TECHNICAL SPECIFICATIONS AND DRAWINGS

LOW WATER DRAIN CIPP REHABILITATION

MURPHEY CANDLER PARK DAM

Invitation to Bid, No. 22-116

BID DATE SEPTEMBER 27, 2022

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Richard E. Dunn, Director

Watershed Protection Branch
2 Martin Luther King, Jr. Drive
Suite 1152, East Tower
Atlanta, Georgia 30334
404-463-1511

Received 5/11/22
Scanned 5/12/22

Don Sherrill, Director of Public Works
City of Brookhaven
4362 Peachtree Road
Brookhaven, GA 30319

MAY 0 6 2022

SUBJECT: Murphey Candler Dam
DeKalb County
Permit 044-002-00005-A-01

Dear Mr. Sherrill:

It has been determined that the construction plans and technical specifications submitted on April 7, 2022, meet the requirements of the 1978 Georgia Safe Dams Act as amended and Sections 391-3-8-.08 and 391-3-8-.09 of the Rules for Dam Safety and are hereby approved for construction. This office requires a 10-day written notice before work begins.

As a reminder, this office has agreed that ground penetrating radar (GPR) testing beneath the overflow/chute spillway, as required in the permit conditions for the subject dam, may be performed alongside the work outlined in these plans. Results from this testing should be submitted to the Program as soon as possible. Additionally, based on GPR testing results, design documents including a design report, plans, and specifications for repair or replacement of the primary and overflow/chute spillways should be submitted to this office within 90 days of completion of the GPR testing.

Please have your engineer provide a minimum of three (3) stamped and signed copies of the design documents for us to stamp: one for your contractor, one for this office, and one for the Engineer of Record (EOR). The documents will be stamped by this office and sent back to your engineer. Erosion control measures must be in place prior to any ground disturbing activity. Any significant changes to the plans will need to be reviewed and approved by this office prior to the changes being implemented. Qualified engineering personnel must inspect the work. An approved set of documents must be on-site during construction. Construction inspection reports detailing progress, including all testing reports, must be submitted to this office at least every month by the 15th of each following month by your engineer. Additional permits may be required for the project by other entities.

Your design engineer must certify in writing to our office that the work on the dam was completed in accordance with the approved plans. As-built plans and the Engineer of Record's certification will need to be submitted within 30 days of completion of the work. The final construction report is required after completion of the work and not less than 10 days prior to the required Safe Dams Program final construction inspection.

If there are any questions, please feel free to contact this office at (470) 524-0696 or at caroline.walden@dnr.ga.gov.

Sincerely,

Caroline Walden
Environmental Engineer
Safe Dams Program

cc: Tom Roberts, City of Brookhaven Stormwater Manager
Sam Crampton, P.E., C.F.M., Dewberry Engineers Inc.

APPROVED
Engineering
Timothy Ward

APPROVED
ARBORIST
Jeff Dadisman

100% CONSTRUCTION PLANS FOR:

MURPHEY CANDLER PARK DAM CMP SPILLWAY REPAIR

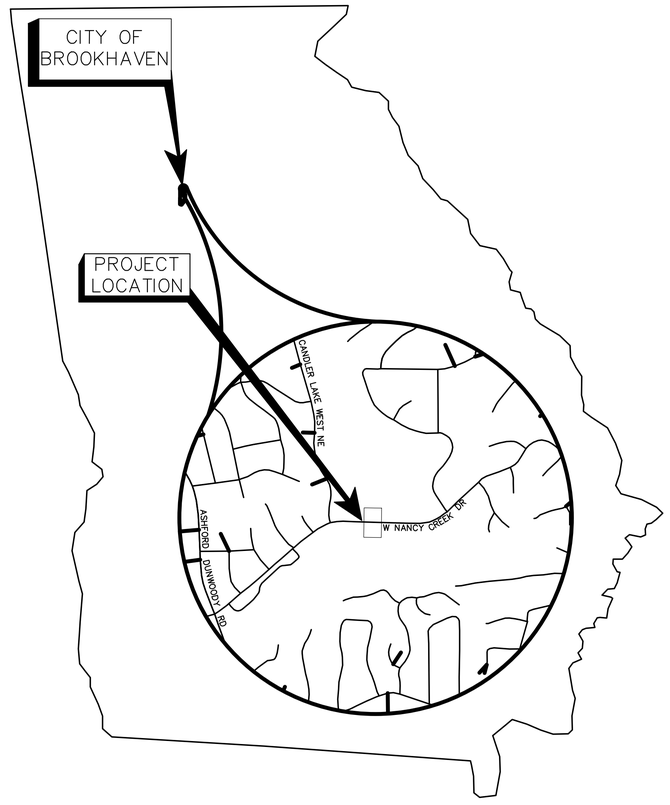
CITY OF BROOKHAVEN DEVELOPMENT FILE MS22-00050

JUNE 24, 2022

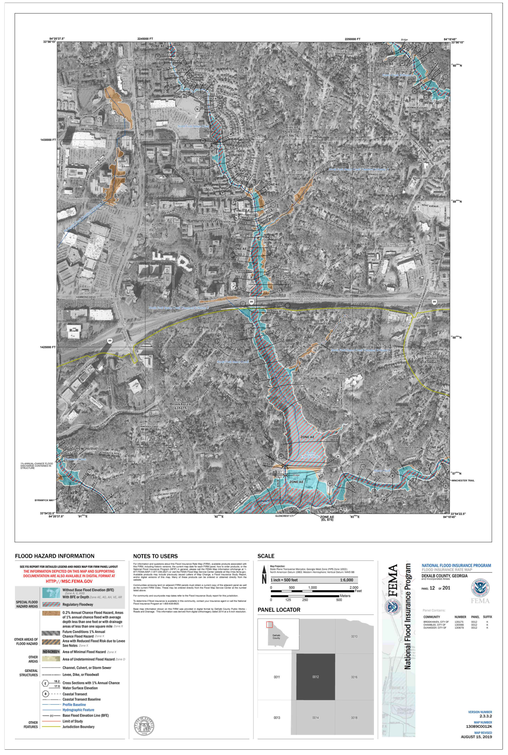
TAX PARCEL # 18 326 01 041

APPROVED
PUBLIC WORKS
Tom Roberts

SHEET INDEX:



VICINITY MAP



FEMA MAP PANEL IMAGE FOR PANEL # 0012K

THIS SITE IS LOCATED WITHIN A ZONE AE AS DEFINED BY FIRM COMMUNITY PANEL NUMBER 13089C0012K FOR UNINCORPORATED DEKALB COUNTY, GA

ADJOINING PROPERTIES:

1. *1551 W NANCY CREEK DR*
   OWNER: CITY OF BROOKHAVEN
   DB X PG X
   TAX PARCEL # 18 326 01 041
2. *4051 CANDLER LK*
   OWNER: CITY OF BROOKHAVEN
   DB X PG X
   TAX PARCEL # 18 331 01 005

DISTURBED AREA: 0.32 ACRES
TOTAL TRACT SIZE: 0.32 ACRES
IMPERVIOUS AREA: 0.08 ACRES
PCT OF TRACT IMP: 25%

BEGINNING OF STRUCTURE:
LAT: 33.9095
LONG: −84.3245
END OF STRUCTURE:
LAT: 33.9090
LONG: −84.3245

CONSTRUCTION SCHEDULE

WEEK	1	2	3	4	5	6	7
INSTALL EROSION CONTROLS	■						
INSTALL COFFER DAMS & DRAIN LAKE		■	■				
MAINTAIN EROSION CONTROL		■	■	■	■	■	
CIPP INSTALLATION				■			
FINAL LANDSCAPING (PERM. GRASSING)					■		
CLEANUP / REMOVE BMP'S						■	
REFILL RESERVOIR TO NORMAL POOL LEVEL							■

The City of Brookhaven does not certify the accuracy of these drawings. In approving these drawings and specifications, the City has relied upon the accuracy of the information and representations furnished herein by the engineer, or architect, and/or applicant. The City of Brookhaven assumes no liability or responsibility for the accuracy of the representations provided.

DO NOT BEGIN CONSTRUCTION
before the on-site pre-construction meeting with the City Land Development Inspector.
Schedule through the Project Portal:
https://cityworks.brookhavenga.gov/ProjectPortal

OWNER/PRIMARY PERMITTEE:
CITY OF BROOKHAVEN PUBLIC WORKS
4362 PEACHTREE ROAD
BROOKHAVEN, GA 30319
CONTACT: TOM ROBERTS
TOM.ROBERTS@BROOKHAVENGA.GOV
404-906-2747

DEVELOPER:
N/A

24 HOUR EMERGENCY CONTACT:
TOM ROBERTS
4362 PEACHTREE ROAD
BROOKHAVEN, GA 30319
404-906-2747

ENGINEER:
SAM FLEMING, PE
DEWBERRY
2835 BRANDYWINE ROAD
SUITE 100
ATLANTA, GA 30341-4015
678.537.8627
678.530.0040 FAX

SAMUEL I. FLEMING, PE
LEVEL II CERTIFIED DESIGN PROFESSIONAL
GSWCC CERTIFICATION NO. 22173
EXPIRES 11/09/2024

GEORGIA811 Utilities Protection Center, Inc
Know what's below. Call before you dig.

Dewberry®

DEWBERRY ENGINEERS INC.
2835 Brandywine Road
Suite 100
Atlanta, GA 30341-4015
678.530.0022
License No. PEF002398
Expires 6/30/2022

MURPHEY CANDLER PARK DAM
CMP SPILLWAY REPAIR

CITY OF BROOKHAVEN
DEPARTMENT OF PUBLIC WORKS

SEAL

GEORGIA REGISTERED No. 24408 PROFESSIONAL ENGINEER SAMUEL L. FLEMING

COUNTY APPROVAL

SCALE

NO.	DESCRIPTION	DATE
5	BROOKHAVEN REVISIONS	6/24/2022
4	GASDP REVISIONS v2	4/7/2022
3	GASDP REVIEW REVISIONS	2/16/2022
2	100 PERCENT SUBMITTAL	12/17/2021
1	90 PERCENT SUBMITTAL	11/24/2021

REVISIONS

DRAWN BY	DT
APPROVED BY	SF
CHECKED BY	MH
DATE	6/24/2022

TITLE

COVER SHEET

PROJECT NO.

G-001

SHEET NO.

APPROVED PLAN 07/12/2022
Permit # MS22-00050

1/22/2016 9:07:15 AM
P:\BROOKHAVENGA\501146369_MCD_CIPP\DESIGN\CAD\MCD_CIPP_109PCT.DWG

GENERAL NOTES

1. OWNER — CITY OF BROOKHAVEN PUBLIC WORKS
   4362 PEACHTREE ROAD
   BROOKHAVEN, GEORGIA 30319
   404–906–2747
2. EMERGENCY 24-HOUR CONTACT — NAME: TOM ROBERTS
   CITY OF BROOKHAVEN
   OFFICE # 404–906–2747
3. DISTURBED AREA: 0.32 ACRES
4. THE LAND DISTRICT AND LAND LOT FOR THE PROJECT IS: 01–326.
5. DESCRIPTION: WORK PERFORMED BY THIS CONTRACT WILL INCLUDE TRENCHLESS CURED IN PLACE PIPE REHABILITATION FOR 169 LF OF EXISTING 30" CMP LOW LEVEL DRAIN FOR MURPHEY CANDLER DAM.
6. EXISTING SITE CONDITIONS AND ADJACENT AREAS: THE SITE IS PART OF MURPHEY CANDLER PARK, WHICH IS A PUBLIC RECREATIONAL PARK CONSISTING OF BALLFIELDS, WALKING TRAILS, & A LAKE, OWNED BY THE CITY OF BROOKHAVEN.
7. **THIS SITE DOES CONTAIN WETLANDS BUT DOES NOT CONTAIN ANY KNOWN CEMETERIES.**
8. NO UNIQUE VEGETATION, INCLUDING WETLAND VEGETATION, HAVE BEEN FOUND TO EXIST WITHIN PROJECT LIMITS.
9. SINCE THE PROJECT CONSISTS OF MAINTENANCE OF AN EXISTING STRUCTURE AND LESS THAN 100 LF OF STREAM IMPACTS, THE PROJECT IS AUTHORIZED UNDER NWP 3(A) MAINTENANCE, BUT A PRE–CONSTRUCTION NOTIFICATION (PCN) IS NOT REQUIRED.
10. THE PROJECT SITE CONTAINS STATE WATERS AND DOES NOT REQUIRE A STREAM BUFFER VARIANCE AND APPROVAL FROM GEORGIA EPD.
11. NOTIFICATION TO GEORGIA EPD IS REQUIRED FOR THIS CIPP REHABILITATION PROJECT.
12. NORTH FORK NANCY CREEK IS THE RECEIVING WATERS, AND THIS PROJECT IS LOCATED IN THE NANCY CREEK WATERSHED.
13. THIS PROJECT IS LOCATED WITHIN 1 MILE UPSTREAM OF AND WITHIN THE SAME WATERSHED AS A PORTION OF A BIOTA IMPAIRED STREAM SEGMENT.
14. NO NEW IMPERVIOUS SURFACES ARE BEING CREATED. EXISTING STORM DRAIN PIPES WILL BE REPAIRED.
15. WASTE MATERIALS SHALL NOT BE DISCHARGED TO STATE WATERS, EXCEPT AS AUTHORIZED BY A SECTION 404 PERMIT.
16. SITES ARE LOCATED IN CITY OF BROOKHAVEN UNLESS OTHERWISE NOTED.
17. ALL LAND DISTURBING ACTIVITY IS LOCATED WITHIN RESIDENTIAL AND RURAL AREAS.
18. **ALL SPECIAL FLOOD HAZARD AREA INFORMATION TAKEN FROM PANELS ON FIRM MAPS DATED 08/15/2019.**
19. WORK ZONES WILL BE SET UP ACCORDING TO M.U.T.C.D. MANUAL.
20. INERT WASTE DOES NOT EXIST ON THE SITE.
21. ALL MANHOLES OR CATCH BASINS MAY NOT BE COVERED DURING OR AFTER CONSTRUCTION AND SHALL BE VISIBLE AND CLEAN ON FINAL INSPECTION.
22. SHOULDER RESTORATION WILL BE LEVEL WITH EXISTING ASPHALT AND SLOPING TO DITCH LINE.
23. ONE WAY TRAFFIC WILL BE MAINTAINED AT ALL TIMES.
24. THE CONTRACTOR SHALL RESTORE ALL DISTURBED GRAVEL, RIPRAP, PAVED, OR CONCRETE SIDEWALKS TO PRECONSTRUCTION CONDITIONS OR PER PLANS, AND IN ACCORDANCE WITH APPLICABLE GDOT AND CITY OF BROOKHAVEN DOT STANDARDS AND REQUIREMENTS.
25. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING AND MAINTAINING ALL LINES AND GRADES REQUIRED FOR INSTALLATION OF THE PROPOSED UTILITIES.
26. ANY SOIL OR DEBRIS ON ROAD WILL BE REMOVED DAILY OR IMMEDIATELY IF A HAZARDOUS ROAD CONDITION EXISTS.
27. UTILITY WORK COORDINATION WILL BE REQUIRED AS PART OF THIS CONTRACT. THE CONTRACTOR WILL BE REQUIRED TO USE THE ON–CALL CENTER TELEPHONE NUMBER, 811, FOR THE PURPOSE OF COORDINATING THE MARKING OF UNDERGROUND UTILITIES. 72 HOUR NOTICE IS REQUIRED TO GEORGIA 811 UTILITY PROTECTION CENTER BEFORE ANY PLANNED DIGGING. A LIST OF CONTACTS FOR UTILITIES THAT HAVE FACILITIES IN THE PROJECT AREA IS PROVIDED. THIS LIST IS BASED ON THE BEST INFORMATION AVAILABLE, BUT IS NOT GUARANTEED TO BE COMPLETE.
28. GENERAL CONTRACTOR TO COORDINATE WITH UTILITY OWNERS EXISTING LOCATIONS OF FACILITIES AND PROPOSED WORK AROUND THESE FACILITIES. IF RELOCATION OF EXISTING FACILITIES IS NEEDED, CONTRACTOR IS RESPONSIBLE FOR COORDINATING UTILITY RELOCATION WITH SAID UTILITY PROVIDER.
29. OVERHEAD UTILITIES ARE SHOWN SCHEMATICALLY ON THE DRAWINGS. SIZES, TYPES, VOLTAGE, HEIGHT OF CABLE, ETC. ARE NOT SHOWN. THE CONTRACTOR SHALL COMPLY WITH THE GEORGIA HIGH VOLTAGE SAFETY ACT (OCGA 46–3–30 THROUGH 46–3–40). THE CONTRACTOR SHALL VISIT THE SITE AND NOTE THE CONDITIONS REGARDING OVERHEAD UTILITIES PRIOR TO SUBMITTING HIS/HER BID.
30. THE SIZE, TYPE, MATERIALS, AND LOCATIONS OF EXISTING UNDERGROUND UTILITIES SHOWN ON THE PLANS ARE BASED ON INVESTIGATIONS AND SURVEYS PERFORMED FOR DESIGN PURPOSES. SUBSURFACE UTILITY DATA SHOWN IS APPROXIMATE ONLY AND NO GUARANTEE IS MADE THAT ALL UTILITIES AND OTHER FEATURES ARE SHOWN ON THE PLANS. IF THE CONTRACTOR ENCOUNTERS SUBSURFACE CONDITIONS AT THE SITE MATERIALLY DIFFERENT FROM THOSE SHOWN ON THE PLANS, HE SHALL IMMEDIATELY NOTIFY THE OWNER AND ENGINEER. CONTRACTOR SHALL ANTICIPATE HAND DIGGING AROUND EXISTING UTILITIES DURING CONSTRUCTION. UTILITY FACILITIES SUCH AS SERVICE LINES OR UNKNOWN FACILITIES NOT SHOWN ON PLANS WILL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY UNDER THIS REQUIREMENT. "EXISTING UTILITY FACILITIES" MEANS ANY UTILITY THAT EXISTS ON THE PROJECT IN ITS ORIGINAL, RELOCATED, OR NEWLY INSTALLED POSITION. ALL UTILITY FACILITIES WHICH ARE IN CONFLICT WITH CONSTRUCTION ARE TO BE REMOVED OR RELOCATED TO CLEAR CONSTRUCTION IN ADVANCE OF THIS WORK.
31. RIGHT–OF–WAY MARKERS IN RESIDENTIAL LAWN AND DEVELOPED COMMERCIAL AREAS SHALL BE PLACED FLUSH WITH THE FINISHED SURFACE.
32. THE SURVEY FOR THIS PROJECT WAS PREPARED BY TERRAMARK AND IS RELATIVE TO THE GEORGIA STATE PLANE COORDINATE SYSTEM, WEST ZONE AS REFERENCED IN NAD83 (1994 ADJUSTMENT) AND NAVD88. SEE PLANS FOR LOCATIONS AND DESCRIPTIONS OF BENCHMARKS USED.
33. THE CONTRACTOR SHALL OBSERVE ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY REGULATIONS REGARDING TRENCHLESS INSTALLATION. NO SEPARATE PAYMENT WILL BE MADE FOR ANY COST INCURRED TO COMPLY WITH THIS REQUIREMENT.
34. IF ANY CONFLICTS OR DISCREPANCIES ARE DISCOVERED, EITHER ON THE CONSTRUCTION DOCUMENTS OR THE FIELD CONDITIONS, THE GENERAL CONTRACTOR MUST NOTIFY THE ENGINEER IMMEDIATELY, AND SHALL NOT COMMENCE CONSTRUCTION UNTIL THE CONFLICTS OR DISCREPANCIES ARE RESOLVED.
35. THE CONTRACTOR SHALL ENSURE THAT POSITIVE AND ADEQUATE DRAINAGE INCLUDE, BUT NOT LIMITED TO, REPLACEMENT OR RECONSTRUCTION OF EXISTING DRAINAGE STRUCTURES THAT HAVE BEEN DAMAGED, REMOVED OR REGRADED AS REQUIRED BY THE ENGINEER, EXCEPT FOR THOSE DRAINAGE ITEMS SHOWN AT SPECIFIC LOCATIONS IN THE PLANS AND HAVING SPECIFIC PAY ITEMS IN THE DETAILED COST ESTIMATE. NO SEPARATE PAYMENT WILL BE MADE FOR ANY COSTS INCURRED TO COMPLY WITH THIS REQUIREMENT.
36. CONSTRUCTION LAYOUT WILL BE REQUIRED BY THE CONTRACTOR. ALL COSTS FOR THIS ITEM WILL BE INCLUDED IN THE PRICE BID FOR OTHER CONTRACT ITEMS.
37. CONTRACTOR SHALL BE RESPONSIBLE FOR CONTROL OF WATER TO INCLUDE BUT NOT LIMITED TO BYPASS PUMPING, DEWATERING, LOCALIZED DEWATERING TO CONTROL GROUNDWATER INFLOW, STREAM DIVERSION, AND TEMPORARILY LOWERING AND MAINTAINING MURPHEY CANDLER LAKE ELEVATION AT 875' +/– DURING CONSTRUCTION.. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND MAINTAINING ON THE PROJECT SITE THE GEORGIA D.O.T. STANDARD DRAWINGS AND THE CONSTRUCTION DETAIL DRAWINGS. FULL SIZED SHEETS MAY BE PURCHASED BY THE CONTRACTOR AT HIS EXPENSE FROM THE GEORGIA D.O.T.
38. CONTRACTOR TO REPAIR ANY SEPTIC AND/OR IRRIGATION LINES AND APPURTENANCES DAMAGED AS A RESULT OF CONSTRUCTION. NO SEPARATE PAYMENT WILL BE MADE FOR DAMAGE TO SEPTIC AND/OR IRRIGATION LINES AND APPURTENANCES NOT ILLUSTRATED ON THE CONSTRUCTION PLANS.
39. THE CONTRACTOR SHALL STRICTLY ADHERE TO DUST CONTROL REGULATIONS. ALL AREAS SUBJECTED TO DUST FORMATION MUST BE PERIODICALLY WATERED SUFFICIENT TO RETARD DUST. ALL COSTS FOR DUST CONTROL SHALL BE INCIDENTAL TO THE CONTRACT.
40. CITY OF BROOKHAVEN IS NOT RESPONSIBLE FOR ANY ERRORS OR OMISSIONS BY ENGINEERS OR OTHER DESIGN PROFESSIONALS ON DESIGN OR COUNTY CODE REQUIREMENTS FOR THIS PROJECT.
41. NECESSARY BARRICADES, SUFFICIENT LIGHTS, SIGNS, AND OTHER TRAFFIC CONTROL METHODS AS MAY BE NECESSARY FOR THE PROTECTION AND SAFETY SHALL BE PROVIDED AND MAINTAINED THROUGHOUT THE WIDENING OF AND CONSTRUCTION ON DEKALB COUNTY ROADS.
42. IF CIPP REHABILITATION IMPROVEMENTS ARE CONSTRUCTED CONCURRENTLY WITH THE ONGOING BOARDWALK IMPROVEMENT PROJECT, THE CONTRACTORS OF BOTH PROJECTS SHALL COORDINATE, AND DISCREPANCIES BETWEEN THE PLAN SETS SHALL BE RESOLVED.

EROSION CONTROL NOTES

1. **INSTALLATION: THE ESCAPE OF SEDIMENT FROM THE SITE SHALL BE PREVENTED BY THE INSTALLATION OF EROSION AND SEDIMENT CONTROL MEASURES AND PRACTICES PRIOR TO, OR CONCURRENT WITH, LAND DISTURBING ACTIVITIES.**
2. **MAINTENANCE: EROSION CONTROL MEASURES WILL BE MAINTAINED AT ALL TIMES. IF FULL IMPLEMENTATION OF THE APPROVED PLAN DOES NOT PROVIDE FOR EFFECTIVE EROSION CONTROL, ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED TO CONTROL OR TREAT THE SEDIMENT SOURCE.**
3. **ANY DISTURBED AREA LEFT EXPOSED SHALL BE TEMPORARILY STABILIZED WITH MULCH OR TEMPORARY SEEDING AS SOON AS POSSIBLE AFTER ROUGH GRADING IS COMPLETED BUT WITHIN 14 DAYS AFTER DISTURBANCE; PERMANENT VEGETATION SHALL BE PLANTED IF THE AREA IS TO BE LEFT UNDISTURBED FOR GREATER THAN 6 MONTHS.**
4. EROSION CONTROL MEASURES SHOWN ON THE DRAWINGS ARE MINIMUM REQUIREMENTS. ADDITIONAL EROSION CONTROL MEASURES SHALL BE EMPLOYED BY THE CONTRACTOR WHERE DETERMINED NECESSARY BY LOCAL AUTHORITIES OR THE ENGINEER BASED UPON ACTUAL SITE CONDITIONS.
5. EROSION CONTROL MEASURES MAY HAVE TO BE ALTERED FROM THAT SHOWN ON THE DRAWINGS IF DRAINAGE PATTERNS DURING CONSTRUCTION ARE DIFFERENT FROM THE DRAINAGE PATTERNS SHOWN ON THE DRAWINGS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ACCOMPLISH EROSION CONTROL FOR ALL DRAINAGE PATTERNS CREATED AT VARIOUS STAGES DURING CONSTRUCTION. ADDITIONAL SEDIMENT BARRIERS WILL BE PLACED AS REQUIRED BY INSPECTOR.
6. MAINTENANCE OF ALL SOIL EROSION AND SEDIMENTATION CONTROL PRACTICES, WHETHER TEMPORARY OR PERMANENT, SHALL BE AT ALL TIMES THE RESPONSIBILITY OF THE CONTRACTOR DURING CONSTRUCTION.
7. PROVISIONS TO PREVENT EROSION OF SOIL FROM SITE SHALL BE, AT A MINIMUM, IN CONFORMANCE WITH THE LATEST REVISION OF THE "MANUAL FOR EROSION AND SEDIMENTATION CONTROL IN GEORGIA."
8. FAILURE TO INSTALL, OPERATE, OR MAINTAIN ALL EROSION CONTROL MEASURES WILL RESULT IN ALL CONSTRUCTION BEING STOPPED ON THE JOB SITE UNTIL SUCH MEASURES ARE CORRECTED CONSISTENT WITH THE CITY OF BROOKHAVEN EROSION CONTROL ORDINANCE.
9. IF FINES OR PENALTIES ARE LEVIED AGAINST THE PROPERTY OR THE PROPERTY OWNER BECAUSE OF A LACK OF EROSION OR SEDIMENTATION CONTROL, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PAYMENT OF SUCH FINES OR PENALTIES, OR THE COST OF SUCH FINES OR PENALTIES SHALL BE DEDUCTED FROM THE CONTRACT AMOUNT.
10. ALL MATERIALS SPILLED, DROPPED, WASHED, OR TRACKED FROM VEHICLE OR SITE ONTO PUBLIC ROADWAYS OR INTO STORM DRAINS SHALL BE KEPT TO A MINIMUM & REMOVED BY THE END OF THE DAY.
11. TEMPORARY MULCHING SHALL BE PROVIDED TO DISTURBED AREAS DAILY.
12. **LIMITS OF CONSTRUCTION SHALL BE CONTAINED WITHIN THE RIGHT OF WAY AND CITY OF BROOKHAVEN PROPERTY.**

EROSION CONTROL NOTES CONTINUED

13. PRIOR TO COMMENCING LAND DISTURBANCE ACTIVITY, THE LIMITS OF LAND DISTURBANCE SHALL BE CLEARLY AND ACCURATELY DEMARCATED WITH STAKES, RIBBONS, OR OTHER APPROPRIATE MEANS. THE LOCATION AND EXTENT OF ALL AUTHORIZED LAND DISTURBANCE ACTIVITY SHALL BE DEMARCATED FOR THE DURATION OF THE CONSTRUCTION ACTIVITY. NO DISTURBANCE ACTIVITY SHALL OCCUR OUTSIDE THE LIMITS INDICATED ON THE DRAWINGS.
14. ALL EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES (BMPS) WILL BE INSPECTED DAILY, AND ANY DEFICIENCIES WILL BE CORRECTED BY THE END OF EACH DAY. ADDITIONAL EROSION CONTROL BMPS WILL BE INSTALLED IF DEEMED NECESSARY BY ON SITE INSPECTION BY THE ISSUING AUTHORITY.
15. SEDIMENT CONTROL MEASURES WILL BE MAINTAINED UNTIL ALL UPSTREAM DISTURBED GROUND WITHIN THE CONSTRUCTION AREA HAS BEEN COMPLETELY STABILIZED WITH PERMANENT VEGETATION AND ALL ROADS/PARKING HAVE BEEN PAVED.
16. PRIOR TO ANY OTHER CONSTRUCTION, A STABILIZED CONSTRUCTION ENTRANCE SHALL BE CONSTRUCTED AT EACH ENTRY TO OR EXIT FROM THE SITE
17. THE CONSTRUCTION EXITS SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOW OF MUD ON TO PUBLIC RIGHT OF WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH STONE, AS CONDITIONS DEMAND, AND REPAIR AND/OR CLEAN–OUT OF ANY STRUCTURES USED TO TRAP SEDIMENT. ALL MATERIALS SPILLED, DROPPED, WASHED, OR TRACKED FROM VEHICLE ONTO PUBLIC ROADWAY OR INTO STORMDRAIN MUST BE REMOVED IMMEDIATELY. THE CONTRACTOR SHALL INSPECT CONTROL MEASURES AT THE END OF EACH WORK DAY TO ENSURE MEASURES ARE FUNCTIONING PROPERLY.
18. IMMEDIATELY AFTER THE ESTABLISHMENT OF CONSTRUCTION ENTRANCES/EXITS, ALL PERIMETER EROSION CONTROL DEVICES AND STORM WATER MANAGEMENT DEVICES SHALL BE INSTALLED PRIOR TO ANY OTHER CONSTRUCTION.
19. THE CONTRACTOR SHALL FURNISH AND MAINTAIN ALL NECESSARY BARRICADES WHILE ROADWAY FRONTAGE IMPROVEMENTS ARE BEING MADE.
20. THE CONSTRUCTION OF THE SITE WILL INITIATE WITH THE INSTALLATION OF EROSION CONTROL MEASURES SUFFICIENT TO CONTROL SEDIMENT DEPOSITS AND EROSION. ALL SEDIMENT CONTROL WILL BE MAINTAINED UNTIL ALL UPSTREAM GROUND WITHIN THE CONSTRUCTION AREA HAS BEEN COMPLETELY STABILIZED WITH PERMANENT VEGETATION AND ALL ROADS/DRIVEWAYS HAVE BEEN PAVED.
21. IF CONCRETE WORK IS DONE ON SITE THAN A CONCRETE WASHDOWN BMP SHALL BE PROVIDED OR A NOTE "CONCRETE WASHDOWN IS NOT ALLOWED ON SITE ". THE CONCRETE WASHDOWN AREA, IF ALLOWED, SHALL BE FOR THE TOOLS, CONCRETE MIXER CHUTES, HOPPERS AND THE REAR OF VEHICLES. WASHOUT OF THE DRUM AT THE CONSTRUCTION SITE IS PROHIBITED.
22. A COPY OF THE APPROVED LAND DISTURBANCE PLAN AND PERMIT SHALL BE PRESENT ON THE SITE WHENEVER LAND DISTURBANCE ACTIVITY IS IN PROGRESS.
23. ALL SEWER EASEMENTS DISTURBED MUST BE DRESSED AND GRASSED TO CONTROL EROSION.
24. CONTRACTOR SHALL INSPECT AND REPAIR EROSION CONTROL MEASURES AT LEAST DAILY AND PRIOR TO EACH ANTICIPATED RAINFALL.
25. THE CONTRACTOR SHALL REMOVE ACCUMULATED SILT FROM SEDIMENT BARRIERS AND CHECK DAMS WHICH BECOME SILTED ABOVE ONE–HALF OF THEIR ORIGINAL HEIGHT.
26. THE CONSTRUCTION ACTIVITIES AT THESE SITES WILL NOT RESULT IN FLOODING OR CHANNEL DEGRADATION DOWNSTREAM.
27. CUT AND FILL SLOPES SHALL NOT EXCEED 3H:1V ON RESIDENTIAL PROJECTS AND LOTS, AND SHALL NOT EXCEED 2H:1V ON ALL OTHER PROJECTS. IF COMPLIANCE IS NOT MET AN APPLICATION FOR A VARIANCE MAY BE AN OPTION.
28. ALL FILL SLOPES WILL HAVE SILT FENCES AT THE TOE OF SLOPES.
29. SURFACE ROUGHENING (Su): ALL CUT AND FILL SLOPES SHALL BE SURFACE ROUGHENED AND VEGETATED WITHIN (3) THREE DAYS AFTER GRADING IS COMPLETED.
30. AT THE END OF EACH WORK DAY, ALL SLOPES 2:1 OR STEEPER AND HIGHER THAN 5 FEET SHALL RECEIVE SURFACE ROUGHENING, POLYMERS, AND MATTING.
31. **DOUBLE ROW TYPE C SILT FENCE REQUIRED WHEN PLACED ALONG STATE WATERS AND AT THE TOE OF SLOPES EXCEEDING 10' VERTICAL.**
32. ALL SILT FENCES MUST BE PLACED AS ACCESS IS OBTAINED DURING CLEARING. NO GRADING SHALL BE DONE UNTIL SILT FENCE INSTALLATION IS COMPLETE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN ALL SILT RENCES AND TO REPAIR OR REPLACE ANY SILT FENCE THAT IS NOT SATISFACTORY. EROSION CONTROL CHECK DAMS OR FILTER RINGS SHALL BE PLACED IMMEDIATELY AFTER DRAINAGE STRUCTURES ARE IN PLACE. ALL EROSION CONTROL DEVICES SHALL BE PLACED ACCORDING TO THE PLANS AND AS DIRECTED BY THE ENGINEER. SEE THAT GADOT STANDARD SPECIFICATIONS REGARDING EROSION CONTROL AND THE MANUAL FOR EROSION AND SEDIMENT CONTROL BY G.S.W.C.C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING WETLAND AREAS FREE FROM SILTATION. THE CONTRACTOR SHALL OBTAIN AND ABIDE BY ALL CORPS OF ENGINEERS RULES AND REGULATIONS CONCERNING CONSTRUCTION ADJACENT TO WATERWAYS AND MAINTAIN WATER QUALITY.
26. AN UNDISTURBED VEGETATIVE BUFFER (MEETING COUNTY & STATE REGULATIONS) AND THE APPROPRIATE IMPERVIOUS SETBACK ADJACENT TO ALL STATE WATERS WILL BE PRESERVED.
27. CRITICAL AREAS: RIP RAP AND/OR STONE CHECK DAMS SHALL BE PLACED AT ALL CRITICAL EROSION AREAS INCLUDING, BUT NOT LIMITED TO, STREAM CROSSINGS.
28. PERMANENT VEGETATION SHALL BE PROVIDED AT THE EARLIEST SUITABLE GROWING SEASON.
29. WHEN ANY CONSTRUCTION BORDERS A DRAINAGE COURSE, THE CONTRACTOR SHALL NOT DEPOSIT ANY BUILDING OR OTHER EXCAVATION SPOIL DIRT, CONSTRUCTION TRASH OR DEBRIS, ECT. IN THE DRAINAGE COURSE OR ASSOCIATED FLOOD PLAIN.
30. GRADING EQUIPMENT MUST CROSS FLOWING STREAMS BY THE MEANS OF BRIDGING OR CULVERTS, EXCEPT WHEN SUCH METHODS ARE NOT FEASIBLE; ALL STREAM CROSSINGS WILL BE PERFORMED IN ACCORDANCE WITH THE LATEST REVISION OF THE "MANUAL FOR EROSION AND SEDIMENTATION CONTROL IN GEORGIA."
31. DISCHARGE OF STORM–WATER RUN–OFF FROM DISTURBED AREAS TO A STREAM SHALL BE CONTROLLED TO THE EXTENT THAT TURBIDITY OF THE STREAM DOWNSTREAM FROM THE DISCHARGE SHALL NOT EXCEED 25 NEPHELOMETRIC TURBIDITY UNITS HIGHER THAN THE TURBIDITY LEVEL OF THE RECEIVING STREAM IMMEDIATELY UPSTREAM FROM THE STORM–WATER RUN–OFF DISCHARGE AT THE TIME OF SUCH DISCHARGE.
32. DISPOSE OF WASTE SOILS AND CLEARED AND GRUBBED & CONSTRUCTION DEBRIS OFF–SITE AT AN APPROVED LANDFILL SECURED BY THE CONTRACTOR, AND IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS.
33. ALL SOLID WASTE IS TO BE HAULED OFF–SITE. STUMPS AND CONSTRUCTION DEBRIS SHALL BE DEPOSITED IN A PROPERLY PERMITTED LANDFILL.
34. **NON-EXEMPT ACTIVITIES SHALL NOT BE CONDUCTED WITHIN THE 25 OR 50-FOOT UNDISTURBED STREAM BUFFER AS MEASURED FROM THE POINT OF WRESTED VEGETATION OR WITHIN 25-FEET OF THE COASTAL MARSHLAND BUFFER AS MEASURED FROM THE JURISDICTIONAL DETERMINATION LINE WITHOUT FIRST ACQUIRING THE NECESSARY VARIANCES AND PERMITS.**
35. WEEKLY EROSION AND SEDIMENT CONTROL REPORTS SHALL BE SUBMITTED TO THE DEVELOPMENT DEPARTMENT STARTING WITH THE ISSUANCE OF THE DEVELOPMENT PERMIT AND ENDING WHEN THE PROJECT IS RELEASED BY THE INSPECTOR.
36. ANY AMENDMENTS/REVISIONS TO THE ES&PC PLAN WHICH HAVE A SIGNIFICANT EFFECT ON BMPS WITH A HYDRAULIC COMPONENT MUST BE CERTIFIED BY THE DESIGN PROFESSIONAL.
37. SEE DETAIL PAGES FOR CHART WITH SYMBOLS, DETAILS, AND DESCRIPTIONS OF FULL EROSION CONTROL MEASURES.
38. ALL TREE PROTECTION FENCING TO BE INSPECTED DAILY AND REPLACED OR REPAIRED AS NEEDED.
39. ALL TREE PROTECTION DEVICES ARE TO BE INSTALLED PRIOR TO THE START OF LAND DISTURBANCE AND MAINTAINED UNTIL FINAL LANDSCAPING IS INSTALLED.
40. NO PARKING, STORAGE, OR OTHER CONSTRUCTION SITE ACTIVITIES ARE TO OCCUR WITHIN THE TREE PROTECTION AREAS.
41. ALL REQUIRED VEGETATION MUST BE MAINTAINED FOR TWO GROWING SEASONS AFTER THE DATE OF FINAL INSPECTION.
42. ALL OTHER TREE PROTECTION AREAS TO BE PROTECTED FROM SEDIMENTATION.
43. THE DESIGN PROFESSIONAL WHO PREPARED THE ES&PC PLAN IS TO INSPECT THE INSTALLATION OF THE INITIAL SEDIMENT STORAGE REQUIREMENTS, PERIMETER CONTROL BMPS, AND SEDIMENT BASINS WITHIN 7 DAYS AFTER INSTALLATION.

