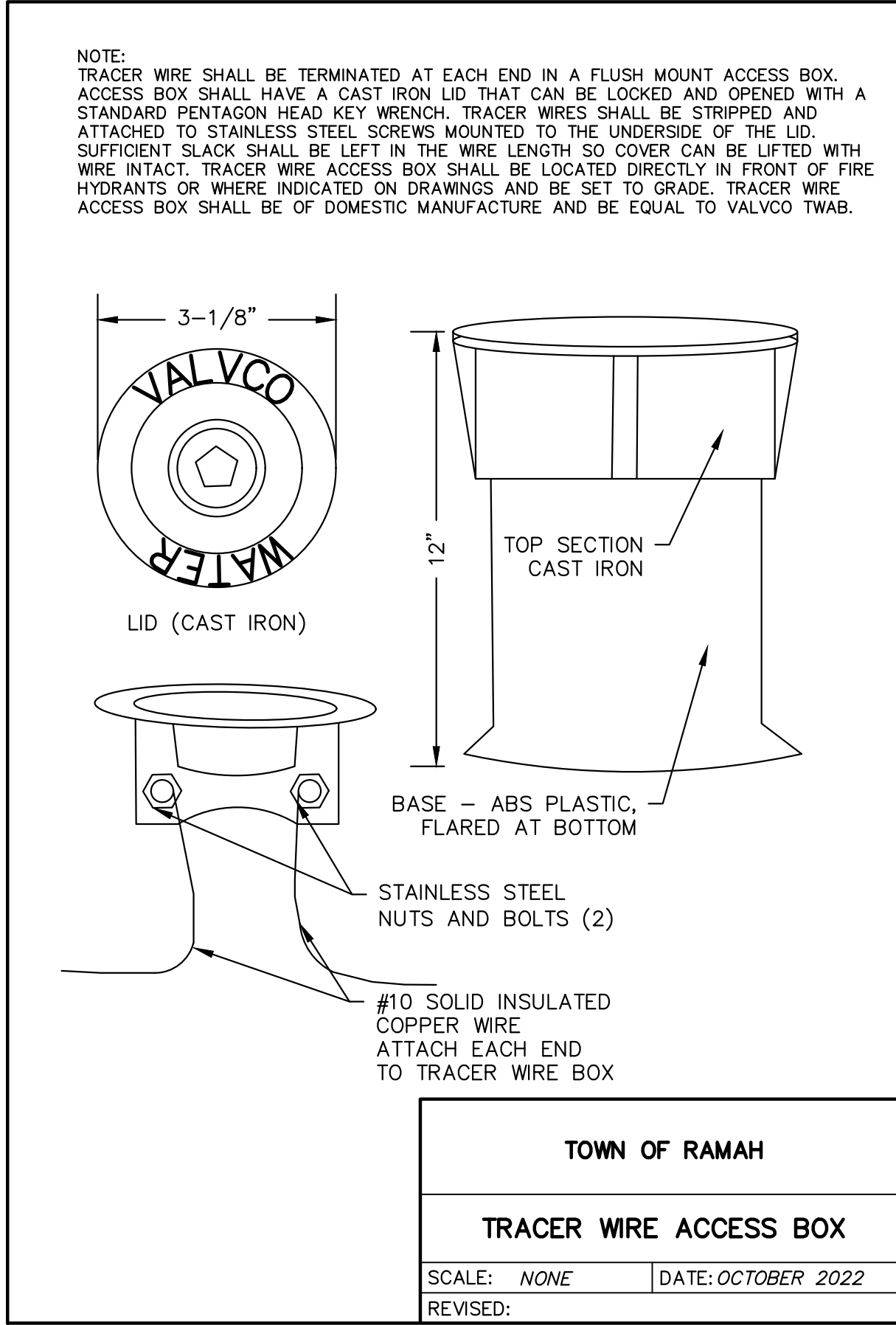
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EDITION:  
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C26 OF C31