PRODUCT SPECIFIC PRACTICES

1. PETROLEUM BASED PRODUCTS – CONTAINERS FOR PRODUCTS SUCH AS FUELS, LUBRICANTS AND TARS WILL BE INSPECTED DAILY FOR LEAKS AND SPILLS. THIS INCLUDES ON–SITE VEHICLE AND MACHINERY DAILY INSPECTIONS AND REGULAR PREVENTATIVE MAINTENANCE OF SUCH EQUIPMENT. EQUIPMENT MAINTENANCE AREAS WILL BE LOCATED AWAY FROM STATE WATERS, NATURAL DRAINS AND STORM WATER DRAINAGE INLETS. IN ADDITION, TEMPORARY FUELING TANKS SHALL HAVE A SECONDARY CONTAINMENT LINER TO PREVENT/MINIMIZE SITE CONTAMINATION. DISCHARGE OF OILS, FUELS AND LUBRICANTS IS PROHIBITED. PROPER DISPOSAL METHODS WILL INCLUDE COLLECTION IN A SUITABLE CONTAINER AND DISPOSAL AS REQUIRED BY LOCAL AND STATE REGULATIONS.
2. PAINTS/FINISHES/SOLVENTS – ALL PRODUCTS WILL BE STORED IN TIGHTLY SEALED ORIGINAL CONTAINERS WHEN NOT IN USE. EXCESS PRODUCT WILL NOT BE DISCHARGED TO THE STORM WATER COLLECTION SYSTEM. EXCESS PRODUCT, MATERIALS USED WITH THESE PRODUCTS AND PRODUCT CONTAINERS WILL BE DISPOSED OF ACCORDING TO MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
3. CONCRETE TRUCK WASHING – NO CONCRETE TRUCKS WILL BE ALLOWED TO WASH OUT OR DISCHARGE SURPLUS CONCRETE OR DRUM WASH WATER ONSITE.
4. FERTILIZER/HERBICIDES – THESE PRODUCTS WILL BE APPLIED AT RATES THAT DO NOT EXCEED THE MANUFACTURER'S SPECIFICATIONS OR ABOVE THE GUIDELINES SET FORTH IN THE CROP ESTABLISHMENT OR IN THE GSWCC MANUAL FOR EROSION AND SEDIMENT CONTROL IN GEORGIA. ANY STORAGE OF THESE MATERIALS WILL BE UNDER ROOF IN SEALED CONTAINERS.
5. BUILDING MATERIALS – NO BUILDING OR CONSTRUCTION MATERIALS WILL BE BURIED OR DISPOSED OF ONSITE. ALL SUCH MATERIAL WILL BE DISPOSED OF USING PROPER WASTE DISPOSAL PROCEDURES.

SOIL CLEANUP AND CONTROL PRACTICES

1. LOCAL, STATE AND MANUFACTURER'S RECOMMENDED METHODS FOR SPILL CLEANUP WILL BE CLEARLY POSTED AND PROCEDURES WILL BE MADE AVAILABLE TO SITE PERSONNEL.
2. MATERIAL AND EQUIPMENT NECESSARY FOR SPILL CLEANUP WILL BE KEPT IN THE MATERIAL STORAGE AREAS. TYPICAL MATERIALS AND EQUIPMENT INCLUDES, BUT IS NOT LIMITED TO, BROOMS, DUSTPANS, MAPS, RAGS, GLOVES, GOGGLES, CAT LITTER, SAND, SAWDUST AND PROPERLY LABELED PLASTIC AND METAL WASTE CONTAINERS.
3. SPILL PREVENTION PRACTICES AND PROCEDURES WILL BE REVIEWED AFTER A SPILL AND ADJUSTED AS NECESSARY TO PREVENT FUTURE SPILLS.
4. ALL SPILLS WILL BE CLEANED UP IMMEDIATELY UPON DISCOVERY. ALL SPILLS WILL BE REPORTED AS REQUIRED BY LOCAL, STATE AND FEDERAL REGULATIONS.
5. FOR SPILLS THAT IMPACT SURFACE WATER (LEAVE A SHEEN ON SURFACE WATER), THE NATIONAL RESPONSE CENTER (NRC) WILL BE CONTACTED WITHIN 24 HOURS AT 1–800–426–2675.
6. FOR SPILLS OF AN UNKNOWN AMOUNT, THE NATIONAL RESPONSE CENTER (NRC) WILL BE CONTACTED WITHIN 24 HOURS AT 1–800–426–2675.
7. FOR SPILLS GREATER THAN 25 GALLONS AND NO SURFACE WATER IMPACT, THE GEORGIA EPD WILL BE CONTACTED WITHIN 24 HOURS.
8. FOR SPILLS LESS THAN 25 GALLONS AND NO SURFACE WATER IMPACT, THE SPILL WILL BE CLEANED UP AND LOCAL AGENCIES WILL BE CONTACTED AS REQUIRED.
9. THE CONTRACTOR SHALL NOTIFY THE LICENSED PROFESSIONAL WHO PREPARED THIS PLAN IF MORE THAN 1,320 GALLONS OF PETROLEUM IS STORED ONSITE (THIS INCLUDES CAPACITIES OF EQUIPMENT) OR IF ANY ONE PIECE OF EQUIPMENT HAS A CAPACITY GREATER THAN 660 GALLONS. THE CONTRACTOR WILL NEED A SPILL PREVENTION CONTAINMENT AND COUNTERMEASURES PLAN PREPARED BY THAT LICENSED PROFESSIONAL.
10. SPILL AREA WILL BE KEPT WELL VENTILATED AND PERSONNEL WILL WEAR APPROPRIATE PROTECTIVE CLOTHING TO PREVENT INJURY FROM CONTACT WITH A HAZARDOUS SUBSTANCE
11. SPILLS OF TOXIC OR HAZARDOUS MATERIAL WILL BE REPORTED TO THE APPROPRIATE STATE OR LOCAL GOVERNMENT AGENCY REGARDLESS OF THE SIZE.
12. THE SPILL PREVENTION PLAN WILL BE ADJUSTED TO INCLUDE MEASURES TO PREVENT THIS TYPE OF SPILL FROM REOCCURRING AND HOW TO CLEAN UP THE SPILL IF THERE IS ANOTHER ONE. A DESCRIPTION OF THE SPILL, WHAT CAUSED IT, AND THE CLEANUP MEASURES WILL ALSO BE INCLUDED.
13. THE CONTRACTOR'S SITE SUPERINTENDENT RESPONSIBLE FOR THE DAY–TO–DAY SITE OPERATIONS WILL BE THE SPILL PREVENTION AND CLEANUP COORDINATOR. HE WILL DESIGNATE AT LEAST ONE OTHER SITE PERSON WHO WILL RECEIVE SPILL PREVENTION AND CLEANUP TRAINING. THIS INDIVIDUAL WILL BECOME RESPONSIBLE FOR A PARTICULAR PHASE OF PREVENTION AND CLEANUP. THE NAMES OF RESPONSIBLE SPILL PERSONNEL WILL BE POSTED IN THE MATERIAL STORAGE AREA AND IN THE OFFICE TRAILER ONSITE (OR DESIGNATED ONSITE JOB LOCATION).

CONCRETE TRUCKS

1. CONCRETE TRUCK DRUMS WILL NOT BE WASHED OUT ONSITE.
2. SURPLUS CONCRETE WILL NOT BE DISCARDED ONSITE.
3. CONCRETE TRUCK SHOOTS AND TOOLS WILL BE WASHED OUT IN THE ADJACENT PARKING LOT TO THE DAM, AND WILL BE CONTAINED AND PREVENTED FROM ENTERING THE STORM DRAINAGE SYSTEM AND LAKE.
4. NO WATER FROM WASHING OFF TOOLS OR SHOOTS WILL LEAVE THE SITE OR DRAIN ONTO UNDISTURBED AREAS.

STREAM BUFFER ENCROACHMENT

1. DUE TO THE NATURE OF A LOW DRAIN REHAB PROJECT, WORK WILL OCCUR IN 0.08 ACRES OF STREAM BUFFER OF NORTH FORK NANCY CREEK. SINCE THE ENCROACHMENT IS ASSOCIATED WITH A DRAINAGE STRUCTURE THAT MUST BE CONSTRUCTED IN A STREAM BUFFER, THE WORK IS EXEMPT FROM A STREAM BUFFER VARIANCE PER GADNR RULES 391-3-7.05(1)(B) and 391-3-7.05(1)(C).

UTILITY CONTACTS

GAS	WATER & SEWER	POWER
AGL RESOURCES MARTIN MAREK 404–584–4126	DEKALB COUNTY WATER & SEWER JEFF WOODS 770–724–1490	GEORGIA POWER IKE COLLINS 404–506–4569
TELECOM	**DEKALB**	**TELECOMUNICATIONS**
AT&T DISTRIBUTION ANGELO HINES 770–784–3972	DEKALB COUNTY TRAFFIC & SAFETY K. COLLINS KACOLLINS@DEKALBCOUNTYGA.GOV	COMCAST COMMUNICATIONS SANDRA ANDREWS 770–559–6879

TELECOM	TELECOM	TELECOM	TELECOM
LEVEL 3 COMMUNICATIONS, INC 877–366–8344 EXT. 3	VERIZON/MCI DENNIS RAINEY 478–471–1042	CENTURYLINK 888–723–8010	ZAYO FIBER SOLUTIONS NIC FLORES 678–666–2493

LEGEND

CURB AND GUTTER (C&G)
FENCE
HANDRAIL
STORM DRAIN LINE
SANITARY SEWER
WATER LINE
GAS LINE
UNDERGROUND POWER LINE
OVERHEAD POWER LINE
COMMUNICATION
TOPOGRAPHIC CONTOUR
PROPERTY LINE
GUARD RAIL
WET WEATHER DITCH
WATER SPIGOT
CATCH BASIN (DWCB)
CATCH BASIN (SWCB)
DROP INLET (DI)
JUNCTION BOX (JB)
HEAD WALL (HW)
CURB INLET (CI)
FLARED END SECTION (FES)
OUTLET CONTROL STRUCTURE
YARD DRAIN INLET
SS MANHOLE (MH)
CLEAN OUT (CO)
IRRIGATION CONTROL VALVE
FIRE HYDRANT (FH)
WATER VALVE (WV)
WATER METER (WM)
FIRE DEPT. CONNECTION (FDC)
WATER VALVE MARKER
TRANSFORMER BOX (TX)
AIR CONDITIONER (AC)
ELECTRIC METER (EM)
ELECTRIC UTILITY
LIGHT POLE (LP)
POWER POLE WITH LIGHT
POWER POLE (PP)
UTILITY MANHOLE (UM)
SPOTLIGHT
GAS METER (GM)
GAS VALVE (GV)
TELEPHONE PEDESTAL
COMMUNICATION BOX
BOLLARD (BO)
MAIL BOX
SIGN
X 1000.00 SPOT ELEVATION
CONCRETE AREA
OVERHANG AREA
RIP-RAP AREA
BRICK AREA
TREELINE

ABBREVIATIONS

A	ARC LENGTH	IPS	IRON PIN SET (CAPPED)
AC.	ACRE	N/F	NOW OR FORMERLY
AE	ACCESS EASEMENT	OTP	OPEN TOP PIPE
BSL	BUILDING SETBACK LINE	PB.	PLAT BOOK
BW	BARBWIRE	PG.	PAGE
CH	CHORD LENGTH	POB	POINT OF BEGINNING
CLF	CHAIN LINK FENCE	POC	POINT OF COMMENCEMENT
CMF	CONCRETE MONUMENT FOUND	R	RADIUS LENGTH
CMP	CORRUGATED METAL PIPE	R/W	RIGHT OF WAY
CONC.	CONCRETE	R/W MON	RIGHT OF WAY MONUMENT
CTP	CRIMP TOP PIPE	RB	REBAR
DB.	DEED BOOK	RCP	REINFORCED CONCRETE PIPE
DIP	DUCTILE IRON PIPE	SDE	STORM DRAINAGE EASEMENT
FDC	FIRE DEPARTMENT CONNECTION	SQ. FT.	SQUARE FEET
FND	FOUND	SSE	SANITARY SEWER EASEMENT
HDPE	HIGH DENSITY POLYETHYLENE PIPE	WPF	WOOD PRIVACY FENCE
IPF	IRON PIN FOUND		

TREE LEGEND (ABBREVIATIONS)

DECIDUOUS (TREE)
CONIFEROUS (TREE)

BIR	BIRCH	HLY	HOLLY
BCH	BEECH	HW	HARDWOOD
CM	CRAPE MYRTLE	MAG	MAGNOLIA
CHY	CHERRY	MAP	MAPLE
CYP	CYPRESS	OAK	OAK
FIR	FIR	ORN	ORNAMENTAL
GINGKO	GINGKO	PEAR	PEAR
GUM	SWEET GUM	POP	POPLAR
HIC	HICKORY	SYC	SYCAMORE

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MURPHEY CANDLER PARK DAM CMP SPILLWAY REPAIR

CITY OF BROOKHAVEN
DEPARTMENT OF PUBLIC WORKS

SEAL

GEORGIA REGISTERED No. 24408 PROFESSIONAL ENGINEER SAMUEL L. FLEMING 6/24/2022

COUNTY APPROVAL

SCALE

NO.	DESCRIPTION	DATE
5	BROOKHAVEN REVISIONS	6/24/2022
4	GASDP REVISIONS v2	4/7/2022
3	GASDP REVIEW REVISIONS	2/16/2022
2	100 PERCENT SUBMITTAL	12/17/2021
1	90 PERCENT SUBMITTAL	11/24/2021

REVISIONS

DRAWN BY: DT
APPROVED BY: SF
CHECKED BY: MH
DATE: 6/24/2022

TITLE
GENERAL NOTES

PROJECT NO. ----

SHEET NO.
C-001

APPROVED PLAN 07/12/2022
Permit # MS22-00050

1/22/2016 9:07:15 AM
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ABBREVIATIONS

A	ARC LENGTH	IPS	IRON PIN SET (CAPPED)
AE	ACCESS EASEMENT	N/F	NOW OR FORMERLY
BSL	BUILDING SETBACK LINE	OTP	OPEN TOP PIPE
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FND	FOUND	SQ. FT.	SQUARE FEET
HDPE	HIGH DENSITY POLYETHYLENE PIPE	SSE	SANITARY SEWER EASEMENT
IPF	IRON PIN FOUND	WPF	WOOD PRIVACY FENCE

LINE TABLE

L34	N 71° 58' 41" E	16,97'
L35	N 88° 16' 49" E	17,50'
L36	N 78° 06' 07" E	39,74'
L37	N 79° 38' 04" E	19,32'
L38	N 25° 16' 40" W	37,04'

SCALE: 1" = 40'

GRID (GA WEST ZONE) NADB3

N/F ASHFORD PLACE CONDOMINIUM ASSOCIATION PB. 4 PG. 3 ZONED: R-100

GEORGIA REGISTERED No. 2577 LAND SURVEYOR WILLIAM C. WOHLFORT JR.

FLOOD ZONE LEGEND

FLOOD ZONE AREA

(SEE SHEET 13 FOR FLOOD ZONE DETAIL)

JOB NUMBER 2016-097 PLOT SIZE 24 X 36

TerraMark Land Surveying, Inc.
1396 Bells Ferry Road
Marietta, Georgia 30066
Phone No. (770) 421-1927
Fax No. (770) 421-0552
www.TerraMark.com
Professional Land Surveying C. O. A.# LSF000810

TerraMark

Revision	Date

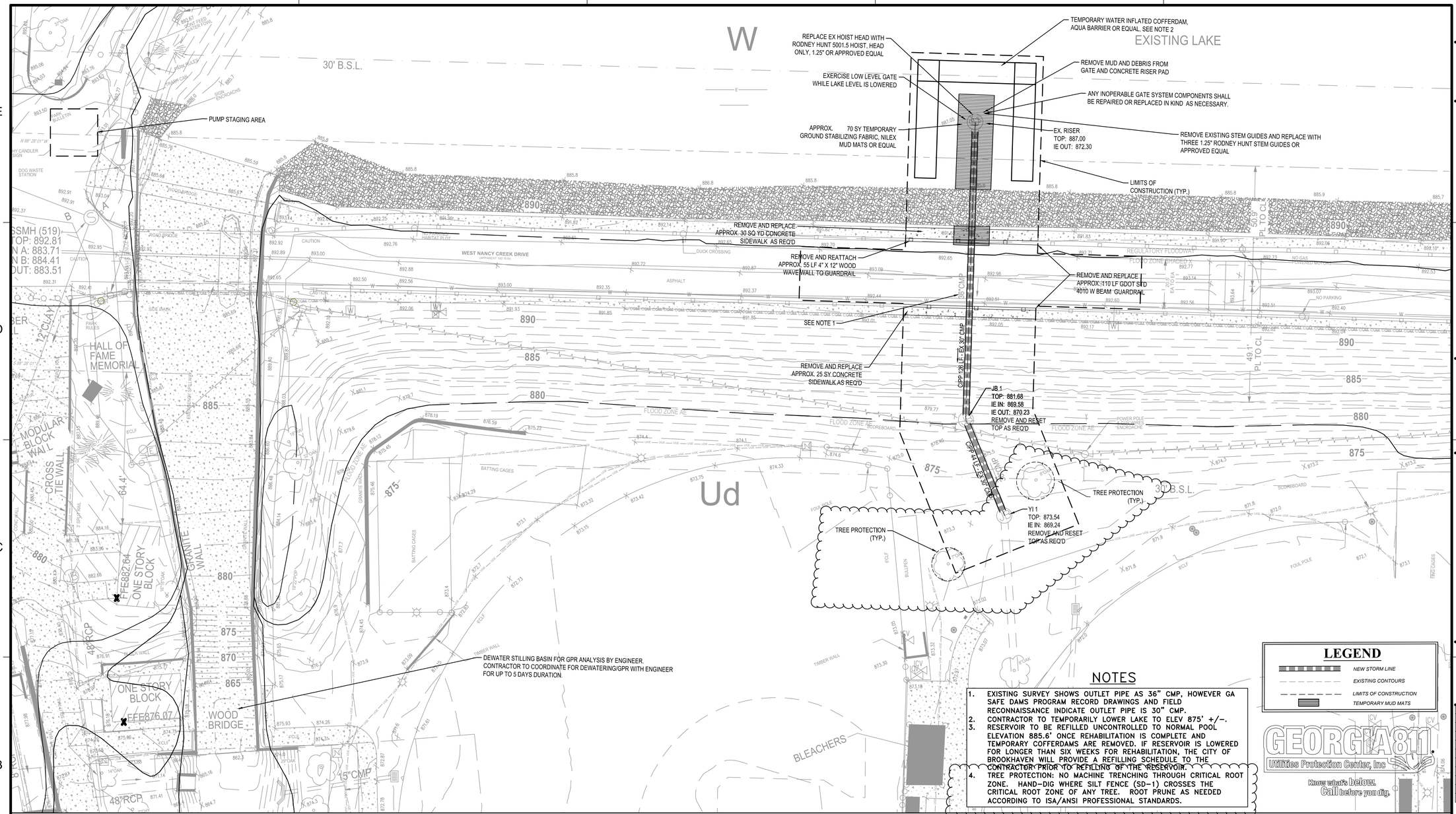
Project No.	2016-097	No	#1	#2	#3	#4	#5
Survey Crew:	VM, DW						
Drawn By:	NEC						
Approved By:	WCW						
Date:	08/22/16	#6	#7	#8			
Scale:	1"=40'	PATH: S:\SURVEY\2016\2016-097\DGN\ TOPO.DGN					

BOUNDARY AND TOPOGRAPHIC SURVEY
FOR
THE CITY OF BROOKHAVEN
(MURPHEY CANDLER PARK)
LOCATED IN
LAND LOTS 326, 327 & 331, 18TH DISTRICT
DEKALB COUNTY, GEORGIA

SHEET NO.
6
13

DRAWING# TM 16 097

APPROVED PLAN 07/12/2022
Permit # MS22-00050



NOTES

1. EXISTING SURVEY SHOWS OUTLET PIPE AS 36" CMP, HOWEVER GA SAFE DAMS PROGRAM RECORD DRAWINGS AND FIELD RECONNAISSANCE INDICATE OUTLET PIPE IS 30" CMP.
2. CONTRACTOR TO TEMPORARILY LOWER LAKE TO ELEV 875' +/-.
3. RESERVOIR TO BE REFILLED UNCONTROLLED TO NORMAL POOL ELEVATION 885.6' ONCE REHABILITATION IS COMPLETE AND TEMPORARY COFFERDAMS ARE REMOVED. IF RESERVOIR IS LOWERED FOR LONGER THAN SIX WEEKS FOR REHABILITATION, THE CITY OF BROOKHAVEN WILL PROVIDE A REFILLING SCHEDULE TO THE CONTRACTOR PRIOR TO REFILLING OF THE RESERVOIR.
4. TREE PROTECTION: NO MACHINE TRENCHING THROUGH CRITICAL ROOT ZONE. HAND-DIG WHERE SILT FENCE (SD-1) CROSSES THE CRITICAL ROOT ZONE OF ANY TREE. ROOT PRUNE AS NEEDED ACCORDING TO ISA/ANSI PROFESSIONAL STANDARDS.

LEGEND

- NEW STORM LINE
- EXISTING CONTOURS
- LIMITS OF CONSTRUCTION
- TEMPORARY MUD MATS

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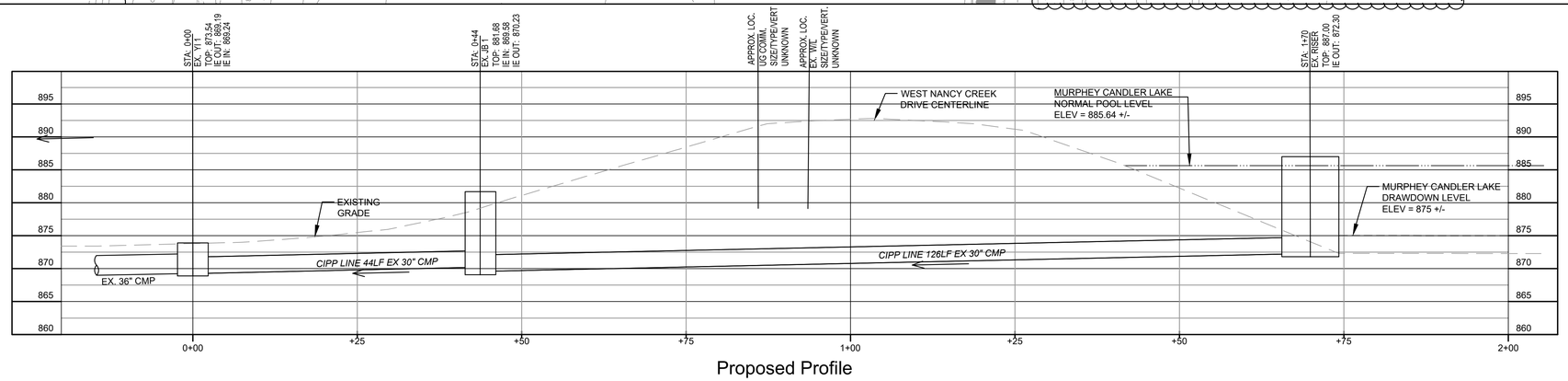

Proposed Profile

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

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MURPHEY CANDLER PARK DAM CMP SPILLWAY REPAIR

CITY OF BROOKHAVEN
DEPARTMENT OF PUBLIC WORKS

SEAL

GEORGIA REGISTERED No. 24408 PROFESSIONAL ENGINEER SAMUEL L. FLEMING

COUNTY APPROVAL

SCALE
0' 10' 20' 40'
SCALE: 1" = 20'

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REVISIONS

DRAWN BY	DT
APPROVED BY	SF
CHECKED BY	MH
DATE	6/24/2022

TITLE

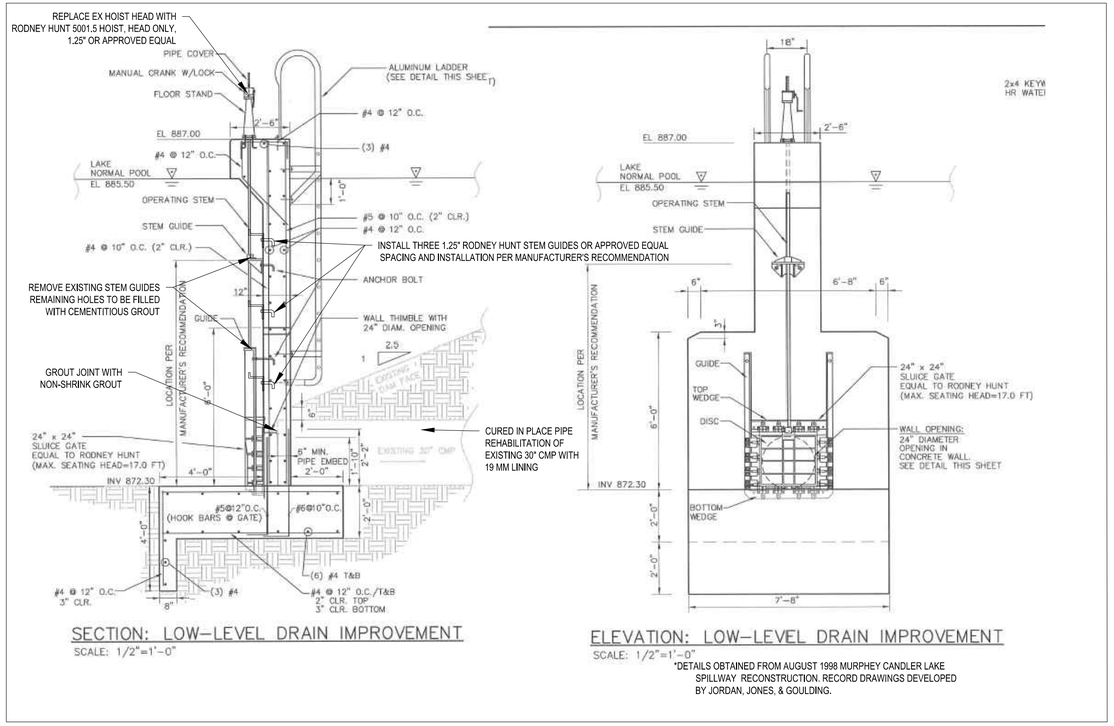
CONSTRUCTION PLAN & PROFILE

PROJECT NO. ----

CP-101

SHEET NO.

APPROVED PLAN 07/12/2022
Permit # MS22-00050



Topsoiling Tp

DEFINITION
Stripping off the more fertile top soil, storing it, then spreading it over the disturbed area after completion of construction activities.

PURPOSE
To provide a suitable soil medium for vegetative growth on areas where other measures will not produce or maintain a desirable stand.

CONDITIONS
This practice is recommended for sites of 2:1 or flatter slopes where:

1. The texture of the exposed subsoil or parent material is not suitable to produce adequate vegetative growth.
2. The soil material is so shallow that the rooting zone is not deep enough to support plants with continuing supplies of moisture and food.
3. The soil to be vegetated contains material toxic to plant growth.

CONSTRUCTION SPECIFICATIONS
Materials
Topsoil should be friable and loamy, free of debris, objectionable weeds and stones and contain no toxic substance that may be harmful to plant growth. A pH range of 5.0-7.5 is acceptable. Soluble salts should not exceed 500 ppm.

Testing
Field exploration should be made to determine whether the quantity and quality of surface soil justifies stripping.

Stripping
Stripping should be confined to the immediate construction area.

A 4 to 6 inch stripping depth is common, but may vary depending on the particular soil.

Topsoil pH
If pH value is less than 6.0, lime shall be applied and incorporated with the topsoil to adjust the pH to 6.5 or higher. Topsoils containing soluble salts greater than 500 parts per million shall not be used.

Stockpiles
The location of topsoil stockpiles should not obstruct natural drainage or cause off-site environmental damage.

Stabilization
Stockpiles shall be contained by sediment barriers to prevent sedimentation on adjacent areas. Stockpiles shall be stabilized in accordance **with specifications Ds1 and Ds2 - Disturbed Area Stabilization (With Mulching) and (With Temporary Grassing), respectively, or Tac-Tackifiers.**

Site Preparation
(Where topsoil is to be added)

Topsoiling - When topsoiling, maintain needed erosion control practices such as diversions, grade stabilization structures, berms, dikes, level spreaders, waterways, sediment basins, etc.

Grading - Grades on the areas to be topsoiled that have been previously established shall be maintained.

Liming - Soil tests should be used to determine the pH of the soil. Where the pH of the subsoil is 5.0 or less or composed of heavy clays, agricultural limestone shall be spread at the rate of 100 pounds per 1,000 square feet. Lime shall be distributed uniformly over designated areas and worked into the soil in conjunction with tillage operations as described in the following procedure.

Bonding - Use one of the following methods to insure bonding of topsoil and subsoil:

1. Tilling. After the areas to be topsoiled have been brought to grade, and immediately prior to dumping and spreading the topsoil, the subgrade shall be loosened by discing or scarifying to a depth of at least 3 inches to permit bonding of the topsoil to the subsoil.
2. Tracking. Passing a bulldozer over the entire surface area of the slope to leave horizontal depressions.

Applying Topsoil
1. Topsoil should be handled only when it is dry enough to work without damaging soil structure.
2. A uniform application of 5 inches (unsettled) is recommended, but may be adjusted at the discretion of the design professional.

Table 6-37.1. Cubic Yards Of Topsoil Required For Application To Various Depths

Depth (Inches)	Per 1,000 Square Feet	Per Acre
1	3.1	134
2	6.2	268
3	9.3	403
4	12.4	537
5	15.5	672
6	18.6	806

Stems and Stem Guide

RODNEY HUNT®

1.Stems are shipped with thrust nuts and couplings attached. These should be removed before installation.

2.Stem guide brackets should be mounted tightly to the wall with anchor bolts positioned in concrete as indicated in the installation drawings. The stem guide, or collar, should be loose on the bracket.

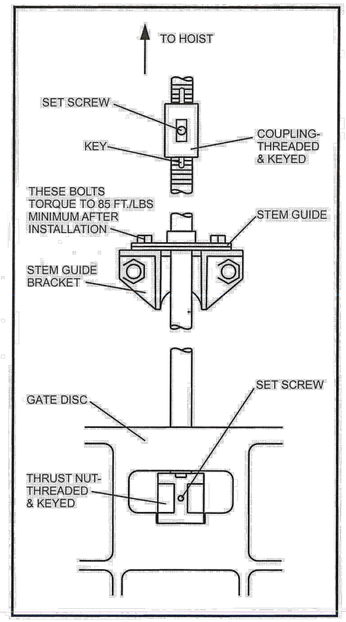
3.The lowest section of the stem should be lowered through the holes in the upper disc ribs and threaded into the bronze thrust nut until the stem is flush with the bottom of the nut.

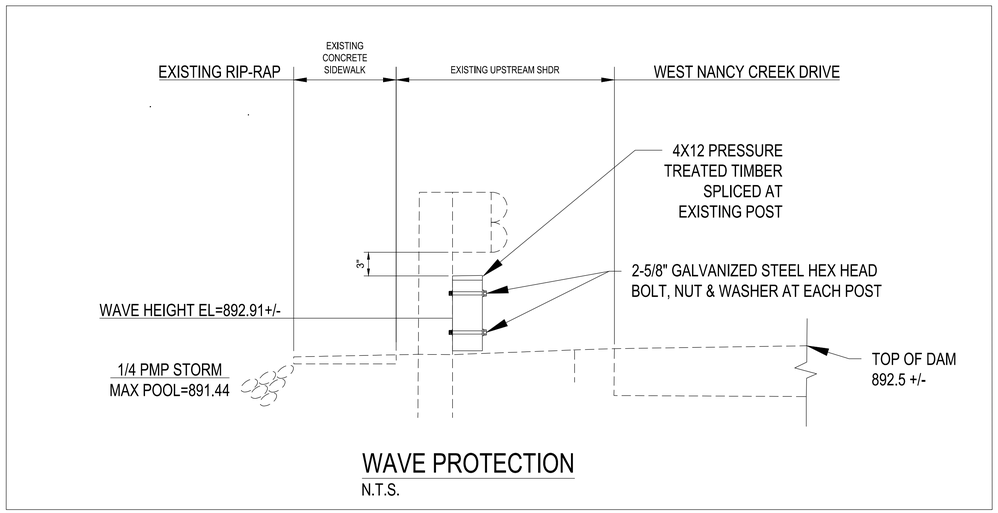
4.The gib head key is inserted from the top and the locking set screw should be tightened. The stem should be lightly supported as it passes through stem guides in the proper sequence.

5.Stem couplings, where required, should be threaded onto the lower section of the stem. The upper section of the stem is then threaded into the coupling. Take care to make sure the coupling is threaded an equal amount onto each stem.

6.The key should then be inserted and locked in place by means of the set screw.

7.The threaded section of stem should be cleaned and checked to make sure that no damage has occurred to the threads during installation.





WAVE PROTECTION
N.T.S.

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SCALE: 1" = 20'

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2	100 PERCENT SUBMITTAL	12/17/2021
1	90 PERCENT SUBMITTAL	11/24/2021

REVISIONS

DRAWN BY	DT
APPROVED BY	SF
CHECKED BY	MH
DATE	6/24/2022

TITLE

DETAILS

PROJECT NO. ----

CU-501

SHEET NO.

APPROVED PLAN 07/12/2022
Permit # MS22-00050

SPECIES	BROADCAST PER ACRE	BROADCAST PER 1000 SF	RESOURCE AREA	PLANTING DATES J F M A M J J A S O N D	REMARKS
BARLEY			M–L P C		14,000 SEED PER POUND WINTER HARDY. USE ON PRODUCTIVE SOILS
ALONE	144 LBS	3.3 LBS			
IN MIXTURE	24 LBS	0.6 LBS			
MILLET, BROWN TOP			M–L P C		137,000 SEED PER POUND, QUICK DENSE COVER. WILL PROVIDE TOO MUCH COMPETITION IN MIXTURES IF SEEDED AT HIGH RATES
ALONE	40 LBS	0.9 LBS			
IN MIXTURE	10 LBS	0.2 LBS			
RYE			M–L P C		18,000 SEED PER POUND. QUICK COVER. DROUGHT TOLERANT AND WINTER HARDY
ALONE	3 BU	3.9 LBS			
IN MIXTURE	1/2 BU	0.6 LBS			
RYEGRASS, ANNUAL			M–L P C		227,000 SEED PER POUND. DENSE COVER. VERY COMPETITIVE AND IS NOT TO BE USED IN MIXTURES.
ALONE	40 LBS	0.9 LBS			

M–L REPRESENTS TO MOUNTAIN; BLUE RIDGE; AND RIDGES AND VALLEYS MLRA'S

C REPRESENTS THE SOUTHERN COASTAL PLAIN; SAND HILLS; AND ATLANTIC COAST. FLATWOODS MLRA'S

DISTURBED AREA STABILIZATION (TEMP)

SCALE:NTS E42

Ds2

TYPE OF SPECIES	YEAR	ANALYSIS OR EQUIVALENT N–P–K	RATE	N TOP DRESSING RATE
1. COOL SEASON GRASSES	FIRST SECOND MAINTENANCE	6–12–12 6–12–12 10–10–10	1500 LBS/AC 1000 LBS/AC 400 LBS/AC	50–100 LBS/AC 1/2/ – 30
2. COOL SEASON GRASSES AND LEGUMES	FIRST SECOND MAINTENANCE	6–12–12 0–10–10 0–10–10	1500 LSB/AC 1000 LBS/AC 400 LBS/AC	0–50 LBS/AC 1/ – –
3. GROUND COVERS	FIRST SECOND MAINTENANCE	10–10–10 10–10–10 10–10–10	1300 LBS/AC 3/ 1300 LBS/AC 3/ 1100 LBS/AC	– – –
4. SHRUBS	FIRST MAINTENANCE	0–10–10 0–10–10	700 LBS/AC 700 LBS/AC 4/	– –
5. TEMPORARY COVER CROPS SEEDED ALONE	FIRST	10–10–10	500 LBS/AC	30 LBS/AC 5/
6. WARM SEASON GRASSES	FIRST SECOND MAINTENANCE	6–12–12 6–12–12 10–10–10	1500 LBS/AC 800 LBS/AC 400 LBS/AC	50–100 LBS/AC 2/6/ 50–100 LBS/AC 2/ 30 LBS/AC
7. WARM SEASON GRASSES AND LEGUMES	FIRST SECOND MAINTENANCE	6–12–12 0–10–10 0–10–10	1500 LBS/AC 1000 LBS/AC 400 LBS/AC	50 LBS/AC 6/

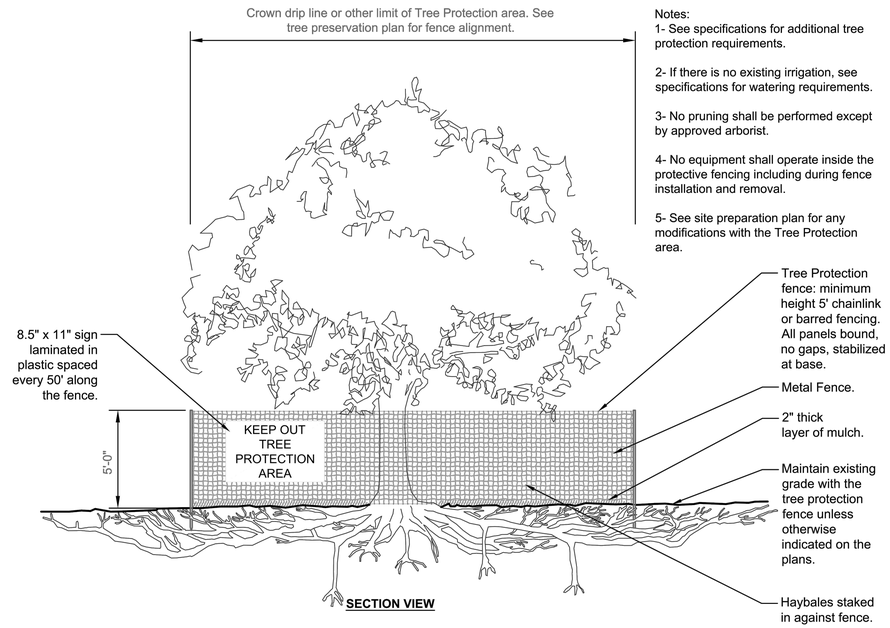
MULCHING RATES:
1. DRY STRAW: 2 TONS PER ACRE.
2. DRY HAY: 2–1/2 TONS PER ACRE.
3. FOR HYDRAULIC SEEDING USE WOOD CELLULOSE MULCH OR WOOD PULP FIBER AT THE RATE OF 500 POUNDS PER ACRE.