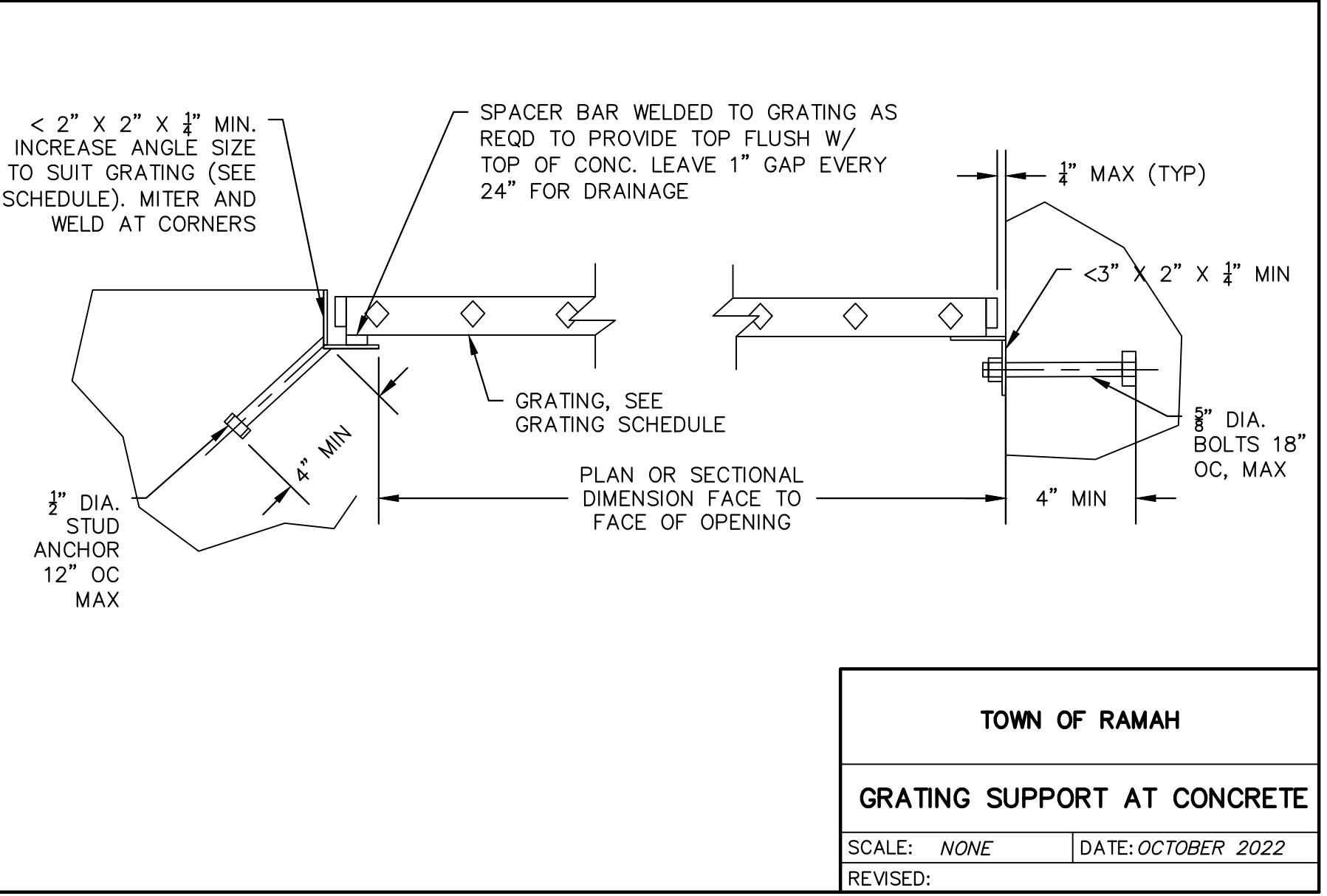
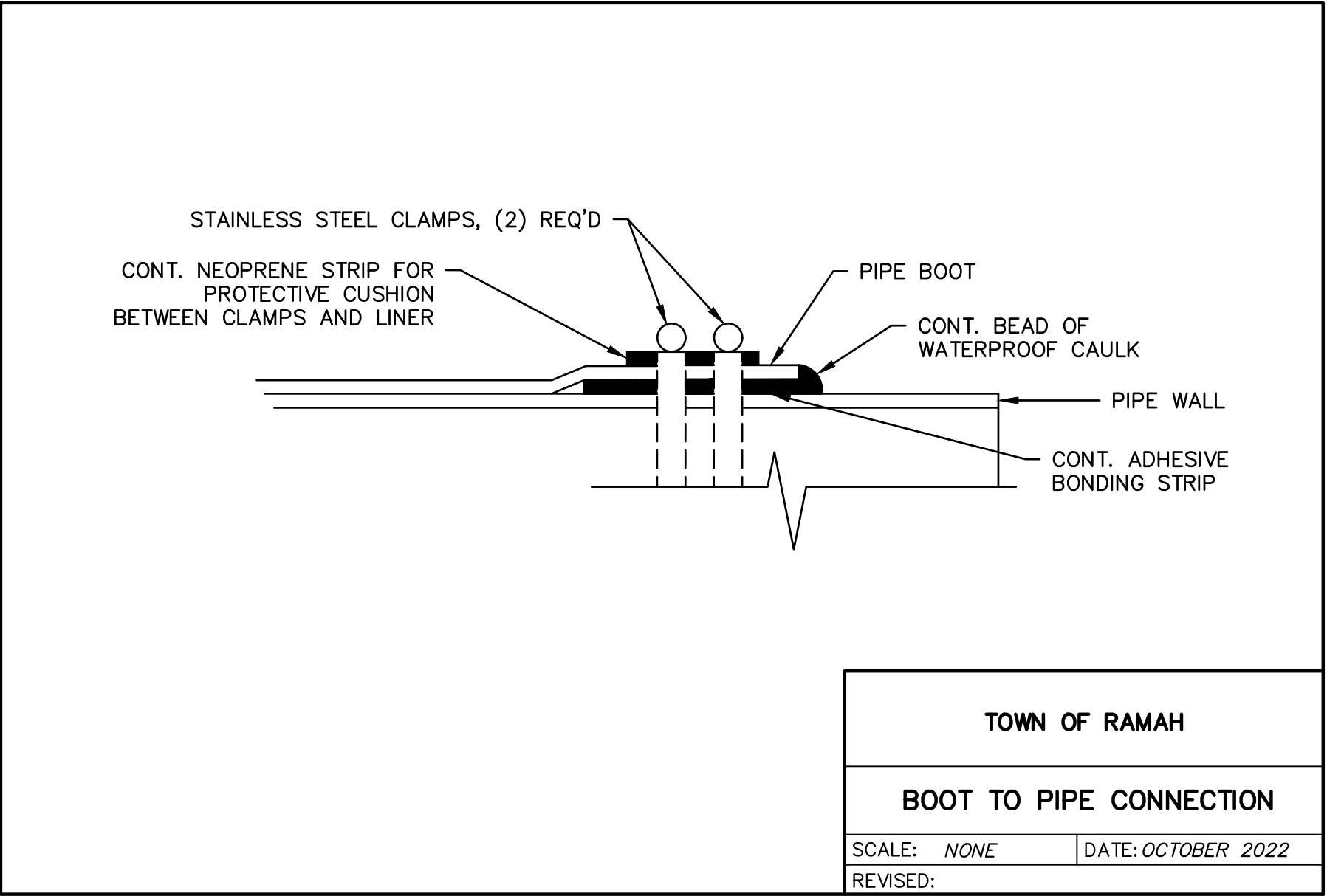
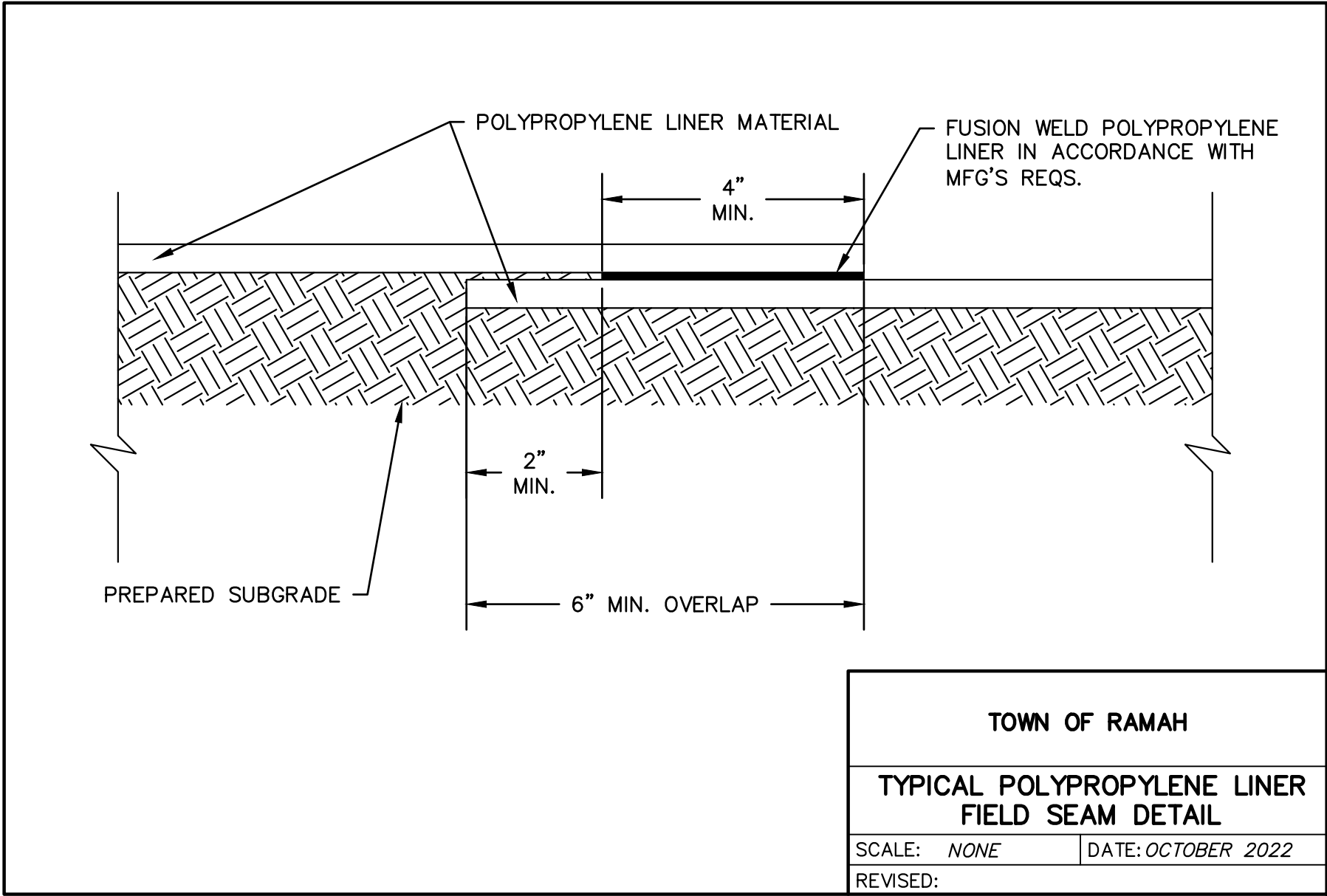
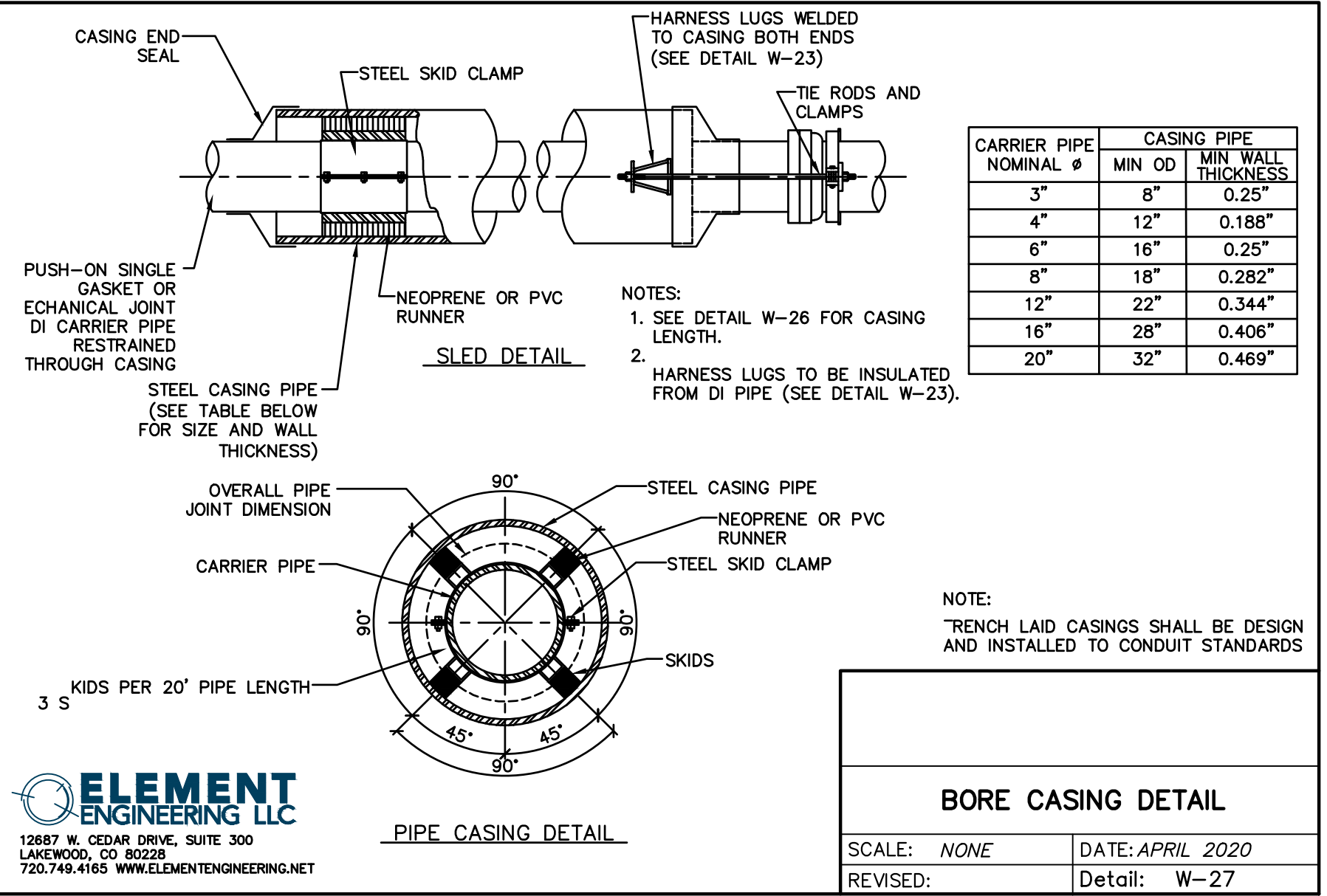
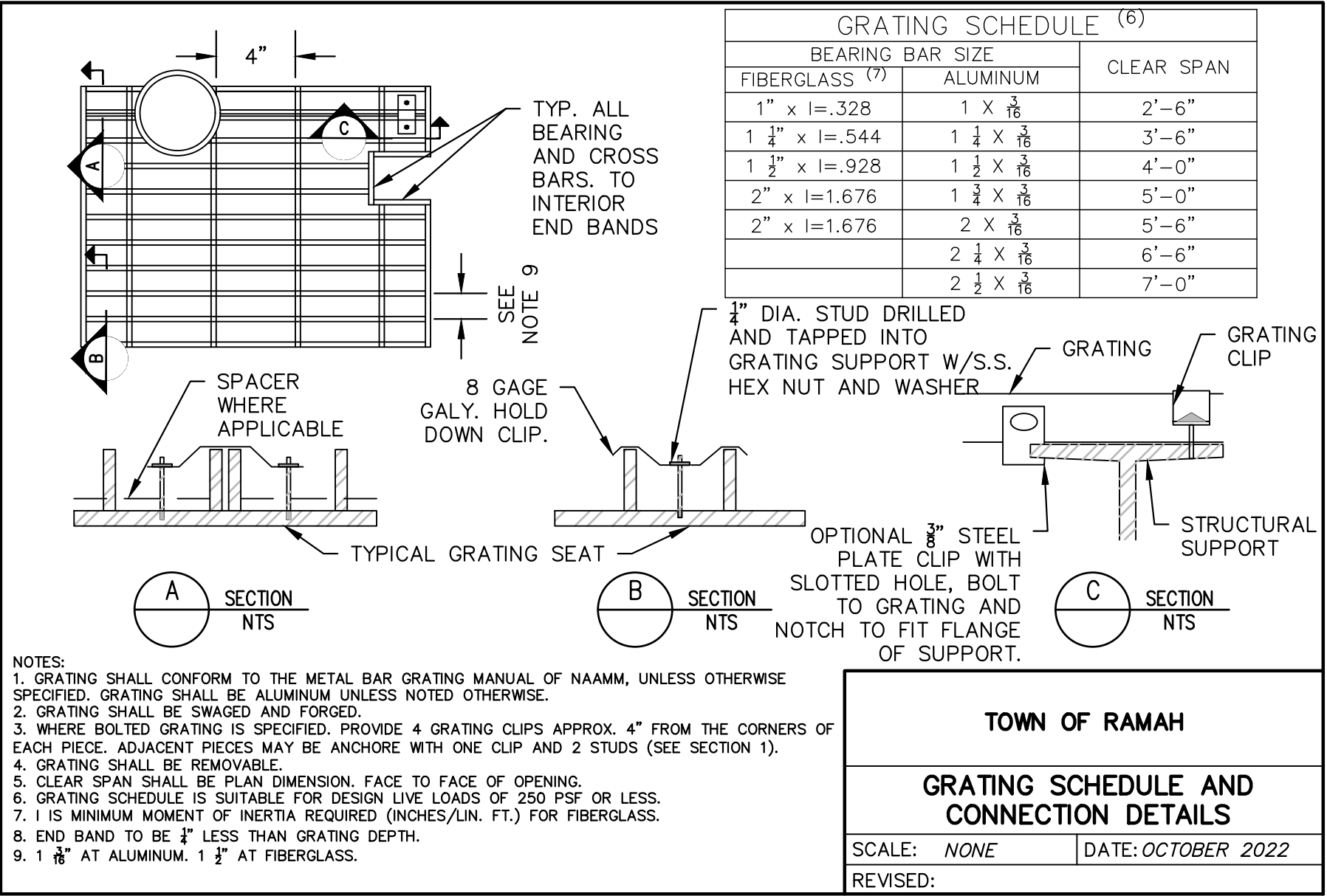
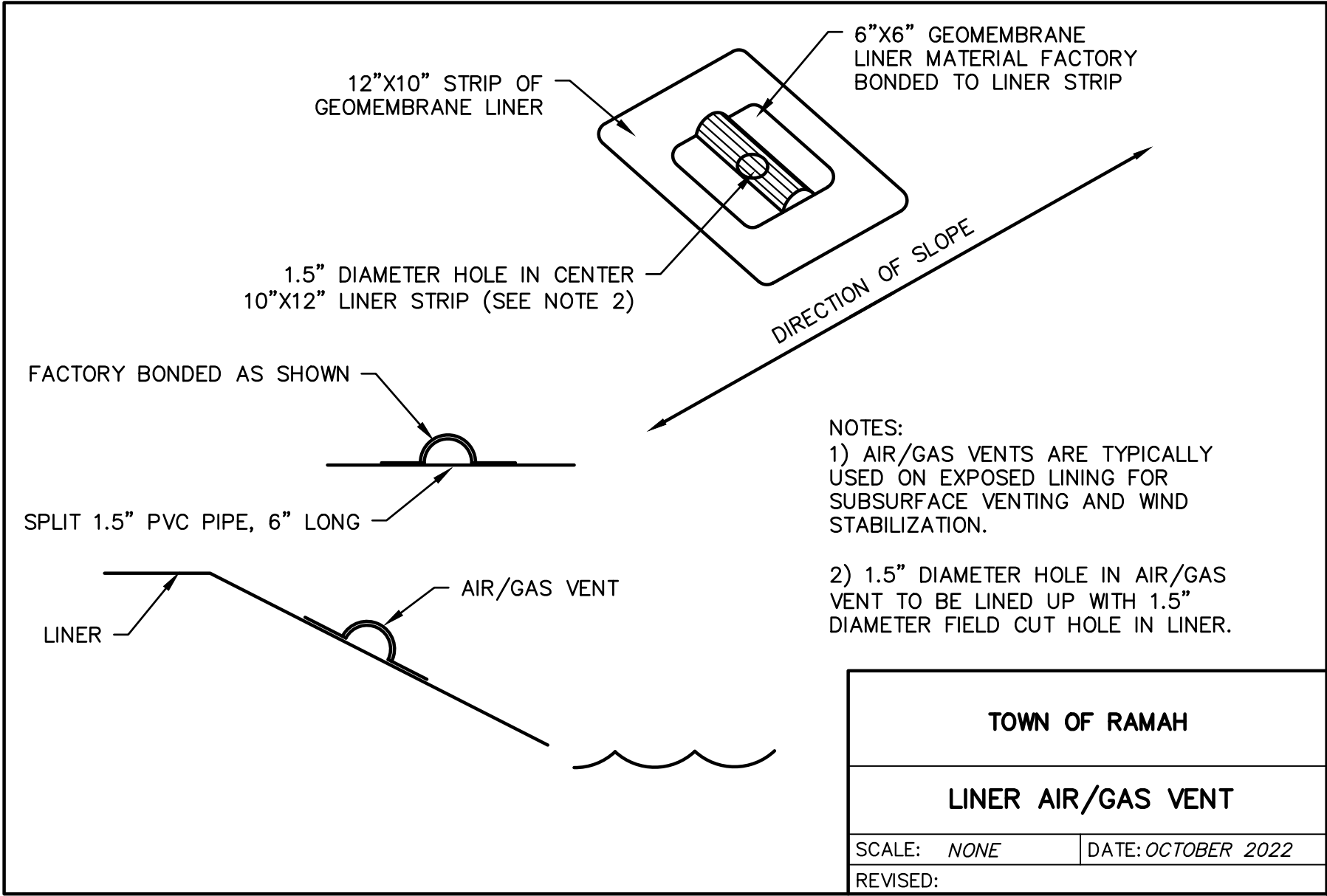
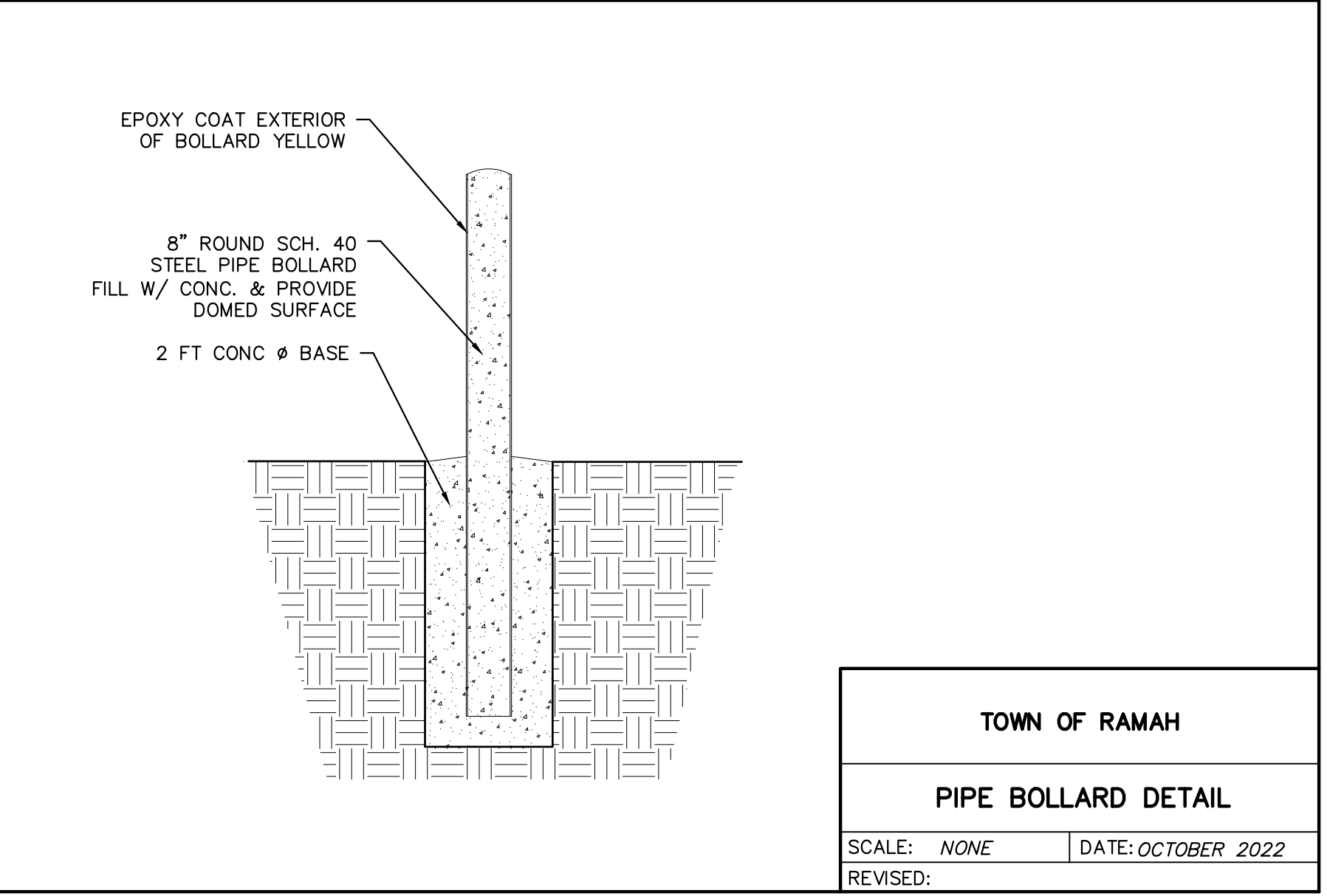
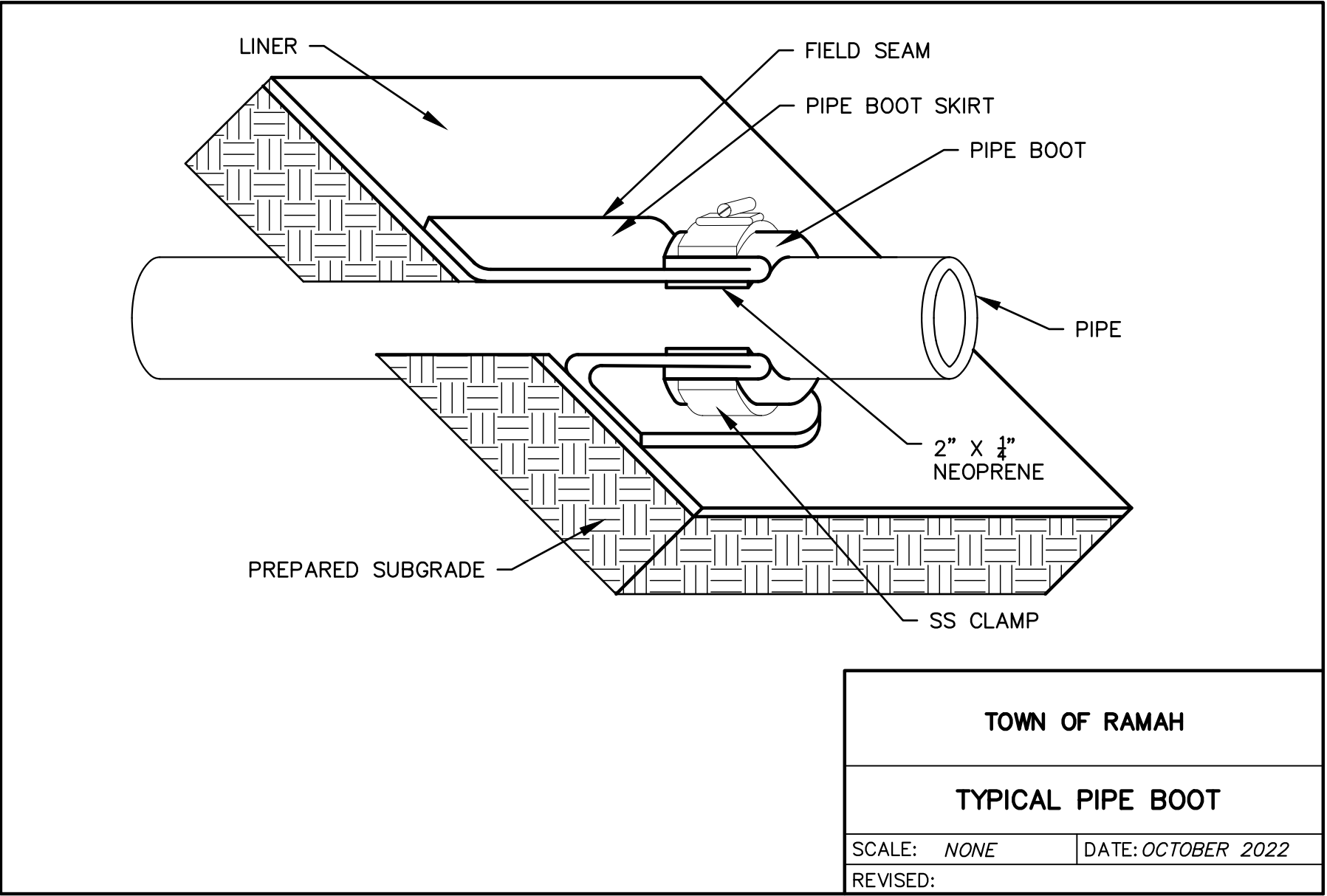
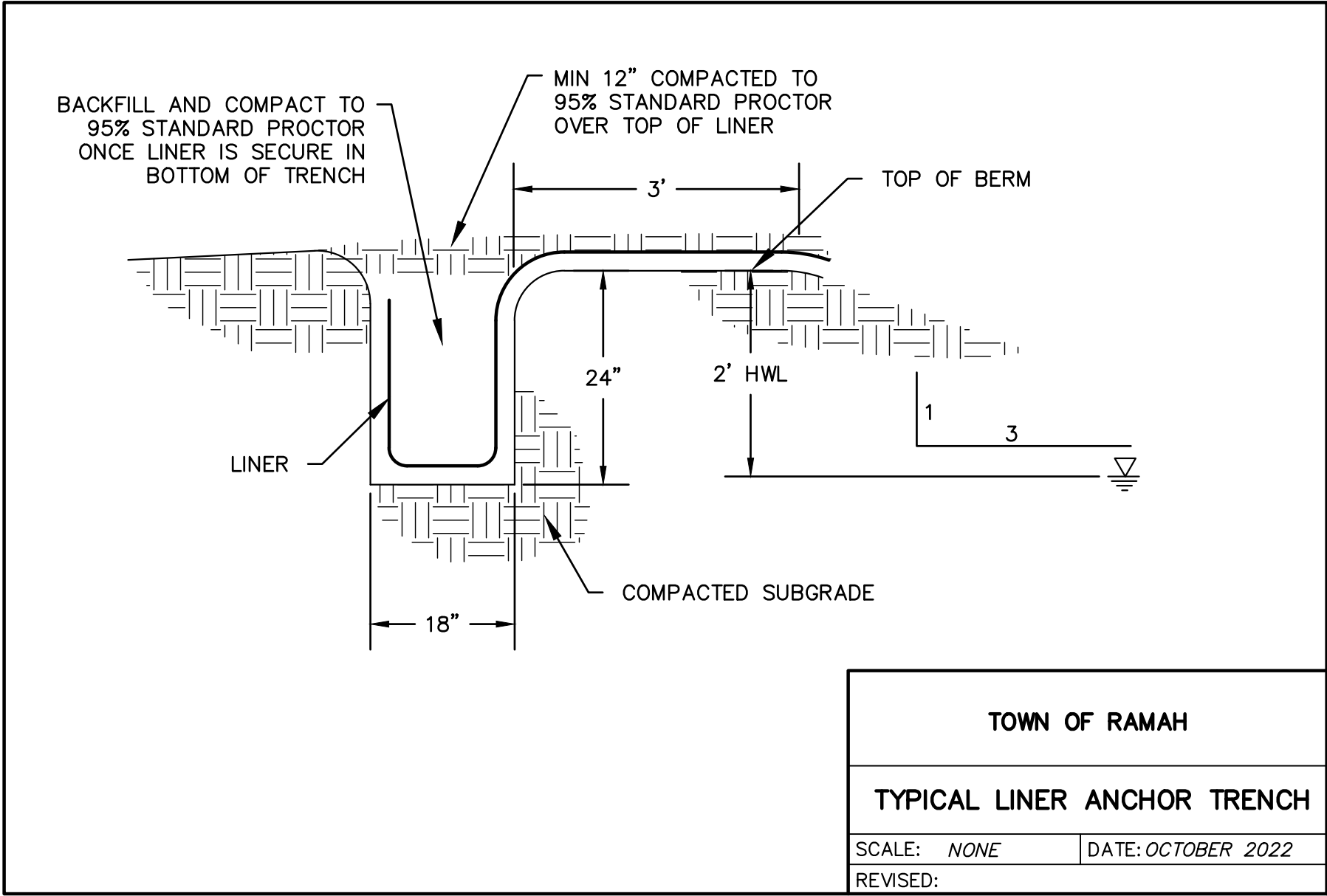