1/ APPLY IN SPRING FOLLOWING SEEDING.
2/ APPLY IN SPLIT APPLICATIONS WHEN HIGH RATES ARE USED.
3/ APPLY IN 3 SPLIT APPLICATIONS.
4/ APPLY WHEN PLANTS ARE PRUNED.
5/ APPLY TO GRASS SPECIES ONLY.
6/ APPLY WHEN PLANTS GROW TO A HEIGHT OF 2 TO 4 INCHES.

FERTILIZER AND MULCHING REQUIREMENTS

SCALE:NTS E41

Ds1



Notes:
1- See specifications for additional tree protection requirements.

2- If there is no existing irrigation, see specifications for watering requirements.

3- No pruning shall be performed except by approved arborist.

4- No equipment shall operate inside the protective fencing including during fence installation and removal.

5- See site preparation plan for any modifications with the Tree Protection area.

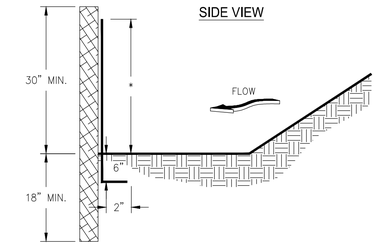
TREE PROTECTION

S-X

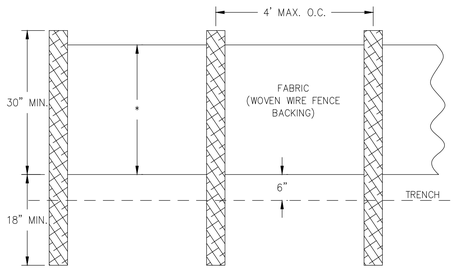
SILT FENCE - TYPE SENSITIVE

Sd1-S

SIDE VIEW



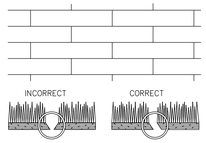
FRONT VIEW



NOTES:
1. USE STEEL POSTS WITH WIRE REINFORCEMENT OR AS SPECIFIED BY THE EROSION, SEDIMENTATION, AND POLLUTION CONTROL PLAN.
2. HEIGHT (*) IS TO BE SHOWN ON THE EROSION, SEDIMENTATION, AND POLLUTION CONTROL PLAN.

SOD MAINTENANCE AND INSTALLATION

SOD LAYOUT AND PREPARATION



LAY SOD IN A STAGGERED PATTERN. BUTT THE STRIPS TIGHTLY AGAINST EACH OTHER. DO NOT LEAVE SPACES AND DO NOT OVERLAP. A SHARPENED MASON'S TROWEL IS A HANDY TOOL FOR TUCKING DOWN THE ENDS AND TRIMMING PIECES.

BUTTING: ANGLED ENDS CAUSED BY THE AUTOMATIC SOD CUTTER MUST BE MATCHED CORRECTLY.

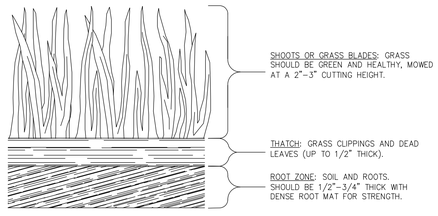
DIRECTIONS FOR INITIAL MAINTENANCE

Step 1. ROLL SOD IMMEDIATELY TO ACHIEVE FIRM CONTACT WITH THE SOIL

Step 2. WATER TO A DEPTH OF 4" AS NEEDED. WATER WELL AS SOON AS THE SOD IS LAID.

Step 3. MOW WHEN THE SOD IS ESTABLISHED -- IN 2–3 WEEKS. SET THE MOWER HIGH (2"–3").

APPEARANCE OF GOOD SOD



SHOOTS OR GRASS BLADES: GRASS SHOULD BE GREEN AND HEALTHY, MOWED AT A 2"–3" CUTTING HEIGHT.

THATCH: GRASS CLIPPINGS AND DEAD LEAVES (UP TO 1/2" THICK).

ROOT ZONE: SOIL AND ROOTS. SHOULD BE 1/2"–3/4" THICK WITH DENSE ROOT MAT FOR STRENGTH.

Ds4

Dewberry
DEWBERRY ENGINEERS INC.
2835 Brandywine Road
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Atlanta, GA 30341-4015
678.530.0022
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Expires 6/30/2022

MURPHEY CANDLER PARK DAM
CMP SPILLWAY REPAIR

CITY OF BROOKHAVEN
DEPARTMENT OF PUBLIC WORKS

SEAL

GEORGIA REGISTERED No. 24408 PROFESSIONAL ENGINEER SAMUEL L. FLEMING

COUNTY APPROVAL

SCALE
0' 10' 20' 40'
SCALE: 1" = 20'

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REVISIONS

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DATE	6/24/2022

TITLE

DETAILS

PROJECT NO. ----

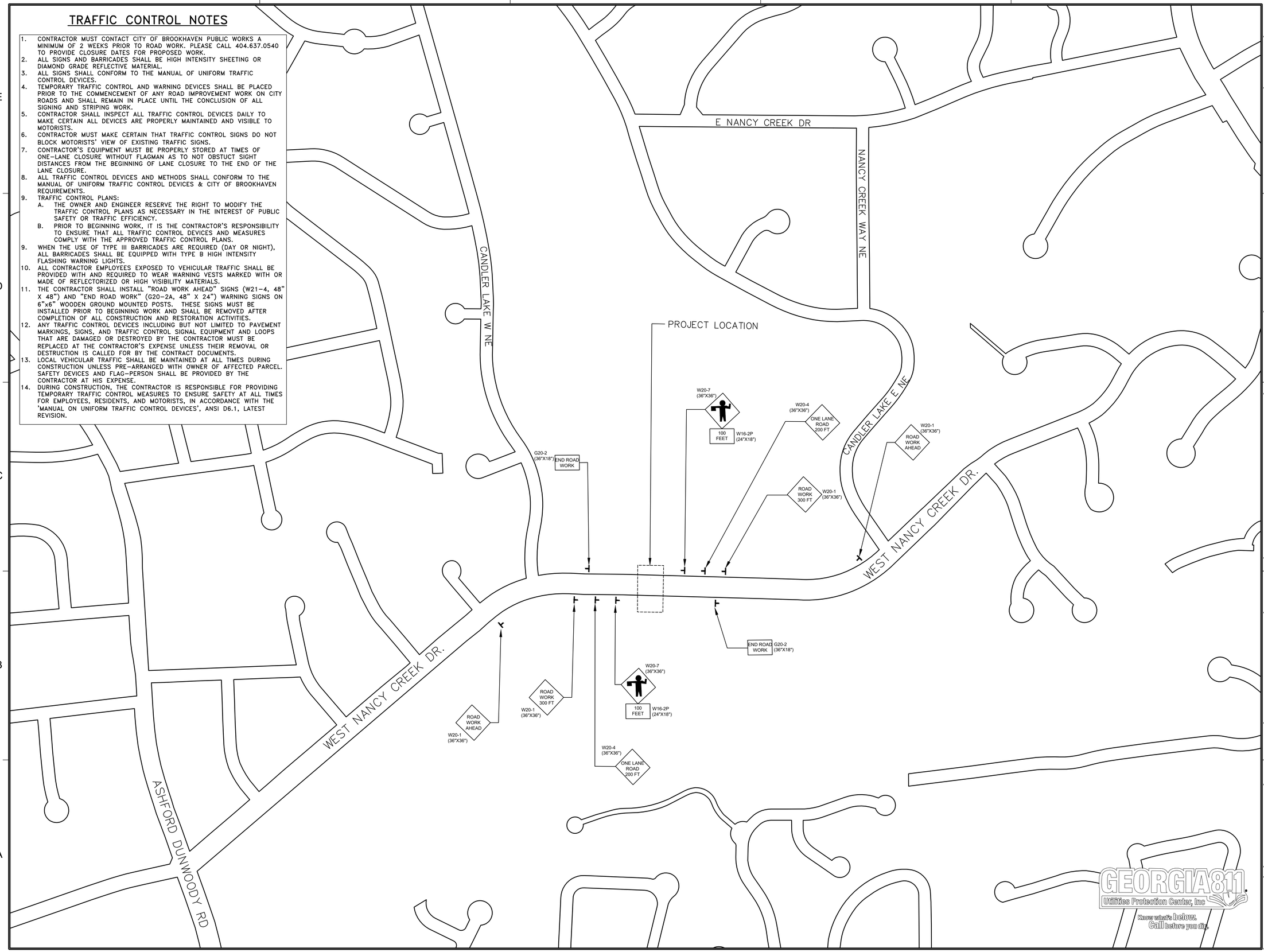
CU-502

SHEET NO.

APPROVED PLAN 07/12/2022
Permit # MS22-00050

TRAFFIC CONTROL NOTES

1. CONTRACTOR MUST CONTACT CITY OF BROOKHAVEN PUBLIC WORKS A MINIMUM OF 2 WEEKS PRIOR TO ROAD WORK. PLEASE CALL 404.637.0540 TO PROVIDE CLOSURE DATES FOR PROPOSED WORK.
2. ALL SIGNS AND BARRICADES SHALL BE HIGH INTENSITY SHEETING OR DIAMOND GRADE REFLECTIVE MATERIAL.
3. ALL SIGNS SHALL CONFORM TO THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
4. TEMPORARY TRAFFIC CONTROL AND WARNING DEVICES SHALL BE PLACED PRIOR TO THE COMMENCEMENT OF ANY ROAD IMPROVEMENT WORK ON CITY ROADS AND SHALL REMAIN IN PLACE UNTIL THE CONCLUSION OF ALL SIGNING AND STRIPING WORK.
5. CONTRACTOR SHALL INSPECT ALL TRAFFIC CONTROL DEVICES DAILY TO MAKE CERTAIN ALL DEVICES ARE PROPERLY MAINTAINED AND VISIBLE TO MOTORISTS.
6. CONTRACTOR MUST MAKE CERTAIN THAT TRAFFIC CONTROL SIGNS DO NOT BLOCK MOTORISTS' VIEW OF EXISTING TRAFFIC SIGNS.
7. CONTRACTOR'S EQUIPMENT MUST BE PROPERLY STORED AT TIMES OF ONE-LANE CLOSURE WITHOUT FLAGMAN AS TO NOT OBSTUCT SIGHT DISTANCES FROM THE BEGINNING OF LANE CLOSURE TO THE END OF THE LANE CLOSURE.
8. ALL TRAFFIC CONTROL DEVICES AND METHODS SHALL CONFORM TO THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES & CITY OF BROOKHAVEN REQUIREMENTS.
9. TRAFFIC CONTROL PLANS:
   A. THE OWNER AND ENGINEER RESERVE THE RIGHT TO MODIFY THE TRAFFIC CONTROL PLANS AS NECESSARY IN THE INTEREST OF PUBLIC SAFETY OR TRAFFIC EFFICIENCY.
   B. PRIOR TO BEGINNING WORK, IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT ALL TRAFFIC CONTROL DEVICES AND MEASURES COMPLY WITH THE APPROVED TRAFFIC CONTROL PLANS.
9. WHEN THE USE OF TYPE III BARRICADES ARE REQUIRED (DAY OR NIGHT), ALL BARRICADES SHALL BE EQUIPPED WITH TYPE B HIGH INTENSITY FLASHING WARNING LIGHTS.
10. ALL CONTRACTOR EMPLOYEES EXPOSED TO VEHICULAR TRAFFIC SHALL BE PROVIDED WITH AND REQUIRED TO WEAR WARNING VESTS MARKED WITH OR MADE OF REFLECTORIZED OR HIGH VISIBILITY MATERIALS.
11. THE CONTRACTOR SHALL INSTALL "ROAD WORK AHEAD" SIGNS (W21-4, 48" X 48") AND "END ROAD WORK" (G20-2A, 48" X 24") WARNING SIGNS ON 6"x6" WOODEN GROUND MOUNTED POSTS. THESE SIGNS MUST BE INSTALLED PRIOR TO BEGINNING WORK AND SHALL BE REMOVED AFTER COMPLETION OF ALL CONSTRUCTION AND RESTORATION ACTIVITIES.
12. ANY TRAFFIC CONTROL DEVICES INCLUDING BUT NOT LIMITED TO PAVEMENT MARKINGS, SIGNS, AND TRAFFIC CONTROL SIGNAL EQUIPMENT AND LOOPS THAT ARE DAMAGED OR DESTROYED BY THE CONTRACTOR MUST BE REPLACED AT THE CONTRACTOR'S EXPENSE UNLESS THEIR REMOVAL OR DESTRUCTION IS CALLED FOR BY THE CONTRACT DOCUMENTS.
13. LOCAL VEHICULAR TRAFFIC SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION UNLESS PRE-ARRANGED WITH OWNER OF AFFECTED PARCEL. SAFETY DEVICES AND FLAG-PERSON SHALL BE PROVIDED BY THE CONTRACTOR AT HIS EXPENSE.
14. DURING CONSTRUCTION, THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING TEMPORARY TRAFFIC CONTROL MEASURES TO ENSURE SAFETY AT ALL TIMES FOR EMPLOYEES, RESIDENTS, AND MOTORISTS, IN ACCORDANCE WITH THE 'MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES', ANSI D6.1, LATEST REVISION.



Dewberry

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MURPHEY CANDLER PARK DAM CMP SPILLWAY REPAIR

CITY OF BROOKHAVEN
DEPARTMENT OF PUBLIC WORKS

SEAL

GEORGIA REGISTERED No. 24408 PROFESSIONAL ENGINEER SAMUEL L. FLEMING 6/24/22

COUNTY APPROVAL

SCALE

0' 100' 200' 400'

SCALE: 1" = 200'

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TITLE

OVERALL TRAFFIC CONTROL PLAN

PROJECT NO. ----

CD-101

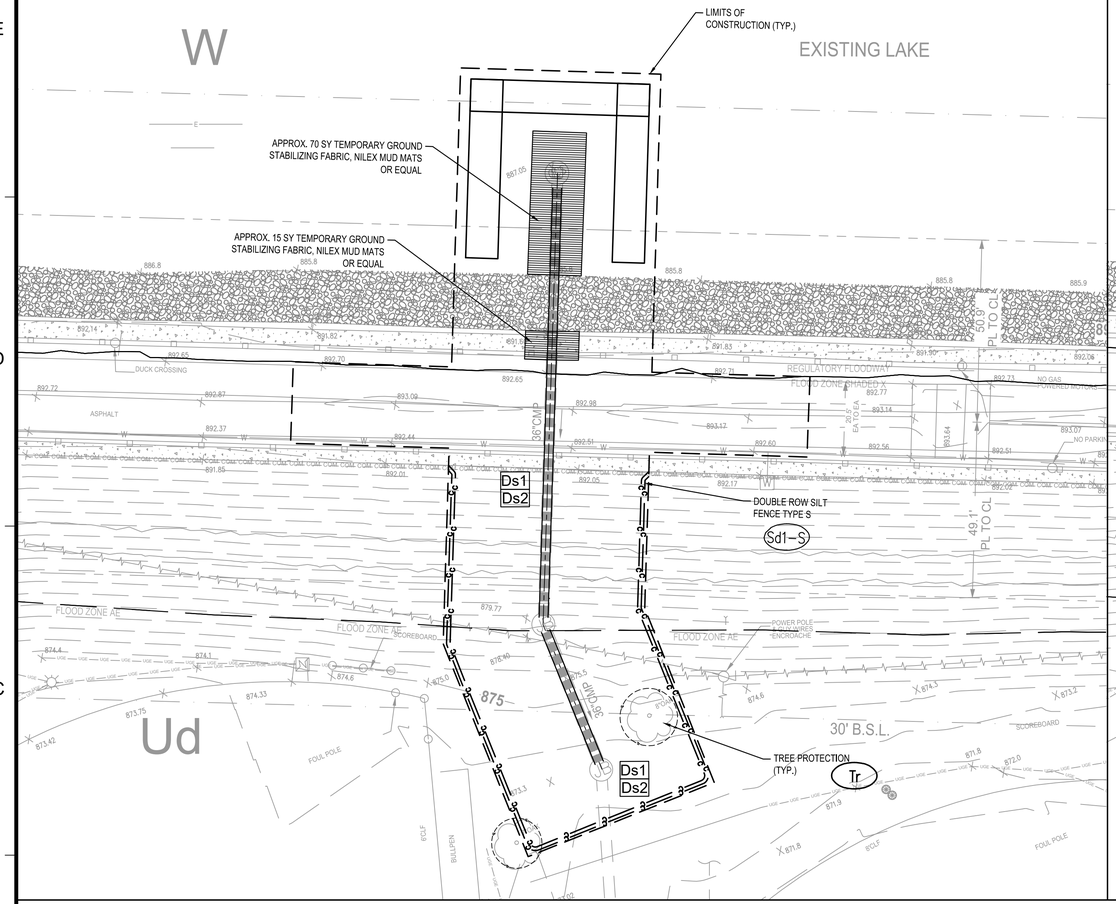
SHEET NO.

GEORGIA811 Utilities Protection Center, Inc
Know what's below. Call before you dig.

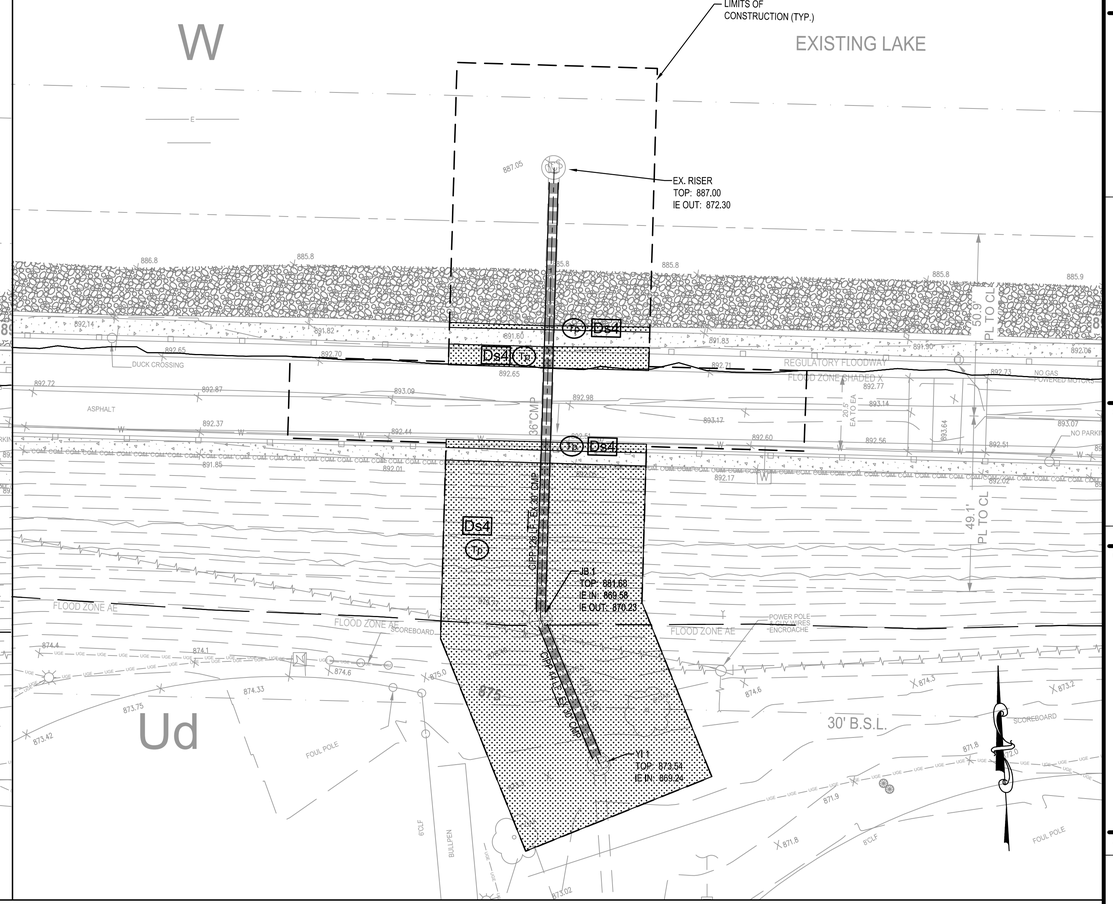
APPROVED PLAN 07/12/2022
Permit # MS22-00050

6-224

INITIAL/INTERMEDIATE EROSION AND SEDIMENT CONTROL



FINAL EROSION AND SEDIMENT CONTROL



STRUCTURAL PRACTICES

CODE	PRACTICE	DETAIL	MAP SYMBOL	DESCRIPTION
Sd1-S	SEDIMENT BARRIER–SILT FENCE		 (INDICATE TYPE)	A barrier to prevent sediment from leaving the construction site. It may be sandbags, bales of straw or hay, brush, logs and poles, gravel, or a silt fence.
Tr	TREE PROTECTION		 (DENOTE TREE CENTERS)	To protect desirable trees from injury during construction activity.

VEGETATIVE PRACTICES

CODE	PRACTICE	DETAIL	MAP SYMBOL	DESCRIPTION
Ds1	DISTURBED AREA STABILIZATION (WITH MULCHING ONLY)		Ds1	Establishing temporary protection for disturbed areas where seedlings may not have a suitable growing season to produce an erosion retarding cover.
Ds2	DISTURBED AREA STABILIZATION (WITH TEMP SEEDING)		Ds2	Establishing a temporary vegetative cover with fast growing seedings on disturbed areas.

ENGINEER:
SAM FLEMING, PE
DEWBERRY
2835 BRANDYWINE ROAD
SUITE 100
ATLANTA, GA 30341-4015
678.537.8627
678.530.0040 FAX

24 HOUR EMERGENCY CONTACT:
TOM ROBERTS
4362 PEACHTREE ROAD
BROOKHAVEN, GA 30319
404-906-2747

OWNER/PRIMARY PERMITTEE:
CITY OF BROOKHAVEN PUBLIC WORKS
4362 PEACHTREE ROAD
BROOKHAVEN, GA 30319
CONTACT: TOM ROBERTS
TOM.ROBERTS@BROOKHAVENGA.GOV
404-906-2747

STRUCTURAL PRACTICES

CODE	PRACTICE	DETAIL	MAP SYMBOL	DESCRIPTION
Tp	TOPSOILING		 (SHOW STAGING AND STORAGE AREAS)	The practice of stripping off the more fertile soil, storing it, then spreading it over the disturbed area after completion of construction activities.

VEGETATIVE PRACTICES

CODE	PRACTICE	DETAIL	MAP SYMBOL	DESCRIPTION
Ds4	DISTURBED AREA STABILIZATION (SODDING)		Ds4	A permanent vegetative cover using sods on highly erodable or critically eroded lands.

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MURPHEY CANDLER PARK DAM CMP SPILLWAY REPAIR

CITY OF BROOKHAVEN
DEPARTMENT OF PUBLIC WORKS

SEAL

GEORGIA REGISTERED No. 24408 PROFESSIONAL ENGINEER SAMUEL L. FLEMING

COUNTY APPROVAL

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TITLE

EROSION & SEDIMENT CONTROL

PROJECT NO. ----

EC-101

SHEET NO.

APPROVED PLAN 07/12/2022
Permit # MS22-00050

SPECIFICATIONS

FOR

MURPHEY CANDLER DAM
CIPP REHABILITATION

FOR

CITY OF BROOKHAVEN

APRIL 2022

TABLE OF CONTENTS

TECHNICAL SPECIFICATIONS

SECTION 01 00 00

GENERAL REQUIREMENTS

PART 1 – GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

Section	Title
1.2	References
1.3	Definitions
1.4	System Description
1.5	Contract Drawings
1.6	Schedules
1.7	Or Equals
1.8	Submittals
3.1	Access
3.2	Aid to the Injured
3.3	Buildings and Shanties
3.4	Cleaning
3.5	Cleaning and Crowning of Streets
3.6	Cleaning Surfaces
3.7	Contractor’s Office
3.8	Dimensions and Elevations
3.9	Emergency Response
3.10	Environmental Contamination
3.11	Existing Irrigation and Sprinkler Systems
3.12	Existing Utilities
3.13	Experience
3.14	Inspections
3.15	Insufficiency of Safety Precautions
3.16	Intoxicating Liquors
3.17	Landscape Protection
3.18	Lighting
3.19	Means and Methods
3.20	Measures and Weights
3.21	Mill and Shop Tests and Inspection
3.22	Monuments and Landmarks
3.23	Obstructions Encountered
3.24	Overtime Work
3.25	Ownership of Materials
3.26	Painting and Coatings
3.27	Power
3.28	Protecting Existing Buildings and Structures
3.29	Protection
3.30	Record Drawings

3.31 Responsibility for Overflows and Spills
3.32 Roadway Right-of-Way, Working Facilities, and Easements
3.33 Safety
3.34 Sales Tax
3.35 Sanitary Measures.
3.36 Schedules
3.37 Shoring, Formwork, and Temporary Structures
3.38 Site Video
3.39 Sound Attenuation
3.40 Storage
3.41 Temporary Heat
3.42 Use of Facilities
3.43 Use of Streets
3.44 Utility Relocations or Modifications
3.45 Water Supply
3.46 Work in Inclement Weather

1.2 REFERENCES

A. Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no bids). If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the documents before it was discontinued shall apply.

B. This section contains references to the following documents in Section 1.3. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. In the event of conflict between the requirements of this section and those of the listed documents, the requirements of the technical specifications shall prevail.

1.3 DEFINITIONS

A. Whenever the following abbreviations are used, they shall refer to and designate:

"AASHTO" – American Association of State Highway and Transportation Officials
"ACI" - American Concrete Institute
"AISC" - American Institute of Steel Construction
"ANSI" - American National Standards Institute
"ASME" - American Society of Mechanical Engineers
"ASTM" - American Society for Testing and Materials
"AWWA" - American Water Works Association
"CITY" – City of Brookhaven
"CRSI" – Concrete Reinforcing Steel Institute
"GASDP" – Georgia Safe Dams Program
"GDOT" – Georgia Department of Transportation
"MUTCD" – Manual on Uniform Traffic Control Devices

"Owner" – City of Brookhaven

1.4 SYSTEM DESCRIPTION

A. Performance Requirements

The Work shall mean the furnishing of all labor, materials, equipment, superintendence, and other incidentals necessary to the successful completion of construction upgrades to the Murphey Candler Dam as identified in the Contract Documents, including but not limited to, safety, removal, replacement, rehabilitation, and installation with any and all appurtenances in accordance with the Contract Documents, complete and fully operational in compliance with federal, state, city, county, and local codes and regulations, standards, and specifications as applicable at the time of bid unless otherwise directed in writing by the CITY.

1.5 CONTRACT DRAWINGS

A. The approved plans, profiles, typical cross sections, working drawings, supplemental drawings, details, sketches, narratives, service request forms, geographic information system (GIS) data, maps, or exact reproductions thereof, which show the location, character, dimensions, and/or details of the Work.

B. Existing conditions shown on the Drawings were derived from the best available information at the time Drawings were prepared and do not purport to be completely correct. The CITY expressly disclaims any responsibility for the accuracy or completeness of the information given regarding these existing conditions on the Drawings. The Contractor will not be entitled to any extra compensation on account of inaccuracy or incompleteness of such information. The Contractor is therefore directed to perform any and all field surveys that are deemed necessary to satisfy himself/herself to the actual surface and sub-surface conditions.

C. The Work proposed, its connections, routing, and design intent were based on the available information of the existing conditions. The Contractor shall field verify the nature and extent of the Work proposed prior to ordering any materials. Payment will be made only for materials retained as part of the CITY's facilities and its appurtenances.

D. Additionally, the CITY reserves the right to require Contract Modifications during construction. Payment for these Contract Modifications will be made using appropriate unit prices for the Work.

E. The Contractor shall maintain one (1) complete set of Contract Documents at the site throughout the course of the Work and make available to the CITY upon request.

1.6 SCHEDULES

A. Contractors shall prepare, furnish, distribute, and periodically update the Project Progress Schedule and Schedule of Submittals, as specified herein. Contractor shall also prepare and furnish a Schedule of Values, as specified herein.

B. Acceptance of the Contractor's Project Progress Schedule, Schedule of Submittals, and Schedule of Values, and revisions thereto, shall in no way relieve Contractor of any

duties and obligations under the Agreement. Such approval is limited to the format of the schedule, and does not in any way indicate approval of, or concurrence with, the Contractor's means, methods, and ability to carry out the Work.

C. Submit a monthly update of the Project Progress Schedule and Schedule of Submittals with each request for payment.

D. Failure the Contractor to meet the schedule submission milestones will result in withholding of monthly payments, until deliverables associated with the milestones are received. Payments will be withheld should the Contractor fail to deliver acceptable schedules within thirty (30) days after date of Notice to Proceed.

1.7 OR EQUALS

A. For the purposes of these Contract Documents, "or equal" item(s) shall be defined as:

1. A product or manufacturer offered as a replacement to a specified product or manufacturer where the term "or equal" is included after the list of acceptable manufacturers in the Specification.

B. An item which is offered where no specific product, manufacturer, means, methods, technique, sequence, or procedure of construction is specified or shown on the Drawings, are not be considered a replacement, and will be at the option of the Contractor, subject to the provisions in the Contract Documents for that item.

C. For products specified only by a referenced standard, the Contractor may select any product by any manufacturer, which meets the requirements of the Specifications, unless indicated otherwise in the Contract Documents.

D. If the manufacturer is named on the Drawings, or in the Specifications as an acceptable manufacturer, products of that manufacturer meeting all requirements of the Specifications and Drawings are acceptable.

E. Whenever the design is based on a specific product of a particular manufacturer, that manufacturer will be shown on the Drawings and/or listed in the list of approved manufacturers in the Specifications. Any Contractor intending to furnish products other than the listed acceptable manufacturer(s) shall:

1. Verify that the item being furnished will fit in the space allowed, perform the same function(s), and have the same capabilities as the item specified,

2. Include in the item price the cost of all accessory items, which may be required by the "or equal" product,

3. Include the cost of any architectural, structural, mechanical, piping, electrical, instrumentation, or other modifications required, and

4. Include the cost of required additional work by the CITY and/or the Engineer, if any to accommodate the item.

F. Approval of the CITY and/or the Engineer and Owner of an "or equal" item as an acceptable manufacturer, is dependent on determination that the product offered:

1. Is maintenance, reliability, service life, availability of local technical support, and other criteria to that on which the design is based, and

2. Will require no major modifications to structures, electrical systems, control

systems, or piping systems.

G. "Or equal" items will be considered only if the term "or equal" is included after the list of acceptable manufacturers in the Specification.

H. The Contractor shall submit shop drawings on the "or equal" item for the CITY and/or the Engineer's review in accordance with Specification Section 01 33 00 Submittal Procedures.

I. The cost of the CITY and/or Engineer's and Owner's factory inspection, reference project tour, or mill inspection, required to evaluate the acceptance of the "or equal" product shall be paid by the Contractor.

1.8 SUBMITTALS

A. Contractor shall be required to prepare each project specific submittal, utilizing the approved bid schedule, and shall include scope of work defined, and for any scope not included in defined bid schedule, shall attach individual cost estimate sheets based on the Additional Work provision

B. Submit Shop Drawings and other required submittals to the CITY and/or the Engineer. Submittals will only be accepted directly from the Contractor which include the Contractor certification that they have been reviewed and found acceptable to submit to the City and/or Engineer for review.

C. Each submittal, with variations from the requirements of the Contract Documents, shall make specific mention of such variations. Those declared variations found acceptable by the CITY shall require the Contractor to take suitable action for the proper installation in accordance with the Contract Documents. Variation not declared or suitable action not taken by the Contractor shall not relieve him/her of the responsibility for executing the Work or error and cost for remedial actions deemed necessary by the CITY.

PART 2 – PRODUCTS – (NOT USED)

PART 3 – EXECUTION

3.1 ACCESS

A. The Contractor shall enable and facilitate access to all parts of the Work to the CITY and/or its authorized representatives.

3.2 AID TO THE INJURED

A. The Contractor shall furnish, maintain, and make ready and available for immediate use, first aid to the injured with standing arrangements for the immediate removal, transport, and hospital treatment of any personnel who may be injured on the Site, as required by federal, state, city, county and local laws, codes and regulations.

3.3 BUILDINGS AND SHANTIES

A. No provision shall be allowed for the housing of men/women employed for the Work on the project site.

3.4 CLEANING

A. With completion of the Work, the Contractor shall return the surface conditions of the work area to pre-work status, unless where otherwise specified in the Contract Documents. The finished surface Work shall leave the grounds in a neat and approved condition, including but not limited to, the removal of material, debris, equipment, structures, and the Contractor's office.

B. Contractor shall terminate utilities as applicable or as required by the Contract Documents. Contractor shall also clean out all drains, pipes, inlets, and miscellaneous and appurtenant structures of debris from its operations.

3.5 CLEANING AND CROWNING OF STREETS

A. The Contractor shall thoroughly clean all streets, roads, sidewalks, and lawns free from all debris and dirt resulting from the construction, shall open all gutters and open channels so they drain freely, and completely crown the roadway as construction progresses and maintain these conditions to final acceptance of the Work.

3.6 CLEANING SURFACES

A. Contact surfaces between existing and new Work shall be free from debris, dirt, grease, or foreign matter as recommended by the manufacturer or directed by the CITY. The cost for cleaning shall be included in the Prices Bid and stipulated for the various items of thebid.

3.7 CONTRACTOR'S OFFICE

A. Facilities are not required to be on the project site. The Contractor shall be responsible for providing adequate indoor facilities for conducting project meetings. At a minimum, the facilities shall be equipped with power, water, lighting, heating ventilation and air conditioning, a conference room, table and chairs. If in the opinion of the CITY, the location of the facilities are not convenient to project personnel, the CITY may provide suitable facilities for project meetings.

3.8 DIMENSIONS AND ELEVATIONS

A. In the Contract Documents, figured dimensions shall take precedence over scaled dimensions; detailed drawings shall take precedence over general drawings, and where elevations are denoted, shall be in accordance with the section titled Survey.

3.9 EMERGENCY RESPONSE

A. The Contractor shall respond within four (4) hours to any emergency that may arise in connection with the Work on a twenty-four (24) hour per day, seven (7) days per week basis. Should CITY maintenance forces be called upon by the CITY to rectify a problem created by the Contractor, the Contractor shall be responsible for all costs incurred by the CITY, plus twenty-five (25) percent, with a minimum charge of one hundred (100) dollars per occurrence. This charge is subject to change depending upon the severity of

the emergency and will be determined by the CITY.

3.10 ENVIRONMENTAL CONTAMINATION

A. Precautions against property endangerment and/or damages from water, sewage, seepage, storm, stormwater, and flood flows shall be active during the course of Work. Cost for precautions shall be included in the Prices Bid and stipulated for the items of Work.

3.11 EXISTING IRRIGATION AND SPRINKLER SYSTEMS

A. The Contractor shall be responsible for repairing existing irrigation or sprinkler systems disturbed and/or damaged by the Work. No additional compensation shall be made for this Work.

3.12 EXISTING UTILITIES

A. Before the Work commences, the Contractor shall locate all utilities in the Work area and investigate any potential conflicts between the Work and existing utilities. All provisions of Georgia law relating to notification and protection of utilities shall be met by the Contractor.

B. Existing utilities shall be maintained, except when a utility or a utility feature requires moving. In such circumstances, the Contractor shall notify the utility before any such Work is started for approval. In the event that the utility grants approval for such movement that results in damage, it shall be repaired by the authorities having control of the same, and the expense of said repairs shall be paid by the Contractor or deducted from the monies which are due or to become due to said Contractor. No underground or overhead facilities encountered shall be disturbed without proper authority and then only in such manner as said owner may prescribe and approve.

C. Should it become necessary to change the position, or permanently or temporarily remove part of a utility in order to clear the structure being built or to permit the Contractor to use a particular method of construction, the Contractor shall notify the CITY of the location and circumstances and shall cease work if necessary, until satisfactory arrangements have been made by the Owners of the said utility to properly care for or relocate the same as necessary to permit the Work to proceed as specified. No claims for damages shall be allowed the Contractor on account of any delay occasioned thereby. The entire cost of the changes or temporary or permanent removal of such utilities shall be borne by the Contractor and the cost thereof shall be included in the Prices Bid and stipulated for the various Items of the Bid.

D. Nothing contained herein shall relieve the Contractor of doing such Work at his cost and expense as is specifically included in the Contract Documents.

E. Nothing contained herein shall relieve the Contractor of his obligation to support and protect all pipes, conduits, utilities, and other structures which may be encountered during the construction of Work, and to make good all damages done to such pipes, conduits, utilities, and other structures, as provided in this specification. Any such damages must be repaired without delay and the cost of such repairs must be paid by the Contractor.

F. No separate payment will be made for the location, protection, support, or maintaining service for any existing utility. Such items shall be considered incidental to the work and no additional compensation will be allowed. The Contractor shall also be responsible for the cost of repairing utilities damaged by the Work.

3.13 EXPERIENCE

A. Contractor shall not make any changes to the personnel, subcontractors, materials, products or rehabilitation systems used on this project without the prior written approval of the CITY. Additionally, the Contractor shall not use personnel, subcontractors, materials, products or rehabilitation systems on this project other than those the Contractor proposed in their Prequalification Proposal.

B. Subcontractors shall not make any changes to the personnel, materials, products or rehabilitation systems used on this project without the prior written approval of the CITY. Additionally, subcontractors shall not use personnel, materials, products or rehabilitation systems on this project other than those the Contractor proposed in their Prequalification Proposal.

C. The CITY reserves the right to waive these requirements, at its sole discretion, whenever doing so is deemed to serve the interest of the CITY.

3.14 INSPECTIONS

A. The Contractor shall schedule a pre-construction meeting with the CITY a minimum of 2 weeks prior to construction. During construction the CITY's Inspector shall be the lead person for scheduling, coordination, and overseeing, witness to sampling and work that may be required or determined necessary by the CITY. Should existing conditions necessitate a change or cost to the Contract Documents, the CITY shall be notified for approval prior to proceeding.

B. The CITY shall review and approve unit items installed in the Work by the Contractor prior to its submittal for payment to the CITY. Failure to do so may result in delays in processing payments.

C. Upon notification by the Contractor, the CITY shall perform an inspection of the finished surface features and conditions for acceptance of the Work. Should discrepancies exist, the Contractor shall make restorations as directed, until acceptance is granted by the CITY, upon which final payment shall be made for the Work.

D. Contractor shall pay for second inspections, if so required by the CITY.

3.15 INSUFFICIENCY OF SAFETY PRECAUTIONS

A. If at any time, in the opinion of the CITY, the Work is not properly instituted or maintained and is not in accordance with federal, state, city, county and local laws, codes and regulations, the Contractor shall execute immediate measures to bring into compliance unsatisfactory surroundings. In the event that the Contractor is not readily available at the Work to be notified of the insufficiency of safety precautions, then the CITY may elect to institute or restore such Work to a state deemed safe. Such actions by the CITY shall in no way release the Contractor from its judiciary duty specified. Costs to correct safety precautions shall be at the Contractor's expense.

3.16 INTOXICATING LIQUORS

A. The Contractor shall neither permit nor suffer the introduction or use of intoxicating substances, such as but not limited to, alcohol or illegal drugs upon or about the Work jobsite.

3.17 LANDSCAPE PROTECTION

A. Landscaping, such as but not limited to, ornamental trees, shrubbery, hedges, flower beds, decorative berms, decorative rocks, ponds, timbers, and their appurtenances shall not be removed or disturbed without approval from the CITY. However, should it be required to remove or disturb such items, the Contractor shall seek approval no later than 2 weeks in advance of conflict. If and when approval is granted by the CITY, the Contractor shall take the proper precautions to preserve, protect, and reestablish such items along the line of or contiguous to the Work. All landscaping shall be restored to the same or better general conditions as existed prior to commencement of the Work. If deemed damaged by the CITY, each item damaged shall be replaced with the same type and like size. Cost for removal and relocation shall be considered as having been included in the Prices Bid and stipulated for the various items of Work. Cost for restitution shall be borne by the Contractor.

3.18 LIGHTING

A. Except for acts of nature, the Work shall be secured by such means to prevent loss to health, limb, and property. Adequate lighting shall be provided and maintained during periods of Overtime Work, from one-half (½) hour before sunset to one-half (½) hour after sunrise. Contractor shall provide adequate lighting for safety and performance of construction operations and provide the necessary safety and other facilities required for work during normal working hours and for work at night.

3.19 MEANS AND METHODS

A. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

B. If the Contract Documents note, or Contractor determines, that professional engineering or other design services are needed to carry out Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures, or for Site safety, then Contractor shall cause such services to be provided by a properly licensed design professional, at Contractor's expense. Such services are not Owner-delegated professional design services under this Contract, and neither Owner nor Engineer has any responsibility with respect to (1) Contractor's determination of the need for such services, (2) the qualifications or licensing of the design professionals retained or employed by Contractor, (3) the performance of such services, or (4) any errors, omissions, or defects in such services.

C. The Contractor shall have the right to deny access to the Work during construction except to third parties to inspect, certify, or observe when required by law; or to those who require reasonable access to the Work by reason of specific contractual relationship to the Work.

3.20 MEASURES AND WEIGHTS

A. Whenever so requested as deemed necessary by the CITY, the Contractor shall provide accurate scales, adequate equipment, and the necessary assistance for weighing and/or measuring materials for the installed Work as specified. It is understood and agreed that a "ton" shall mean the short ton of two thousand (2,000) pounds.

3.21 MILL AND SHOP TESTS AND INSPECTION

A. Where the specifications call for mill or shop tests, the Contractor shall furnish triplicate copies of attested certificates signed by a duly authorized representative of the manufacturer, showing details of quality or performance sufficient to demonstrate compliance with the Contract Documents. Inspection of materials shall be made as required by these specifications.

3.22 MONUMENTS AND LANDMARKS

A. Monuments or landmarks shall not be damaged or removed by the Contractor or any of its employees without the written consent of the CITY. Any monument or landmark so removed shall be replaced by the CITY at the expense of the Contractor. The cost thereof shall be retained from the monies due or to become due the Contractor under this agreement.

3.23 OBSTRUCTION ENCOUNTERED

A. The giving of this information upon the Project specific scope of work and field survey determinations shall not relieve the Contractor of his obligation to support and protect all pipes, conduits, and other structures which may be encountered during the construction of Work, and to make good all damages done to such pipes, conduits, and other structures, as provided in this Specification. Any such damages must be repaired without delay and the costs of such repairs must be borne by the Contractor. The Contractor shall locate obstructions ahead of the Work without cost to the CITY. Should the Contractor determine that the existing information is not correct and an obstruction shall be encountered, it shall immediately contact the CITY.

3.24 OVERTIME WORK

A. It is the intent of the contract that the Contractor provide sufficient work force at all times during normal working hours and days of each week to complete the Work without resort to overtime work. The definition of normal working hours and days is Monday through Friday, trade recognized legal holidays excepted, during a consecutive period as agreed upon in the area of the Work, not counting the lunch period; and the definition of normal work week is the aggregate of the five (5) consecutive eight (8) hour days, Monday through Friday inclusive, maximum, the same holidays excepted.

B. Night work or work on Saturdays, Sundays, or trade recognized legal holidays, requiring the presence of CITY personnel or an inspector, shall not be permitted except in case of emergency, and then only to such extent as is absolutely necessary, and with the written permission of the CITY.

C. Should the Contractor, for his convenience, request permission to work overtime or to

work on Saturdays, Sundays, or trade recognized legal holidays in the area of the Work, the CITY shall have the right to deduct sufficient sums from the monies due the Contractor to cover payment of additional salaries for the CITY personnel and such inspectors as are normally employed on the Work.

D. Should it become necessary for Work to be accomplished at the direction of the CITY for the convenience and/or requirement of the CITY outside of normal working hours, then full inspection and engineering shall be provided at no additional cost to the Contractor during those hours.

E. During periods of overtime work, the Contractor shall provide the necessary facilities required for work during normal working hours and for work at night. The Contractor shall be in readiness in time of emergency even nights, Saturdays, Sundays, and holidays at no cost to the CITY.

3.25 OWNERSHIP OF MATERIALS

A. Existing material removed that shall not be relocated or reused in the Work shall be moved off site within 48 hours after completion of the project, becoming the property of the Contractor. The cost for such Work shall be as stipulated by the Prices Bid, for the various items of the Work.

B. Existing material recovered that shall be relocated or reused in the Work shall be refurbished or renovated as required, unless otherwise directed by the CITY.

C. Existing material removed shall be disposed of in a manner approved by the CITY at the Contractor's expense.

D. New material not installed in the Work shall be moved offsite and remain the property of the Contractor. Only material that is installed by the Contractor will be paid for. However, the Contractor may submit pay applications for stored material in accordance with the General Conditions.

3.26 PAINTING AND COATINGS

A. It is the intention of these specifications that metal permanently installed in the Work shall be protected by a durable coating of paint, or other approved material, and that all such metal surfaces not buried in the earth or masonry shall be left clean and well painted at the completion of the Contract, and in accordance with detailed requirements as may hereinafter be set forth.

3.27 POWER

A. The Contractor shall make his own arrangements for power. No payment shall be made for cost of obtaining power. The cost for power shall be as stipulated by the Prices Bid, for the various items of the Work.

3.28 PROTECTING EXISTING BUILDINGS AND STRUCTURES

A. The Contractor shall take the necessary precautions to protect, including but not limited to, buildings, structures, and substantial walls or fences which may be encountered or endangered in the execution of the Work, not otherwise provided for, shall repair and make good any damages caused by reason of his operations and restore such property

to its state before the damages. Existing walls and fences that are removed due to the execution of the Work shall be replaced by the Contractor and, where required or directed by the CITY.

3.29 PROTECTION

A. The Contractor shall furnish and maintain satisfactory protection to the Work against injury by weather, flooding, or breakage thereby permitting all Work to be left in a perfect condition at the completion of the Work.

3.30 RECORD DRAWINGS

A. The Contractor shall be furnished one set of Contract Drawings for the purpose of recording information on the as-installed Work. The information shall be correct and presented on the Drawings and returned to the CITY for acceptance.

B. The Contractor shall provide Georgia State Plane GPS coordinates for all fire hydrants, manholes, junction boxes, drainage structures, vault, headwalls, and valves (new or existing) associated with the Work.

3.31 RESPONSIBILITY FOR OVERFLOWS AND SPILLS

A. It shall be the responsibility of the Contractor to schedule and perform his work so as to result in no overflows or spills from the system. If flows are such that they interfere with the Contractor's ability to perform work, the Contractor shall be responsible for scheduling his work during low flow periods or provide bypass pumping.

B. In the event of overflows caused by the Contractor's work activities, the Contractor shall immediately take appropriate action to contain and stop the overflow, clean up the spillage, disinfect the area affected by the spill, and notify the CITY in a timely manner. The Contractor shall prepare his own written Standard Operating Procedure (SOP) for handling and reporting spills.

C. Contractor will indemnify and hold harmless the CITY for any fines or third-party claims for personal or property damage arising out of a spill or overflow that is fully or partially the responsibility of the Contractor. Should fines subsequently be imposed as a result of any overflow for which the Contractor is fully or partially responsible, the Contractor shall pay all such fines and all of the CITY's legal, engineering, and administrative costs in defending such fines and claims associated with the overflow.

3.32 ROADWAY RIGHT-OF-WAY, WORKING FACILITIES, AND EASEMENTS

A. Work within the limits of private property and rights-of-way shall be done in conformity with all applicable permits and agreements with the CITY and the owners of such private property, easements, or rights-of-way. Whether or not such a condition be part of the agreement, care shall be taken to avoid injury to the premises entered, which premises shall be left in a neat and orderly condition by the removal of rubbish and the grading of surplus materials, and the restoration of said private property to the same or better general conditions as at the time of entry for Work to be performed under this contract. The Contractor shall not enter any easement without first confirming with the CITY that such easement is fully executed.

B. The Contractor shall not (except after consent from the proper parties), enter or occupy with employees, tools, or equipment on any land outside the right-of-way or property of the CITY.

C. The Contractor shall be allowed use of the site designated for construction as necessary for the Work. However, existing access to properties shall be maintained or adequate access provided during the course of the Work. Cost for access shall be included in the Prices Bid and stipulated for the various items of the Work to be done under this contract.

D. Work that shall be performed on private property or easements that requires granted access beyond the established road right-of-ways shall be done in conformity with all permits and agreements between the CITY and property owners. Should the Contractor desire or require additional space outside the limits of Work, it must arrange for such space with property and easement owners at its own expense. Legal binding agreements for such additional space must be in writing and a copy filed with the CITY, prior to accessing such lands. In such agreements, care shall be taken to avoid injury to the premises entered and shall be left in a neat and orderly condition as existed at the time of entry for Work.

E. When working on easements or property that was acquired by the CITY through condemnation, the Contractor shall install Tree Save Barriers along all boundaries of the work area, unless otherwise specifically directed by the CITY, prior to any Work. Work premises shall be left in a neat and orderly condition by the removal of rubbish, debris, and the grading of surplus materials and the restoration of said private property to the same general conditions as existed at the time of entry for Work.

3.33 SAFETY

A. Comply with Laws and Regulations during the course of the Work.

3.34 SALES TAX

A. The Contractor shall furnish the CITY with certified copies of paid invoices or their equivalent proof covering sales tax paid on items which the CITY is eligible for tax refund; none of which shall be refunded or credited to the Contractor.

3.35 SANITARY MEASURES

A. Sanitary conveniences shall be employed prior to beginning the Work in sufficient number, in such manner and in such places as shall satisfy the CITY. Such sanitary conveniences shall be operated and maintained in such a manner as to remove harmful effects to personnel or environment. All persons connected with the Work are obliged to use the conveniences provided and shall in no way violate these provisions. Violations shall result in an immediate dismissal of the employee and removal from the Work. Only upon written consent by the CITY shall the violator regain access to the Work. Sanitary conveniences shall be maintained during the Work and in compliance with the local Health Department and the CITY. When possible, sanitary conveniences shall be placed in locations that least impact public view. Upon completion of the Work, the Contractor shall remove sanitary conveniences without deleterious effect.

3.36 SCHEDULES

A. The Project Progress Schedule shall be plotted on a minimum eleven-inch by seventeen-inch (11" x 17") size sheets with the flow of activities from left to right. Printing shall be in color and suitable for half-size reproduction. No lettering or numbering shall be less than one eighth-inch (1/8") in height for capital letters and numbers. The critical path shall be clearly marked and readily identifiable.

B. The Project Progress Schedule shall be a Critical Path Method (CPM) Network Diagram, and include the following:

1. Furnish an updated diagram with all activities and restraints. This includes providing an "As-Built" Schedule with completion dates for all key monthly completion and delivery dates,
2. Provide updated Project Progress Schedule graphics in color showing progress to-date and completion schedule. The critical path shall be clearly identified,
3. A legend clearly identifying each symbol used,
4. Be prepared in the form of a time-scaled CPM network,
5. Group activities by facility and major area of work. The identification number of the individual activities shall be coded such to provide the grouping,
6. Be prepared in chronological order of the beginning of each item of work,
7. Have a horizontal time scale based on calendar days and identify the Monday of each week,
8. Show the order and interdependencies of the activities and the sequence in which the work is to be accomplished as planned by the Contractor. The diagram shall show how the start of a given activity is dependent upon the completion of the preceding activities, and how its completion restricts the start of following activities. Float need not be shown on the network diagram,
9. Show all activities relating to the construction of the work, and include the following information related to the activities:
    a. Activity number
    b. Activity description
    c. Percent complete
    d. Estimated duration, in working days, of each activity
    e. Start date
    f. Finish date
10. Show all planned facility shutdowns, including temporary relocations, temporary bypasses, and transitions from existing to temporary, temporary to new, and the like.
    a. For each anticipated shutdown included in the schedule, submit within thirty (30) days prior to the planned shutdown, a description of the shutdown, duration, anticipated start and completion dates, related preparation work,

and related temporary facilities to be provided.

11. Show adverse weather days on the critical path.
    a. The total number of adverse weather days shall be monitored and agreed to monthly by Contractor, the CITY and/or Engineer. The Project Progress Schedule shall be updated to reflect the accrual of adverse weather days agreed to and enacted by a Contract Time extension.
12. Show the following for specified submittals of Shop Drawings, product data, samples, and materials:
    a. Submittal date,
    b. Review period, based on fourteen (14) calendar day review period,
    c. Fabrication duration,
    d. Delivery dates.
13. Show the following events and milestones in addition to construction activities:
    a. Notice to Proceed,
    b. Milestones,
    c. Schedule of Submittals,
    d. Operational Testing (including ait testing, chlorination, CCTV, etc.),
    e. Owner Coordination,
    f. Notification Periods,
    g. Coordination with separate contracts/contractors,
    h. Owner activities impacting the Work.

C. The Project Progress Schedule update shall coincide with the end of the pay period. The update shall be used to create the monthly payment application request. No monthly payment request will be processed unless the Project Progress Schedule is updated and submitted to the CITY and/or the Engineer.

D. The Schedule of Values shall be of the following form:
1. Type schedule on eight and one-half –inch by eleven-inch (8½" x 11") white paper,
2. Contractor's standard forms and automated printouts may be used,
3. Identify Schedule of Values information with:
    a. Title of Project
    b. Project Location
    c. Purchase Order and Bid Number
    d. Name and Address of Contractor
    e. Date of Submission

E. The Schedule of Values shall list the installed value of the component parts of the Work

in sufficient detail to serve as a basis for computing values for progress payments during construction. Breakdown shall be by utility, then by CSI Format, for ease of field verification.

F. For Schedule of Values, follow the Bid Form as the format for listing component items. Identify each item with number and title of the respective major section of the Specifications.

G. For each major line item, list sub values of major products or operations under this item.

H. For the various portions of the Work:

1. Each item shall include a directly proportional amount of the Contractor's overhead and profit.

2. For items on which progress payments will be requested for stored materials, breakdown the value into:

a. The delivered and unloaded cost of the materials, with taxes paid. Owner shall require invoices for proof of purchase.

b. The total installed value, including Contractor's overhead and profit, less value of stored material item a. above.

3.37 SHORING, FORMWORK, AND TEMPORARY STRUCTURES

A. The Contractor shall take full responsibility including the hiring of practicing Professional Engineer licensed in the State of Georgia that may be needed for the adequacy and safety throughout erection, use and removal of all temporary Work such as shoring and supports during all phases of the Work, formwork, and supports for concrete, temporary protection, and structures of all kinds.

3.38 SITE VIDEO

A. No sooner than one (1) week prior to commencing the Work and within 48 hours after completing the project once all materials and equipment have been removed, the Contractor shall perform and supply the CITY thoroughly detailed video(s) of the worksite and its contiguous area. The video(s) shall be of such quality as to view and establish existing conditions in detail and used to render a decision where no other documentation is available. If videos are not maintained by the Contractor, the Contractor shall be liable for any and all accused damages. Site video(s) made from a moving vehicle will not be accepted.

3.39 SOUND ATTENUATION

A. The Contractor shall, during the course of the Work, comply with the CITY's Noise Ordinance.

B. Work operations, machinery, equipment, and material handling shall be performed in such a manner as to avoid and eliminate unnecessary noise. Noise deemed unacceptable by the CITY shall be immediately terminated.

3.40 STORAGE

A. Materials, equipment, tools, and machinery required for the Work shall be neatly and compactly piled in such a manner as to cause the least inconvenience to property owners and traffic. Storage shall be in areas approved by the CITY. Fire hydrants, water and gas shut-off boxes, underground power and telephone line manholes shall, at all times, be kept free and unobstructed, and shall be left uncovered by such materials.

B. Stringing of pipe may not be used to stockpile pipe. Stringing of pipe on CITY's rights-of- ways must be approved by the CITY and may be limited to the amount of pipe which will be installed during a work day. Should stringing of pipe be permitted, no pipe may be stored nearer than 10-feet to the edge of pavement.

C. All materials, equipment, tools, and machinery stored upon public thoroughfares must be provided with sufficient lights at night time to warn traffic of such obstructions.

D. The Contractor shall be responsible for any loss of or damage to materials, equipment, tools, machinery, public rights-of-way, and/or private property. Storage of materials, equipment, tools, and machinery shall be at no cost to the CITY.

3.41 TEMPORARY HEAT

A. The Contractor shall supply temporary heat for such period of time and at such temperature as needed for the proper protection and execution of the Work. No cost shall be paid for temporary heat and shall be incidental to the contract price.

3.42 USE OF FACILITIES

A. The CITY shall have the right or grant permits to connect any conduit, pipe line, or structure with the Work and its appurtenances at any time before the Work is accepted. The Contractor shall not interfere or be granted compensation for such Work.

3.43 USE OF STREETS

A. Access: During the progress of the Work, the Contractor shall make ample provisions for both vehicular and foot traffic on public roadways except during periods of road closures approved by the CITY, and shall indemnify and save harmless the CITY from any expense whatsoever due to the Work. The Contractor shall provide, but not limited to, free access to all driveways unless temporary closure is specified on the Contract Documents and/or drawings, fire hydrants, water, and gas valves located along the line of Work. Gutters and waterways must be kept open or other provisions made for the removal of stormwater.

Street intersections may not be blocked, except for one-half (½) the roadway at any given time, and the Contractor shall lay and maintain temporary driveways and crossings, such as in the opinion of the CITY are necessary to reasonably accommodate the public.

B. Traffic Control: Adequate signs, barricades, and lights, in accordance with the standards of the GDOT and/or CITY necessary to protect the public shall be provided.

Flagmen to direct traffic shall be employed continuously during periods when only one-way traffic can be maintained or when equipment is operated back and forth across the pavement areas.

Roadway disturbances shall not be left unfilled overnight, except in emergencies, and

in such cases adequate precautions shall be exercised to protect traffic.

C. Procedural Rules: Work in roads shall be in accordance with the rules and regulations of the controlling agency.

In the event of the Contractor's failure to comply with these provisions, the CITY may cause the same to be done, and shall deduct the cost of such Work from any monies due or to become due the Contractor under this agreement, but the performance of such Work by the CITY or at its instance, shall serve in no way to release the Contractor from his general or particular liability for the safety of the public or of the Work.

3.44 UTILITY RELOCATIONS OR MODIFICATIONS

A. Should, in the course of the Work, a need arise to relocate or modify a portion of the DeKalb County's existing piping system, the Contractor shall immediately notify the the CITY and DeKalb County for approval to proceed with such Work in accordance with the Contract Documents, or as directed by the CITY and/or DeKalb County. Removal of the existing piping system shall include, but not be limited to, the removal of its bulkheads, thrust restraints, piping appurtenances, concrete, and/or masonry that was exposed by excavation in part or whole, except for tie-rods beyond the limits of trenching. Without exception, any part of an existing restraint system relevant to the remaining existing piping system shall remain and be supplemented with additional restraint to maintain an unimpaired piping system. The cost for such Work shall be as stipulated by the Prices Bid, for the various items of the Work.

3.45 WATER SUPPLY

A. In the vicinity of the Work, the Contractor shall be responsible to acquire all water required to execute the Work. The Contractor shall be responsible for the retrieval, transport, and delivery of such water with all means to protect and maintain the integrity of DeKalb County's water system at its own cost in accordance with all applicable rules and regulations. When water is required for the Work, the Contractor shall obtain a hydrant water meter from DeKalb County. The cost of the meter and water usage shall be incidental to the Work and will not be measured and paid for separately.

3.46 WORK IN INCLEMENT WEATHER

A. The Contractor shall take into account historical weather conditions and potential difficulties that may be encountered for completing the Work demonstrated in the work schedule and provide adequate protection against unfavorable weather to the satisfaction of the CITY. Weather shall not be grounds for contract extension of available work days, unless such should be most abnormal and then only when reasonable effort was exercised. Use the form ("Weather Delay Monthly Report") to track monthly weather delays, this form is provided in the Appendix A.

END OF SECTION 01 00 00

SECTION 01 11 00

SUMMARY OF WORK

PART 1 – GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

Section	Title
1.2	Work Covered by Contract Documents
1.3	Scheduling and Sequence of Work
1.4	Use of Premises
1.5	Communication

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Work to be performed under this Contract is as described in the Notice of Bid Advertisement and shall consist of furnishing all labor, materials, tools, equipment, and incidentals and performing all work required for upgrade to the Murphey Candler Dam in a complete and functioning manner including the following work as indicated on the Contract Documents and/or Drawings or as directed by the CITY:

1. Install and maintain erosion control measures throughout the duration of the project. Maintain traffic control throughout the duration of construction.
2. Lower normal pool lake elevation to work area around low level drain pipe. Provide the necessary bypass pumping, temporary diversion, and/or groundwater control for execution of the Work, while allowing flow to continue through the system and around the work area, as well as dewatering of stilling basin for Ground Penetrating Radar Analysis by Engineer.
3. Provide and install all necessary cured-in-place-pipe materials to rehabilitate the existing low level drain pipe.
4. Replace hoist head and stem guides for sluice gate structure, and any inoperable system components.
5. Restore all disturbed areas including roadways, curb and gutter, and sidewalks, restore all disturbed areas with final landscaping.
6. Clean-up the project work area and return the area to its pre-construction conditions.
7. Furnish and provide all other labor, materials, equipment, and other incidentals required to complete the Work as shown in the Contract Documents.

1.3 SCHEDULING AND SEQUENCE OF WORK

A. Install and maintain erosion control measures as required by the Contract Documents and/or Drawings.

B. Positive drainage for existing stormwater conveyance systems must remain in service throughout the duration of the Work. Provide bypass pumping or temporary diversion(s) as required.

C. Construct the Work as indicated on the Contract Documents and/or Drawings.

D. Prepare and submit a detailed plan for setup, operation, monitoring, and shutdown of the bypass system, as outlined in Section 31 23 19 Dewatering.

E. Construct upgrades to the Murphey Candler Dam as indicated on the Contract Documents and/or Drawings.

F. Once the Contractor has successfully completed construction, the Work is in service and all disturbed areas have been restored, then the erosion control measures may be removed.

1.4 USE OF PREMISES

A. Confine operations at the site to areas permitted by law, ordinances, permits, and Contract Documents.

B. Do not unreasonably encumber premises with materials and equipment.

C. Maintain the premises in clean and safe conditions at all times.

D. Maintain access for emergency service personnel and school bus traffic at all times during construction.

E. The Contractor shall also maintain, on site, suitable steel plates for use in allowing vehicle access across open trenches and place plates as required allowing vehicular traffic to pass.

F. Provide access to the CITY's authorized persons and the police, fire, or other departments having legal jurisdiction to the site at all times and provide cooperation in their work.

1.5 COMMUNICATION

A. All communications shall be in writing. Use prescribed forms as required by the CITY.

B. Designate in writing the individual who will be the Contractor's authorized representative.

END OF SECTION 01 11 00

SECTION 01 22 15.11

MEASUREMENT AND PAYMENT

PART 1 – GENERAL

1.1 SUMMARY

A. This section defines the Pay Items of Work listed on the Bid Form and how payment shall be determined. Payment shall be made for each Pay Item based on the description in this section.

B. Bid Prices included on the Bid Form shall be full compensation for all materials, labor, equipment, tools, construction equipment and machinery, heat, utilities, mobilization, demobilization, transportation, taxes, overhead, markup, incidentals and services necessary for the execution and completion of the Work in the Contract Documents. Any item of work required to complete the Work in the Contract Documents but not specifically enumerated for separate measurement and payment in the various project bid items are considered incidental to the project and the Contractor is to include the cost for this incidental work in its associated Bid Prices.

C. For the Work described, the allowance and unit price, actual used and installed quantities of each Pay Item shall be measured in the field and certified by the Engineer and/or CITY upon completion of construction in the manner set forth for each item in this and other sections of the Specifications. Payment for all items listed on the Bid Form will constitute full compensation for all Work performed.

D. The Contractor shall assist and fully cooperate with CITY to determine proper measurement and payment for each item providing complete and reasonable backup documentation as requested by CITY to substantiate payment due.

1.2 BID ITEMS

The following Bid Items 1 through 12, together with any supplemental and/or alternate Bid Items that may also be included, comprise the Bid Total as listed on the Bid Form.

A. ITEM 1, SPECIFICATION SECTION NO. 31 25 00, MUD MATS:
MEASUREMENT: The quantity to be paid for under this item shall be the number of square yards of mud mats installed as shown on the Contract documents and/or drawing or as authorized by CITY.
PAYMENT: The Unit Price Bid shall include all labor, equipment, and materials necessary for furnishing, placing, maintenance, removal, inspection, monitoring, and reporting on the erosion and sedimentation controls required to complete the Work as specified in the Contract documents and/or drawings, or as directed by CITY. No additional payment shall be made for re-application or maintenance of mud mats.

B. ITEM 2, SPECIFICATION SECTION NO. 31 25 00, MULCH COMPLETE:
MEASUREMENT: Mulch shall be measured per square yard installed at the coverage rate specified, complete in place, as shown on the Contract documents and/or drawing or

as authorized by CITY.
PAYMENT: The Unit Price Bid per square yard shall include all labor, equipment, and materials necessary for furnishing, placing, maintenance, removal, inspection, monitoring, and reporting on the erosion and sedimentation controls required to complete the Work as specified on the Contract documents and/or drawings, or as directed by CITY. No additional payment shall be made for re-application or maintenance of mulch.

C. ITEMS 3, SPECIFICATION SECTION NO. 32 92 00, UNIT PRICE FOR SODDING AND PERMANENT SEEDING (ALL ZONES) COMPLETE:
MEASUREMENT: The quantity to be paid for under this item shall be the number of square yards of permanent seeding by zone, permanent matting, and sod removal/replacement as shown on the Contract documents and/or drawing or as authorized by CITY.
PAYMENT: The Unit Price Bid per square yard includes the furnishing of all labor, materials, seed, sod, plugs, rhizomes, sanding, topsoil, watering, fertilizing, maintenance, equipment, inspection, monitoring, and reporting on the erosion and sediment controls necessary to complete the Work as specified on the Contract documents and/or drawings, or as directed by CITY.

D. ITEM 4, SPECIFICATION SECTION NO. 31 25 00, UNIT PRICE FOR TEMPORARY SEEDING, COMPLETE:
MEASUREMENT: The quantity to be paid for under this item shall be the number of square yards of temporary seeding as shown on the Contract documents and/or drawing or as authorized by CITY.
PAYMENT: The Unit Price Bid per square yard includes the furnishing of all labor, materials, seeding, watering, fertilizing, maintenance, equipment, inspection, monitoring, and reporting on the erosion and sediment controls necessary to complete the Work as specified on the Contract documents and/or drawings, or as directed by CITY.

E. ITEM 5, SPECIFICATION SECTION NO. 31 25 00, SILT FENCE, COMPLETE, TYPE S:
MEASUREMENT: Silt Fence Type S (Sensitive) shall be measured per linear foot installed, complete in place, as shown on the Contract documents and/or drawing or as authorized by CITY.
PAYMENT: The Unit Price Bid per linear foot shall include all labor, equipment, and materials necessary for furnishing, placing, maintenance, removal, inspection, monitoring, and reporting on the erosion and sedimentation controls required to complete the Work as specified on the Contract documents and/or drawings, or as directed by CITY. No additional payment shall be made for maintenance or replacement of Silt Fence.

F. ITEM 6, SPECIFICATION SECTION NO. 31 13 11, TREE PROTECTION FENCE COMPLETE:
MEASUREMENT: Tree Protection Fence shall be measured per linear foot installed, complete in place as shown on the Contract documents and/or drawings or as directed by CITY. This item shall not be utilized for orange barrier fencing used as safety fence, which shall be considered incidental to the Work.
PAYMENT: The Unit Price Bid per linear foot shall include all labor, equipment, and

materials necessary for furnishing, placing, maintenance, removal, inspection, monitoring, and reporting on the erosion and sedimentation controls required to complete the Work as specified on the Contract documents and/or drawings, or as directed by CITY. No additional payment shall be made for maintenance or replacement of Orange Barrier Fence.

G. ITEM 7, SPECIFICATION SECTION NO. 33 01 30.72, UNIT PRICE FOR CURED-IN-PLACE PIPE REHABILITATION:
MEASUREMENT: Cured-in-Place Pipe Rehabilitation shall be measured and paid for per linear foot actually installed measured in the horizontal plane after the pipe has been connected as shown on the Contract documents and/or drawings or as directed by CITY. Measurements shall be from inside face of the outlet control structure to the face of structure.
PAYMENT: The Unit Price per linear foot shall include: pre-installation and post-installation cleaning; pre-installation and post-installation CCTV inspections; removal and resetting drainage structure tops; inversion setup(s); point repairs; CIPP liner; CIPP liner installation; invert installation; installation of thermal barriers or other devices to protect water services or other utilities; containment, capture, and discharge of process water into sanitary sewer systems; testing; design; and all other labor materials, equipment, field measurements, and incidentals required to complete the work as shown on the Drawings.

H. ITEM 8, SPECIFICATION SECTION NO. 31 23 23.33, FLOWABLE FILL:
MEASUREMENT: Flowable fill shall be measured and paid for per cubic yard of material placed as shown on the Contract documents and/or drawings or as directed by CITY.
PAYMENT: The Unit Price per cubic yard for flowable fill, non-excavatable, placed shall include cost for flowable fill, pumping, bulkheads, piping, testing, reporting, monitoring, design, and all other labor materials, equipment, field measurements, and all other labor materials, equipment, field measurements, and incidentals required to complete the work as shown on the Drawings.

I. ITEM 9, SPECIFICATION SECTIONS NO. 31 23 19, DEWATERING AND 31 52 00, COFFERDAMS:
MEASUREMENT: Dewatering shall be measured and paid at the lump sum price bid for the project, complete, as shown on the Contract documents and/or drawings or as directed by CITY.
PAYMENT: The lump sum Unit Price Bid for dewatering shall include furnishing, maintaining, and removing dewatering measures to include, but are not limited to pumps, bypassing pumping, and cofferdams for lake drawdown, dewatering work area and stilling basin, and refilling and all other labor, materials, equipment, and incidentals required to complete the Work as specified on the Contract documents and/or drawings or as directed by CITY.

J. ITEM 10, SPECIFICATION SECTION NO. 32 16 13, SIDEWALK REPLACEMENT:
MEASUREMENT: Sidewalk Replacement shall be measured per square yard installed and completed in place, as shown on the Contract documents and/or drawing or as authorized by CITY.
PAYMENT: The Unit Price Bid per square yard shall include all labor, equipment, and

materials necessary for removing and replacing any sidewalk required to complete the Work as specified on the Contract documents and/or drawings, or as directed by CITY.

K. ITEM 11, SPECIFICATION SECTION NO. 34 71 00, W BEAM GUARDRAIL:
MEASUREMENT: Guardrail shall be measured per linear foot installed, complete in place as shown on the Contract documents and/or drawings or as directed by CITY.
PAYMENT: The Unit Price Bid per linear foot shall include all labor, equipment, and materials necessary for removing and replacing guardrails and wave walls required to complete the Work as specified on the Contract documents and/or drawings, or as directed by CITY.

L. ITEM 12, SPECIFICATION SECTION NO. 34 41 16.10, TRAFFIC CONTROL:
MEASUREMENT: Traffic Control shall be measured and paid at the lump sum price bid for the project, complete, as shown on the Contract documents and/or drawings or as directed by CITY.
PAYMENT: The lump sum Unit Price Bid for Traffic Control shall include furnishing and maintaining traffic control measures to include, but are not limited to temporary barricades, temporary barriers, warning signals, pilot vehicles, crash trucks, barrels, cones, steel plates, lights, flagmen, watchmen, off duty police officers, temporary signs, maintenance, obtaining traffic permits, and all other labor, materials, equipment, and incidentals required to complete the Work as specified on the Contract documents and/or drawings or as directed by CITY.

M. ITEMS 13-17, SPECIFICATION SECTION NO. 33 01 30.72, SLUICE GATE STRUCTURE COMPONENT SYSTEM (VARIOUS), COMPLETE
MEASUREMENT: Each of the sluice gate components, attachments, assembly bolts and nuts, and other appurtenant parts shall be measured per each component system complete (stem guides complete, hoist head complete, pedestal complete, operating stem complete, or gate complete) removed and replaced as shown on the Contract documents and/or drawing or as authorized by CITY.
PAYMENT: The Unit Price Bid for each sluice gate component system shall include all labor, equipment, and materials necessary for removing and replacing the existing sluice gate components required to complete the Work as specified on the Contract documents and/or drawings, or as directed by CITY.

END OF SECTION 01 22 15.11

SECTION 01 31 19

PROJECT MEETINGS

PART 1 – GENERAL

1.1 SCOPE:

A. Work under this Section includes all scheduling and administering of pre-construction and progress meetings as herein specified and necessary for the proper and complete performance of this Work. No separate measurement and payment will be made for work under this section. All costs in connection with this work specified herein is consider to be incidental to the Work.