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WASTEWATER TREATMENT PLANT PLANS FOR BID
GENERAL DETAILS
TOWN OF RAMAH - PCD FILE NO. PPR2325 113 S. COMMERCIAL STREET RAMAH, CO 80832





REVISIONS	BY	DATE	DESCRIPTION

NO.	DESCRIPTION

WASTEWATER TREATMENT PLANT PLANS FOR BID

GENERAL DETAILS

TOWN OF RAMAH - BCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAMAH, CO 80832



STANDARD EROSION AND SEDIMENT CONTROL PLAN NOTES

GENERAL NOTES

- THE APPROVED EROSION CONTROL PLAN SHALL BE MAINTAINED FOR THE ENTIRE DURATION OF THIS PROJECT.
- THE CONTRACTOR IS RESPONSIBLE FOR IMPLEMENTING AND MAINTAINING EROSION AND SEDIMENT CONTROL MEASURES AT ALL TIMES DURING CONSTRUCTION.
- A THOROUGH INSPECTION OF THE STORMWATER MANAGEMENT PLAN BEST MANAGEMENT PRACTICES (BMPS) IS RECOMMENDED EVERY FOURTEEN (14) DAYS AND AFTER ANY PRECIPITATION OR SNOW MELT EVENT.
- PERIODIC INSPECTIONS SHALL ALSO INCLUDE INSPECTING EQUIPMENT FOR LEAKS AND REVIEWING EQUIPMENT MAINTENANCE PRACTICE. ALL INSPECTIONS AND MAINTENANCE SHALL BE DOCUMENTED BY THE PROJECT EROSION CONTROL SUPERVISOR AND MADE AVAILABLE TO THE OWNER AND CDPHE UPON REQUEST. ANY EROSION CONTROL BMP THAT HAS BEEN COMPROMISED OR HAS BEEN DISTURBED SHALL BE REPLACED OR RECONSTRUCTED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE ALL EROSION CONTROL BMPS IN PLACE AND EFFECTIVE PRIOR TO A STORM EVENT.
- THE STORMWATER MANAGEMENT PLAN LOG BOOK SHALL BE UPDATED EVERY FOURTEEN (14) DAYS. THIS LOG SHALL REMAIN ON SITE AVAILABLE FOR REVIEW BY SAGUACHE COUNTY AND CDPHE UPON REQUEST UNTIL AN INACTIVATION NOTICE FOR CONSTRUCTION STORMWATER DISCHARGE GENERAL PERMIT CERTIFICATION HAS BEEN OBTAINED. MAINTENANCE ACTIVITIES TO CORRECT PROBLEMS NOTED DURING INSPECTIONS MUST BE DOCUMENTED AND KEPT IN THE STORMWATER MANAGEMENT PLAN LOG BOOK.
- ALL STREETS WITHIN AND IMMEDIATELY SURROUNDING A CONSTRUCTION SITE SHALL BE CLEANED OF DIRT AND DEBRIS ON A WEEKLY BASIS. STREETS SHALL BE CLEANED BY SCRAPING AND SWEEPING THE DIRT OFF THE ROADWAYS. SCRAPED OR SWEEP MATERIAL SHALL NOT BE DEPOSITED IN THE STORM SEWER SYSTEM. DIRT TRACKED ONTO ROADWAYS AND OTHER PAVED SURFACES SHALL BE CLEANED UP BY THE END OF THE WORKDAY.
- ALL CONSTRUCTION SITE OPERATORS SHALL CONTROL WASTE SUCH AS DISCARDED BUILDING MATERIALS, CONCRETE TRUCK WASHOUT, HAZARDOUS CHEMICALS (TO INCLUDE BUT NOT LIMITED TO HEAVY EQUIPMENT MAINTENANCE FLUIDS, MOTOR OIL, ANTIFREEZE AND VEHICLE FUEL), LITTER, AND SANITARY WASTE AT THE CONSTRUCTION SITE THAT MAY CAUSE ADVERSE IMPACTS TO STORMWATER QUALITY
- ALL POTENTIAL POLLUTION SOURCES ON-SITE SHALL BE IDENTIFIED AND CONTROL MEASURES INSTALLED AND PRACTICED TO MINIMIZE THE LIKELIHOOD OF A RELEASE. REFER TO THE SPILL PREVENTION, CONTROL, AND COUNTERMEASURE (SPCC) PLAN FOR MEASURES TO RESPOND TO ANY SPILLS, LEAKS OR OTHER RELEASES.
- ALL PORTABLE TOILET FACILITIES SHALL BE LOCATED AWAY FROM GUTTERS, INLETS DITCHES, DRAINAGEWAYS, RECEIVING WATERS AND AREAS SUSCEPTIBLE TO FLOODING OR DAMAGE BY CONSTRUCTION EQUIPMENT.
- ALL PORTABLE TOILET FACILITIES SHALL BE SECURED IN PLACE BY STAKES INTO THE GROUND TO PREVENT TIPPING.
- STOCKPILES INCLUDING LANDSCAPING MATERIALS, EARTH MATERIALS AND DIRT FROM GRADING OR EXCAVATION SHALL NOT BE LOCATED ADJACENT TO WATERWAYS; SHALL BE STABILIZED WITHIN FOURTEEN (14) DAYS OF ESTABLISHMENT BY SURFACE ROUGHENING, SEEDING, AND MULCHING; AND SHALL NOT EXCEED TEN FEET IN HEIGHT.
- SLOPES 3:1 OR STEEPER SHALL BE PROTECTED WITH BIODEGRADABLE EROSION CONTROL BLANKETS.
- ALL MATERIAL IMPORTED TO OR EXPORTED FROM THE SITE SHALL BE PROPERLY COVERED TO PREVENT THE LOSS OF MATERIAL DURING TRANSPORT. HAUL ROUTES MUST BE PRE-APPROVED BY THE COUNTY. NO MATERIAL SHALL BE TRANSPORTED TO ANOTHER SITE WITHOUT FIRST OBTAINING A HAULING PERMIT FROM THE OWNER.
- THE CONCRETE WASHOUT CONTAINMENT STRUCTURE SHALL CONTAIN ALL WASHOUT WATER. STORMWATER SHALL NOT CARRY WASTES FROM WASHOUT LOCATION.
- THE CONCRETE WASHOUT CONTAINMENT STRUCTURE SHALL BE LOCATED A MINIMUM OF FIFTY (50) FEET HORIZONTAL FROM WATERS OF THE STATE. THE CONCRETE WASHOUT CONTAINMENT STRUCTURE SHALL BE SIGNED AS – CONCRETE WASHOUT.
- PERMANENT SOIL STABILIZATION MEASURES SHALL BE APPLIED WITHIN FOURTEEN (14) DAYS TO DISTURBED AREAS IN WHICH FINAL GRADE IS COMPLETED.

BMP MAINTENANCE NOTES

- IT IS ANTICIPATED THAT THE BMPS IMPLEMENTED AT THE SITE WILL HAVE TO BE MODIFIED TO ADAPT TO CHANGING CONDITIONS OR TO ENSURE THAT POTENTIAL POLLUTANTS ARE BEING PROPERLY MANAGED AT THE SITE.
- ALL INLET/OUTLET PROTECTIONS WILL BE CHECKED FOR MAINTENANCE AND FAILURE. SEDIMENT SHALL BE REMOVED AND PROPERLY DISPOSED OF ONCE IT HAS ACCUMULATED TO HALF THE DESIGN OF THE TRAP.
- ALL SPILLS SHALL BE CLEANED UP IMMEDIATELY AFTER DISCOVERY, OR CONTAINED UNTIL APPROPRIATE CLEANUP METHODS CAN BE EMPLOYED. MANUFACTURE'S RECOMMENDED METHODS FOR SPILL CLEANUP SHALL BE FOLLOWED, ALONG WITH PROPER DISPOSAL METHODS.
- EACH CONCRETE TRUCK OPERATOR SHALL BE AWARE OF THE DESIGNATED CONCRETE WASHOUT AREA.
- THE CONTRACTOR SHALL CHECK THE CAPACITY FOR ALL CONCRETE WASHOUT AREAS. WASTE MATERIALS MUST BE REMOVED BY THE CONTRACTOR AND LEGALLY DISPOSED OF WHEN ACCUMULATIONS AMOUNT TO TWO-THIRDS OF THE WET STORAGE CAPACITY OF THE STRUCTURE.
- ALL CONCRETE WASHOUT AREAS SHALL BE CLEARLY MARKED. THE CONCRETE WASHOUT CONTAINMENT DETAIL WILL INCLUDE ORANGE PLASTIC CONSTRUCTION FENCING OR EQUIVALENT AROUND THE WASHOUT STRUCTURE AND A SIGN POSTED WITH THE WORDS "CONCRETE WASHOUT".
- THE CONCRETE WASHOUT AREA SHALL BE REPAIRED AND/OR ENLARGED AS NECESSARY TO MAINTAIN CAPACITY FOR WASTED CONCRETE.
- AT THE END OF CONSTRUCTION, ALL CONCRETE SHALL BE REMOVED FROM THE SITE AND LEGALLY DISPOSED OF AT AN APPROVED WASTE SITE.
- ALL SEDIMENT SHALL BE REMOVED UPON INITIAL ACCEPTANCE FROM TEMPORARY SEDIMENT BASINS AND STORM SEWER FACILITIES, I.E., PIPES, OUTLETS AND INLETS. THIS SEDIMENT SHALL NOT BE FLUSHED OFF-SITE, BUT SHALL BE CAPTURED ON-SITE AND DISPOSED OF AT AN APPROVED LOCATION.
- INSPECT BMPS EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPS SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPS AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
- FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPS IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
- WHERE BMPS HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.

CHECK DAM INSTALLATION NOTES

- SEE PLAN VIEW FOR:
  - LOCATION OF CHECK DAMS
  - CHECK DAM TYPE (CHECK DAM OR REINFORCED CHECK DAM)
  - LENGTH (L), CREST LENGTH (CL), AND DEPTH (D)
- CHECK DAMS INDICATED ON INITIAL SWMP SHALL BE INSTALLED AFTER CONSTRUCTION FENCE, BUT PRIOR TO ANY UPSTREAM LAND DISTURBING ACTIVITIES.
- RIPRAP UTILIZED FOR CHECK DAMS SHOULD BE OF APPROPRIATE SIZE FOR THE APPLICATION. TYPICAL TYPES OF RIPRAP USED FOR CHECK DAMS ARE TYPE M (D50 12") OR TYPE L (D50 9").
- RIPRAP PAD SHALL BE TRENCHED INTO THE GROUND A MINIMUM OF 1'.
- THE ENDS OF THE CHECK DAM SHALL BE A MINIMUM OF 1'-6" HIGHER THAN THE CENTER OF THE CHECK DAM.

CHECK DAM MAINTENANCE NOTES

- SEDIMENT ACCUMULATED UPSTREAM OF THE CHECK DAMS SHALL BE REMOVED WHEN THE SEDIMENT DEPTH IS WITHIN ½ OF THE HEIGHT OF THE CREST.
- CHECK DAMS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.
- WHEN CHECK DAMS ARE REMOVED, EXCAVATIONS SHALL BE FILLED WITH SUITABLE COMPACTED BACKFILL. DISTURBED AREA SHALL BE SEEDED AND MULCHED AND COVERED WITH GEOTEXTILE OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.

CULVERT INLET PROTECTION INSTALLATION NOTES

- SEE PLAN VIEW FOR LOCATION OF CULVERT INLET PROTECTION
- SEE ROCK SOCK DESIGN DETAIL FOR ROCK GRADATION REQUIREMENTS AND JOINTING DETAIL.