B. Scheduling and Administration by Owner:
1. Prepare Agenda, with assistance from Engineer
2. Make physical arrangements for the meetings.
3. Preside at meetings.

C. Scheduling and Administration by Engineer:
1. Assist Owner with Agenda
2. Record minutes and include significant proceedings and decisions.
3. Distribute "Draft" meeting minutes for review/revision
4. Incorporate revisions and distribute Final copies of the minutes to participants.

1.2 PRE-CONSTRUCTION MEETING:

A. The Owner shall schedule the pre-construction conference prior to the issuance of the Notice to Proceed.

B. Representatives of the following parties are to be in attendance at the meeting:
1. Owner; including project manager, project inspector, Operations stakeholder(s)
2. Engineer
3. Contractor's project staff including at a minimum: the project manager, site superintendent, quality/safety control coordinator, and subcontractor coordinator
4. Major subcontractors
5. Representative(s) of governmental or regulatory agencies, when appropriate.
6. Materials Testing Firm representative

C. The agenda for the preconstruction conference shall consist of the following as a minimum:
1. List of attendees, and introduction of each attendee and their respective project role.
2. Project Data to include Bid date, total Bid amount, Notice to Proceed Date, Substantial Completion date, and Final Completion Date.

3. List of project stakeholders and their contact information including email address and cell phone number.
4. Communication procedures and chain of communication for specified project components.
5. Distribute and discuss a list of major subcontractors and a tentative construction schedule, including City Holidays, and adverse weather days.
6. Critical work sequencing.
7. Pay request procedure including format, submittal, pay date, and retainage.
8. Procedures for maintaining record documents.
9. Discuss submittals to include, project schedules, requests for information, shop drawings, product data, samples, and project record drawings.
10. Processing of field decisions and Change Orders.
11. Work Times and Schedule.
12. Inspection of Work, testing, and laboratory work.
13. Safety and first aid procedures.
14. Permits, easements, and their acquisition status.
15. Blasting protocol.
16. Traffic control.
17. Housekeeping notes and procedures.

1.3 PROJECT PROGRESS MEETINGS:

A. Owner to schedule progress meetings monthly, or more frequently as directed by the Engineer.
B. Hold called meetings as the progress of the Work dictates.
C. The meetings shall be held at the location indicated by the Owner.
D. Representatives of the following parties are to be in attendance at the meetings:
   1. Owner, to include project manager, project inspector, and as conditions dictate, Operations stakeholder(s)
   2. Engineer.
   3. Contractor’s project staff including at a minimum the project manager, site superintendent, quality control coordinator, and subcontractor coordinator
   4. Major subcontractors as pertinent to the agenda.
   5. Representatives of governmental or other regulatory agencies, as appropriate.
   6. Materials testing firm representative as pertinent to the agenda

E. The minimum agenda for progress meetings shall consist of the following:
   1. List of attendees
   2. Review and approve minutes of previous meeting.
   3. Contractor to supply updated Project Progress Schedule.
   4. Review work progress since last meeting.
   5. Review work progress planned for the next period.
   6. Status of Overall Project Schedule, identify problems which impede planned progress.
   7. Review Contractor's corrective measures and procedures to regain plan schedule.

8. Review budget status.
9. Review Request for Information process
10. Review Change Management items and status of individual Change documents.
11. Review Notices, Punch lists, and project coordination issues.
12. Note field observations, problems and decisions.
13. Review testing and quality control measures and associated issues.
14. Complete other current business.

1.4 SHUTDOWN COORDINATION MEETINGS:

A. One week minimum prior to significant planned shutdowns, Contractor shall arrange with Owner, and Owner shall convene a coordination meeting.

B. Meeting participants shall include Owner, Engineer, and Contractor, including involved subcontractors.

C. Meeting agenda shall include Contractor's review/presentation of detailed work plan and schedule, Owner input regarding facility operations, and all other pertinent coordination topics.

1.5 QUALITY CONTROL AND COORDINATION MEETINGS:

A. Scheduled by Engineer and coordinated with Owner, on regular basis and as necessary to review test and inspection reports, and other matters relating to quality control of Work and work of other contractors.

B. Attendees will include:

1. Owner, including project manager, project inspector, chief inspector, and as it pertains to the Work, Operations stakeholder(s)
2. Engineer
3. Contractor's project staff including at a minimum: the project manager, site superintendent, quality/safety control coordinator, and subcontractor coordinator
4. Major subcontractors, as it pertains to the Work
5. Materials Testing Firm representative, as it pertains to the Work.

1.6 PRE-INSTALLATION MEETINGS:

A. When required in individual Specification Sections, convene at site prior to commencing Work of that section.
B. Require attendance of entities directly affecting, or affected by, Work of that Section.
C. Notify Engineer and Owner five (5) days in advance of meeting date.
D. Provide suggested agenda to Engineer to include reviewing conditions of installation,

preparation and installation or application procedures, and coordination with related Work and work of others.

1.7 FACILITY STARTUP MEETINGS:

A. Schedule and attend facility startup meetings for each system, facility, or group of facilities, as applicable.

B. Attendees will include:
1. Contractor's project staff including at a minimum the site superintendent.
2. Subcontractors and equipment manufacturer's representatives whom Contractor deems to be directly involved in facility startup.
3. Engineer's representatives.
4. Owner's inspection personnel.
5. Others as required by Contract Documents.

1.8 OTHER MEETINGS:

A. In accordance with Contract Documents and as may be required by Owner and Engineer.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 31 19

SECTION 01 32 33

GRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. Prior to the beginning of any work, take project photographs of the work area to record existing conditions. Submit the pre-construction photographs to the Engineer within 15 calendar days after the date of receipt by the Contractor of the Notice to Proceed.

B. Submit a minimum of fifteen progress photographs with each request for payment, or at each monthly progress meeting, whichever is more frequent. The view selection will be as agreed to with the Engineer. Submit two flash drives with copies of the electronic photograph files in jpeg format. Include the date and time marking of the recording on the photographs. Electronically label all photographs to indicate date and description of work shown.

C. Following completion of the work, take another set of photos showing the same areas and features as in the pre-construction photographs to clearly depict the completed Project.

1. Photograph all significant areas of completed construction.

2. Do not take completion photographs until all construction trailers, excess materials, trash, and debris have been removed.

D. Provide video recordings of the Site.

1. Record the condition of all existing facilities in or abutting the construction area (right-of-way) including streets, curb and gutter, utilities, driveways, fencing, landscaping, etc., prior the beginning of construction. Provide one copy of the dated and labeled recording to the Engineer before the start of construction. Provide additional recording as directed by the Engineer if the recording provided is not considered suitable for the purpose of recording pre-existing conditions.

2. Provide a video recording of the Site after the Project is complete and all construction trailers, excess materials, trash, and debris have been removed. Provide a 360-degree view of the Project from a consistent height and angle.

3. Format must allow photographic still shots to be extracted from the video recording.

E. All photographs and video recordings are to become the property of the Owner. Photographs or recordings may not be used for public or private publication or display without the written consent of the Owner.

1.2 DOCUMENTATION

A. Submit photographic documentation and video recordings in accordance with Section 01 33 00 “Submittal Procedures.”

1.3 QUALITY ASSURANCE

A. Provide clear photographs and video recordings taken with proper exposure. View photographs and video recordings in the field and take new photographs or video recordings immediately if photos of an adequate print quality cannot be produced or video quality is not adequate. Provide photographs with adequate quality and resolution to permit enlargements.

1.4 MEASUREMENT AND PAYMENT

A. No separate measurement and payment will be made for work under this section. All costs in connection with this work specified herein, is considered to be incidental to the Work.

1.5 DISPUTES AND POTENTIAL CLAIMS

A. In the event a problem arises or dispute occurs, which may result in a potential Claim, and the problem or dispute can be illustrated by photographs and video recordings, the Contractor shall provide such photographs and video files.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHS

A. Provide photographs in digital format with a minimum resolution of 1280x960, accomplished without a digital zoom.

B. Take photographs at locations acceptable to the Engineer.

C. Provide a digital copy of each photograph taken.

2.2 VIDEO RECORDING

A. Provide video recordings in digital format that can be played with Windows Media Player in common format in full screen mode without loss of resolution.

B. Identify Project on video by audio or visual means.

C. Provide video with file size that does not exceed 1 GB.

D. Provide video resolution of at least 1080p.

E. The quality of the video must be sufficient to determine the existing conditions of the construction area. Camera panning must be performed while at rest; do not pan the camera while walking or driving. Camera pans should be performed at intervals sufficient to clearly view the entire construction area.

F. Label the video recording with construction stationing. Stationing is to be annotated in the video.

G. The entire construction area recording must be submitted at once. Sections submitted separately will not be accepted.

H. Linear projects should be recorded linearly from beginning to end.

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 33 06

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

Section	Title
1.2	References
1.3	Contractor's Responsibilities
1.4	Engineer's Responsibilities
1.5	Request for Information (RFI)
1.6	Letter of Transmittal
2.1	General
2.2	Schedules
2.3	Request for Information
2.4	Shop Drawings
2.5	Operation and Maintenance Manuals
2.6	Record Drawing
3.1	General
3.2	Review Procedures
3.3	Schedules
3.4	Request for Information
3.5	Shop Drawings
3.6	Effect of Review of Contractor's Submittals
3.7	Cost for Review of Submittals

B. All materials and/or equipment provided to the CITY shall require submittal to, and acceptance by, Engineer prior to releasing Contractor for ordering. Any items ordered and/or delivered without accepted submittals may be rejected by the CITY.

C. This section includes information and requirements for the submittal of documents during the course of work for, including but not limited to, schedules, shop drawings, product data, operation and maintenance manuals, requests for information, and record drawings as specified.

D. Submittals shall include, but not be limited to, manufacturers' information, catalog data, shop drawings, test procedures, test results, samples, calculations of equipment performance, equipment weight, fabrication, erection, mechanical accessories, materials installed, reinforcing steel, piping, details, and Work-related information. The Contractor shall furnish scaled drawings, or drawings of equivalent dimensions to ascertain information deemed necessary by the Engineer, including descriptive data, certificates, samples, tests, and any other instructions specifically required in the Contract Documents

or recommended by the manufacturer to demonstrate that the materials and equipment to be furnished, and the methods of Work, comply with the provisions and intent of the Contract Documents.

1.2 REFERENCES

A. Drawings and general provisions of the Agreement, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.3 CONTRACTOR'S RESPONSIBILITIES

A. Before starting construction, Contractor shall submit to the Engineer and regulatory agencies where required for timely review, a Preliminary Progress Schedule, and a Preliminary Schedule of Submittals; and shall submit to the CITY for timely review, a Schedule of Values for all of the Work, in a format acceptable to the CITY, per Specification Section 01 00 00 General Requirements.

B. After starting and during construction, Contractor shall submit to the Engineer for timely review, an updated Progress Schedule, and an updated Schedule of Submittals, per Specification Section 01 00 00 General Requirements.

C. The Contractor shall be responsible for the accuracy and completeness of information contained in each submittal assuring that the Work shall be done in accordance with the Contract Documents, unless a deviation has been accepted. The Contractor shall verify that each feature of every product shall conform to the specified requirements. Submittal documents shall be clearly edited to indicate only those items being submitted in accordance with the Work. All extraneous materials shall be stricken out or removed. The Contractor shall coordinate submittals among his subcontractors and suppliers to meet the specified Work so that the Work shall not be delayed. No extension of time shall be allowed because of failure to properly schedule submittals. The Contractor shall certify on each submittal document that he/she has reviewed the submittal, verified field conditions, and complied with the Contract Documents.

D. The Contractor may authorize in writing to the CITY that a material or equipment supplier may deal directly with the CITY or its authorized representative. These dealings shall be limited to contract interpretations to clarify and expedite the Work.

E. If the information provided in a submittal indicates any deviation from the Contract requirements, the Contractor shall by written statement accompanying the submittal, advise the Engineer and the CITY of any deviation and state the reasons for such.

F. It shall be the Contractor's responsibility to ensure there is no conflict with other submittals and to notify the Engineer and the CITY in any case where the Contractor's submittal may concern work by another contractor, subcontractor, or the CITY. The Contractor is solely responsible for the coordination of submittals by his subcontractors and shall verify that his subcontractors' submittals are complete in every way and meet the requirements of the Contract.

1.4 ENGINEER'S RESPONSIBILITIES

A. Submittal reviews shall be returned to the Contractor and copied to the CITY and regulatory agencies where required, marked with one of the following, "Reviewed No Exceptions", "Reviewed Exceptions Noted", "Revise and Resubmit", "Rejected", or "Information Only". Returned submittals marked with "Revise and Resubmit" or "Rejected" shall be re-submitted until an acceptable mark of "Reviewed No Exceptions" or "Reviewed Exceptions Noted" is granted. The contractor shall pay for any submittals requiring Engineer to review beyond the second submittal.

B. The acceptance of the Contractor's submittals shall not relieve the Contractor of responsibility for any error, or any obligation for accuracy of dimensions and details, or for agreement with and conformity to the Contract and Contract Documents, or the responsibility to fulfill the Contract as prescribed. Nor shall acceptance be considered acceptance of any deviation or conflict unless Engineer and the CITY have been expressly advised of the same, or Engineer and the CITY have expressly accepted such deviation or conflict.

1.5 REQUEST FOR INFORMATION (RFI)

A. The Contractor shall submit in writing, a Request for Information (RFI) to the Engineer concerning all proposed substitutions and deviations to the Contract Documents, with the specified or associated parts. Such written requests shall be clearly marked with a numeric designation and should show a corresponding, concise, and lucid justification substantiating the benefits to the CITY. RFIs are subject to rejection.

1.6 LETTER OF TRANSMITTAL

A. Transmittals shall be attached to each submittal with the following minimum requirements:

1. Transmittals written in pencil will be returned along with the submitted documents without review.

2. Transmittals shall be used for each submittal.

3. Transmittals shall be typed or written in ink announcing the project particulars, sender's and receivers' information, purpose for the submittal, a listing of items contained in the submittal with a detailed explanation attached to the cover of each submittal package.

PART 2 - SUBMITTALS

2.1 GENERAL

A. Submittals typically fall into one of five (5) general categories; "Schedules", "Request For Information (RFI)", "Shop Drawings", "Operation and Maintenance Manuals" and "Record Drawings". Unless otherwise specified, all submittals shall be considered product data.

2.2 SCHEDULES

A. The Contractor shall submit all requirements sufficiently in advance of construction requirements to allow ample time for the Contractor and Engineer to complete their responsibilities, as specified herein, without claim and or allowance by the Contractor for delays arising from his failure in this respect.

B. Preliminary and updated Project Progress Schedules shall include construction activities, milestones, and dates for events, including Schedule of Submittals.

C. The Schedule of Values shall list the installed value of component items of the Work to serve as a basis for computing values for progress payments during construction.

2.3 REQUEST FOR INFORMATION (RFI)

A. The Contractor shall submit all requirements sufficiently in advance of construction requirements to allow ample time for the Contractor and Engineer to complete their responsibilities, as specified herein, without claim and or allowance by the Contractor for delays arising from his failure in this respect.

B. Submittals shall include the project name and number, and RFI number in numerical order, on the top portion, of the top page of the document(s).

2.4 SHOP DRAWINGS

A. The Contractor shall submit all requirements sufficiently in advance of construction requirements to allow ample time for the Contractor and Engineer to complete their responsibilities, as specified herein, without claim and or allowance by the Contractor for delays arising from his failure in this respect.

B. All shop drawings submitted must bear the stamp of approval of and by the Contractor as evidence that the submittal has been thoroughly reviewed and coordinated.

C. Submittals shall include the project name and number, and Shop Drawing Number in numerical order, on the top portion, of the top page of the document(s).

2.5 OPERATION AND MAINTENANCE MANUALS

A. Operation and Maintenance Manuals submittal documents common to more than one piece of equipment shall be identified with all the appropriate equipment numbers and referenced in the other parts of the manual under that specific equipment or material. Submittals that consist of various items that together constitute a manufacturer's equipment or package, or are so functionally related, must be submitted, reviewed and approved as a whole.

2.6 RECORD DRAWINGS – Refer to Section 01 78 39 "Project Record Documents"

PART 3 - EXECUTION

3.1 GENERAL

A. As applicable, submittals shall be marked in accordance to following color schemes:

1. **Manufacturer/vendor** comments shall be in '**black**' ink
2. **Contracto**r comments shall be in '**green**' ink
3. **Engineer** comments shall be in '**blue**' ink
4. **CITY** comments shall be in '**red**' ink

3.2 REVIEW PROCEDURES

A. Submittals are specified for those features and characteristics of materials, equipment, and methods of operation which can be selected based on the Contractor's judgment of their conformance to the specified requirements. Review shall not extend to means, methods, techniques, sequences or procedures of construction, or to verifying quantities, dimensions, weights or gages, or fabrication processes (except where specifically indicated or required by the specifications) or to safety precautions or programs incident thereto.

B. When the Contract Documents require a submittal by the Contractor, it shall be to the following minimum requirements:

1. Shop Drawings: Unless otherwise directed by the Engineer, six (6) copies of submitted information shall be transmitted to Engineer for review and comment. After Engineer's review and comments, Engineer shall return two (2) copies to the Contractor.

3.3 SCHEDULES

A. Preliminary Project Progress Schedule:
1. Contractor shall submit to the Engineer, a Preliminary Project Progress Schedule within ten (10) calendar days after the effective date of the Agreement.
2. The Engineer will review said Preliminary Project Progress Schedule and return reviewed copy to Contractor within fourteen (14) calendar days.
3. If required, Contractor will resubmit to Engineer, a revised Preliminary Project Progress Schedule incorporating all revisions, within ten (10) calendar days after receipt of a returned review copy.

B. Preliminary Schedule of Submittals:
1. Contractor shall submit to the Engineer, a Preliminary Schedule of Submittals within ten (10) calendar days after the effective date of the Agreement.
2. The Engineer will review said Preliminary Schedule of Submittals and return reviewed copy to Contractor, within fourteen (14) calendar days.
3. If required, Contractor will resubmit to Engineer, a revised Preliminary Schedule of Submittals incorporating all revisions, within ten (10) calendar days after receipt of a returned review copy.

C. Schedule of Values:
1. Contractor shall submit to the CITY, a Schedule of Values allocated to the various portions of the Work, within ten (10) calendar days after the effective date of the Agreement. The value of each activity shall be a complete and total value, including all taxes, overhead, and profit. The sum of all the values of the activities shall equal the total Agreement Price. The first progress payment will

not be made until the next pay cycle following the CITY's approval of the Contractor's Schedule of Values.

2. The CITY will review said Schedule of Values and return reviewed copy to Contractor, within fourteen (14) calendar days. Upon request of the CITY, support the values with data, which will substantiate their correctness.
3. If required, Contractor will resubmit to CITY, a revised Schedule of Values incorporating all revisions, within ten (10) calendar days after receipt of a returned review copy.
4. The Schedule of Values shall be used only as a basis of the Contractor's Application for Payment.

D. Project Progress Schedule:

1. Contractor shall submit to the Engineer, an updated Project Progress Schedule within thirty (30) calendar days after the effective date of the Agreement.
2. The Engineer will review said Project Progress Schedule and return reviewed copy to Contractor within fourteen (14) calendar days.
3. If required, Contractor will resubmit to Engineer, a revised Project Progress Schedule incorporating all revisions, within ten (10) calendar days after receipt of a returned review copy.

E. Schedule of Submittals:

1. Contractor shall submit to the Engineer, an updated Schedule of Submittals within thirty (30) calendar days after the effective date of the Agreement.
2. The Engineer will review said Schedule of Submittals and return reviewed copy to Contractor, within fourteen (14) calendar days.
3. If required, Contractor will resubmit to Engineer, a revised Schedule of Submittals incorporating all revisions, within ten (10) calendar days after receipt of a returned review copy.

3.4 REQUEST FOR INFORMATION (RFI)

A. If the Contractor proposes to provide material, equipment, or method of Work which deviates from the project manual, he/she shall indicate so on the transmittal letter accompanying that specific submittal. Each RFI must be clearly marked with a numeric designation having a corresponding detailed explanation to indicate the benefit to the CITY and/or the project. Submittals which do not identify deviations from the contract shall not be acceptable and shall be returned without review.

3.5 SHOP DRAWINGS

A. The Engineer shall have fourteen (14) calendar days to review and comment on a submittal after its receipt. The returned submittal shall indicate one of the following actions:

1. If the review indicates that the submittal complies with the Contract Documents, it shall be marked "Reviewed No Exceptions". In this event, the Contractor may begin to implement the work method or incorporate the material or equipment covered by the submittal; no re-submittal is required.

2. If the review indicates limited corrections are required, copies shall be marked "Reviewed Exceptions Noted". The Contractor may begin implementing the work method or incorporating the material and equipment covered by the submittal in accordance with the noted corrections. No re-submittal shall be required except where the submittal information shall be incorporated into the Project Operation and Maintenance Manuals, and then a corrected copy shall be incorporated.

3. If the review reveals that the submittal is insufficient and or contains incorrect data, copies shall be marked "Revise and Resubmit". Except at his own risk, the Contractor shall not undertake Work covered by this submittal until it has been revised, resubmitted and returned with a mark of "Reviewed No Exceptions" or "Reviewed Exceptions Noted."

4. If the review reveals that the submittal is unacceptable it shall be marked "Rejected". The Contractor shall not undertake Work covered by this submittal until it has been revised, resubmitted and returned with a mark of "Reviewed No Exceptions" or "Reviewed Exceptions Noted."

3.6 EFFECT OF REVIEW OF CONTRACTOR'S SUBMITTALS

A. Review of the Contractor's submittals shall not relieve the Contractor of his responsibility for errors therein and shall not be regarded as an assumption of risks or liability by the CITY. Also, the Contractor shall have no claim on account of the failure, or partial failure, of the method of Work, material, or equipment so reviewed. A mark of "Reviewed No Exceptions" or "Reviewed Exceptions Noted" shall mean that the CITY has no objection to the Contractor, upon his own responsibility, using the plan or method of Work proposed, or providing the materials or equipment proposed, with the exception of incorporating any Notes made by the Engineer.

3.7 COST FOR REVIEW OF SUBMITTALS

A. The CITY shall pay for the review of each initial submittal and the first re-submittal required for a project. However, if the Engineer requires that shop drawings or product data be submitted for a third or more review, the Contractor shall then be responsible to pay for the Engineer's time to review the second or more re-submittal, and for each re-submittal of the same thereafter.

END OF SECTION 01 33 00

SECTION 01 41 00

REGULATORY REQUIREMENTS

PART 1 – GENERAL

1.1 SCOPE:

A. Permits and Responsibilities: The Contractor shall, without additional expense to the CITY, be responsible for obtaining all necessary licenses and permits and for complying with any applicable federal, state, county and municipal laws, codes, ordinances and regulations, in connection with the prosecution of the Work. The Contractor shall be responsible for coordinating and scheduling all necessary inspections required by applicable federal, state, county and municipal codes and regulations in relation to licenses and permits, including building permits issued for the project.

B. The Contractor shall take proper safety and health precautions to protect the Work, the workers, the public and the property of others.

C. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the Work.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 41 00

SECTION 01 42 19

REFERENCE STANDARDS

PART 1 – GENERAL

1.1 DESCRIPTION:

A. Whenever reference is made to conforming to the standards of any technical society, organization, body, code or standard, it shall be construed to mean the latest standard, code, specification or tentative specification adopted and published at the time of advertisement for Bids. This shall include the furnishing of materials, testing of materials, fabrication and installation practices. In those cases where the Contractor's quality standards establish more stringent quality requirements, the more stringent requirement shall prevail. Such standards are made a part hereof to the extent which is indicated or intended.

B. The inclusion of an organization under one category does not preclude that organization's standards from applying to another category.

C. In addition, all work shall comply with the applicable requirements of local codes, utilities and other authorities having jurisdiction.

D. All material and equipment, for which a UL Standard, an AGA or NSF approval or an ASME requirement is established, shall be so approved and labeled or stamped. The label or stamp shall be conspicuous and not covered, painted, or otherwise obscured from visual inspection.

E. The standards which apply to this Project are not necessarily restricted to those organizations which are listed in Article 1.2.

1.2 STANDARD ORGANIZATIONS:

A. Piping and Valves:

ACPA	American Concrete Pipe Association
ANSI	American National Standards Institute
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
AWWA	American Water Works Association
CISPI	Cast Iron Soil Pipe Institute
DIPRA	Ductile Iron Pipe Research Association
FCI	Fluid Controls Institute
MSS	Manufacturers Standardization Society
NCPI	National Clay Pipe Institute

NSF	National Sanitation Foundation
PPI	Plastic Pipe Institute
Uni-Bell	PVC Pipe Association

B. Materials:

AASHTO	American Association of State Highway and Transportation Officials
ALS	American Lumber Standards
AMA	Acoustical Materials Association
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials

C. Painting and Surface Preparation:

NACE	National Association of Corrosion Engineers
SSPC	Society for Protective Coatings

D. Steel, Concrete, and Asphalt:

ACI	American Concrete Institute
AI	Asphalt Institute
AISC	American Institute of Steel Construction, Inc.
AISI	American Iron and Steel Institute
CRSI	Concrete Reinforcing Steel Institute
NRMA	National Ready-Mix Association
PCA	Portland Cement Association
PCI	Prestressed Concrete Institute

E. Welding:

ASME	American Society of Mechanical Engineers
AWS	American Welding Society

F. Government and Technical Organizations:

AIA	American Institute of Architects
APHA	American Public Health Association
APWA	American Public Works Association
ASA	American Standards Association
ASAE	American Society of Agricultural Engineers
ASCE	American Society of Civil Engineers
ASQC	American Society of Quality Control
ASSE	American Society of Sanitary Engineers
CFR	Code of Federal Regulations
CSI	Construction Specifications Institute
EDA	Economic Development Administration
EPA	Environmental Protection Agency
EPD	Georgia Environmental Protection Division
FCC	Federal Communications Commission
FCWS	Fulton County Water Services
FmHA	Farmers Home Administration
FS	Federal Specifications

GASDP	Georgia Safe Dams Program
IAI	International Association of Identification
ISEA	Industrial Safety Equipment Association
ISO	International Organization for Standardization
ITE	Institute of Traffic Engineers
NBFU	National Board of Fire Underwriters
(NFPA)	National Fluid Power Association
NBS	National Bureau of Standards
NISO	National Information Standards Organization
OSHA	Occupational Safety and Health Administration
SI	Salt Institute
SPI	The Society of the Plastics Industry, Inc.
USDC	United States Department of Commerce
WEF	Water Environment Federation

G. Roadways:

AREA	American Railway Engineering Association
GDOT	Georgia Department of Transportation
CITY	City of Johns Creek
SSRBC	Standard Specifications for Construction of Transportation Systems, Georgia Department of Transportation

H. Plumbing:

AGA	American Gas Association
NSF	National Sanitation Foundation
PDI	Plumbing Drainage Institute
SPC	SBCC Standard Plumbing Code

1.3 SYMBOLS:

Symbols and material legends shall be as scheduled on the Drawings.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 42 19

SECTION 01 43 00

QUALITY ASSURANCE

PART 1 - GENERAL

1.01 DESCRIPTION:

A. This section covers Quality Assurance and Quality Control requirements for this contract. No separate measurement and payment will be made for work under this section. All costs in connection with this work specified herein is consider to be incidental to the Work.

B. The Contractor is responsible for controlling the quality of work, including work of its subcontractors, and suppliers and for assuring the quality specified in the Technical Specifications is achieved.

1.02 SUMMARY:

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.

2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and control procedures that facilitate compliance with the Contract Document requirements.

3. Requirements for Contractor to provide quality-assurance and control services required by, including but not limited to, Engineer, Owner, or authorities having jurisdiction, are not limited by provisions of this Section.

C. Related Requirements:

1. Divisions 01 through 44 Sections for specific test and inspection requirements.

1.03 REFERENCES:

A. American Society for Testing and Materials (ASTM):

1. E329: Standard Specification for Agencies Engaged in Construction Inspection and/or Testing

1.04 DEFINITIONS:

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Engineer.

C. Preconstruction Testing: Tests and inspections performed specifically for the Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

D. Product Testing: Tests and inspections that are performed by a Nationally Recognized Testing Laboratory (NRTL), an (National Voluntary Laboratory Accreditation Program (NVLAP), or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.

2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

E. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

F. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

H. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

I. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five (5) previous projects similar in nature, size,

and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.05 CONFLICTING REQUIREMENTS:

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Engineer for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Engineer for a decision before proceeding.

1.06 SUBMITTALS:

A. Shop Drawings: Provide plans, sections, dimensions, and elevations, indicating materials and size of proposed construction.

1. Indicate manufacturer and model number of individual components.

2. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

B. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

C. Qualification Data: For Contractor's quality-control personnel.

D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

1.07 CONTRACTOR'S QUALITY-CONTROL PLAN:

A. Quality Control Plan, General: Submit quality-control plan within thirty (30) days of Notice to Proceed. Submit in format acceptable to Engineer. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.

B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.

1. Project quality-control manager may also serve as Project superintendent.

C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:

1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.

2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."

3. Owner-performed tests and inspections indicated in the Contract Documents.

E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and accepted mockups.

F. Monitoring and Documentation: Maintain testing and inspection reports including log of accepted and rejected results. Include work Engineer has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.08 REPORTS AND DOCUMENTS:

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
1. Date of issue.
2. Project title and number.

3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector, as applicable.
13. Recommendations on retesting and reinspecting.

B. Manufacturer’s Technical Representative’s Field Reports: Prepare written information documenting manufacturer’s technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative’s Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.09 QUALITY ASSURANCE:

A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:
   a. Provide test specimens representative of proposed products and construction.
   b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
   c. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
   d. When testing is complete, remove test specimens, assemblies; do not reuse products on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Engineer with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

K. Copies of applicable referenced standards are not included in the Contract Documents. Where copies of standards are needed by the Contractor for superintendence and quality control of the work, the Contractor shall obtain a copy or copies directly from the publication source and maintain at the jobsite, available to the Contractor's personnel, subcontractors, and Engineer

L. Quality of Materials: Unless otherwise specified, all materials and equipment furnished for permanent installation in the Work shall conform to applicable standards and specifications and shall be new, unused, and free from defects and imperfections, when installed or otherwise incorporated in the Work. The Contractor shall not use material and equipment for any purpose other than that intended or specified unless the Engineer authorizes such use.

M. Where so specified, products or workmanship shall also conform to the additional performance requirements included within the Contract Documents to establish a higher or more stringent standard or quality than that required by the referenced standard.

1.10 OFFSITE INSPECTION:

A. When the specifications require inspection of materials or equipment during the production, manufacturing, or fabricating process, or before shipment, such services shall be performed by the Owner’s independent testing laboratory, or inspection organization acceptable to Engineer in conjunction with or by the Engineer.

B. The Contractor shall give appropriate written notice to the Engineer not less than thirty (30) days before offsite inspection services are required, and shall provide for the

producer, manufacturer, or fabricator to furnish safe access and proper facilities and to cooperate with inspecting personnel in the performance of their duties.

1.11 MATERIALS AND EQUIPMENT:

A. The Contractor shall maintain control over procurement sources to ensure that materials and equipment conform to specified requirements in the Contract Documents.

B. The Contractor shall comply with manufacturer's printed instructions regarding all facets of materials and/or equipment movement, storage, installation, testing, startup, and operation. Should circumstances occur where the contract documents are more stringent than the manufacturer's printed instructions, the Contractor shall comply with the specifications. In cases where the manufacturer's printed instructions are more stringent than the contract documents, the Contractor shall advise the Engineer of the disparity and conform to the manufacturer's printed instructions. In either case, the Contractor is to apply the more stringent specification or recommendation, unless accepted otherwise by the Engineer.

1.12 QUALITY CONTROL:

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.

2. The Contractor shall furnish a construction schedule and a minimum of 48-hour notice of readiness for testing and inspection of the work. The Engineer shall determine the exact time and location of field sampling and testing, and may require such additional sampling and testing to determine that materials and equipment conform with data previously furnished by Contractor and with the Contract Documents.

3. The Contractor shall schedule the work to permit adequate time for testing and re-testing should test results not conform to the contract documents. Lack of testing or inspection which is attributable to insufficient notice by the Contractor or failure of the Contractor to cooperate, will be cause for rejection of the work.

4. The Contractor shall deliver materials in sufficient quantities to the Owner's testing agency as may be required. Laboratory testing shall be performed within a reasonable time, consistent with the specified standards.

5. The Contractor shall furnish material samples and cooperate in the field sampling and testing activities, interrupting the work when necessary. The Contractor shall furnish personnel, facilities and access to assist in the sampling and testing activities.

6. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.

2. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

3. Comply with manufacturers' instructions, including each step in sequence.

4. When manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

5. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

6. Perform Work by persons qualified to produce required and specified quality.

7. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.

8. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

9. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

    a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

10. Notify testing agencies at least twenty-four (24) hours in advance of time when Work that requires testing or inspecting will be performed.

11. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.

12. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.

13. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Tolerances:

1. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

2. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.

3. Adjust products to appropriate dimensions; position before securing products in place.

D. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections.

E. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

F. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

G. Testing Agency Responsibilities: Cooperate with Engineer and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

H. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as

requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspecting equipment at Project site.

I. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

J. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.

1. Distribution: Distribute schedule to Owner, Engineer, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.13 SPECIAL TESTS AND INSPECTIONS:

A. Special Tests and Inspections: Owner will engage a qualified agency to conduct special tests and inspections required, as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
2. Notifying Engineer and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Engineer with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 EXAMINATION:

A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Verify utility services are available, of correct characteristics, and in correct locations.

3.02 PREPARATION:

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

3.03 QUALITY CONTROL:

A. Quality control is the responsibility of the Contractor, and the Contractor shall maintain control over construction and installation processes to assure compliance with specified requirements.

B. Certifications for personnel, procedures, and equipment associated with special processes (e.g., welding, cable splicing, surveying) shall be maintained by the Contractor, available for inspection by the Engineer. Copies shall be made available to the Engineer upon request.

C. Means and methods of construction and installation processes are the responsibility of the Contractor, and at no time is it the intent of the Engineer to supersede or void that responsibility.

3.04 TEST AND INSPECTION LOG:

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
   1. Date test or inspection was conducted.
   2. Description of the Work tested or inspected.
   3. Date test or inspection results were transmitted to Engineer.
   4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Engineer's reference during normal working hours.

3.05 REPAIR AND PROTECTION:

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

3.06 DEFECTIVE WORK

A. Immediately correct any Defective Work or notify the Engineer why the Work is not to be corrected immediately and when corrective action will be completed.

B. Work performed that is connected or adjacent to Defective Work or Work that would have to be removed to correct Defective Work is also considered to be Defective. Contractor is responsible for all costs associated with replacing any acceptable Work that must be removed, or might be damaged by corrective actions.

C. Document Defective Work, corrective actions taken to correct defects and that corrected Work complies with the Contract Documents.

D. Implement countermeasures to prevent future Defective Work.

E. No payment will be made for Defective Work. Remove Work from the Application for Payment if Work paid for on a previous Application for Payment is found to be Defective.

F. Owner will withhold payment for Defective Work or Work that has not been tested or inspected in accordance with the Contractor’s Quality Control Plan, Owner’s Quality Control Plan, or the Contract Documents.

3.07 VERIFICATION TESTING FOR CORRECTED DEFECTS

A. Provide verification testing on corrected Work when corrective action is complete to demonstrate that the corrected Work complies with the Contract Documents. Conduct the same tests or inspections used to determine that the original Work was Defective. Different tests or methods may be used if approved by the OPT. Document that Defective Work has been corrected with the Engineer.

B. Pay for verification testing until Work meets quality requirement set forth in the Contract Documents. OPT may perform verification testing as part of its Quality

Management Program and impose a Set-off to recover the cost for this testing.

END OF SECTION 01 43 00

SECTION 01 45 29

TESTING LABORATORY SERVICES

PART 1 – GENERAL

1.01 SCOPE:

A. This Section includes testing which the CITY may require, beyond that testing required of the manufacturer, to determine if materials provided for the Project meet the requirements of these Specifications.

B. This work also includes all testing required by the CITY to verify work performed by the Contractor is in accordance with the requirements of these Specifications, i.e., concrete strength, slump testing, soil compaction, etc.

C. This work does not include materials testing required in various sections of these Specifications to be performed by the manufacturer.

D. The testing laboratory or laboratories will be selected by the CITY. The testing laboratory or laboratories will work for the CITY.

E. No separate measurement and payment will be made for work under this section. All costs in connection with this work specified herein is consider to be incidental to the Work.

1.02 PAYMENT FOR TESTING SERVICES:

A. Testing services provided by the CITY will be paid by the CITY. Testing services provided by the Contractor shall be approved by the CITY, but paid by the Contractor.

B. The cost of material testing described in various sections of these Specifications or as required in referenced standards to be provided by a material manufacturer, shall be included in the price bid for that item and shall not be paid for by the CITY.

C. The cost of retesting any item that fails to meet the requirements of these Specifications shall be paid for by the Contractor. Retesting shall be performed by the testing laboratory working for the CITY.

1.03 LABORATORY DUTIES:

A. Cooperate with the CITY, Engineer and Contractor.

B. Provide qualified personnel promptly on notice.

C. Perform specified inspections, sampling and testing of materials.

1. Comply with specified standards, ASTM, other recognized authorities, and as specified.

2. Ascertain compliance with requirements of the Contract Documents.

D. Promptly notify the Engineer and Contractor of irregularity or deficiency of work which are observed during performance of services.