CULVERT INLET PROTECTION MAINTENANCE NOTES

- SEDIMENT ACCUMULATED UPSTREAM OF THE CULVERT SHALL BE REMOVED WHEN THE SEDIMENT DEPTH IS ½ THE HEIGHT OF THE ROCK SOCK.
- CULVERT INLET PROTECTION SHALL REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS PERMANENTLY STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.

EARTH DIKE AND DRAINAGE SWALE INSTALLATION NOTES

- SEE SITE PLAN FOR:
  - LOCATION OF DIVERSION SWALE
  - TYPE OF SWALE (UNLINED, COMPACTED AND/OR LINED)
  - LENGTH OF EACH SWALE
  - DEPTH, D, AND WIDTH, W DIMENSIONS
  - FOR ECB/TRM LINED DITCH, SEE ECB DETAIL
  - FOR RIPRAP LINED DITCH, SIZE OF RIPRAP, D50
- SEE DRAINAGE PLANS FOR DETAILS OF PERMANENT CONVEYANCE FACILITIES AND/OR DIVERSION SWALES EXCEEDING 2-YEAR FLOW RATE OR 10 CFS.
- EARTH DIKES AND SWALES INDICATED ON SWMP SHALL BE INSTALLED PRIOR TO LAND-DISTURBING ACTIVITIES IN PROXIMITY.
- EMBANKMENT IS TO BE COMPACTED TO 90% OF MAXIMUM DENSITY AND WITHIN 2% OF OPTIMUM MOISTURE CONTENT ACCORDING TO ASTM D698.
- SWALES ARE TO DRAIN TO A SEDIMENT CONTROL BMP.
- FOR LINED DITCHES, INSTALLATION OF ECB/TRM SHALL CONFORM TO THE REQUIREMENTS OF THE ECB DETAIL.
- WHEN CONSTRUCTION TRAFFIC MUST CROSS A DIVERSION SWALE, INSTALL A TEMPORARY CULVERT WITH A MINIMUM DIAMETER OF 12 INCHES.

EARTH DIKE AND DRAINAGE SWALE MAINTENANCE NOTES

- SWALES SHALL REMAIN IN PLACE UNTIL THE END OF CONSTRUCTION; IF APPROVED BY LOCAL JURISDICTION, SWALES MAY BE LEFT IN PLACE.
- WHEN A SWALE IS REMOVED, THE DISTURBED AREA SHALL BE COVERED WITH TOPSOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY LOCAL JURISDICTION.

EROSION CONTROL BLANKET INSTALLATION NOTES

- SEE PLAN VIEW FOR:
  - LOCATION OF ECB
  - TYPE OF ECB (STRAW, STRAW-COCONUT, COCONUT, OR ECESLOR)
  - AREA, A, IN SQUARE YARDS OF EACH TYPE OF ECB
- 100% NATURAL AND BIODEGRADABLE MATERIALS ARE PREFERRED FOR RECPS, ALTHOUGH SOME JURISDICTIONS MAY ALLOW OTHER MATERIALS IN SOME APPLICATIONS.
- IN AREAS WHERE ECBs ARE SHOWN ON THE PLANS, THE PERMITTEE SHALL PLACE TOPSOIL AND PERFORM FINAL GRADING, SURFACE PREPARATION, AND SEEDING AND MULCHING. SUBGRADE SHALL BE SMOOTH AND MOIST PRIOR TO ECB INSTALLATION AND THE ECB SHALL BE IN FULL CONTACT WITH SUBGRADE. NO GAPS OR VOIDS SHALL EXIST UNDER THE BLANKET.
- PERIMETER ANCHOR TRENCH SHALL BE USED ALONG THE OUTSIDE PERIMETER OF ALL BLANKET AREAS.
- JOINT ANCHOR TRENCH SHALL BE USED TO JOIN ROLLS OF ECBs TOGETHER (LONGITUDINALLY AND TRANSVERSELY) FOR ALL ECBs EXCEPT STRAW WHICH MAY USE AN OVERLAPPING JOINT.
- INTERMEDIATE ANCHOR TRENCH SHALL BE USED AT SPACING OF ONE-HALF ROLL LENGTH FOR COCONUT AND EXCELSIOR ECBs.
- OVERLAPPING JOINT DETAIL SHALL BE USED TO JOIN ROLLS OF ECBs TOGETHER FOR ECBs ON SLOPES.
- MATERIAL SPECIFICATIONS OF ECBs SHALL CONFORM TO TABLE ECB-1.
- ANY AREAS OF SEEDING AND MULCHING DISTURBED IN THE PROCESS OF INSTALLING ECBs SHALL BE RESEEDD AND MULCHED.
- DETAILS ON DESIGN PLANS FOR MAJOR DRAINAGEWAY STABILIZATION WILL GOVERN IF DIFFERENT FROM THOSE SHOWN HERE.

EROSION CONTROL BLANKET MAINTENANCE NOTES

- ECBS SHALL BE LEFT IN PLACE TO EVENTUALLY BIODEGRADE, UNLESS REQUESTED TO BE REMOVED BY THE LOCAL JURISDICTION.
- ANY ECB PULLED OUT, TORN, OR OTHERWISE DAMAGED SHALL BE REPAIRED OR REINSTALLED. ANY SUBGRADE AREAS BELOW THE GEOTEXTILE THAT HAVE ERODED TO CREATE A VOID UNDER THE BLANKET, OR THAT REMAIN DEVOID OF GRASS SHALL BE REPAIRED, RESEEDD, AND MULCHED AND THE ECB REINSTALLED.

SILT FENCE INSTALLATION NOTES

- SILT FENCE MUST BE PLACED AWAY FROM THE TOE OF THE SLOPE TO ALLOW FOR WATER PONDING. SILT FENCE AT THE TOW OF A SLOPE SHOULD BE INSTALLED IN A FLAT LOCATION AT LEAST SEVERAL FEET (2-5 FT) FROM THE TOW OF THE SLOPE TO ALLOW ROOM FOR PONDING AND DEPOSITION.
- A UNIFORM 6" X 4" ANCHOR TRENCH SHALL BE EXCAVATED USING TRENCHER OR SILT FENCE INSTALLATION DEVICE. NO ROAD GRADERS, BACKHOES, OR SIMILAR EQUIPMENT SHALL BE USED.
- COMPACT ANCHOR TRENCH BY HAND WITH A "JUMPING JACK" OR BY WHEEL ROLLING. COMPACTION SHALL BE SUCH THAT SILT FENCE RESISTS BEING PULLED OUT OF ANCHOR TRENCH BY HAND.
- SILT FENCE SHALL BE PULLED TIGHT AS IT IS ANCHORED TO THE STAKES. THERE SHOULD BE NO NOTICEABLE SAG BETWEEN STAKES AFTER IT HAS BEEN ANCHORED TO THE STAKES.
- SILT FENCE FABRIC SHALL BE ANCHORED TO THE STAKES USING 1" HEAVY DUTY STAPLES OR NAILS WITH 1" HEADS. STAPLES AND NAILS SHOULD BE PLACED 3" ALONG THE FABRIC DOWN THE STAKE.
- AT THE END OF A RUN OF SILT FENCE ALONG A CONTOUR, THE SILT FENCE SHOULD BE TURNED PERPENDICULAR TO THE CONTOUR TO CREATE A "J-HOOK". THE "J-HOOK" EXTENDING PERPENDICULAR TO THE CONTOUR SHOULD BE OF SUFFICIENT LENGTH TO KEEP RUNOFF FROM FLOWING AROUND THE END OF THE SILT FENCE (TYPICALLY 10' - 20').
- SILT FENCE SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.

SILT FENCE MAINTENANCE NOTES

- SEDIMENT ACCUMULATED UPSTREAM OF THE SILT FENCE SHALL BE REMOVED AS NEEDED TO MAINTAIN THE FUNCTIONALITY OF THE BMP, TYPICALLY WHEN DEPTH OF ACCUMULATED SEDIMENTS IS APPROXIMATELY 6".
- REPAIR OR REPLACE SILT FENCE WHEN THERE ARE SIGNS OF WEAR, SUCH AS SAGGING, TEARING, OR COLLAPSE.
- SILT FENCE IS TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND APPROVED BY THE LOCAL JURISDICTION, OR IS REPLACED BY AN EQUIVALENT PERIMETER SEDIMENT CONTROL BMP.
- WHEN SILT FENCE IS REMOVED, ALL DISTURBED AREAS SHALL BE COVERED WITH TOPSOIL, SEEDED, AND MULCHED OR OTHERWISE STABILIZED AS APPROVED BY LOCAL JURISDICTION.

STABILIZED STAGING AREA INSTALLATION NOTES

- SEE PLAN VIEW FOR:
  - LOCATION OF STAGING AREA(S)
  - CONTRACTOR MAY ADJUST LOCATION AND SIZE OF STAGING AREA WITH APPROVAL FROM THE LOCAL JURISDICTION
- STABILIZED STAGING AREA SHOULD BE APPROPRIATE FOR THE NEEDS OF THE SITE. OVERSIZING RESULTS IN A LARGER AREA TO STABILIZE FOLLOWING CONSTRUCTION.
- STAGING AREA SHALL BE STABILIZED PRIOR TO OTHER OPERATIONS ON THE SITE.
- THE STABILIZED STAGING AREA SHALL CONSIST OF A MINIMUM 3" THINK GRANULAR MATERIAL.
- UNLESS OTHERWISE SPECIFIED BY LOCAL JURISDICTION, ROCK SHALL CONSIST OF DOT SECT. #703, AASHTO #3 COARSE AGGREGATE OR 6" (MINUS) ROCK.
- ADDITIONAL PERIMETER BMPS MAY BE REQUIRED INCLUDING BUT NOT LIMITED TO SILT FENCE AND CONSTRUCTION FENCING.

STABILIZED STAGING AREA MAINTENANCE NOTES

- ROCK SHALL BE REAPPLIED OR REGRADED AS NECESSARY IF RUTTING OCCURS OR UNDERLYING SUBGRADE BECOMES EXPOSED.
- STABILIZED STAGING AREA SHALL BE ENLARGED IF NECESSARY TO CONTAIN PARKING, STORAGE, AND UNLOADING/LOADING OPERATIONS.
- THE STABILIZED STAGING AREA SHALL BE REMOVED AT THE END OF CONSTRUCTION. THE GRANULAR MATERIAL SHALL BE REMOVED OR, IF APPROVED BY THE LOCAL JURISDICTION, USED ON SITE, AND THE AREA COVERED WITH TOPSOIL, SEEDED, AND MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY LOCAL JURISDICTION.
- NOTE: MANY MUNICIPALITIES PROHIBIT THE USE OF RECYCLED CONCRETE AS GRANULAR MATERIAL FOR STABILIZED STAGING AREAS DUE TO DIFFICULTIES WITH RE-ESTABLISHMENT OF VEGETATION IN AREAS WHERE RECYCLED CONCRETE WAS PLACED.

STABILIZED CONSTRUCTION ENTRANCE/EXIT INSTALLATION NOTES

- SEE PLAN VIEW FOR:
  - LOCATION OF CONSTRUCTION ENTRANCE(S)/EXIT(S)
  - TYPE OF CONSTRUCTION ENTRANCE(S)/EXIT(S) (WITH/WITHOUT WHEEL WASH, CONSTRUCTION MAT OR TRM)
- CONSTRUCTION MAT OR TRM STABILIZED CONSTRUCTION ENTRANCES ARE ONLY TO BE USED ON SHORT DURATION PROJECTS (TYPICALLY RANGING FROM A WEEK TO A MONTH) WHERE THERE WILL BE LIMITED VEHICULAR ACCESS.
- A STABILIZED CONSTRUCTION ENTRANCE/EXIT SHALL BE LOCATED AT ALL ACCESS POINTS WHERE VEHICLES ACCESS THE CONSTRUCTION SITE FROM PAVED RIGHT-OF-WAYS.
- STABILIZED CONSTRUCTION ENTRANCE/EXIT SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.
- A NON-WOVEN GEOTEXTILE FABRIC SHALL BE PLACED UNDER THE STABILIZED CONSTRUCTION ENTRANCE/EXIT PRIOR TO THE PLACEMENT OF ROCK.
- UNLESS OTHERWISE SPECIFIED BY LOCAL JURISDICTION, ROCK SHALL CONSIST OF DOT SECT. #703, AASHTO #3 COARSE AGGREGATE OR 6" (MINUS) ROCK.

STABILIZED CONSTRUCTION ENTRANCE/EXIT MAINTENANCE NOTES

- ROCK SHALL BE REAPPLIED OR REGRADED AS NECESSARY TO THE STABILIZED ENTRANCE/EXIT TO MAINTAIN A CONSISTENT DEPTH.
- SEDIMENT TRACKED ONTO PAVED ROADS IS TO BE REMOVED THROUGHOUT THE DAY AND AT THE END OF THE DAY BY SHOVELING OR SWEEPING. SEDIMENT MAY NOT BE WASHED DOWN STORM SEWER DRAINS.

APPLICATION, CONTROL MEASURE	CONTROL MEASURE IMPLEMENTATION PHASE		
	INITIAL ACTIVITIES	INTERIM ACTIVITIES	PERMANENT STABILIZATION
SILT FENCE OR SEDIMENT CONTROL LOGS		X	
CULVERT INLET PROTECTION	X	X	X
CONCRETE WASHOUT AREAS		X	
VEHICLE TRACKING CONTROL	X		
STABILIZED STAGING AREA	X	X	
STOCKPILE MANAGEMENT	X	X	
ROCK SOCKS	X	X	
PERMANENT SEEDING AND MULCHING/HYDROSEED			X
EROSION CONTROL BLANKET	X	X	X
SURFACE ROUGHENING		X	
STREET SWEEPING	X	X	
WIND EROSION/DUST CONTROL	X	X	
MINIMIZE SOIL COMPACTION	X	X	
CONSTRUCTION PHASING	X	X	
COVER STOCKPILES AND STORED MATERIALS/CHEMICALS	X	X	
DESIGNATED AREAS	X	X	
PESTICIDES AND FERTILIZERS	X	X	
CHECK DAMS			X

CONSTRUCTION CONTRACTOR IS RESPONSIBLE FOR FINAL STABILIZATION UNTIL 70% VEGETATION IS ACHIEVED.

ELEMENTENGINEERING LLC



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LAKEWOOD, CO 80226

720.749.4165  
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REVIEWS	DESCRIPTION	NO	DATE	BY

WASTEWATER TREATMENT PLANT PLANS FOR BID

EROSION CONTROL DETAILS

TOWN OF RAWAH – RCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAWAH, CO 80832

PREPARED UNDER THE DIRECT SUPERVISION OF



FOR AND ON BEHALF OF  
ELEMENT ENGINEERING, LLC

DATE  
JANUARY 2024

JOB NUMBER  
0043.0001

SCALE  
NTS

EDITION  
BIDDING

SHEET  
C29 OF C31



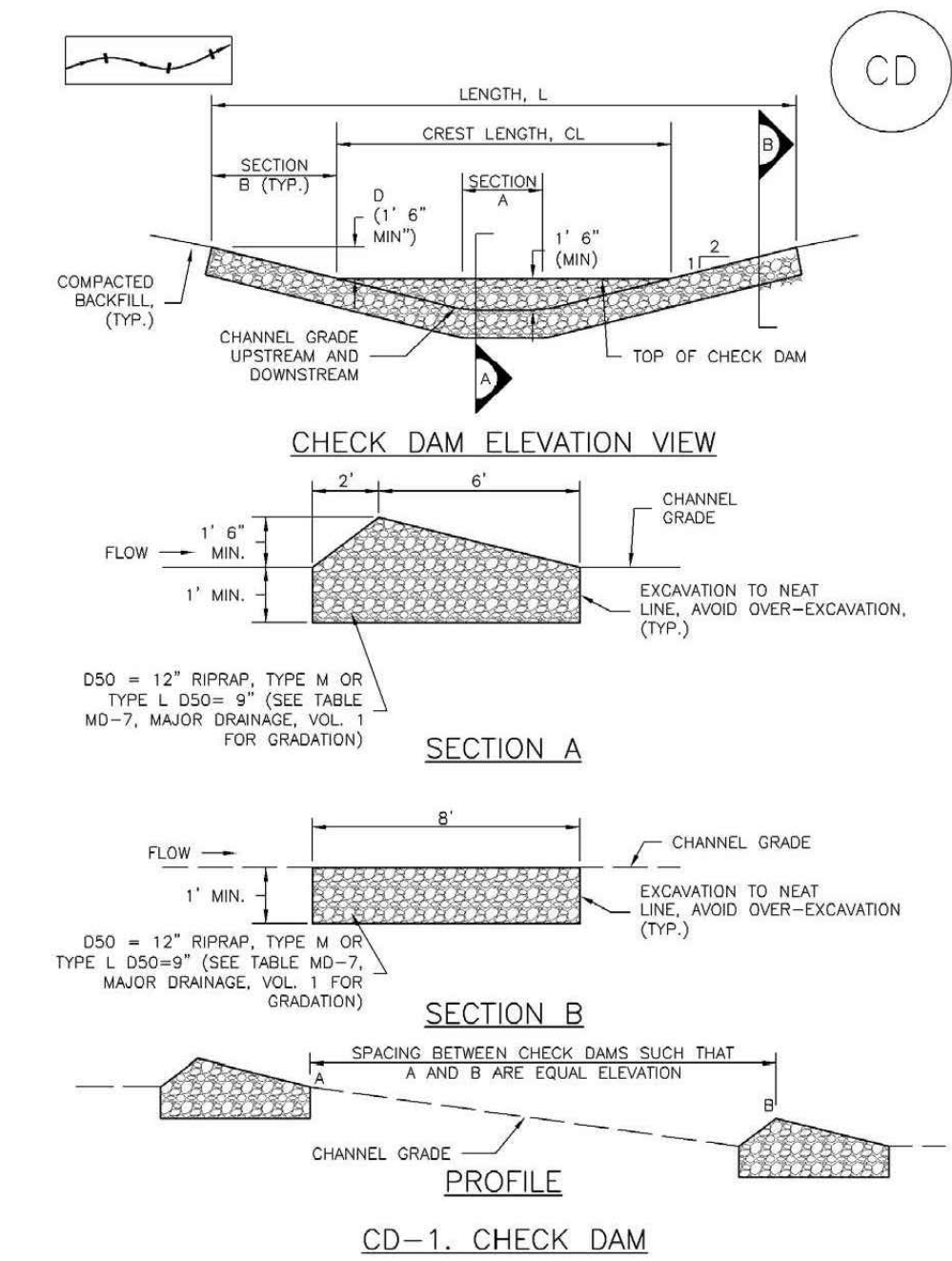
STANDARD NOTES FOR EL PASO COUNTY GRADING AND EROSION CONTROL PLANS

- STORMWATER DISCHARGES FROM CONSTRUCTION SITES SHALL NOT CAUSE OR THREATEN TO CAUSE POLLUTION, CONTAMINATION, OR DEGRADATION OF STATE WATERS. ALL WORK AND EARTH DISTURBANCE SHALL BE DONE IN A MANNER THAT MINIMIZES POLLUTION OF ANY ON-SITE OR OFF-SITE WATERS, INCLUDING WETLANDS.
- NOTWITHSTANDING ANYTHING DEPICTED IN THESE PLANS IN WORDS OR GRAPHIC REPRESENTATION, ALL DESIGN AND CONSTRUCTION RELATED TO ROADS, STORM DRAINAGE AND EROSION CONTROL SHALL CONFORM TO THE STANDARDS AND REQUIREMENTS OF THE MOST RECENT VERSION OF THE RELEVANT ADOPTED EL PASO COUNTY STANDARDS, INCLUDING THE LAND DEVELOPMENT CODE, THE ENGINEERING CRITERIA MANUAL, THE DRAINAGE CRITERIA MANUAL, AND THE DRAINAGE CRITERIA MANUAL VOLUME 2. ANY DEVIATIONS FROM REGULATIONS AND STANDARDS MUST BE REQUESTED, AND APPROVED, IN WRITING.
- A SEPARATE STORMWATER MANAGEMENT PLAN (SWMP) FOR THIS PROJECT SHALL BE COMPLETED AND AN EROSION AND STORMWATER QUALITY CONTROL PERMIT (ESQCP) ISSUED PRIOR TO COMMENCING CONSTRUCTION. MANAGEMENT OF THE SWMP DURING CONSTRUCTION IS THE RESPONSIBILITY OF THE DESIGNATED QUALIFIED STORMWATER MANAGER OR CERTIFIED EROSION CONTROL INSPECTOR. THE SWMP SHALL BE LOCATED ON SITE AT ALL TIMES DURING CONSTRUCTION AND SHALL BE KEPT UP TO DATE WITH WORK PROGRESS AND CHANGES IN THE FIELD.
- ONCE THE ESQCP IS APPROVED AND A "NOTICE TO PROCEED" HAS BEEN ISSUED, THE CONTRACTOR MAY INSTALL THE INITIAL STAGE EROSION AND SEDIMENT CONTROL MEASURES AS INDICATED ON THE APPROVED GEC. A PRECONSTRUCTION MEETING BETWEEN THE CONTRACTOR, ENGINEER, AND EL PASO COUNTY WILL BE HELD PRIOR TO ANY CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE APPLICANT TO COORDINATE THE MEETING TIME AND PLACE WITH COUNTY STAFF.
- CONTROL MEASURES MUST BE INSTALLED PRIOR TO COMMENCEMENT OF ACTIVITIES THAT COULD CONTRIBUTE POLLUTANTS TO STORMWATER. CONTROL MEASURES FOR ALL SLOPES, CHANNELS, DITCHES, AND DISTURBED LAND AREAS SHALL BE INSTALLED IMMEDIATELY UPON COMPLETION OF THE DISTURBANCE.
- ALL TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES SHALL BE MAINTAINED AND REMAIN IN EFFECTIVE OPERATING CONDITION UNTIL PERMANENT SOIL EROSION CONTROL MEASURES ARE IMPLEMENTED AND FINAL STABILIZATION IS ESTABLISHED. ALL PERSONS ENGAGED IN LAND DISTURBANCE ACTIVITIES SHALL ASSESS THE ADEQUACY OF CONTROL MEASURES AT THE SITE AND IDENTIFY IF CHANGES TO THOSE CONTROL MEASURES ARE NEEDED TO ENSURE THE CONTINUED EFFECTIVE PERFORMANCE OF THE CONTROL MEASURES. ALL CHANGES TO TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES MUST BE INCORPORATED INTO THE STORMWATER MANAGEMENT PLAN.
- TEMPORARY STABILIZATION SHALL BE IMPLEMENTED ON DISTURBED AREAS AND STOCKPILES WHERE GROUND DISTURBING CONSTRUCTION ACTIVITY HAS PERMANENTLY CEASED OR TEMPORARILY CEASED FOR LONGER THAN 14 DAYS.
- FINAL STABILIZATION MUST BE IMPLEMENTED AT ALL APPLICABLE CONSTRUCTION SITES. FINAL STABILIZATION IS ACHIEVED WHEN ALL GROUND DISTURBING ACTIVITIES ARE COMPLETE AND ALL DISTURBED AREAS EITHER HAVE A UNIFORM VEGETATIVE COVER WITH INDIVIDUAL PLANT DENSITY OF 70 PERCENT OF PRE-DISTURBANCE LEVELS ESTABLISHED OR EQUIVALENT PERMANENT ALTERNATIVE STABILIZATION METHOD IS IMPLEMENTED. ALL TEMPORARY SEDIMENT AND EROSION CONTROL MEASURES SHALL BE REMOVED UPON FINAL STABILIZATION AND BEFORE PERMIT CLOSURE.
- ALL PERMANENT STORMWATER MANAGEMENT FACILITIES SHALL BE INSTALLED AS DESIGNED IN THE APPROVED PLANS. ANY PROPOSED CHANGES THAT AFFECT THE DESIGN OR FUNCTION OF PERMANENT STORMWATER MANAGEMENT STRUCTURES MUST BE APPROVED BY THE ECM ADMINISTRATOR PRIOR TO IMPLEMENTATION.
- EARTH DISTURBANCES SHALL BE CONDUCTED IN SUCH A MANNER SO AS TO EFFECTIVELY MINIMIZE ACCELERATED SOIL EROSION AND RESULTING SEDIMENTATION. ALL DISTURBANCES SHALL BE DESIGNED, CONSTRUCTED, AND COMPLETED SO THAT THE EXPOSED AREA OF ANY DISTURBED LAND SHALL BE LIMITED TO THE SHORTEST PRACTICAL PERIOD OF TIME. PRE-EXISTING VEGETATION SHALL BE PROTECTED AND MAINTAINED WITHIN 50 HORIZONTAL FEET OF A WATERS OF THE STATE UNLESS SHOWN TO BE INFEASIBLE AND SPECIFICALLY REQUESTED AND APPROVED.
- COMPACTION OF SOIL MUST BE PREVENTED IN AREAS DESIGNATED FOR INFILTRATION CONTROL MEASURES OR WHERE FINAL STABILIZATION WILL BE ACHIEVED BY VEGETATIVE COVER. AREAS DESIGNATED FOR INFILTRATION CONTROL MEASURES SHALL ALSO BE PROTECTED FROM SEDIMENTATION DURING CONSTRUCTION UNTIL FINAL STABILIZATION IS ACHIEVED. IF COMPACTION PREVENTION IS NOT FEASIBLE DUE TO SITE CONSTRAINTS, ALL AREAS DESIGNATED FOR INFILTRATION AND VEGETATION CONTROL MEASURES MUST BE LOOSENEED PRIOR TO INSTALLATION OF THE CONTROL MEASURE(S).
- ANY TEMPORARY OR PERMANENT FACILITY DESIGNED AND CONSTRUCTED FOR THE CONVEYANCE OF STORMWATER AROUND, THROUGH, OR FROM THE EARTH DISTURBANCE AREA SHALL BE A STABILIZED CONVEYANCE DESIGNED TO MINIMIZE EROSION AND THE DISCHARGE OF SEDIMENT OFF SITE.
- CONCRETE WASH WATER SHALL BE CONTAINED AND DISPOSED OF IN ACCORDANCE WITH THE SWMP. NO WASH WATER SHALL BE DISCHARGED TO OR ALLOWED TO ENTER STATE WATERS, INCLUDING ANY SURFACE OR SUBSURFACE STORM DRAINAGE SYSTEM OR FACILITIES. CONCRETE WASHOUTS SHALL NOT BE LOCATED IN AN AREA WHERE SHALLOW GROUNDWATER MAY BE PRESENT, OR WITHIN 50 FEET OF A SURFACE WATER BODY, CREEK OR STREAM.
- DURING DEWATERING OPERATIONS OF UNCONTAMINATED GROUND WATER MAY BE DISCHARGED ON SITE, BUT SHALL NOT LEAVE THE SITE IN THE FORM OF SURFACE RUNOFF UNLESS AN APPROVED STATE DEWATERING PERMIT IS IN PLACE.
- EROSION CONTROL BLANKETING OR OTHER PROTECTIVE COVERING SHALL BE USED ON SLOPES STEEPER THAN 3:1.
- CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL WASTES FROM THE CONSTRUCTION SITE FOR DISPOSAL IN ACCORDANCE WITH LOCAL AND STATE REGULATORY REQUIREMENTS. NO CONSTRUCTION DEBRIS, TREE SLASH, BUILDING MATERIAL WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURIED, DUMPED, OR DISCHARGED AT THE SITE.
- WASTE MATERIALS SHALL NOT BE TEMPORARILY PLACED OR STORED IN THE STREET, ALLEY, OR OTHER PUBLIC WAY, UNLESS IN ACCORDANCE WITH AN APPROVED TRAFFIC CONTROL PLAN. CONTROL MEASURES MAY BE REQUIRED BY EL PASO COUNTY ENGINEERING IF DEEMED NECESSARY, BASED ON SPECIFIC CONDITIONS AND CIRCUMSTANCES.
- TRACKING OF SOILS AND CONSTRUCTION DEBRIS OFF-SITE SHALL BE MINIMIZED. MATERIALS TRACKED OFF-SITE SHALL BE CLEANED UP AND PROPERLY DISPOSED OF IMMEDIATELY.
- THE OWNER/DEVELOPER SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL CONSTRUCTION DEBRIS, DIRT, TRASH, ROCK, SEDIMENT, SOIL, AND SAND THAT MAY ACCUMULATE IN ROADS, STORM DRAINS AND OTHER DRAINAGE CONVEYANCE SYSTEMS AND STORMWATER APPURTENANCES AS A RESULT OF SITE DEVELOPMENT.
- THE QUANTITY OF MATERIALS STORED ON THE PROJECT SITE SHALL BE LIMITED, AS MUCH AS PRACTICAL, TO THAT QUANTITY REQUIRED TO PERFORM THE WORK IN AN ORDERLY SEQUENCE. ALL MATERIALS STORED ON-SITE SHALL BE STORED IN A NEAT, ORDERLY MANNER, IN THEIR ORIGINAL CONTAINERS, WITH ORIGINAL MANUFACTURER'S LABELS.