E. Promptly submit three (3) copies of report of inspections and tests in addition to those additional copies required by the Contractor; one (1) copy to the CITY, one (1) copy to the Engineer, and one (1) copy to the Contractor, with the following information included:
1. Date issued
2. Project title and number
3. Testing laboratory name and address
4. Name and signature of inspector
5. Date of inspection or sampling
6. Record of temperature and weather
7. Date of test
8. Identification of product and Specification section
9. Location of Project
10. Type of inspection or test
11. Results of test
12. Observations regarding compliance with the Contract Documents

F. Perform additional services as required.

G. The laboratory is not authorized to release, revoke, alter or enlarge on requirements of the Contract Documents, or approve or accept any portion of the Work.

1.04 CONTRACTOR RESPONSIBILITIES:

A. Cooperate with laboratory personnel; provide access to Work and/or manufacturer's requirements.

B. Provide to the laboratory, representative samples, in required quantities, of materials to be tested.

C. Furnish copies of mill test reports.

D. Furnish required labor and facilities to:

1. Provide access to Work to be tested;
2. Obtain and handle samples at the site;
3. Facilitate inspections and tests;

E. Notify the laboratory sufficiently in advance of operation to allow for the assignment of personnel and schedules of tests.

F. Laboratory Tests: Where such inspection and testing are to be conducted by an independent laboratory agency, the sample(s) shall be selected by such laboratory or agency, or the Engineer, and shipped to the laboratory by the Contractor at Contractor's expense.

G. Copies of all correspondence between the Contractor and testing agencies shall be provided to the Engineer.

1.05 QUALITY ASSURANCE:

A. Testing shall be in accordance with all pertinent codes and regulations and with procedures and requirements of the American Society for Testing and Materials (ASTM).

1.06 PRODUCT HANDLING:

A. Promptly process and distribute all required copies of test reports and related instructions to insure all necessary retesting or replacement of materials with the least possible delay in the progress of the Work.

1.07 FURNISHING MATERIALS:

A. The Contractor shall be responsible for furnishing all materials necessary for testing.

1.08 CODE COMPLIANCE TESTING:

A. Inspections and tests required by codes or ordinances or by a plan approval authority, and made by a legally constituted authority, shall be the responsibility of, and shall be paid for by the Contractor, unless otherwise provided in the Contract Documents.

1.09 CONTRACTOR'S CONVENIENCE TESTING:

A. Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

1.10 SCHEDULES FOR TESTING:

A. Establishing Schedule

1. The Contractor shall, by advance discussion with the testing laboratory selected by the CITY, determine the time required for the laboratory to perform its tests and to issue each of its findings, and make all arrangements for the testing laboratory to be on site to provide the required testing.

2. Provide all required time within the construction schedule.

B. When changes of construction schedule are necessary during construction, coordinate all such changes of schedule with the testing laboratory as required.

C. When the testing laboratory is ready to test according to the determined schedule, but is prevented from testing or taking specimens due to incompleteness of the Work, all extra costs for testing attributable to the delay will be back-charged to the Contractor and shall not be borne by the CITY.

1.11 TAKING SPECIMENS:

A. Unless otherwise provided in the Contract Documents, all specimens and samples for tests will be taken by the testing laboratory or the Engineer.

1.12 TRANSPORTING SAMPLES:

A. The Contractor shall be responsible for transporting all samples, except those taken by testing laboratory personnel, to the testing laboratory.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 45 29

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 – GENERAL

1.01 SCOPE:

A. Temporary facilities required for this work include, but are not necessarily limited to:

1. Temporary utilities such as water and electricity.
2. First aid facilities.
3. Sanitary facilities.
4. Potable water.
5. Temporary enclosures and construction facilities.

1.02 GENERAL:

A. First aid facilities, sanitary facilities and potable water shall be available on the Project site on the first day that any activities are conducted on site. The other facilities shall be provided as the schedule of the Project warrants.

B. Maintenance: Use all means necessary to maintain temporary facilities in proper and safe condition throughout progress of the Work. In the event of loss or damage, immediately make all repairs and replacements necessary, at no additional cost to the CITY.

C. Removal: Remove all such temporary facilities and controls as rapidly as progress of the Work will permit.

D. No separate measurement and payment will be made for work under this section. All costs in connection with this work specified herein is consider to be incidental to the Work.

1.03 TEMPORARY UTILITIES:

A. General

1. Provide and pay all costs for all utilities required for the performance of the Work.
2. Pay all costs for temporary utilities until Project completion.
3. Costs for temporary utilities shall include all utilities necessary for the performance of testing as required by the Contract Documents.

B. Temporary Water: Provide all necessary temporary piping, and upon completion of the Work, remove all such temporary piping.

C. Temporary Electricity:

1. Provide all necessary wiring for the Contractor's use.
2. Furnish, locate and install area distribution boxes such that the individual trades may use, their own construction type extension cords to obtain adequate power, and artificial lighting at all points where required for safety.
3. Provide all temporary electrical services, wire, generators, etc. required for performance of the Work inclusive of maintaining existing facilities in service during required service shutdowns.
4. Pay all fuel bills for temporary power required for the performance of the Work where required during shutdowns, bypass pumping etc.

D. Lighting: Provide temporary lighting to meet all applicable safety requirements to allow application or installation of materials and equipment, and observation or inspection of the Work.

E. Water:

1. Provide temporary facilities and piping required to bring water to point of use, and remove when no longer needed. Install an acceptable metering device for measuring water used.

2. Provide a means to prevent water used for construction and testing from flowing back into source pipeline. Device(s) shall be as approved by DeKalb County for backflow prevention.

1.04 FIRST AID FACILITIES:

A. The Contractor shall provide a suitable first aid station, equipped with all facilities and medical supplies necessary to administer emergency first aid treatment. The Contractor shall have standing arrangements for the removal and hospital treatment of any injured person. All first aid facilities and emergency ambulance service shall be made available by the Contractor to the CITY and the Engineer's personnel.

1.05 SANITARY FACILITIES:

A. Prior to starting the Work, the Contractor shall furnish, for use of Contractor's personnel on the job, subcontractors, and all other on-site personnel, all necessary toilet facilities which shall be secluded from public observation, as much as practical. These facilities shall be chemical toilets. All facilities shall be kept in a clean and sanitary condition and shall comply with the requirements and regulations of the area in which the Work is performed. Adequacy of these facilities will be subject to the Engineer's review and maintenance of same must be satisfactory to the Engineer at all times.

1.06 POTABLE WATER:

A. The Contractor shall be responsible for furnishing a supply of potable drinking water for employees, subcontractors, inspectors, engineers and the CITY who are associated with the Work.

1.07 ENCLOSURES AND CONSTRUCTION FACILITIES:

A. Furnish, install and maintain for the duration of construction, all required scaffolds, tarpaulins, canopies, steps, bridges, platforms and other temporary construction necessary for proper completion of the Work in compliance with all pertinent safety and other regulations.

1.08 PARKING FACILITIES:

A. Parking facilities for the Contractor's and Contractor's subcontractors' personnel shall be the Contractor's responsibility.

PART 2 – PRODUCT (NOT USED)

PART 3 – EXECUTION

3.01 PROTECTION OF WORK AND PROPERTY:

A. General:

1. Perform Work within right-of-way and easements in a systematic manner that minimizes inconvenience to property owners and the public.

2. No residence or business shall be cut off from vehicular traffic for a period exceeding 4 hours, unless special arrangements have been made.

3. Maintain in continuous service all existing oil and gas pipelines, underground power, telephone or communication cable, water mains, irrigation lines, sewers, poles and overhead power, and all other utilities encountered along the line of the Work, unless other arrangements satisfactory to owners of said utilities have been made.

4. Where completion of the Work requires temporary or permanent removal and/or relocation of existing utility, coordinate all activities with owner of said utility and perform all work to their satisfaction.

5. Protect, shore, brace, support, and maintain underground pipes, conduits, drains, and other underground utility construction uncovered or otherwise affected by construction operations.

6. Keep fire hydrants and water control valves free from obstruction and available

for use at all times.

7. In areas where Contractor's operations are adjacent to or near a utility, such as gas, telephone, television, electric power, water, sewer, or irrigation system, and such operations may cause damage or inconvenience, suspend operations until arrangements necessary for protection thereof have been made by Contractor.

8. Utility Interruptions:

   a. Notify property owners and utility owner offices that may be affected by construction operation at least two (2) days in advance.

   b. Before exposing a utility, obtain utility owner's permission. Should service of utility be interrupted due to Contractor's operation, notify proper authority immediately. Cooperate with said authority in restoring service as promptly as possible and bear costs incurred.

9. Do not impair operation of existing sewer systems. Prevent construction material, pavement, concrete, earth, volatile and corrosive wastes, and other debris from entering sewers, pump stations, or other sewer structures.

10. Maintain original site drainage wherever possible.

B. Trees and Plantings:

1. Protect from damage and preserve trees, shrubs, and other plants outside limits of the Work and within limits of the Work, which are designated on the Drawings to remain undisturbed.

   a. Where practical, tunnel beneath trees when on or near line of trench.

   b. Employ hand excavation as necessary to prevent tree injury.

   c. Do not stockpile materials or permit traffic within drip lines of trees.

   d. Provide and maintain temporary barricades around trees.

   e. Water vegetation as necessary to maintain health.

   f. Cover temporarily exposed roots with wet burlap, and keep burlap moist until soil is replaced around roots.

   g. No trees, except those specifically shown on Drawings to be removed, shall be removed without written approval of Engineer.

   h. Dispose of removed trees in a legal manner off the site.

2. In event of damage to bark, trunks, limbs, or roots of plants that are not designated for removal, treat damage by corrective pruning, bark tracing, application of a heavy coating of tree paint, and other accepted horticultural and

tree surgery practices.

3. Replace each plant that dies as a result of construction activities.

C. Waterways: Keep ditches, culverts, and natural drainages continuously free of construction materials and debris.

D. Dewatering: Construct, maintain, and operate cofferdams, channels, flume drains, sumps, pumps, or other temporary diversion and protection works. Furnish materials required, install, maintain, and operate necessary pumping and other equipment for the environmentally safe removal and disposal of water from the various parts of the Work. Maintain foundations and parts of the Work free from water.

3.02 TEMPORARY CONTROLS:

A. Air Pollution Control:

1. Minimize air pollution from construction operations.

2. Burning of waste materials, rubbish, or other debris will not be permitted on or adjacent to site.

3. Conduct operations of dumping rock and of carrying rock away in trucks to cause a minimum of dust. Give unpaved streets, roads, detours, or haul roads used in construction area a dust-preventive treatment or periodically water to prevent dust. Strictly adhere to applicable environmental regulations for dust prevention.

4. Provide and maintain temporary dust-tight partitions, bulkheads, or other protective devices during construction to permit normal operation of existing facilities. Construct partitions of plywood, insulating board, plastic sheets, or similar material. Construct partitions in such a manner that dust and dirt from demolition and cutting will not enter other parts of existing building or facilities. Remove temporary partitions as soon as need no longer exists.

B. Noise Control:

1. Provide acoustical barriers so noise emanating from tools or equipment will not exceed legal noise levels.

2. Noise Control Ordinance: THE CODE OF THE CITY OF BROOKHAVEN, GEORGIA, Article VII.

C. Water Pollution Control:

1. Divert sanitary sewage and nonstorm waste flow interfering with construction and requiring diversion to sanitary sewers. Do not cause or permit action to occur which would cause an overflow to existing waterway.

2. Prior to commencing excavation and construction, obtain Engineer's agreement with detailed plans showing procedures intended to handle and dispose of sewage, groundwater, and stormwater flow, including dewatering pump discharges.

3. Comply with procedures outlined in the Georgia Soil and Water Conservation Commission Manual for Erosion and Sediment Control in Georgia and NPDES Construction Storm Water General Permit GAR100002 Infrastructure Construction General Permit.

4. Do not dispose of volatile wastes such as mineral spirits, oil, chemicals, or paint thinner in storm or sanitary drains. Disposal of wastes into streams or waterways is prohibited. Provide acceptable containers for collection and lawful disposal of waste materials, debris, and rubbish.

D. Erosion, Sediment, and Flood Control:

1. Provide, maintain, and operate temporary facilities to control erosion and sediment releases, and to protect the Work and existing facilities from flooding during construction period.

2. Install erosion and sediment controls as shown on the Drawings, in accordance with applicable local, state, and federal regulations, and as directed by the Engineer.

3.03 STORAGE YARDS AND BUILDINGS:

A. Temporary Storage Yards: Construct temporary storage yards for storage of products that are not subject to damage by weather conditions.

B. Temporary Storage Buildings:

1. Provide environmental control systems that meet recommendations of manufacturers of equipment and materials stored.

2. Arrange or partition to provide security of contents and ready access for inspection and inventory.

3. Store combustible materials (paints, solvents, fuels, etc.) in a well-ventilated and remote building meeting safety standards.

3.04 PARKING AREAS:

A. Control vehicular parking to preclude interference with public traffic or parking, access

by emergency vehicles, CITY's operations, or construction operations.

B. Provide parking facilities for personnel working on the Project.

END OF SECTION 01 50 00

SECTION 01 65 00

PRODUCT DELIVERY REQUIREMENTS

PART 1 – GENERAL

1.1 SCOPE:

A. The Contractor shall provide transportation of all equipment, materials and products furnished under these Contract Documents to the Work site. In addition, the Contractor shall provide preparation for shipment, loading, unloading, handling and preparation for installation and all other work and incidental items necessary or convenient to the Contractor for the satisfactory prosecution and completion of the Work.

B. All equipment, materials and products damaged during transportation or handling shall be repaired or replaced by the Contractor at no additional cost to the Owner prior to being incorporated into the Work.

1.2 PREPARATION FOR SHIPMENT:

A. When practical, factory-assemble products. Match mark or tag separate parts and assemblies to facilitate field assembly. Cover machined and unpainted parts that may be damaged by the elements with a strippable protective coating.

B. Package products to facilitate handling and protect from damage during shipping, handling, and storage. Mark or tag outside of each package or crate to indicate its purchase order number, bill of lading number, contents by name, name of Project, and Contractor, product number, and approximate weight. Include complete packing lists and bills of materials with each shipment.

C. Deliver materials to project site and place at a location determined by Contractor.

D. Notify Engineer and Owner’s Inspector upon arrival.

E. Protect equipment from exposure to the elements and keep dry and dust-free as far as practical. Protect painted surfaces against impact, abrasion, discoloration, or other damage.

F. For major items, request a minimum seven (7) day advance notice of shipment from manufacturers. Upon receipt of manufacturer’s advance notice of shipment, promptly notify Engineer of anticipated date of equipment arrival.

G. Factory Test Results: Reviewed and accepted by Engineer before product shipment as required in individual Specification sections.

1.3 TRANSPORTATION:

A. All products shall be suitably boxed, crated or otherwise protected during transportation.

B. Where products will be unloaded using cranes, forklifts, or other hoisting equipment, the Contractor shall ensure that the weights of the assembled sections do not exceed the capacity of the hoisting equipment.

C. Small items and appurtenances such as gauges and valves, which could be damaged during shipment shall be removed from the equipment prior to shipment, packaged and shipped separately. All openings shall be plugged or sealed to prevent the entrance of water or dirt.

1.4 HANDLING:

A. Handle products in accordance with the manufacturer's written instructions, and in a manner to prevent damage. Store products, upon delivery, in accordance with manufacturer's instructions, with labels intact and legible, in approved storage yards or sheds. Provide manufacturer's recommended maintenance during storage, installation, and until products are accepted for use by Owner.

B. Lifting and handling drawings and instructions furnished by the manufacturer or supplier shall be strictly followed. Eyebolts or lifting lugs furnished on the equipment shall be used in handling the equipment. Spreader bars or lifting beams shall be used when the distance between lifting points exceeds that permitted by standard industry practice.

C. Under no circumstances shall equipment or products such as pipe, structural steel, castings, reinforcement, lumber, piles, poles, etc., be thrown or rolled off of trucks onto the ground.

D. Slings and chains shall be padded as required to prevent damage to protective coatings and finishes.

1.5 OWNER FURNISHED EQUIPMENT:

A. Owner furnished equipment shall mean any Owner purchased equipment and such being required by these Specifications to be installed by the Contractor.

B. The Contractor shall off load and store all Owner furnished equipment per this Section of these Specifications.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 65 00

SECTION 01 66 00

PRODUCT STORAGE AND HANDLING REQUIREMENTS

PART 1 – GENERAL

1.01 SCOPE:

A. The work under this Section includes, but not limited to, the furnishing of all labor, tools and materials necessary to properly store and protect all materials, equipment, products and the like, as necessary for the proper and complete performance of the Work.

B. The Contractor shall be responsible for selecting and securing a storage site or sites necessary for the construction of this Project.

1.02 STORAGE AND PROTECTION:

A. Storage:

1. Maintain ample way for foot traffic at all times, except as otherwise approved by the Engineer. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration. Keep running account of products in storage to facilitate inspection and to estimate progress payments for products delivered but not installed in the Work.
2. All property damaged by reason of storing of material shall be properly replaced at no additional cost to the CITY.
3. Packaged materials shall be delivered in original unopened containers and so stored until ready for use.
4. All materials shall meet the requirements of these Specifications at the time that they are used in the Work.
5. Store products in accordance with manufacturer's instructions.

B. Protection:

1. Use all means necessary to protect the materials, equipment and products of every section before, during and after installation and to protect the installed work and materials of all other trades.
2. All materials shall be delivered, stored and handled to prevent the inclusion of foreign materials and damage by water, breakage, vandalism or other causes.

C. Replacements: In the event of damage, immediately make all repairs and replacements necessary for the approval of the Engineer and at no additional cost to the CITY.

D. All equipment shall be boxed, crated or otherwise completely enclosed and protected during shipment, handling, and storage. All equipment shall be protected from exposure to the elements and shall be kept clean and dry, as far as practical. All products shall be stored above ground level and adequately supported on wood blocking or other approved support material. Printed storage instructions of the manufacturers shall be strictly adhered to.

E. Painted, anodized or otherwise coated surfaces shall be protected against impact, abrasion, discoloration and other damage. All coated surfaces which are damaged prior to acceptance of equipment shall be cleaned and coated to the satisfaction of the Engineer with the same or equivalent coating used in the original application.

F. Individually packaged, unpainted steel parts shall be protected by a wrapping of vapor phase inhibiting or oil-impregnated paper and polyethylene film prior to shipment.

G. Parts and equipment not requiring periodic inspection or maintenance shall be stored unopened in their original packaging until used.

H. Flanged openings on equipment shall be covered with suitable solid wooden or metal blanks securely bolted to the flange using a minimum of four bolts and a suitable rubber gasket. Ends of threaded pipe and fittings shall be sealed watertight with metal or plastic caps. Threaded openings shall be sealed watertight with metal or plastic plugs. Other openings shall be sealed with two layers of 6 mil polyethylene securely taped in place with waterproof tape.

I. Immediately prior to installation, equipment shall be cleaned of any protective coatings used during storage and any rust, dirt, grit or other foreign material shall be removed.

J. After storage, rubber parts such as valve seats, diaphragms, expansion joints, gaskets, hoses and shaft couplings shall be checked for hardening or cracking. Deteriorated parts shall be replaced prior to placing in service by the Contractor at Contractor's own expense.

K. Unless otherwise permitted in writing by the Engineer, building products and materials such as cement, grout, plaster, particleboard, finish lumber, wiring, etc., shall be stored indoors in a dry location. Building products such as rough lumber, plywood, concrete block and structural tile may be stored outdoors.

L. Tarps and other coverings shall be supported above the stored equipment or materials on wooden strips to provide ventilation under the cover and minimize condensation. Tarps and covers shall be arranged to prevent ponding of water.

1.03 OWNER FURNISHED EQUIPMENT:

A. The Contractor shall provide storage and protection for all Owner furnished equipment and materials, including extended storage as specified above.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 66 00

SECTION 01 71 23.16

CONSTRUCTION SURVEYING

PART 1 – GENERAL

1.1 SCOPE:

A. Construction surveying shall include all of the surveying work required to layout the Work and control the location of the finished Project. The Contractor shall have the full responsibility for constructing the Project to the correct horizontal and vertical alignment, as shown on the Drawings, as specified, or as directed by the Engineer. The Contractor shall assume all costs associated with rectifying work constructed in the wrong location.

B. No separate measurement and payment will be made for work under this section. All costs in connection with this work specified herein is consider to be incidental to the Work.

C. From the information shown on the Drawings and the information to be provided as indicated under Project Conditions below, the Contractor shall:

1. Be responsible for setting reference points and/or offsets, establishment of baselines, and all other layout, staking, and all other surveying required for the construction of the Project.

2. Safeguard all reference points, stakes, grade marks, horizontal and vertical control points, and shall bear the cost of re-establishing same if disturbed.

3. Stake out the permanent and temporary easements or the limits of construction to ensure that the Work is not deviating from the indicated limits.

4. Be responsible for all damage done to reference points, baselines, center lines and temporary bench marks, and shall be responsible for the cost of re-establishment of reference points, baselines, center lines and temporary bench marks as a result of the operations.

D. Baselines shall be defined as the line to which the location of the Work is referenced, i.e., edge of pavement, road centerline, property line, right-of-way or surveyline.

E. Record Drawing surveys shall be performed in accordance with Section 01 78 39.

1.2 PROJECT CONDITIONS:

A. The Drawings provide the location and/or coordinates of principal components of the Project. The alignment of some components of the Project may be indicated in the Specifications. The Engineer may order changes to the location of some of the components of the Project or provide clarification to questions regarding the correct alignment.

B. The location and elevation of benchmarks are shown on the Drawings.

C. Check and establish exact location of existing facilities prior to construction of new facilities and any connections thereto.

1.3 QUALITY ASSURANCE:

A. The Contractor shall furnish documentation, prepared by a surveyor currently registered in the State of Georgia, confirming that staking is being done to the horizontal and vertical alignment shown in the Contract Documents. This requires that the Contractor hire, at the Contractor's own expense, a currently registered surveyor, acceptable to the Owner, to provide ongoing construction staking or confirmation of such.

B. Any deviations from the Drawings shall be confirmed by the Engineer prior to construction of that portion of the Project.

C. Construction Verification Surveying.

1. The Engineer may verify the Contractor’s reference points, centerlines and work performed. This verification activity in no way relieves the Contractor of the responsibility of installing reference points, centerlines, temporary benchmarks, verifying that the work has been performed accurately, and all other work covered by this Section.

1.4 SITE WORK:

A. Staking Precision: The precision of construction staking shall match the precision of a component’s location indicated on the Drawings. Staking of utilities shall be done in accordance with generally accepted practice for the type of utility.

B. Written certification, by a licensed surveyor, that structure base grade and structure locations match the locations shown on the Drawings is required prior to beginning construction of the structure.

C. Paved Surfaces: The Contractor shall establish a reference point for establishing and verifying the paving subgrade and finished grade elevations. Any variance with plan grades shall be identified by the Contractor and confirmed by the Engineer prior to constructing the road base.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 71 23.16

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.01 SUMMARY:

A. Section includes administrative and procedural requirements for:

1. Salvaging nonhazardous demolition and construction waste.
2. Recycling nonhazardous demolition and construction waste.
3. Disposing of nonhazardous demolition and construction waste.

B. No separate measurement and payment will be made for work under this section. All costs in connection with this work specified herein is considered to be incidental to the Work.

1.02 DEFINITIONS:

A. Construction Waste: Structure and site improvement materials and other solid waste resulting from construction, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Structure and site improvement materials resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycle, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.03 PERFORMANCE REQUIREMENTS:

A. General: Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials, including the following:

1. Demolition Waste:
   a. Asphalt paving.
   b. Concrete.
   c. Concrete reinforcing steel.
   d. Brick.
   e. Concrete masonry units.
   f. Structural and miscellaneous steel.
   g. Piping.
   h. Supports and hangers.
   i. Valves.
   j. Sprinklers.

2. Construction Waste:
   a. Masonry and CMU.
   b. Lumber.
   c. Wood sheet materials.
   d. Wood trim.
   e. Metals.
   f. Piping.
   g. Electrical conduit.
   h. Packaging: Salvage or recycle 100 percent of the following uncontaminated packaging materials:
      1) Paper.
      2) Cardboard.
      3) Boxes.
      4) Plastic sheet and film.
      5) Polystyrene packaging.
      6) Wood crates.
      7) Plastic pails.

1.04 INFORMATIONAL SUBMITTALS:

A. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.05 QUALITY ASSURANCE:

A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Waste Management Conference: Conduct conference at Project site. Review methods and procedures related to waste management including, but not limited to, the following:

1. Review and discuss waste management plan.
2. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
3. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.

1.06 WASTE MANAGEMENT PLAN:

A. Waste Identification: Indicate anticipated types and quantities of demolition site-clearing and construction waste generated by the Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 PLAN IMPLEMENTATION:

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

1. Comply with operation, termination, and removal requirements in Section 01 50 00 Temporary Facilities and Controls.

B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.

1. Distribute waste management plan to everyone concerned within three (3) days of submittal return.
2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
2. Comply with Section 01 50 00 Temporary Facilities and Controls for controlling dust and dirt, environmental protection, and noise control.

3.02 SALVAGING DEMOLITION WASTE:

A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until installation.
4. Protect items from damage during transport and storage.
5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

B. Salvaged Items for Sale and Donation: Not permitted on Project site.

C. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

3.03 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL:

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Receivers and Processors: List below is provided for information only; available recycling receivers and processors include, but are not limited to, the following:

1. DeKalb County Recycling Centers
2. Recycling Management Resources
3. Georgia Recycling Solutions.

C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.

1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste and transport to recycling receiver or processor.

3.04 RECYCLING DEMOLITION WASTE:

A. Asphalt Paving: Grind asphalt to maximum 1-1/2-inch (38-mm) size.

1. Crush asphaltic concrete paving.
2. Break up and transport paving to asphalt-recycling facility.

B. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.

1. Pulverize concrete to maximum 1-1/2-inch (38-mm) size.

C. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.

1. Pulverize masonry to maximum 1-1/2-inch (38-mm) size.

2. Clean and stack undamaged, whole masonry units on wood pallets.

3.05 RECYCLING CONSTRUCTION WASTE:

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
   a. Comply with requirements in Section 32 92 00 Turf and Grasses for use of clean sawdust as organic mulch.

3.06 DISPOSAL OF WASTE:

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Disposal: Remove waste materials from site and legally dispose of them.

END OF SECTION 01 74 19

SECTION 01 74 23

FINAL CLEANING

PART 1 – GENERAL

1.1 SCOPE:

A. This Section covers the general cleaning which the Contractor shall be required to perform both during construction and before final acceptance of the Project unless otherwise shown on the Drawings or specified elsewhere in these Specifications.

B. No separate measurement and payment will be made for work under this section. All costs in connection with this work specified herein, is considered to be incidental to the Work.

1.2 QUALITY ASSURANCE:

A. Daily, and more often if necessary, conduct inspections verifying that requirements of cleanliness are being met.

B. In addition to the standards described in this Section, comply with all pertinent requirements of governmental agencies having jurisdiction.

1.3 HAZARDOUS MATERIAL AND WASTE:

A. The Contractor shall handle hazardous waste and materials in accordance with applicable local, state, and federal regulations. Waste shall also be disposed of in approved landfills as applicable.

B. The Contractor shall prevent accumulation of wastes which create hazardous conditions.

C. Burning or burying rubbish and waste materials on the site shall not be allowed.

D. Disposal of hazardous wastes or materials into sanitary or storm sewers shall not be allowed.

1.4 DISPOSAL OF WASTE:

A. The definitions contained in Georgia Environmental Protection Division Rules 391-3-4-.01 shall be applicable to this Project. The term waste shall include excess and surplus materials, and shall include liquid and solid wastes.

B. Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

C. Except as otherwise specified, do not allow waste materials that are to be disposed of to accumulate on-site.

D. Remove and transport waste in a manner that will prevent spillage on adjacent surfaces and areas.

E. Burning: Do not burn waste materials on site.

F. Waste removed from the Project site shall be disposed of in sites permitted by the Georgia Environmental Protection Division for the acceptance of type of waste being disposed. The acceptable types of permitted disposal facilities are as follows:

1. Inert Waste Landfills
2. Municipal Solid Waste Landfills
3. Municipal Solid Waste Landfills permitted to receive only construction and demolition wastes.

G. Exceptions to Paragraph F are as follows:

1. Hazardous waste shall be disposed of in accordance with Georgia Environmental Protection Division Rules 391-3-11.
2. Asbestos-containing waste shall also be handled and disposed in accordance with Georgia Environmental Protection Division Rules 391-3-14.
3. Excess earth material and excess excavated rock material may be placed on sites for which the Contractor provides to the Owner a signed affidavit from the property owner that the placement of such material is acceptable to the property owner. The Contractor and property owner shall be responsible for all permitting of such disposal.

H. No waste shall be placed at a transfer station facility.

I. The Contractor shall maintain records related to all waste removed from the Project site so as to allow the Owner or the Engineer to readily determine the following:

1. Date waste removed from Project site.
2. Name of hauler (company and driver) transporting such waste.
3. General description of waste transported.
4. “Truck tickets” indicating the waste disposal site and amount of waste disposed therein.

J. For all wastes hauled to any landfill, the handler of such wastes must be licensed in accordance with Georgia Environmental Protection Division rules.

PART 2 – PRODUCTS

2.1 CLEANING MATERIALS AND EQUIPMENT:

A. Provide all required personnel, equipment and materials needed to maintain the specified standard of cleanliness.

2.2 COMPATIBILITY:

A. Use only the methods and equipment which are compatible with the type of waste being removed, as recommended by the manufacturer of the material or as approved by the Engineer.

PART 3 – EXECUTION

3.1 PROGRESS CLEANING:

A. General

1. Do not allow the accumulation of scrap, debris, waste material and other items not required for construction of this Work.
2. At least each week, and more often if necessary, completely remove all scrap, debris and waste material from the job site.
3. Provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the environment.

B. Site

1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris and waste material. Remove all such items to the place designated for their storage.
2. Restack materials stored on site weekly.
3. At all times maintain the site in a neat and orderly condition which meets the approval of the Engineer.

3.2 FINAL CLEANING:

A. Definitions: Unless otherwise specifically specified, “clean” for the purpose of this Article shall be interpreted as removal of all tools, equipment, surplus materials, scrap, debris, trash, or other waste materials from the site; restoring the site to its pre-construction condition.

B. General: Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris and waste. Conduct final progress cleaning as described in 3.1 above.

C. Site: Unless otherwise specifically directed by the Engineer, hose down all paved areas on the site and all public sidewalks directly adjacent to the site; rake clean other surfaces of the grounds. Completely remove all resultant debris.

D. Structures

1. Remove all traces of soil, waste material, splashed material, and other foreign matter to provide a uniform degree of exterior cleanliness. Visually inspect all exterior surfaces and remove all traces of soil, waste material, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. If necessary to achieve a uniform degree of exterior cleanliness, hose down the exterior of the structure. In the event of stubborn stains not removable with water, the Engineer may require light sandblasting or other cleaning at no additional cost to the Owner.

E. Post-Construction Cleanup: All evidence of temporary construction facilities, haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, or any other evidence of construction, shall be removed as directed by the Engineer.

F. Restoration of Landscape Damage: Any landscape feature damaged by the Contractor shall be restored as nearly as possible to its original condition at the Contractor's expense. Restoration shall be performed to the satisfaction of the Engineer.

G. Timing: Schedule final cleaning as approved by the Engineer to enable the Owner to accept the Project.

END OF SECTION 01 74 23

SECTION 01 78 36

WARRANTIES

PART 1 – GENERAL

1.1 PROJECT MAINTENANCE AND WARRANTY

A. Maintain and keep in good repair the Work covered by these Drawings and Specifications until acceptance by the Owner.

B. Warranty Period: The Contractor shall warrant for a period of one (1) year from the date of Owner's written Final Acceptance of the Project, as defined in the Contract Documents, that the completed Work is free from all defects due to faulty products or workmanship, and the Contractor shall promptly make such corrections as may be necessary by reason of such defects. The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments or other work that may be made necessary by such defects, the Owner may do so and charge the Contractor the cost thereby incurred. The Performance Bond shall remain in full force and effect throughout the Warranty Period.

C. The Contractor shall not be obligated to make replacements which become necessary because of ordinary wear and tear, or as a result of improper operation or maintenance, or as a result of improper work or damage by another Contractor or the Owner, or to perform any work which is normally performed by a maintenance crew during operation.

D. In the event of multiple failures of major consequences prior to the expiration of the one-year warranty described above, the affected work shall be disassembled, inspected and modified or replaced as necessary to prevent further occurrences. All related components which may have been damaged or rendered non-serviceable as a consequence of the failure shall be replaced. A new warranty period equal to the original warranty period shall be provided against defective or deficient design, workmanship, and materials and shall commence on the day that the item is reassembled and placed back into operation. As used herein, multiple failure shall be interpreted to mean two (2) or more successive failures of the same kind in the same item or failures of the same kind in two or more items. Major failures may include, but are not limited to, cracked or broken piping, or vessels, excessive deflections, excessive wear or excessive leakage around seals. Failures which are directly and clearly traceable to operator abuse, such as operations in conflict with published operating procedures or improper maintenance, such as substitution of unauthorized replacement parts, use of incorrect lubricants or chemicals, flagrant over- or under-lubrication and using maintenance procedures not conforming with published maintenance instructions, shall be exempted from the scope of the one (1) year warranty. Should multiple failures occur in a given item, all products of the same size and type shall be inspected, modified or replaced as necessary and re-warranted for the original full Warranty Period.

E. The Contractor shall, at Contractor's own expense, furnish all labor, materials, tools and equipment required and shall make such repairs and removals and shall perform such work or reconstruction as may be made necessary by any structural or functional defect or failure resulting from neglect, faulty workmanship or faulty materials, in any part of the Work performed by the Contractor. Such repair shall also include refilling of trenches, excavations or embankments which show settlement or erosion after backfilling or placement.

F. Except as noted on the Drawings or as specified, all structures such as embankments and fences shall be returned to their original condition prior to the completion of the Contract. Any and all damage to any facility not designated for removal, resulting from the Contractor's operations, shall be promptly repaired by the Contractor at no cost to the Owner.

G. The Contractor shall be responsible for all road and entrance reconstruction and repairs and maintenance of same for a period of one (1) year from the date of final acceptance. In the event the repairs and maintenance are not made immediately and it becomes necessary for the owner of the road to make such repairs, the Contractor shall reimburse the owner of the road for the cost of such repairs.

H. In the event the Contractor fails to proceed to remedy the defects upon notification within ten (10) days of the date of such notice, the Owner reserves the right to cause the required materials to be procured and the work to be done, as described in the Drawings and Specifications, and to hold the Contractor and the sureties on Contractor's bond liable for the cost and expense thereof.

I. Notice to Contractor for repairs and reconstruction will be made in the form of a registered letter addressed to the Contractor at Contractor's home office.

J. Neither the foregoing paragraphs nor any provision in the Contract Documents, nor any special guarantee time limit implies any limitation of the Contractor's liability within the law of the place of construction.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 78 36

SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

Section	Title
1.2	References
1.3	Work Included
1.4	Submittals
2.1	Qualified Personnel
3.1	Maintenance of Documents and Samples
3.2	Record Drawings
3.3	GPS Coordinates for Water Systems
3.4	GPS Coordinates for Sanitary Sewer Systems
3.5	GPS Coordinates for Stormwater Systems

1.2 REFERENCES

A. Drawings and general provisions of the Contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this section.

1.3 WORK INCLUDED

A. The Contractor shall, under this item, furnish all material, tools, labor, and equipment necessary to properly compile, prepare, maintain, record, and submit Project Record Documents as specified herein.

B. Project Record Documents to be prepared and submitted by the Contractor include, but are not limited to Record Drawings, Specifications, Change Orders and other modifications to the Contract, Engineer field orders or written instructions, Requests for Information (RFI) and Clarification Memorandums, reviewed shop drawings, product data and samples, and test records. Final payment will not be made until all Project Record Documents are submitted and approved by the Engineer and the CITY.

C. The Contractor shall maintain on the project site an updated set of Record Drawings. These Drawings must be the latest revision, and match those of the CITY.

D. No separate measurement and payment will be made for work under this section. All costs in connection with this work specified herein, is considered to be incidental to the Work.

1.4 SUBMITTALS

A. Submit for approval in accordance with Section 01 33 00 SUBMITTAL PROCEDURES, the following items:
   1. Record Drawings.
   2. Specifications.

3. Change Orders and other Contract modifications.
4. Engineer/Owner Field Orders.
5. Requests for Information (RFI) and Clarification Memorandums.
6. Approved shop drawings, product data, and samples.
7. Test records.
8. GPS Coordinates for all drainage structures, valves, manholes, and appurtenances installed.

B. Contractor shall accompany each submittal with transmittal letter containing date, project title and number, Contractor's name and address, title and number of each record document, and signature of Contractor's authorized representative.

PART 2 – PRODUCTS

2.1 QUALIFIED PERSONNEL

A. Contractor shall furnish qualified and experienced person, whose duty and responsibility shall be to maintain Project Record Documents.

PART 3 - EXECUTION

3.1 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Maintain secure storage for documents and product samples in the Contractor's field office, or an agreed upon location when field offices are not used, apart from documents used for construction. Example acceptable locations may include lockable tool trailer at the lay down area or superintendent's work vehicle. In any case documents shall be kept neat and secure.

B. File documents and samples in accordance with format of these specifications.

C. Maintain documents in a neat, clean, dry, legible condition and in good order. Do not use record documents for construction purposes. Maintain at an agreed upon site for the CITY, one (1) copy of all Project Record Documents.

D. Make documents and samples available at all times for inspection by the Engineer, or the CITY.

E. Failure to maintain up-to-date Project Record Documents, in a satisfactory manner, may be cause for withholding of a certificate for payment.