- NO CHEMICAL(S) HAVING THE POTENTIAL TO BE RELEASED IN STORMWATER ARE TO BE STORED OR USED ONSITE UNLESS PERMISSION FOR THE USE OF SUCH CHEMICAL(S) IS GRANTED IN WRITING BY THE ECM ADMINISTRATOR. IN GRANTING APPROVAL FOR THE USE OF SUCH CHEMICAL(S), SPECIAL CONDITIONS AND MONITORING MAY BE REQUIRED.
- BULK STORAGE OF ALLOWED PETROLEUM PRODUCTS OR OTHER ALLOWED LIQUID CHEMICALS IN EXCESS OF 55 GALLONS SHALL REQUIRE ADEQUATE SECONDARY CONTAINMENT PROTECTION TO CONTAIN ALL SPILLS ONSITE AND TO PREVENT ANY SPILLED MATERIALS FROM ENTERING STATE WATERS, ANY SURFACE OR SUBSURFACE STORM DRAINAGE SYSTEM OR OTHER FACILITIES.
- NO PERSON SHALL CAUSE THE IMPEDIMENT OF STORMWATER FLOW IN THE CURB AND GUTTER OR DITCH EXCEPT WITH APPROVED SEDIMENT CONTROL MEASURES.
- OWNER/DEVELOPER AND THEIR AGENTS SHALL COMPLY WITH THE "COLORADO WATER QUALITY CONTROL ACT" (TITLE 25, ARTICLE 8, CRS), AND THE "CLEAN WATER ACT" (33 USC 1344), IN ADDITION TO THE REQUIREMENTS OF THE LAND DEVELOPMENT CODE, DCM VOLUME II AND THE ECM APPENDIX I. ALL APPROPRIATE PERMITS MUST BE OBTAINED BY THE CONTRACTOR PRIOR TO CONSTRUCTION (1041, NPDES, FLOODPLAIN, 404, FUGITIVE DUST, ETC.). IN THE EVENT OF CONFLICTS BETWEEN THESE REQUIREMENTS AND OTHER LAWS, RULES, OR REGULATIONS OF OTHER FEDERAL, STATE, LOCAL, OR COUNTY AGENCIES, THE MOST RESTRICTIVE LAWS, RULES, OR REGULATIONS SHALL APPLY.
- ALL CONSTRUCTION TRAFFIC MUST ENTER/EXIT THE SITE ONLY AT APPROVED CONSTRUCTION ACCESS POINTS.
- PRIOR TO CONSTRUCTION THE PERMITTEE SHALL VERIFY THE LOCATION OF EXISTING UTILITIES.
- A WATER SOURCE SHALL BE AVAILABLE ON SITE DURING EARTHWORK OPERATIONS AND SHALL BE UTILIZED AS REQUIRED TO MINIMIZE DUST FROM EARTHWORK EQUIPMENT AND WIND.
- THE SOILS REPORT FOR THIS SITE HAS BEEN PREPARED BY KUMAR AND ASSOCIATES ON JANUARY 6TH, 2023 AND SHALL BE CONSIDERED A PART OF THESE PLANS.
- AT LEAST TEN (10) DAYS PRIOR TO THE ANTICIPATED START OF CONSTRUCTION, FOR PROJECTS THAT WILL DISTURB ONE (1) ACRE OR MORE, THE OWNER OR OPERATOR OF CONSTRUCTION ACTIVITY SHALL SUBMIT A PERMIT APPLICATION FOR STORMWATER DISCHARGE TO THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT, WATER QUALITY DIVISION. THE APPLICATION CONTAINS CERTIFICATION OF COMPLETION OF A STORMWATER MANAGEMENT PLAN (SWMP), OF WHICH THIS GRADING AND EROSION CONTROL PLAN MAY BE A PART. FOR INFORMATION OR APPLICATION MATERIALS CONTACT:  
  
COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT  
WATER QUALITY CONTROL DIVISION  
WOOD – PERMITS  
4300 CHERRY CREEK DRIVE SOUTH  
DENVER, CO 80246-1530  
ATTN: PERMITS UNIT

Check Dams (CD)

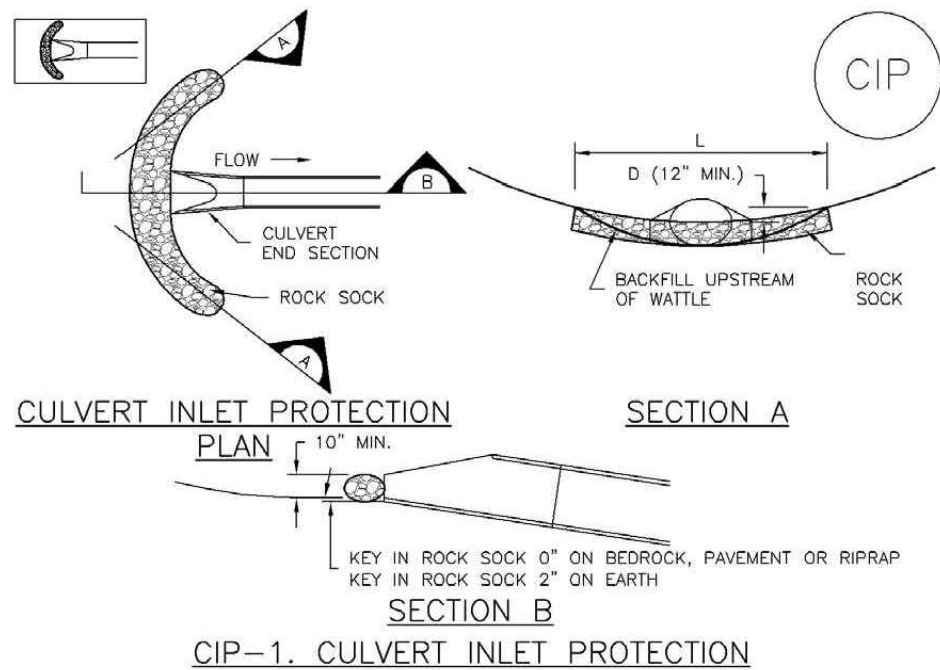
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Urban Storm Drainage Criteria Manual Volume 3

Inlet Protection (IP)

SC-6

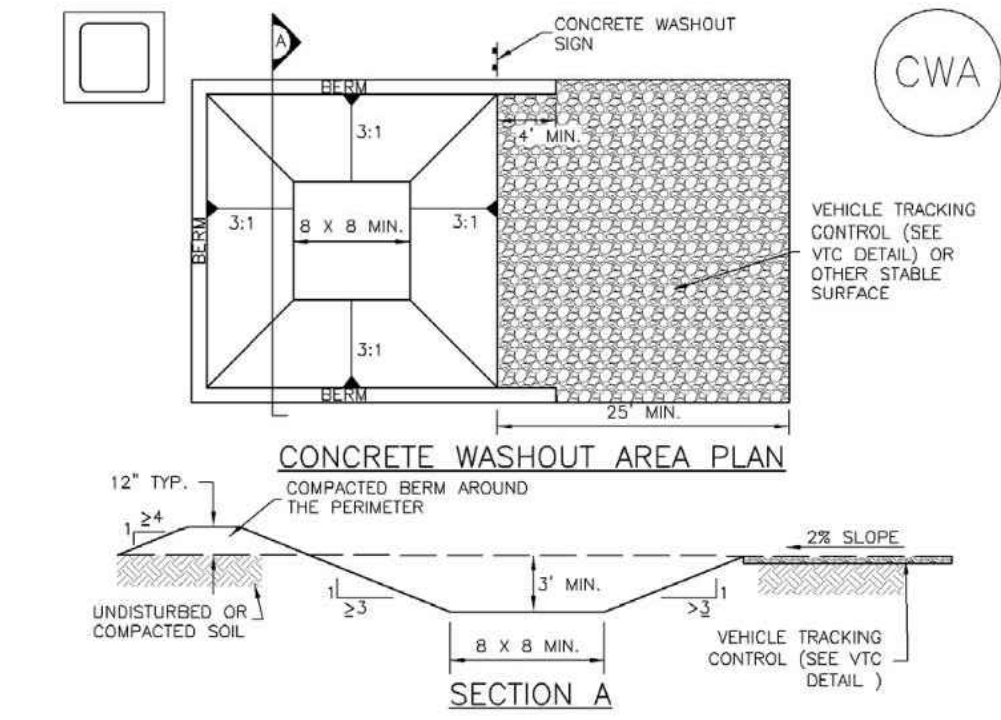


CIP-1. CULVERT INLET PROTECTION  
CULVERT INLET PROTECTION INSTALLATION NOTES  
1. SEE PLAN VIEW FOR  
-LOCATION OF CULVERT INLET PROTECTION.  
2. SEE ROCK SOCK DESIGN DETAIL FOR ROCK GRADATION REQUIREMENTS AND JOINTING DETAIL.  
CULVERT INLET PROTECTION MAINTENANCE NOTES  
1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.  
2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.  
3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.  
4. SEDIMENT ACCUMULATED UPSTREAM OF THE CULVERT SHALL BE REMOVED WHEN THE SEDIMENT DEPTH IS ½ THE HEIGHT OF THE ROCK SOCK.  
5. CULVERT INLET PROTECTION SHALL REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS PERMANENTLY STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.  
(DETAILS ADAPTED FROM AUSTIN, COLORADO, NOT AVAILABLE IN AUTOCAD)  
NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