F. Purpose of Project Record Documents is to document factual information regarding aspects of Work, both concealed and visible, to enable future modification of Work to proceed without lengthy and expensive site measurement, investigation, and examination.

3.2 RECORD DRAWINGS

A. The Contractor must maintain an up-to-date Field Record set of drawings by marking changes and other information directly on a clean set of full-size Contract Drawings. The Contractor shall submit for Engineer and THE CITY approval, up- to-date Record Drawings with monthly pay applications. **Approval of monthly pay applications will not occur until the updated record drawings are approved.** The Engineer and the CITY

will review the record drawings to confirm that the recorded information is current.

B. Record information concurrently with construction progress. Do not conceal any Work until required information is recorded. Make entries within twenty-four (24) hours after receipt of information that a change in Work has occurred.

C. Unless otherwise noted, Record Drawings shall provide dimensions, distances, and coordinates to the nearest one tenth foot (0.1').

D. Unless otherwise noted, Record Drawings shall provide elevations to the nearest one-hundredth foot (0.01') for all pertinent items constructed by the Contractor.

E. Record Drawings shall have a title block indicating that the drawings are Record Drawings, the name of the company preparing the Record Drawings, and the date the Record Drawings were prepared.

F. Record Drawings shall include details not on original Drawings to accurately depict actual constructed items.

G. Legibly mark drawings using erasable colored pencils to record actual construction, including:
   1. Color Coding:
      a. RED – When showing information added to drawings
      b. GREEN – When showing information deleted from drawings
      c. BLUE – When showing information notes on drawings
   2. Date all entries.
   3. Call attention to each entry by drawing a "cloud" around area(s) affected.
   4. For water mains, legibly mark to record actual changes made during construction, including but not limited to:
      a. Depth of valve or meter vaults in relation to finished grade data if not shown, or where depth differs from that indicated on the Drawings. Provide the elevation of piping through the vaults.
      b. Horizontal and vertical locations of existing and new underground facilities and appurtenances, and other underground structures, equipment, or Work. Reference at least two measurements to permanent surface improvements.
      c. Location of internal utilities and appurtenances concealed in the construction referenced to visible and accessible features of the structure.
      d. Locate existing facilities, piping, equipment, and items critical to the interface between existing physical conditions or construction and new construction.
      e. Changes made by Addenda and Field Orders, Work Change Directive, Change Order, Written Amendment, and Engineer's written interpretation and clarification using consistent symbols for each and showing appropriate document tracking number.
   5. For sewer, legibly mark to record actual changes made during construction, including but not limited to:
      a. Invert elevations of all pipes entering manholes, junction boxes, etc.
      b. Top elevations (ring and cover) of all manholes, vaults, etc.
      c. Horizontal and vertical locations of existing and new underground facilities

and appurtenances, and other underground structures, equipment, or Work. Reference at least two measurements to permanent surface improvements.

d. Location of internal utilities and appurtenances concealed in the construction referenced to visible and accessible features of the structure.

e. Locate existing facilities, piping, equipment, and items critical to the interface between existing physical conditions or construction and new construction.

f. Changes made by Addenda and Field Orders, Work Change Directive, Change Order, Written Amendment, and Engineer's written interpretation and clarification using consistent symbols for each and showing appropriate document tracking number.

6. For stormwater, principal spillway, and siphon systems, legibly mark to record actual changes made during construction, including but not limited to:

a. Invert elevations of all pipes entering structures (Principal Spillway Control Structure, Catch Basins, Junction Boxes, Headwalls, Siphon Vault, etc.).

b. Top elevations (ring and cover, grate, throat, etc.) of all stormwater, principal spillway, and siphon system structures.

c. Locate existing facilities, piping, equipment, and items critical to the construction.

d. Changes made by Addenda, Field Orders, Work Change Directive, Change Order, Written Amendment, and Engineer's written interpretation and clarification, using consistent symbols for each and showing appropriate document tracking number.

3.3 GPS COORDINATES FOR WATER SYSTEMS

A. At the completion of construction, the Contractor shall provide GPS coordinates for all newly installed and relocated fire hydrants, blow-offs, valves, valve vaults, master meter vaults, and dead ends. Coordinates shall be of survey grade quality (sub foot accuracy minimum) and provided in the Georgia State Plane Coordinates West Zone. Control shall be based on NAD 83 for horizontal and NAVD 88 for vertical. Coordinates shall be submitted in an ESRI shape file format.

B. As installation of the utility pipeline progresses, the Contractor shall provide offset staking for the centerline of the utility pipe every 100 feet along the pipe. The staking shall identify the distance to the centerline of the pipe and the depth of cover to the top of pipe. At the completion of construction, the Contractor shall provide GPS coordinates for the centerline of the pipe, include depth of bury, based on staked offsets.

3.4 GPS COORDINATES FOR SANITARY SEWER SYSTEMS

A. At the completion of construction, the Contractor shall provide GPS coordinates for all newly installed and relocated manholes, valves, and valve vaults. Coordinates shall be of survey grade quality (sub foot accuracy minimum) and provided in the Georgia State Plane Coordinates West Zone. Control shall be based on NAD 83 for horizontal and NAVD 88 for vertical. Coordinates shall be submitted in an ESRI shape file format.

B. For force mains, as installation of the pipeline progresses, the Contractor shall provide offset staking for the centerline of the utility pipe every 100 feet along the pipe. The staking shall identify the distance to the centerline of the pipe and the depth of cover to the top of pipe. At the completion of construction, the Contractor shall provide GPS coordinates for the centerline of the pipe, include depth of bury, based on the staked offsets.

3.5 GPS COORDINATES FOR STORMWATER SYSTEMS

A. At the completion of construction, the Contractor shall provide GPS coordinates for all newly installed and relocated stormwater structures (Principal Spillway Control Structure, Catch Basins, Siphon Vault, Junction Boxes, Headwall, etc.). Coordinates shall be of survey grade quality (sub foot accuracy minimum) and provided in the Georgia State Plane Coordinates West Zone. Control shall be based on NAD 83 for horizontal and NAVD 88 for vertical. Coordinates shall be submitted in an ESRI shape file format.

END OF SECTION 01 78 39

SECTION 02 41 13.13

PAVING REMOVAL

PART 1 – GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

Section	Title
1.2	References
1.3	Work Included
1.4	Submittals
2.1	Equipment
3.1	Trench Paving Removal
3.2	Milling Operation

1.2 REFERENCES

A. Drawings and general provisions of the Contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this section.

B. Georgia Department of Transportation Standard Specifications.

1.3 WORK INCLUDED

A. The Contractor shall furnish all labor, equipment, and materials necessary to remove, haul-off, and dispose asphalt and/or concrete paving as required for the rehabilitation, replacement, and installation of storm drainage systems and related appurtenances.

1.4 SUBMITTALS

A. The Contractor shall submit for approval, in accordance with Section 01 33 00 SUBMITTAL PROCEDURES all working Contract documents and/or drawings and schedules of materials and methods proposed to follow in the execution of the Work under this item.

B. The Contractor shall submit photographs and/or videotape, sufficiently detailed, of existing conditions of project site. These shall be used to evaluate project areas that might be misconstrued as damage caused by debris or construction material removal.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. MILLING EQUIPMENT:

1. Use power-driven, self-propelled milling equipment that is the size and shape that allows traffic to pass safely through areas adjacent to the work. Also use equipment that is:

a. Designed to mill and remove specified depth of existing asphalt and/or concrete paving

b. Equipped with grade slope controls operating from a string line or ski and based on mechanical or sonic operation

c. Capable of removing pavement to an accuracy of 1/8 in. (3 mm)

d. Furnished with lighting system for night work, as necessary

e. Provided with conveyors capable of side, rear, or front loading to transfer the milled material from the roadway to a truck

B. DUST CONTROL

1. Provide power brooms, vacuum sweepers, power blowers, or other means to remove loose debris or dust. Do not allow dust control to restrict visibility of passing traffic or to disrupt adjacent property owners.

PART 3 - EXECUTION

3.1 TRENCH PAVING REMOVAL

A. Where trench excavation within a paved surface is required, the Contractor shall saw cut vertical joints for the entire depth of pavement. The saw cut joints shall extend for the entire length of trench on both sides of the trench. Ragged edges shall be trimmed so as to provide a substantially straight line juncture between the old and new surfaces.

B. The saw cut joints shall be a minimum of 9 inches outside of the maximum width of excavated trench.

C. Pavement shall be removed in and hauled off site and disposed of in a proper legal manner. Contractor shall be careful not to disturb or damage any pavement that is to remain.

3.2 MILLING OPERATION

A. Follow the Plans to mill the designated areas and depths, as required. Ensure the following requirements are met:

1. Schedule the construction operation. Use milling methods that will produce a uniform finished surface and maintain a constant cross slope between extremities in each lane.

2. Provide positive drainage to prevent water accumulation on the milled pavement, as shown on the Plans or directed by the CITY and/or the Engineer.

3. Bevel back the longitudinal vertical edges greater than 2 in (50 mm) that are produced by the removal process and left exposed to traffic. Bevel them back at least 3 in for each 2 in (75 mm for each 50 mm) of material removed. Use an attached mold board or other approved method.

4. When removing material at ramp areas and ends of milled sections, taper the transverse edges 10 ft (3 m) to avoid creating a traffic hazard and to produce a

smooth surface.

5. Protect with a temporary asphaltic concrete tie-in (paper joint) vertical edges at other areas such as drainage structures and utility appurtenances greater than ½-inch that are left open to transversing vehicles. Place the temporary tie-in at taper rate of at least 6 to 1 horizontal to vertical distance.

6. Remove dust, residue, and loose milled material from the milled surface. Do not allow traffic on the milled surface and do not place asphaltic concrete on the milled surface until removal is complete.

B. The reclaimed asphaltic and/or concrete pavement becomes the Contractor's property unless otherwise specified.

END OF SECTION 02 41 13.13

SECTION 02 42 11

REMOVAL OF CONSTRUCTION MATERIAL

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

Section	Title
1.2	References
1.3	Work Included
1.4	Submittals
3.1	Workmanship

1.2 REFERENCES

A. Drawings and general provisions of the Contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this section.

1.3 WORK INCLUDED

A. The Contractor shall furnish all materials, tools, labor, and equipment, necessary to remove all unwanted construction material and debris, as directed by CITY.

1.4 SUBMITTALS

A. Submit for approval, in accordance with Section 01 33 00 SUBMITTAL PROCEDURES all working drawings and schedules of materials and methods proposed to be followed in the execution of the Work under this item.

B. The Contractor shall supply identification and license of company hauling/transporting material from the site.

C. The Contractor shall submit photographs and/or videotape, sufficiently detailed, of existing conditions of project site. These shall be used to evaluate project areas that might be misconstrued as damage, caused by debris, or construction material removal.

PART 2 - PRODUCTS – (NOT USED)

PART 3 - EXECUTION

3.1 WORKMANSHIP

A. The Contractor shall follow all federal, state, and local regulations related to removal, hauling, and disposal of trash and debris.

B. The Contractor shall comply with City of Brookhaven Solid Waste Ordinance for hauling and disposal of all solid waste removed from the site for the duration of the Work.

C. The Contractor shall load, haul away, and dispose of debris, trash, structures, automobiles, etc., that may be pre-existing on the Worksite, to a legally permitted location.

D. The Contractor shall load, haul away, and dispose of construction material that is generated in execution of the Work, to a legally permitted location; including, but not limited to any debris, trash, structures, piping, etc.

E. The Contractor shall remove and dispose of all unused construction materials prior to Final Acceptance of the Work by CITY and the Engineer.

F. No additional payment shall be made for excavation or disposal of excavated material required for placement or removal of backfill placed above the foundation of the pavement; or for preparation of subgrade. The cost thereof shall be considered included in the pavement unit prices bid. No additional payment shall be made for removal of materials consider as being removed, loaded, hauled away, or disposed under other Bid Items.

END OF SECTION 02 42 11

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

Section	Title
1.2	References
1.3	Work Included
1.4	Concrete Design
1.5	Submittals
1.6	Defective Work
2.1	Forms
2.2	Steel Reinforcement
2.3	Portland Cement
2.4	Coarse Aggregates
2.5	Fine Aggregates
2.6	Joint Sealants
2.7	Water
3.1	Preparation
3.2	Formwork
3.3	Vapor Retarders
3.4	Steel Reinforcement
3.5	Joints
3.6	Concrete Placement
3.7	Finishing Formed Surfaces
3.8	Finishing Floors and Slabs
3.9	Miscellaneous Concrete Items
3.10	Concrete Protection and Curing
3.11	Removal and Reuse of Forms
3.12	Concrete Surface Repairs
3.13	Field Quality Control

1.2 REFERENCES

A. Drawings and general provisions of the Contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this section.

1.3 WORK INCLUDED

A. The Contractor shall, under this item, furnish all the materials for and shall place all cast-in-place concrete, including all reinforcing steel and formwork, in the structures shown on the Contract Documents and/or Drawings, and such other concrete as may be found necessary to fully complete the Work indicated under this Contract or per the CITY.

1.4 CONCRETE DESIGN

A. Cast-in-place concrete shall be designed to meet the following requirements (Note – the Classifications shown below match GDOT Standard Specification Section 500):

1. Class AAA:
   a. Minimum Compressive 28 Day Strength: 5000 psi
   b. Slump: 2-4 inches
   c. Entrained Air: 2.5-6% Total Air Content
2. Class AA1:
   a. Minimum Compressive 28 Day Strength: 4500 psi
   b. Slump: 2-4 inches
   c. Entrained Air: 2.5-6% Total Air Content
3. Class AA:
   a. Minimum Compressive 28 Day Strength: 3500 psi
   b. Slump: 2-4 inches
   c. Entrained Air: 3.5-7% Total Air Content
4. Class A:
   a. Minimum Compressive 28 Day Strength: 3000 psi
   b. Slump: 2-4 inches
   c. Entrained Air: 2.5-6% Total Air Content
5. Class B:
   a. Minimum Compressive 28 Day Strength: 2200 psi
   b. Slump: 2-4 inches
   c. Entrained Air: 3-6% Total Air Content

B. Aggregate sizing and proportioning of cement, water, aggregates, air content, and use of admixtures shall be as required to meet the requirements of each class of concrete shown above and as needed to meet the requirements of the Work.

C. Use of fly ash as a cement substitute is prohibited unless specifically allowed by CITY.

1.5 SUBMITTALS

A. The Contractor shall submit for approval, in accordance with Section 01 33 00 SUBMITTAL PROCEDURES all working Contract documents and/or drawings and schedules of materials and methods proposed to follow in the execution of the Work under this item.

B. Submittals shall show, in detail, the type, mix design, reinforcement layout, and location of all cast-in-place concrete and accessories to be used in construction.

C. Design calculations signed and sealed by a professional engineer registered in the State of Georgia for plan to anchor HDPE principal spillway and siphon pipe to prevent buoyancy during concrete encasement.

D. Upon CITY request, provide certification that all materials used in cast in place concrete meet the material standards specified in this specification.

1.6 DEFECTIVE WORK

A. Any concrete masonry found to be defective from any cause whatsoever, at any time

before the Final Acceptance of the Work, shall be removed and either replaced or repaired at the expense of the Contractor.

PART 2 - PRODUCTS

2.1 FORMS

A. All formwork shall conform to the requirements of ACI 347 “Recommended Practice for Concrete Formwork”.

B. The Contractor shall furnish all labor and materials for all forms required for the construction of the Work.

C. Either metal or wood forms may be used.

D. All forms shall be true to the required shape, clean, of sufficient strength, and well braced so that they shall maintain their proper position during the placing and vibrating of the concrete.

2.2 STEEL REINFORCEMENT

A. Steel reinforcement shall be designed, detailed, fabricated and placed in conformance with all applicable requirements of ACI 318, and the CRSI Manual of Standard Practice.

B. Steel reinforcing bars shall conform to ASTM A615, Grade 60, unless otherwise specified.

C. Welded wire fabric shall conform to ASTM A185.

D. Steel wire shall conform to ASTM A82.

E. All metal accessories for setting and fastening of reinforcement shall conform to CRSI Manual of Standard Practice.

2.3 PORTLAND CEMENT

A. Portland cement used shall be Type I or II conforming to ASTM C150.

2.4 COARSE AGGREGATE

A. Coarse aggregates shall conform to ASTM C33, size numbers 56, 57, 67, and 68, and GDOT Standard Specification Section 500 maximum aggregate size, or as otherwise approved by CITY.

2.5 FINE AGGREGATE

A. Fine aggregates shall conform to ASTM C33.

2.6 JOINT SEALANTS

A. Waterstops: PVC conforming to Corp of Engineer Specification CRD-C 572, or as otherwise specified or approved by CITY.

B. Premolded joint filler: Cork or PVC, conforming to ASTM D1752, or as otherwise specified or approved by CITY.

C. Joint sealants: Synthetic rubber that is resistant to acids and alkalis (pH range 3.5 to 8), or as otherwise specified or approved by CITY.

2.7 WATER

A. Water used shall be clean, fresh, and free from oils, acids, alkalis, organics, or other deleterious substances. Potable water will fulfill this requirement.

PART 3 - EXECUTION

3.1 PREPARATION

A. Measurement and Mixing: Measurement and mixing of concrete shall be subject to the review of CITY in all respects and shall be performed in accordance with the recommendations of ACI 304, as modified herein.
   1. Measuring requirements: Measure cement, fine and coarse aggregates separately by weight by equipment providing accuracy within 1 percent of the net load weighed. Water shall be measured by a suitable device, accurate to within 1 percent of the total amount required for the batch.
   2. Measuring equipment: The accuracy of the weighting equipment shall meet the requirements of the United States Bureau of Standards and standard testing weights and other necessary equipment shall be available at all times for testing the equipment.
   3. Mixing: Concrete shall be mixed in rotary, batch type mixer of adequate design to produce a thorough mix, homogenous in composition and uniform in color. Each batch of 1 cubic yard or less shall be mixed not less than 1-1/2 minutes after the last of the ingredients have been added to the mixer. The mixing time shall be increased 15 seconds for each additional cubic yard or fraction thereof.

B. Ready-Mixed Concrete:
   1. Rate of delivery: The rate of delivery of the mixed concrete shall be such that the interval between placing of fresh concrete in contact with concrete already placed from previous batches shall not exceed 45 minutes. The elapsed time between the introduction of mixing water to the cement and aggregates and depositing concrete in the Work shall not exceed 60 minutes, including mixing and agitating time.
   2. Delivery equipment: Delivery of concrete in non-agitating equipment shall not be permitted.
   3. Addition of water: No water shall be added to the concrete at the site unless accepted by CITY for a specific batch. Acceptance of such addition to one batch shall not be construed as acceptance of additions to subsequent deliveries.

3.2 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Construct forms tight enough to prevent loss of concrete mortar.

D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces.

E. Chamfer exterior corners and edges of permanently exposed concrete.

F. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

G. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

H. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

I. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.3 VAPOR RETARDERS

A. Vapor Retarders: If indicated on the Contract Drawings, a minimum 6 mil polyethylene sheeting shall be utilized under any concrete slab poured on earth or gravel.

B. Lap joints 6 inches and seal with manufacturer's recommended tape.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
   1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

3.5 JOINTS

A. Joints, either vertical or horizontal, shall be made only where and as permitted by CITY.

B. Construct joints true to line with faces perpendicular to surface plane of concrete.

C. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by CITY.
   1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated.
   2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
   3. Locate joints for beams, and slabs in the middle third of spans.
   4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.

5. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by CITY.

C. Unless permission is granted by the CITY Project Inspector, concrete shall not be laid in water nor shall water be allowed to rise on or flow over freshly placed concrete until the concrete has set for at least twenty-four (24) hours.

D. Concrete shall not be mixed at any time during freezing, inclement weather, or at night without explicit permission, and then only at the Contractor's risk. If permitted to build concrete structures in freezing weather, the Contractor shall provide and use proper facilities for covering and keeping warm the newly laid concrete.

E. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
   1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

F. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
   1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
   2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
   3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

G. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
   1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
   2. Maintain reinforcement in position on chairs during concrete placement.
   3. Screed slab surfaces with a straightedge and strike off to correct elevations.
   4. Slope surfaces uniformly to drains where required.
   5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

H. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
   1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
   2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
   3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

I. Hot-Weather Placement: Comply with ACI 301 and as follows:
   1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
   2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.7 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
   1. Apply to concrete surfaces not exposed to view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
   1. Apply to concrete surfaces exposed to view, from inside and out.

C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
   1. Apply float finish to surfaces to receive trowel finish.

C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
   1. Apply a trowel finish to ground floor slab.

2. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-foot- long straightedge resting on 2 high spots and placed anywhere on the surface does not exceed 1/4 inch.

D. Trowel and Fine-Broom Finish: Apply to all pedestrian traffic surfaces other than ground floor slab. Apply a first trowel finish and while concrete is still plastic, slightly scarify surface with a fine broom.

E. Apply non-slip coating to walking surfaces where called for on the Contract Documents and/or Drawings.

3.9 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

3.10 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
   a. Water.
   b. Continuous water-fog spray.
   c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
b. Moisture cure any or all concrete surfaces at Contractor's option.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.11 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.
   1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 75 percent of its 28-day design compressive strength. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.
   2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by CITY.

3.12 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by CITY. Remove and replace concrete that cannot be repaired and patched to CITY's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
   1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete, but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
   2. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by CITY.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
5. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4- inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
6. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to CITY's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to CITY's approval.

3.13 FIELD QUALITY CONTROL

A. Testing and Inspecting will be carried out by the Engineer or 3rd party testing firm and test data will be made available to the Contractor. All costs associated with testing and inspections will be paid by the City.

1. Additional Tests: Engineer or 3rd party testing agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met. Engineer or 3rd party testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by CITY.
2. All additional testing and inspecting due to failed tests shall be at the Contractor's expense.

B. No concrete shall be placed until all steel reinforcement to be covered has been inspected in place and approved by CITY or Engineer.

C. Inspections:
1. Steel reinforcement placement.
2. Verification of use of required design mixture.
3. Concrete placement, including conveying and depositing.
4. Curing procedures and maintenance of curing temperature.
5. Review concrete delivery tickets at time of delivery to assure conformance to ACI 318.
6. Verification of concrete strength before removal of shores and forms from beams and slabs.

D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.
a. When frequency of testing will provide fewer than five compressive- strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
5. Unit Weight: One test for each composite sample.
6. Compression Test Specimens: ASTM C 31/C 31M.
a. Cast and laboratory cure three sets of two standard 6”x12” cylinder specimens for each composite sample.
7. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days. Hold the last set of two for 56-day reserve and discard them if the 28-day results acceptable.
8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
9. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28- day tests.
10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by CITY but will not be used as sole basis for approval or rejection of concrete.

11. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

END OF SECTION 03 30 00

SECTION 31 05 19

GEOTEXTILES

PART 1 – GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

Section	Title
1.2	References
1.3	Work Included
1.4	Submittals
2.1	Non-Woven Geotextile Filter Fabric
2.2	Woven Geotextile Filter Fabric
3.1	Placement

1.2 REFERENCES

A. Drawings and general provisions of the Contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this section.

1.3 WORK INCLUDED

A. The Contractor shall furnish all labor, equipment, and materials necessary for placing geotextile filter fabric at the locations and to the limits indicated on the Contract Documents and/or Drawings or as directed by CITY.

1.4 SUBMITTALS

A. The Contractor shall submit for approval, in accordance with Section 01 33 00 SUBMITTAL PROCEDURES all working Contract documents and/or drawings and schedules of materials and methods proposed to follow in the execution of the Work under this item.

B. Submittals shall include manufacturer's data and literature showing detail, dimensions, and material specifications.

PART 2 – PRODUCTS

2.1 NON-WOVEN GEOTEXTILE FILTER FABRIC

A. Non-woven geotextile filter fabric shall provide the following minimum required properties.

PROPERTY	TEST PROCEDURE	MINIMUM PHYSICAL PROPERTIES
Tensile strength, lbs	ASTM D 4632	250
Elongation, %	ASTM D 4632	40
Puncture, Strength, lbs	ASTM D D6241	700
Flow Rate, gal/ft^2/min	ASTM D 4491	75
Permittivity, sec^{-1}	ASTM D 4491 96)	0.8
AOS, Sieve Size	ASTM D 4751 (95)	100
Trapezoidal Tear Strength, lbs	ASTM D 4533	100

2.2 WOVEN GEOTEXTILE FILTER FABRIC

A. Woven geotextile filter fabric shall provide the following minimum required properties.

PROPERTY	TEST PROCEDURE	MINIMUM PHYSICAL PROPERTIES
Tensile strength, lbs	ASTM D 4632	250
Elongation, %	ASTM D 4632	10-35
Puncture, Strength, lbs	ASTM D D6241	700
Flow Rate, gal/ft^2/min	ASTM D 4491	15
Permittivity, sec^{-1}	ASTM D 4491 96)	0.2
AOS, Sieve Size	ASTM D 4751 (95)	70
Trapezoidal Tear Strength, lbs	ASTM D 4533	100

PART 3 - EXECUTION

3.1 PLACEMENT

A. Geotextile filter fabric shall be placed as shown on the Drawings or as directed by the Engineer to prevent contamination of the sand filter, drainage aggregate, pipe bedding, and rip rap.

B. Non-woven geotextile fabric shall be used beneath pipe bedding, structure bedding, sand filter material, and drainage aggregate material.

C. Woven geotextile fabric shall be used beneath riprap.

D. Lower the groundwater table to at least 3-ft below the bottom of the excavation base.

E. Excavate foundation surface to conform with the correct lines and grades before beginning the placement. Subgrade shall be clean and free of organic matter, loose soil, obstructions, debris, and standing water.

F. Place geotextile filter fabric on the subgrade with the long dimension running up the slope. Minimize the number of overlaps.

G. Place the strips to provide a width of at least 18-inches of overlap for each joint unless manufacturer recommends greater overlap.

H. Anchor the filter fabric in place with securing pins of the type recommended by the fabric manufacturer. Place the pins on or within 3 in of the centerline of the overlap.

I. Place the fabric so that the upstream strip will overlap the downstream strip.

J. Loosely place the fabric to prevent stretching and tearing during stone placement.

K. Always protect the fabric during construction from clogging due to clay, silts, chemicals, or other contaminants.

L. Care should be taken during placement of subsequent bedding, drainage, riprap, or backfill layers that the fabric does not puncture, tear, or become damaged in any way. Remove contaminated fabric or fabric damaged during installation. Replace with uncontaminated or undamaged fabric at no expense to the CITY.

END OF SECTION 31 05 19

SECTION 31 11 00

CLEARING AND GRUBBING

PART 1 – GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

Section	Title
1.2	References
1.3	Work Included
1.4	Submittals
3.1	Clearing and Grubbing
3.2	Workmanship

1.2 REFERENCES

A. Drawings and general provisions of the Contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this section.

1.3 WORK INCLUDED

A. The Contractor shall furnish all labor, equipment, and materials necessary to clear woodland areas.

B. All clearing and grubbing shall be incidental to the Contract Work.

1.4 SUBMITTALS

A. The Contractor shall submit for approval, in accordance with Section 01 33 00 SUBMITTAL PROCEDURES all working Contract documents and/or drawings and schedules of materials and methods proposed to follow in the execution of the Work under this item.

B. Photographs and/or videotape sufficiently detailed of existing conditions within the limits of construction and of trees and plantings, construction, and site improvements of the adjoining area that might be misconstrued as damage caused by site clearing.

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 CLEARING AND GRUBBING

A. The term clearing and grubbing as used herein shall mean removal of all trees, shrubbery, and brush.

B. The sites of all excavation, grading, embankment construction, or any other fill shall be first cleared of all paving, trees, walls, fences, sidewalks, stumps, brush, rubbish, and crops, which shall be removed or disposed of in a satisfactory manner.

C. Remove trees and brush as indicated on the Contract Documents and Drawings and/or as authorized by the CITY to permit Work to be completed.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated. When it is necessary to cut tree roots on the surface of the ground, the ends shall be cut off smooth, without splitting or shattering and scars greater than one inch in diameter shall be sealed with an approved sealer asphalted tree paint. The trunks of the trees shall be carefully protected from damage, and if unavoidable damage occurs, the injured portions shall be neatly trimmed and covered with an application of tree paint. Excavating machinery and other equipment shall be handled with care to prevent damage to shade trees, particularly to overhanging branches, and branches shall not be cut off except by permission of the CITY.

2. Remove stumps and roots for trees 8-inch and greater diameter as measured at the standard breast height within the limits of the dam.

3. Grind stumps and remove roots, obstructions, and debris extending to a depth of 12-inches below exposed sub-grade for trees less than 8-inch diameter as measured at the standard breast height within the limits of the dam and for all trees outside the limits of the dam.

4. Use only hand methods for grubbing within tree protection zone.

D. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

E. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

F. Remove, load, haul away, and dispose all construction debris from clearing and grubbing operations from the jobsite in accordance with Specification Section 01 74 19. Burning of construction debris resulting from clearing and grubbing operations shall be prohibited.

G. Abandon vertical plastic pipes in the crest of the dam in place and fill with cement/bentonite grout mix as indicated on the Contract Documents and/or Drawings or as authorized by the City.

3.2 WORKMANSHIP

A. The Contractor shall remove all brush, trees and stumps. All cleared debris shall be hauled offsite. There shall be no additional payment for removal of materials considered as being removed, loaded, hauled away, and disposed under other Pay Items. No material other than rock may be buried onsite.

END OF SECTION 31 11 00

SECTION 31 13 11

FENCING

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

Section	Title
1.2	References
1.3	Work Included
1.4	Submittals
1.5	Payment
2.1	Chain Link Fencing
3.1	Temporary Fencing
3.2	Permanent Fencing

1.2 REFERENCES

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.3 WORK INCLUDED

A. The Contractor is responsible to install and maintain Temporary Fencing as indicated on the plans or as directed by the CITY's Project Inspector.

1.4 SUBMITTALS

A. The Contractor shall submit for approval, in accordance with Section 01 33 00 SUBMITTAL PROCEDURES all working Contract documents and/or drawings and schedules of materials and methods proposed to be followed in the execution of the Work under this item.

1.5 PAYMENT

A. Removal and disposal of existing fencing shall be included in the unit cost of any fence installations.

PART 2 - PRODUCTS

2.1 TEMPORARY FENCING

A. Temporary fencing shall be commercial chain link fencing.
   1. Posts, tubes, rails, bracing, fence fabric, shall be galvanized steel.
   2. Fence fabric shall be 2-inch mesh.
   3. The Contractor may embed fence posts in the earth as needed, or use temporary portable bases.

4. Upon CITY approval, alternative materials and types of temporary fencing may be used to meet project specific needs where such alternatives would be more appropriate than chain link fencing. Such alternatives shall be measured and paid for at the same unit of measurement and price as temporary chain link fencing.

2.2 PERMANENT FENCING

A. Permanent fencing shall be zinc, aluminum, or vinyl coated chain link fencing or wood fencing matching the existing fence material in kind to the extent possible.

PART 3 - EXECUTION

3.1 TEMPORARY FENCING

A. The Contractor shall install temporary chain link fencing and tree protection fencing as necessary or directed by CITY to exclude ingress or egress of designated areas. Fencing shall be maintained in good condition during construction operations, and shall be removed when no longer needed and approved by CITY.

3.2 PERMANENT FENCING

A. When permanent fencing is disturbed during construction, the Contractor shall either remove and store, or remove and dispose of disturbed fencing as applicable. At the completion of construction, the Contractor shall restore all disturbed fencing sections to pre-construction conditions to the extent possible. All disturbed sections shall be restored with pre-existing stored materials or in like and kind with new materials, or as otherwise negotiated with the fence/property owner.

END OF SECTION 31 13 11

SECTION 31 23 00

EXCAVATION AND FILL

PART 1 – GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

Section	Title
1.2	References
1.3	Work Included
1.4	Submittals
2.1	Bedding
2.2	Backfill
2.3	Borrow
2.4	Classified Stone
3.1	Additional Excavation
3.2	Bedding and Backfilling
3.3	Embankment
3.4	Borrow
3.5	Clearing and Care of Surface Materials
3.6	Disposal of Material
3.7	Excavation Methods
3.8	Length of Trench to Be Opened
3.9	Protection of Trees and Shrubbery
3.10	Removal of Water
3.11	Sheeting, Shoring, and Bracing
3.12	Storage of Materials
3.13	Rock Excavation
3.14	Unauthorized Excavation
3.15	Access By Owner’s Materials Testing Firm

1.2 REFERENCES

A. Drawings and general provisions of the Contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this section.

1.3 WORK INCLUDED

A. The Contractor shall make all foundation and pavement cuts, make all earth excavations required for various pipelines, to the lines and grades as indicated on the Contract Documents and/or Drawings, or as directed, and shall dispose of all excess excavated materials in making fills or as otherwise specified herein.

B. The term “earth excavation" as used herein shall mean excavation of materials including earth, hardpan, all rock excavation, masonry, plain concrete, reinforced concrete, pavement, pavement foundation, ashes, rubbish, muck, rock etc.

C. Earth excavation shall include the removal, handling, re-handling, filling, and disposal of any and all materials encountered in performing the Work and shall include all groundwater and surface water control (pumping, bailing, and draining, etc.), protection of excavation and adjacent utilities and structures (sheeting, and shoring, etc); the support of sewers, conduits, roadways, foundations, and other piping within the limits of the trench or adjacent thereto; prevention of damage to structures; all backfill, refill, borrow, additional bedding, rolling, tamping, and protection therefore; and all incidental Work. Moreover, the Contractor must assume all responsibility for any obstacles or conditions, foreseen or unforeseen, encountered, or manifest during the prosecution of the Work.

D. Contract Documents and/or Drawings will be furnished indicating elevations of the existing ground and the approximate elevations of the finished grades of the fills around structures prior to construction of the various portions of the Work. The elevations of the present ground are believed to be reasonably correct, but do not purport to be absolutely so, and, together with any schedule of quantities are presented only as an approximation. The Contractor shall satisfy himself/herself, however, by actual examination of the site of the Work, as to the existing elevations and the amount of work required under these items.

E. The Contractor shall, under this item, furnish all the materials for and shall properly place pipe bedding material, which may be deemed necessary by CITY and which may be required for proper completion of the Work included under this Contract.

1.4 SUBMITTALS

A. The Contractor shall submit for approval, in accordance with Section 01 33 00 SUBMITTAL PROCEDURES all working Contract documents and/or drawings and schedules of materials and methods proposed to be followed in the execution of the Work under this item.

B. Borrow: Contractor shall provide location and access to borrow sites for the Engineer to collect samples for testing.

C. Bedding and Classified Stone: Quarry test data.

D. The Contractor shall submit a plan and design calculations signed and sealed by a professional engineer in the State of Georgia for all sheeting and shoring including temporary shoring for the existing sanitary sewer where exposed by excavation for spillway, storm, or siphon pipe crossings.

E. Blasting plans, monitoring reports, and surveys in accordance with Section 3.14 of this Specification.

PART 2 – PRODUCTS

2.1 BEDDING

A. Unless otherwise specified, bedding materials for principal spillway, siphon, and storm drainage systems shall be No. 89 stone free of organics meeting the requirements of Georgia DOT Standard Specification for Construction of Transportation Systems,

Section 800. This material shall be well graded within the following limits:

Sieve Size	Percent Passing by Weight
1/2 inch	100
3/8 inch	90-100
#4	20-55
#8	0-15
#16	0-10
#50	0-5

2.2 BACKFILL

A. Unless otherwise specified, backfill materials for principal spillway, siphon, and storm drainage systems shall be existing embankment material free of rocks, organics, perishable, and objectionable materials or Borrow as described in Section 2.3

1. Backfill shall be compacted to 98% maximum density per AASHTO T-99 or ASTM D-698.

2.3 BORROW

A. Borrow earthfill material for backfill or embankment shall be GDOT Class IIB2 or better material meeting the requirements of Georgia DOT Specification Section 810 with the following physical properties.

Soil	Class IIB2
% Passing No. 200 Sieve	0 - 45
% Clay	0 – 30
% Volume Change	0 – 15
Maximum Dry Density (lbs/ft3)	110 +

1. Class IIB2 soils shall be medium to well-graded sandy clays, silty sands, and clays with some mica.

2. Borrow for backfill or embankment shall be compacted to 98% maximum density per AASHTO T-99 or ASTM D-698.

2.4 CLASSIFIED STONE

B. Classified stone shall meet the requirements of Georgia DOT Specification Section 800. Stone size shall be No. 89 stone as described in Bedding and No. 4 and No. 57 stone free of organics meeting the requirements of Georgia DOT Standard Specification for Construction of Transportation Systems, Section 800. This material shall be well graded within the following limits:

GDOT No. 4 Stone

Sieve Size	Percent Passing by Weight
2 inch	100
1- 1/2 inch	90-100
1 inch	20-55
3/4 inch	0-15
3/8 inch	0-5

GDOT No. 57 Stone

Sieve Size	Percent Passing by Weight
1- 1/2 inch	100
1 inch	90-100
1/2 inch	20-60
#4	0-10
#8	0-5

PART 3 - EXECUTION

3.1 ADDITIONAL EXCAVATION

A. It is expected that satisfactory foundations will be found at the elevations indicated on the Contract Documents and/or Drawings. However, should CITY determine it necessary to go to additional depth, the excavation shall be carried to an additional depth as authorized and directed by CITY. Replacement will be with Classified Stone as directed by CITY to the bottom of the standard bedding. The cost of removing, handling, and disposal of unsuitable material excavation shall be included in the price per cubic yard. No additional payment shall be made for removal of materials considered as being removed, loaded, hauled away, and disposed under other Pay Items.