August 2013 Urban Drainage and Flood Control District IP-7  
Urban Storm Drainage Criteria Manual Volume 3

Concrete Washout Area (CWA)

MM-1



CWA-1. CONCRETE WASHOUT AREA  
CWA INSTALLATION NOTES  
1. SEE PLAN VIEW FOR  
-CWA INSTALLATION LOCATION.  
2. DO NOT LOCATE AN UNLINED CWA WITHIN 400' OF ANY NATURAL DRAINAGE PATHWAY OR WATERBODY. DO NOT LOCATE WITHIN 1,000' OF ANY WELLS OR DRINKING WATER SOURCES. IF SITE CONSTRAINTS MAKE THIS INFEASIBLE, OR IF HIGHLY PERMEABLE SOILS EXIST ON SITE, THE CWA MUST BE INSTALLED WITH AN IMPERMEABLE LINER (18 MIL MIN. THICKNESS) OR SURFACE STORAGE ALTERNATIVES USING PREFABRICATED CONCRETE WASHOUT DEVICES OR A LINED ABOVE GROUND STORAGE ARE SHOULD BE USED.  
3. THE CWA SHALL BE INSTALLED PRIOR TO CONCRETE PLACEMENT ON SITE.  
4. CWA SHALL INCLUDE A FLAT SUBSURFACE PIT THAT IS AT LEAST 8' BY 8' SLOPES LEADING OUT OF THE SUBSURFACE PIT SHALL BE 3:1 OR FLATTER. THE PIT SHALL BE AT LEAST 3' DEEP.  
5. BERM SURROUNDING SIDES AND BACK OF THE CWA SHALL HAVE MINIMUM HEIGHT OF 1'.  
6. VEHICLE TRACKING PAD SHALL BE SLOPED 2% TOWARDS THE CWA.  
7. SIGNS SHALL BE PLACED AT THE CONSTRUCTION ENTRANCE, AT THE CWA, AND ELSEWHERE AS NECESSARY TO CLEARLY INDICATE THE LOCATION OF THE CWA TO OPERATORS OF CONCRETE TRUCKS AND PUMP RIGS.  
8. USE EXCAVATED MATERIAL FOR PERIMETER BERM CONSTRUCTION.

November 2010 Urban Drainage and Flood Control District CWA-3  
Urban Storm Drainage Criteria Manual Volume 3

MM-1

Concrete Washout Area (CWA)

CWA MAINTENANCE NOTES  
1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.  
2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.  
3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.  
4. THE CWA SHALL BE REPAIRED, CLEANED, OR ENLARGED AS NECESSARY TO MAINTAIN CAPACITY FOR CONCRETE WASTE. CONCRETE MATERIALS ACCUMULATED IN PIT, SHALL BE REMOVED ONCE THE MATERIALS HAVE REACHED A DEPTH OF 2'.  
5. CONCRETE WASHOUT WATER, WASTED PIECES OF CONCRETE AND ALL OTHER DEBRIS IN THE SUBSURFACE PIT SHALL BE TRANSPORTED FROM THE JOB SITE IN A WATER-TIGHT CONTAINER AND DISPOSED OF PROPERLY.  
6. THE CWA SHALL REMAIN IN PLACE UNTIL ALL CONCRETE FOR THE PROJECT IS PLACED.  
7. WHEN THE CWA IS REMOVED, COVER THE DISTURBED AREA WITH TOP SOIL, SEED AND MULCH OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.  
(DETAILS ADAPTED FROM DOUGLAS COUNTY, COLORADO AND THE CITY OF PAPER, COLORADO, NOT AVAILABLE IN AUTOCAD)  
NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

CWA-4 Urban Drainage and Flood Control District November 2010  
Urban Storm Drainage Criteria Manual Volume 3

REVISIONS	DATE	DESCRIPTION
NO		

WASTEWATER TREATMENT PLANT PLANS FOR BID
EROSION CONTROL DETAILS
TOWN OF RAWAH – RCD FILE NO. PPR2325 113 S. COMMERCIAL STREET RAWAH, CO 80832







Rock Sock (RS)

SC-5

ROCK SOCK MAINTENANCE NOTES

1. INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
2. FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
3. WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
4. ROCK SOCKS SHALL BE REPLACED IF THEY BECOME HEAVILY SOILED, OR DAMAGED BEYOND REPAIR.
5. SEDIMENT ACCUMULATED UPSTREAM OF ROCK SOCKS SHALL BE REMOVED AS NEEDED TO MAINTAIN FUNCTIONALITY OF THE BMP, TYPICALLY WHEN DEPTH OF ACCUMULATED SEDIMENTS IS APPROXIMATELY ½ OF THE HEIGHT OF THE ROCK SOCK.
6. ROCK SOCKS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND APPROVED BY THE LOCAL JURISDICTION.
7. WHEN ROCK SOCKS ARE REMOVED, ALL DISTURBED AREAS SHALL BE COVERED WITH TOPSOIL, SEEDED AND MULCHED OR OTHERWISE STABILIZED AS APPROVED BY LOCAL JURISDICTION.

(DETAIL ADAPTED FROM TOWN OF PARKER, COLORADO AND CITY OF AURORA, COLORADO, NOT AVAILABLE IN AUTOCAD)

NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDPCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

NOTE: THE DETAILS INCLUDED WITH THIS FACT SHEET SHOW COMMONLY USED, CONVENTIONAL METHODS OF ROCK SOCK INSTALLATION IN THE DENVER METROPOLITAN AREA. THERE ARE MANY OTHER SIMILAR PROPRIETARY PRODUCTS ON THE MARKET. UDPCD NEITHER ENDORSES NOR DISCOURAGES USE OF PROPRIETARY PROTECTION PRODUCTS; HOWEVER, IN THE EVENT PROPRIETARY METHODS ARE USED, THE APPROPRIATE DETAIL FROM THE MANUFACTURER MUST BE INCLUDED IN THE SWMP AND THE BMP MUST BE INSTALLED AND MAINTAINED AS SHOWN IN THE MANUFACTURER'S DETAILS.

Mulching (MU)

EC-4

Description

Mulching consists of evenly applying straw, hay, shredded wood mulch, rock, bark or compost to disturbed soils and securing the mulch by crimping, tackifiers, netting or other measures. Mulching helps reduce erosion by protecting bare soil from rainfall impact, increasing infiltration, and reducing runoff. Although often applied in conjunction with temporary or permanent seeding, it can also be used for temporary stabilization of areas that cannot be reseeded due to seasonal constraints.

Mulch can be applied either using standard mechanical dry application methods or using hydromulching equipment that hydraulically applies a slurry of water, wood fiber mulch, and often a tackifier.

Appropriate Uses

Use mulch in conjunction with seeding to help protect the seedbed and stabilize the soil. Mulch can also be used as a temporary cover on low to mild slopes to help temporarily stabilize disturbed areas where growing season constraints prevent effective reseeding. Disturbed areas should be properly mulched and tacked, or seeded, mulched and tacked promptly after final grade is reached (typically within no longer than 14 days) on portions of the site not otherwise permanently stabilized.

Standard dry mulching is encouraged in most jurisdictions; however, hydromulching may not be allowed in certain jurisdictions or may not be allowed near waterways.

Do not apply mulch during windy conditions.

Design and Installation

Prior to mulching, surface-roughen areas by rolling with a crimping or punching type roller or by track walking. Track walking should only be used where other methods are impractical because track walking with heavy equipment typically compacts the soil.

A variety of mulches can be used effectively at construction sites. Consider the following:

Mulch	
Functions	
Erosion Control	Yes
Sediment Control	Moderate
Site/Material Management	No



Photograph MU-1. An area that was recently seeded, mulched, and crimped.

EC-4

Mulching (MU)

- Clean, weed-free and seed-free cereal grain straw should be applied evenly at a rate of 2 tons per acre and must be tacked or fastened by a method suitable for the condition of the site. Straw mulch must be anchored (and not merely placed) on the surface. This can be accomplished mechanically by crimping or with the aid of tackifiers or nets. Anchoring with a crimping implement is preferred, and is the recommended method for areas flatter than 3:1. Mechanical crimpers must be capable of tucking the long mulch fibers into the soil to a depth of 3 inches without cutting them. An agricultural disk, while not an ideal substitute, may work if the disk blades are dull or blunted and set vertically; however, the frame may have to be weighted to afford proper soil penetration.
- Grass hay may be used in place of straw; however, because hay is comprised of the entire plant including seed, mulching with hay may seed the site with non-native grass species which might in turn out-compete the native seed. Alternatively, native species of grass hay may be purchased, but can be difficult to find and are more expensive than straw. Purchasing and utilizing a certified weed-free straw is an easier and less costly mulching method. When using grass hay, follow the same guidelines as for straw (provided above).
- On small areas sheltered from the wind and heavy runoff, spraying a tackifier on the mulch is satisfactory for holding it in place. For steep slopes and special situations where greater control is needed, erosion control blankets anchored with stakes should be used instead of mulch.
- Hydraulic mulching consists of wood cellulose fibers mixed with water and a tackifying agent and should be applied at a rate of no less than 1,500 pounds per acre (1,425 lbs of fibers mixed with at least 75 lbs of tackifier) with a hydraulic mulcher. For steeper slopes, up to 2000 pounds per acre may be required for effective hydroseeding. Hydromulch typically requires up to 24 hours to dry; therefore, it should not be applied immediately prior to inclement weather. Application to roads, waterways and existing vegetation should be avoided.
- Erosion control mats, blankets, or nets are recommended to help stabilize steep slopes (generally 3:1 and steeper) and waterways. Depending on the product, these may be used alone or in conjunction with grass or straw mulch. Normally, use of these products will be restricted to relatively small areas. Biodegradable mats made of straw and jute, straw-coconut, coconut fiber, or excelsior can be used instead of mulch. (See the ECM/TRM BMP for more information.)
- Some tackifiers or binders may be used to anchor mulch. Check with the local jurisdiction for allowed tackifiers. Manufacturer's recommendations should be followed at all times. (See the Soil Binder BMP for more information on general types of tackifiers.)
- Rock can also be used as mulch. It provides protection of exposed soils to wind and water erosion and allows infiltration of precipitation. An aggregate base course can be spread on disturbed areas for temporary or permanent stabilization. The rock mulch layer should be thick enough to provide full coverage of exposed soil on the area it is applied.

Maintenance and Removal

After mulching, the bare ground surface should not be more than 10 percent exposed. Reapply mulch, as needed, to cover bare areas.

WASTEWATER TREATMENT PLANT PLANS FOR BID

EROSION CONTROL DETAILS

TOWN OF RAWAH – PCD FILE NO. PPR2325  
113 S. COMMERCIAL STREET  
RAWAH, CO 80832

PREPARED UNDER THE DIRECT SUPERVISION OF



FOR AND ON BEHALF OF  
ELEMENT ENGINEERING, LLC

DATE  
JANUARY 2024

JOB NUMBER  
0043.0001

SCALE  
NTS

EDITION

BIDDING

SHEET  
C32 OF C31

REVISIONS

NO.	DESCRIPTION	DATE				BY			



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