3.2 BEDDING AND BACKFILLING

A. Lower the groundwater table to at least 3-ft below the bottom of the trench.

B. Excavate trench to conform with the location, grades, and dimensions as specified in the Drawings and/or Contract Documents or as directed by the CITY or Engineer. Subgrade shall be clean and free of organic matter, loose soil, obstructions, debris, and standing water.

C. Excavation of pipe trenches with side sloping to the bottom will not be permitted.

D. Bottom of trenches in earth must be shaped or molded and compacted to the contour of the outside of the pipe using bedding materials as indicated on the Contract Documents and/or Drawings, to give a full support to the lower segment of the pipe and so that the pipe is firmly supported in the excavation throughout its entire length, in such manner as to prevent any subsequent settlement of the pipe. Boulders or loose rocks, which might bear against the pipe, will not be permitted in the trench bottom or in the backfill. Bottoms of excavations which are of loose granular soils shall be compacted prior to placing bedding or pipe.

E. Except as otherwise specified or directed, all forms, bracing, and lumber shall be removed before backfilling.

F. Initial backfill in trenches where pipe has been laid shall be placed very carefully in lifts not exceeding six (6) inches loose in thickness and carefully and thoroughly consolidated by tamping simultaneously under the haunches and on both sides of the pipe to a height of twelve (12) inches above the top of the pipe. Initial backfilling must be done properly and before any fill is deposited in large quantities from a machine bucket or other vehicle. During initial backfill, dumping from a bucket must not be allowed to fall from a height of more than one foot upon a pipe, and in all cases the bucket must be lowered so that the shock of the falling earth will not injure the pipe or structure. Only after the initial backfill has been placed to a point twelve (12) inches above the top of the pipe, may Work proceed in placing the remaining backfill, which must be carefully placed and compacted. Backfill shall be placed in horizontal lifts not to exceed eight (8) inches loose in thickness. Initial and final backfill shall be compacted to a density of not less than 98 percent as determined by a standard Proctor test ASTM D698 Current Edition.

G. Backfilling shall not be done in freezing weather (below 32 degrees F) except by permission of the CITY or Engineer, and shall not be done with frozen material or upon frozen materials.

H. All backfilling shall be left with smooth, even surfaces, free of rock on the surface and properly graded, and shall be maintained in this condition until final completion and acceptance of the Work.

I. The Engineer will perform tests at random intervals to determine if backfill meets the requirements of this Specification. Tests will be carried out by the Engineer, and test data will be made available to the Contractor. The location and number of tests shall be designated by CITY or Engineer as work progresses but should not be less than one test per 100 to 150 linear feet of trench backfill placement for each lift placed provided trench is safe to enter per OSHA guidelines for trenching and shoring, otherwise compaction means and methods will be observed until the trench is less than 3 feet in depth.

J. All cost associated with compaction testing performed by the Engineer will be paid for by CITY. The cost of additional testing due to the failure of initial compaction to meet the requirements of this Specification shall be the responsibility of the Contractor.

K. Contractor shall correct deficiencies in the Work that do not meet the requirements of this Specification at the Contractor’s expense.

3.3 EMBANKMENT

A. The materials of which the embankments are to be constructed shall be the same as those permitted for backfill.

B. Benches shall be formed to increase the bond between the existing surface and the proposed grade of the embankment. Benches shall be of a sufficient width to bond the new embankment with the existing embankment and to accommodate the placement and compaction operations and equipment. No additional payment will be made for benching excavation.

C. Prior to beginning embankment construction, the existing ground surface shall be prepared as defined in Section 31 11 00 –Clearing and Grubbing and as indicated on the Contract Drawings. The entire area where embankment is to be placed shall be scarified to a depth of at least 6 inches, excluding inundated areas. Depressions and undercut areas below the ground surface shall be filled with satisfactory material in accordance with Backfill section above.

D. The earth shall be placed in lifts not exceeding eight (8) inches in thickness, loose measurement, which shall be compacted to a density of not less than 98 percent as determined by a standard Proctor test ASTM D698 Current Edition.

E. Embankments shall not be constructed during freezing weather or with frozen materials.

F. The surface shall be brought to the true lines and grades as specified or indicated on the Contract Documents and/or Drawings, and shall be raked smooth and left free from rubbish, stones, or gravel.

G. Placing of fill or embankment over and around structures shall be done evenly on all sides to avoid unbalanced loading or overturning action.

H. The Engineer will perform tests at random intervals to determine if embankment meets the requirements of this Specification. Tests will be carried out by the Engineer, and test data will be made available to the Contractor. The location and number of tests shall be designated by CITY or Engineer as work progresses but should not be less than one test per 500 cubic yards of fill placement for each lift placed.

I. All cost associated with compaction testing performed by the Engineer will be paid for by CITY. The cost of additional testing due to the failure of initial compaction to meet the requirements of this Specification shall be the responsibility of the Contractor.

J. Contractor shall correct deficiencies in the Work that do not meet the requirements of this Specification at the Contractor's expense.

3.4 BORROW

A. When excess excavated material is not available from other parts of the project, and it is necessary to borrow material to complete required backfill and embankment, the Contractor shall obtain necessary material at locations off the site of the Work, and the Contractor shall find his/her own source of supply for the material.

B. All material to be used as borrow shall be inspected, tested, and approved by the Engineer before being hauled to the site. No excavation for this purpose shall be made in the bed of any existing or projected public highway, unless permitted by the CITY. Material obtained from the excess material available from other parts of the Work shall not be paid as Borrow.

C. All cost associated with fieldwork, laboratory testing, and analysis performed by the Engineer will be paid for by CITY for one (1) borrow pit location. The cost of additional fieldwork, analysis, and laboratory testing due to the failure of the soil in the borrow pit to meet the requirements of this Specification shall be the responsibility of the Contractor.

D. Contractor shall be responsible for excavating, handling, and hauling borrow to the project site.

3.5 CLEARING AND CARE OF SURFACE MATERIALS

A. Topsoil shall be removed to its entire depth from all areas to be excavated or graded. The topsoil shall be piled in designated or approved locations where it will not interfere with construction operations. Topsoil as stored, shall be reasonably free of subsoil, debris, and stones larger than (2) two inches in diameter. The stored topsoil shall be used for finished grading.

B. The removal of existing pavement shall be done in accordance with the requirements of the CITY. The Contractor's attention is directed to the section of the General Conditions pertaining to permits for the required Work.

C. Whenever the removal of pavements is required, the Contractor shall outline the area to be removed by making saw cuts, providing vertical cuts in straight lines in order to permit removal in a straight line. Should pavement breakage occur beyond the original saw cut, the Contractor will be required to make a new straight saw cut beyond the furthest point of breakage. Payment for restoration of pavement will be made as specified under the item titled Roadway Construction.

3.6 DISPOSAL OF MATERIAL

A. The Contractor will be required to remove from the site of the Work, all earth in excess of that required to backfill the excavation and to create necessary fills. This shall be done immediately after the backfill and embankment is completed to the satisfaction of the CITY or Engineer. All materials removed shall become the property of the Contractor, and he/she shall make his/her own arrangements satisfactory to CITY for their disposition.

B. All surplus material, and such other materials the CITY or Engineer may deem unfit for use as backfill or embankment, shall be disposed of by the Contractor so as to give a minimum of inconvenience to the public.

C. Any material, which may spill or drip from vehicles while being transported on public streets, drives, or other paved surfaces, shall be immediately removed and cleaned by the Contractor, to the satisfaction of the CITY, Engineer, or the proper officials of the municipality in which the hauling or work is beingdone.

D. The surface of all graded and spoil areas shall be left in a smooth and level or evenly sloped condition, free from stones, rubbish, or other debris.

E. Disturbed areas shall be left in a neat and finished appearance and either temporarily stabilized with mulch only or temporary grassing and mulch, or permanently stabilized with grassing and mulch, and must meet the requirements in the section titled Erosion and Sedimentation Controls.

3.7 EXCAVATION METHODS

A. All excavation shall be in open-cut unless otherwise indicated on the Contract Documents and/or Drawings or approved by CITY or Engineer and shall be in accordance with the Georgia Department of Transportation Standard Specifications for

Road and Bridge Construction, latest edition. In general, topsoil may be removed by machine methods. Excavation below topsoil may also be performed by machine, but shall be supplemented by such hand dressing or leveling as may be required to conform to lines and grades as indicated on the Contract Drawings or as directed by the City or Engineer. Material so removed shall be used in backfill, making embankments, filling low areas, or as otherwise directed.

B. Hand tool excavation shall be used where necessary to protect existing utilities and structures.

C. All slopes shall be carefully cut or graded by hand, to the grades as detailed on the contract documents, drawings, and/or as required by CITY, and shall be tamped or otherwise compacted to maintain the material in position.

D. It is the Contractor's responsibility to have all excavation conform to local and OSHA safety requirements.

E. Unless otherwise shown on the plans, the minimum trench widths shall be sufficiently wide to allow achieving the specified compaction beside the pipe and beneath the pipe's haunches.

3.8 LENGTH OF TRENCH TO BE OPENED

A. The length of trench to be opened or the areas of the surface to be disturbed or un-restored at any one time shall be limited by CITY or Engineer with regard both to expeditious construction and to the convenience, safety, and comfort of citizens directly and indirectly affected by the Work. The Contractor shall not have more than 500 feet of trench open at one time. New trenching will not be permitted to be excavated, if there are previously excavated trenches that require backfilling or surface areas that require restoration. In any event, no additional Work of any kind will be permitted if there are existing streets or roadways that require attention to return them to a safe and proper condition. In general, no trench shall be opened more than 150 feet ahead of pipe laying. For safety, no trenches will be allowed to be left opened at night or on weekends unless approved by the CITY. All required permits shall be obtained before trenching begins.

3.9 PROTECTION OF TREES AND SHRUBBERY

A. The Contractor shall be responsible for the protection of tops, trunks, and roots of existing trees that are to remain on the project site, lawns, or other improved areas. All trees shall remain and receive protection, if necessary, in areas where there is no excavation or embankment. Existing trees, which may be subject to construction damage, shall be boxed, fenced, or otherwise protected before any work is started. The boxing shall be removed when directed or at the completion of the project. Heavy equipment or stockpiles will not be permitted within branch spread. Interfering branches shall be removed without injury to trunks and the scars shall be covered with tree paints.

B. No tree shall be removed unless as indicated on the Contract Drawings or as directed by the City or Engineer. In areas beyond construction, right-of-way, or easements, no trees or shrubbery shall be removed without the written consent of the property owner and approval of CITY.

3.10 REMOVAL OF WATER

A. Per Specification 31 23 19 "Dewatering" and as outlined below.

B. Provide and maintain at all times during construction ample means and devices with which to promptly remove and properly dispose of all water from any source entering the excavations or other parts of the work. Accomplish dewatering by methods which will ensure a dry excavation and preservation of the final lines and grades of the bottoms of excavations. Methods of dewatering may include sump pumps, well points, deep wells, or other suitable methods which do not damage or weaken structures, foundations, or subgrades. Shallow excavations may be dewatered using open ditches provided such ditches are kept open and freedraining at all times.

C. All necessary precautions shall be taken to prevent disturbance and to properly drain the areas upon which concrete is to be poured and upon which pipe is to be laid.

D. Provide and maintain standby pumping equipment on the job site. Make available a minimum of one standby unit (a minimum of one for each ten in the event well points are used) for immediate installation should any pumping unit fail. Design and install well points or deep wells suitable for the accomplishment of the work and in compliance with all local codes. The flow in sewers, drains, gutters, or water courses encountered in the Work shall be adequately accounted for by the Contractor at his/her own expense to ensure these flows do not interfere with prosecution of any and all of the Work, and shall be maintained in such a manner as to ensure continuity of flow at all times.

E. Unless specifically authorized by CITY and/or the Engineer, do not place concrete or mortar in water nor allow water to rise over newly-placed concrete or mortar for at least 24 hours after placement. Do not expose concrete structures to unequal hydrostatic forces until the concrete has reached its specified 28-day strength. Unless otherwise permitted, ground water encountered within the limits of excavation shall be depressed to an elevation not less than three (3) feet below the bottom of such excavation before pipe laying or concreting is started and shall be maintained until concrete and joint materials have attained initial set. Exercise care to prevent damage to pipelines or structures resulting from flotation, undermining, or scour. Commence dewatering operations when ground or surface water is first encountered and continue until such times as water can safely be allowed to rise in accordance with the provisions of this section. Protect excavations from the entrance of surface water to the extent possible by the use of dikes and/or covers.

F. If foundation soils are disturbed or loosened by the upward seepage of water or an uncontrolled flow of water, excavate and replace the affected areas with crushed rock at no cost to the CITY.

G. Dispose of the water from the work in a suitable manner without damage to adjacent property. Do not allow conveyance of the water to interfere with traffic flow or treatment facilities operation. No water shall be drained into work built or under construction without approval from CITY or the engineer. The Contractor will be held responsible for the condition of any pipe or conduit which he may use for drainage purposes, and all such pipes or conduits shall be left clean and free of sediment.

H. Provide sedimentation control measures as necessary to prevent the entrance of excessive or injurious amounts of sand and silt from surface runoff or dewatering

operations into storm drains or receiving waters.

I. Dispose of water in such a manner as not to be a menace to the public health and in accordance with applicable Environmental Protection Agency, Corps of Engineers, and State Environmental Protection Division standards and permits.

J. Should sewage or any other odorous liquids be encountered during the Work, CITY shall be notified immediately. CITY will promptly notify appropriate utility owner or regulatory agencies, if necessary. In addition, CITY will instruct Contractor as to any actions the Contractor can and cannot perform prior to any directives, which may be issued by the utility owner or regulatory agencies. Any sewage will be pumped and hauled to an in-service manhole, pump station, or water reclamation facility, as directed by Fulton County. Any other liquids will be disposed of properly, as directed by CITY and/or any regulatory agencies having jurisdiction. CITY will then determine if actions taken by Contractor have caused the source of the odorous liquid to leak, and if so, Contractor shall be responsible for any fines and/or penalties levied by regulatory agencies having jurisdiction.

3.11 SHEETING, SHORING, AND BRACING

A. Contractor shall sufficiently sheet, shore, and brace the sides of all excavations, as necessary, to prevent slides, cave-ins, settlement or movement of the banks, to maintain the excavation clear of all obstructions, and to provide safe working conditions. Use wood or steel sheeting of approved design and type in wet, saturated or flowing ground. Design all sheeting, shoring, and bracing with sufficient strength and rigidity to withstand the pressure exerted and to maintain shape and position under all circumstances.

B. It is the Contractor’s responsibility for correctly assessing the need for sheeting and analyzing the stresses induced. Since CITY and/or the Engineer does not dictate or determine the Contractor's sequence or limits of excavation, CITY and/or the Engineer assumes no responsibility for sheeting and shoring. The Contractor must employ or otherwise provide for a professional engineer to assess the need for sheeting and shoring and design same. Contract Documents and/or Drawings and design computations shall be signed and sealed by a professional engineer registered in the State of Georgia. The Contract documents and/or drawings and design computations shall be submitted to CITY or the Engineer.

C. Adequately sheet, shore, or brace excavations adjacent to existing or proposed buildings and structures, or in paved streets or alleys to prevent undermining beneath or subsequent settlement of such structures or pavements. Repair any damage to structures or pavements occurring through settlements, water or earth pressures, slides, caves, or other causes; due to failure or lack of sheeting or bracing, or due to improper bracing; or occurring through negligence or fault of the Contractor in any other manner at his own expense.

D. Where in the opinion of CITY the removal of sheeting would endanger the Work built under this Contract or any adjoining improvements, such sheeting will be ordered to be left in place and the tops cut off as directed. In removing sheeting, the Work shall be done in such a manner as to prevent injurious caving of the sides. All voids left by sheeting along trenches shall be carefully refilled and rammed with suitable tools. Any

timber directed to be left in place will not be paid for as supplemental price. No additional payment will be made for sheeting when directed to be left in place.

E. Do not leave sheeting, shoring, or bracing materials in place unless otherwise specified or shown on the Contract Documents and/or Drawings or ordered by CITY and/or the Engineer in writing. Remove such materials in such manner that no danger or damage will occur to new or existing structures or property, public or private, and so that cave-ins or slides will not take place. Leave trench sheeting in place until backfill has been brought to a level 12 inches above the top of the pipe. Then cut off and remove the upper portion. Leave sheeting for structures in place until backfill has been brought to a level of 12 inches above the top of the bottom footing. Then cut off and remove the upper portion.

F. In quicksand or soft ground, sheeting shall be driven to such depth below bottom of the trench to prevent upheaval, or as directed.

G. Fill and thoroughly compact all holes and voids left in the work by the removal of sheeting, shoring, or bracing.

H. Failure or refusal of CITY to order sheeting, or timbering to be left in place shall in no way relieve the Contractor of responsibility placed upon him under any provisions of the Specifications or other Contract Documents.

I. The need and adequacy of sheeting, shoring, bracing, or other provisions to protect men/women and equipment in a trench or other excavation, and to meet local and OSHA safety requirements, shall be the sole and exclusive responsibility of the Contractor.

3.12 STORAGE OF MATERIALS

A. All salvageable materials, which may be removed from the site, together with all materials taken from the trenches, shall be stored in an approved, suitable place or as directed by CITY. The Contractor shall be responsible for any loss of or damage to salvageable materials through careless removal, neglectful or wasteful storage disposal, or use of such material.

B. In the storing of excavated material, which is to be used as a backfill, the Contractor shall exercise care so as to avoid inconveniencing the public. If, in the opinion of CITY, it is necessary to remove this excavated material from the streets or lots, the Contractor will be required to do so at no cost to the County.

C. Stored materials shall be left in a neat, drainable condition and, if left for more than seven (7) days or in an anticipated rainfall event, the areas shall be temporarily stabilized with mulch only or with temporary grassing and mulch, and must meet the requirements in the section titled Erosion and Sedimentation Controls.

3.13 ROCK EXCAVATION

A. Rock is defined as stone in original ledge or mass and boulders over one-half (1/2) cubic yard in volume which cannot be excavated with a backhoe having a bucket curling force rated at not less than 26,000 pounds. Material which can be loosened with a pick, frozen materials, partially weathered rock, which for convenience or economy is loosened by drilling and blasting or by drilling coupled with wedging and material which is exterior to the limits of measurement allowed shall not be measured or

classified as rock excavation.

B. Rock excavation by blasting shall be at least 75 feet in advance of pipe laying. Rock shall be removed to a depth of at least 6 inches below the bottom of the pipe and this area shall be backfilled crushed stone and lightly consolidated before placing the pipe in the trench.

C. In removing, special care shall be taken to excavate it as closely as possible to the required shape and with no projection into the trench. Only rock actually removed shall be paid for and in no case will allowance be made for rock removed outside the specified pay limits unless such rock has been taken out at the direction of the CITY Inspector in writing.

3.14 UNAUTHORIZED EXCAVATION

A. All excavations carried outside of the lines and grades given or specified, together with the disposal of such material and all excavations, and other work resulting from slides, cave-ins, swellings, or upheavals shall be at the Contractor's own cost and expense. All spaces beneath foundations resulting from unauthorized excavations, slides, or cave-ins shall be refilled at the Contractor's expense, with bedding materials or concrete, as directed. This is to include all landscaping outside of the lines and grades given or specified.

3.15 ACCESS BY OWNER’S MATERIAL TESTING FIRM

A. Contractor shall allow and accommodate both scheduled and unscheduled sampling or testing of excavation materials, backfill, and embankment which may include, but is not limited to excavating and setting aside directed materials for sampling, providing description, properties, moisture content, dry density, sieve analysis, Atterburg limits, compaction testing, permeability, etc. The Contractor shall give the City’s Engineer or material testing firm a minimum of 48 hours notice when scheduling testing and/or evaluations.

END OF SECTION 31 23 00

SECTION 31 23 19

DEWATERING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

Paragraph	Title
1.2	System Descriptions
1.3	Well Point System Definition
1.4	Submittals
1.5	Quality Assurance
1.6	Sequencing and Scheduling
1.7	Maintenance
2.1	Well Point System
2.2	Bypass Piping Materials
2.3	Equipment
3.1	Temporary Stream Bypass Pumping
3.2	Well Point System
3.3	Maintenance
4.1	General

B. Scope

1. The various methods of dewatering including temporary stream bypass pumping and well point systems. Contractor shall implement appropriate methods to maintain flow around the Work area and dewatering such that grading can be performed and compacted satisfactorily as shown in the Contract Documents. Contractor shall also dewater concrete spillway stilling basin as part of this project to allow for separate Ground Penetrating Radar Analysis to be conducted by others. Contractor shall coordinate schedule stilling basin dewatering with Engineer and shall dewater stilling basin for up to 5 business days.

2. The Contractor may use a combination of dewatering methods in lieu of well point system and temporary bypass pumping, subject to approval of the CITY. The Contractor shall be responsible for pursuing written approval.

3. No separate measurement and payment shall be made for any Work performed or material used for this section. Full compensation for such work shall be considered as incidental to other items of Work. Costs in connection therewith shall be considered a subsidiary obligation of the Contractor and shall be included in the overall cost of the work.

1.2 System Descriptions

A. Stream Bypass Pumping Performance Requirements

1. It is essential to the operation of the existing stream that there be no interruption in the flow of water throughout the duration of the Project. Provide, maintain, and operate all temporary facilities such as dams, plugs, pumping equipment (both primary and backup units as required), conduits, and all necessary power to intercept the water flow before it reaches the point where it would interfere with the Work, carry it past the Work, and return it to the existing stream downstream of Work.

2. Sufficient bypass pumping and dewatering shall be implemented to prevent delays in schedule.

3. Design, install, and operate the temporary pumping system.

4. Convey the water safely past this Work area.

5. Maintain water flow around the Work area in a manner that will protect public and private property from damage and flooding.

6. Protect water resources, wetlands, and other natural resources.

B. Stream Bypass Pumping Design Requirements

1. Provide all pipeline plugs, pumps of adequate size to handle base flow, and temporary discharge piping, to ensure that the total flow can be safely diverted around the channel section under construction. Bypass pumping system will be required to be operated 24 hours per day 7 days per week, including holidays, during bypass pumping operations. The maximum allowable discharge velocity shall be 8 fps.

2. Pump(s) must be capable of bypassing stream base flow and the removal of seepage flow from the work area.

1.3 Well Point System Definition

A. The well point system shall be developed to the point that is capable of dewatering such that grading and foundation preparation can be performed and compacted satisfactorily as shown in the drawings. Each well point system shall be capable of dewatering and maintaining groundwater levels at the respective structures. Work, in general shall include:

1. Designing, furnishing, installing, testing, operating, monitoring and maintaining a system to control ground water and surface water as required to comply with the performance requirements specified.

2. Controlling and removing seepage and surface water from the excavation,

including excavation slope erosion control.

3. Prevention of surface water from entering the trench and diverting the surface water away from the site.

4. Removal of the temporary dewatering system after completion of the specified portion of work.

5. Removal of ground water and surface water from all remaining excavation, after removal of the temporary dewatering system, until construction has reached finished grades.

1.4 Submittals

A. Stream Bypass Pumping: If required by the CITY, provide detailed plans and descriptions outlining all provisions and precautions regarding the handling of existing water flows. This plan must be specific and complete including such items as schedules, locations, elevations, capacities of equipment, materials and all other incidental items necessary and/or required to ensure proper protection of the facilities, including protection of public and private property from damage and flooding. The plan shall include but not be limited to details of the following:

1. Staging areas for pumps.

2. Cofferdam methods.

3. Number, size, material, location and method of installation of suction piping.

4. Number, size, material, method of installation and location of installation of discharge piping.

5. Bypass pump sizes, capacity, number of each size to be on-site and power requirements.

6. Determination of static lift, friction losses, and flow velocity (pump curves showing pump operating range shall be submitted).

7. Standby power generator size, location.

8. Downstream discharge plan.

9. Thrust and restraint block sizes and locations.

10. Sections showing any suction and discharge pipe depth, embedment, select fill and special backfill where required.

11. Method of noise control and sound monitoring for each pump and/or generator.

12. Any temporary pipe supports and anchoring required.

13. Plans for access to bypass pumping locations.

14. Basis for selection of bypass pumping pipe size.

15. Schedule for installation of and maintenance of bypass pumping lines.

16. Plan indicating selected location of bypass pumping line and air valve locations.

17. Copy of dewatering permit, as needed.

B. Well Point submittals: If required by the CITY, submit:

1. Description of the well point system.

2. Layout of all piping involved.

C. Quality Control Submittals: If required by the CITY, submit:

1. Certification of vendor's compliance with qualifications specified in Article 1.5 Quality Assurance below.

2. Bypass system operators' resumes.

3. Weekly maintenance and inspection logs.

1.5 Quality Assurance

A. Stream By Pass Pumping

1. System operators shall have a minimum one year experience in operating and maintaining bypass systems.

B. Well Point

1. The Contractor or well pointing firm shall engage a qualified surveyor to perform all layouts and measurements in accordance with Section 01 71 23.16. The surveyor shall layout the work to the lines and grades required before installation and shall determine the location of each well point, piezometer and other data, as required.

2. The surveyor shall record and maintain all information pertinent to each well point. The temporary dewatering system in these specifications shall be the minimum system required for controlling groundwater, regardless of source.

3. The installed system shall be capable of lowering and maintaining the groundwater to at least 3 feet below the bottom of the excavation and until the required work is completed. The Contractor shall be responsible for the design of the entire temporary dewatering system and shall make whatever modifications and additions to the system as may be required for the system to

fulfill its requirements.

4. Design, furnish, install, test, operate, monitor and maintain the minimum well point system as specified herein, including all discharge piping and connections at point of discharge, sufficient to lower the ground water level or hydrostatic head below the bottom of the excavation, or lower, so as to prevent seepage of water into the excavation and permit installation of all utilities "in the dry".

5. Design, furnish and install, test, operate, monitor and maintain whatever additional system that may be necessary to supplement the minimum Well pointing system as specified herein, and to maintain the excavation free of groundwater seepage and surface water, regardless of source.

6. The periphery of the entire excavation shall be suitably diked, and the dikes maintained to prevent surface water from entering the excavation.

7. All water seeping, falling or running into the excavation as it is dug, and until the temporary dewatering system is removed as specified, shall be promptly pumped out.

8. Dispose of all seepage and surface water removed from the project, regardless of source, by methods in accordance with the erosion and sedimentation control provisions of these Specifications and as approved by the CITY.

9. Take appropriate and approved measures to prevent erosion of the excavated soils and ramp slopes.

1.6 Sequencing and Scheduling

A. General

1. To meet the overall objectives of the Project, certain tasks and task elements shall be generally performed, completed, or substantially completed in the herein specified sequences. However, two or more of the tasks or task elements may be pursued simultaneously when consistent with the requirements specified herein, the requirements of Sequence Constraints, specified hereinafter, and the approved Project Schedule.

2. The specified sequences are not all inclusive. They are intended to convey overall sequence requirements. The Contractor shall plan its Work, and provide for temporary connections as necessary in appropriate sequences to perform the Work while minimizing interferences with and providing for the continuous flow of the existing stream baseflow.

3. Any part of the Work that is necessary or required to make each task item installation satisfactory and operable for its intended purpose, even though it is not specifically included in the task description, shall be performed as if it were described in the task description.

4. Proceed with construction sequence as shown on the Contract Documents.

B. Sequence Constraints: Erosion control provisions, either permanent or approved temporary, must be in place prior to any construction activities in an area subject to the erosion control provisions.

C. Stream Flow Bypass Pumping System: The Contractor may propose as part of its flow bypass pumping system plan to use alternate pumping arrangements, subject to approval by the CITY.

1.7 Maintenance

A. Maintenance Service: Ensure that the temporary pumping system is properly maintained and a responsible operator shall be on hand at all times when pumps are operating.

B. Extra Materials: Spare parts for pumps and piping shall be kept on-site. Spare parts shall include but not be limited to 100 feet of extra pipe for each size. A fusion weld machine available to be on-site within 3 hours any time of the day, including holidays. A spare pump shall be available within 24 hours if primary pumping system fails.

C. Adequate hoisting equipment for each pump and accessories shall be maintained on the Site.

Part 2 Products

2.1 Well Point System

A. The well point system shall be developed to the point that is capable of dewatering such that grading can be performed and compacted satisfactorily as shown in the Contract Documents. Each well point system shall be capable of dewatering and maintaining groundwater levels.

2.2 Bypass Piping Materials

A. Header Piping: The rated working pressure of the header piping shall be a minimum of 125% of the maximum expected pressure in the pipe.

B. Discharge Piping: Discharge piping shall be used from the connection at the header piping to the discharge point. At the beginning of the Project, all discharge piping shall conform to ASTM D3350 or similar strength material. The CITY at their sole discretion shall have the right to reject sections of discharge piping deemed to be unserviceable. Joints shall be butt fusion welded.

2.3 Equipment

A. All pumps used shall be fully automatic self-priming units that do not require the use of foot-valves or vacuum pumps in the priming system. The pumps may be electric

or diesel powered. All service connection pumps shall be trailer mounted. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of stream flows.

B. Provide the necessary stop/start controls and a visual alarm indicating a pump malfunction for each pump.

C. The main flow back-up pumps shall be online, isolated from the primary system by a valve.

D. Incorporate noise prevention measures for any and all equipment being used to ensure minimum noise impact on the surrounding areas.

1. Include silencers or mufflers, equipment modifications, and special equipment or sound barrier walls as necessary to limit noise levels below 55 decibels at a distance of 25 feet in the direction of any residential home.

2. Comply with the requirements of Section 01 50 00, Article 1.11.

3. In the event the Contractor fails to comply with maximum permissible noise level decibels in the operation of the flow bypass pumping system, the CITY may order the Contractor to restore gravity flow in the stream and stop operation of the flow bypass pumping system until such time as specified noise levels are achieved. The termination of the flow bypass pumping system for such reason shall not be the basis for any extension of Contract time nor for any claim for additional compensation.

E. Repair clamps shall be full circle, stainless steel clamps.

Part 3 Execution

3.1 Temporary Stream Bypass Pumping

A. Contractor shall maintain water levels in the lake during construction at a maximum 2.5-ft deep until all construction activities related to cured-in-place pipe rehabilitation is completed unless otherwise authorized by the CITY or Engineer. Contractor shall also dewater concrete spillway stilling basin as part of this project to allow for separate Ground Penetrating Radar Analysis to be conducted by others. Contractor shall coordinate schedule stilling basin dewatering with Engineer and shall dewater stilling basin for up to 5 business days.

B. Preparation

1. Locate any existing utilities in the area selected to locate the bypass pipelines. Locate bypass pipelines to minimize any disturbance to existing utilities.

2. Bypass pump all water base flows during all phases of the Work and shall coordinate all bypass pumping operations with the CITY.

C. Installation

1. The bypass pipeline must be located off streets, sidewalks, and shoulders of the roads. When the bypass pipeline crosses local streets and private driveways, place the bypass pipelines in trenches and cover with temporary pavement or other approved methods.

2. Protect the bypass discharge line from damage in the areas of other equipment operations.

3. Confine the bypass discharge pipeline to the area within the temporary construction area and construction easement, for construction of the pipeline. Concrete barriers or timber deadman posts can be used to confine the movement of the discharge pipeline during relocation.

D. Field Quality Control

1. Perform a hydrostatic pressure test for each section of discharge piping with a minimum pressure equal to 1.5 times the maximum operating pressure of the system.

2. Operator shall inspect bypass pumping system every hour, or on a schedule approved by the CITY.

3. An inspection log shall be kept at each pumping location. Each inspection log shall be marked with the time of inspection to ensure required maintenance and inspections are being performed.

4. Discharge bypass water in a manner that will not cause erosion or flooding, or otherwise damage existing facilities, work in progress, competed work, or adjacent property. Discharge of water must meet the requirements in Section 31 25 00 - Erosion and Sedimentation Controls.

E. Reservoir Filling

1. If the length of time the reservoir is lowered does not exceed six weeks, the reservoir can be refilled using an uncontrolled rate of fill. If the length of time the reservoir is lowered exceed six weeks, the CITY shall provide a refilling schedule in accordance with GA Safe Dams Programs Engineer Guidelines for GA Safe Dams Program review and approval prior to refilling of the reservoir by the Contractor.

F. Cleaning: Upon completion of the bypass pumping operation, clean up all areas disturbed by these operations, restoring the site to the general condition which existed prior to the start of the Work or as shown on the Contract Documents or to a manner approved by the CITY.

3.2 Well Point System

A. The Contractor shall install a temporary well point system for the removal of subsurface water encountered during construction of the proposed structures and/or piping.

B. At all times during the progress of the Work the Contractor shall use all reasonable precautions to prevent either tampering with the well points or the entrance of foreign material.

C. Protect structures, utilities, sidewalks, pavements and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by temporary dewatering system installation and operation.

D. Discharge of well point water must meet the requirements in Section 31 25 00 - Erosion and Sedimentation Controls.

E. At such time that the well pointing operation is completed, the Contractor shall remove all of its equipment, materials, and supplies from the site of the work, remove all surplus materials and debris, abandon all bored holes by backfilling with bentonite, fill all associated excavations and grade the site to elevations of the surface levels which existed before work started or as shown in the Contract Documents.

3.3 Maintenance

A. The Contractor shall provide system maintenance including, but not limited to, at least daily supervision by someone skilled in the operation, maintenance, and replacement of system components and all other equipment and work required by the CITY to maintain the excavation in a dewatered and hydrostatically relieved condition.

B. Dewatering and pressure relief shall be a continuous operation and interruptions due to power outages, or any other reason, shall not be permitted. A responsible operator capable of starting, finishing and maintaining the dewatering system and starting standby equipment shall be on duty at all times. Responsible personnel shall continuously monitor the dewatering and surface water central systems, until the Contractor has received approval from the CITY that he may discontinue surface and/or groundwater control.

C. The Contractor shall be fully responsible for the failure of any and all components of the temporary dewatering work and for damages to the Work in the excavation area caused by the failure to provide, maintain, and operate the temporary dewatering system, as specified. Contractor shall restore all damaged Work, including failed components of the work in this specification to the general that existed prior to failure of components or in a manner approved by the CITY.

D. Contractor shall maintain on-site at all times at least two pipe repair clamps for all bypass pumping piping sizes used on the project.

END OF SECTION

SECTION 31 23 23.33

FLOWABLE FILL

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

Section	Title
1.2	References
1.3	Work Included
1.4	Submittals
2.1	Materials
2.2	Mix Design
2.3	Equipment
3.1	Preparation
3.2	Mixing
3.3	Construction
3.4	Freezing and Inclement Weather
3.5	Quality Assurance and Acceptance

1.2 REFERENCES

A. Drawings and general provisions of the Contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this section.

B. ASTM C495, Standard Test Method for Compressive Strength of Lightweight Insulating Concrete.

C. ASTM C869, Standard Specification for Foaming Agents Used in Making Preformed Foam for Cellular Concrete.

D. ASTM C618, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete

E. ASTM C796, Standard Test Method for Foaming Agents for Use in Producing Cellular Concrete Using Preformed Foam.

F. ASTM D4832, Standard Test Method for Preparation and Testing of Controlled Low Strength Material Test Cylinders

G. ASTM D5971, Standard Practice for Sampling Freshly Mixed Controlled Low Strength Material

H. ASTM D6103, Standard Test Method for Flow Consistency of Controlled Low Strength Material

1.3 WORK INCLUDED

A. The Contractor shall, under this Specification, furnish all the materials for and shall place all Flowable Fill, as required by the Contract Documents or where otherwise directed by CITY. Applications include, but are not limited to, beddings, encasements, plugging or filling abandoned utilities and structures, general backfill for trenches and abutments, and any other incidences where such work is requested by CITY.

1.4 SUBMITTALS

A. The Contractor shall submit for approval, in accordance with Section 01 33 00 SUBMITTAL PROCEDURES all working drawings and schedules of materials and methods proposed to follow in the execution of the Work under this item:

1. Mix Design: Submit to CITY or Engineer, no later than 30 days prior to commencing flowable fill operations, the design for each proposed flowable fill mix, including
    a. Proposed flowable fill mix design(s), including weights of all materials, water, and admixtures, expressed in terms of quantity per cubic yard.
    b. Description, and source of all materials and water.
    c. Material certificates for each mix constituent, including certificates for admixtures indicating that they comply with specified requirements.
    d. Admixture cut sheets and manufacturer recommendations for use in similar applications.
    e. Certificate, provided by the supplier, identifying fly ash as Class C or Class F, in accordance with ASTM C 618.
    f. Unit weight, and compressive strength tests results for proposed mix design, based on sampling and testing in accordance with ASTM C 495 (compression tests), ASTM C 869 and ASTM C 796 (foaming agent).
2. Daily flowable fill installation reports: Prepare flowable fill installation records on a per-shift basis, and submit to CITY or Engineer within 24-hours of installing flowable fill. Develop and use a standard shift or daily report format. Include:
    a. Batch/delivery tickets.
    b. Volume of flowable fill placed.
    c. Location and depth of filling.
    d. Injection locations, pressures, and time of placement.
    e. Unit weight and testing results, and summary of samples prepared.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fine aggregate shall meet the requirements of GDOT Standard Specification 801.2.02.

B. Cement shall be Type I or Type II Portland Cement meeting the requirements of GDOT Standard Specification 830.2.01.

C. Fly ash shall be Type C or Type F meeting the requirements of GDOT Standard Specification 831.2.03.

D. Clean, potable water shall be used in mixing Flowable Fill.

E. Chemical admixtures: as approved by the CITY or Engineer. Admixtures shall be employed in accordance with manufacturer's recommendations, and shall not adversely affect foam. Admixtures shall not contain chlorides.

F. Grout pipes: PVC or black steel, minimum diameter of 2-inches.

G. Bulkheads: brick or block and mortar or steel plates.

2.2 MIX DESIGN

A. Design the flowable fill mix to be uniform and resistant to segregation during placement. Mix designs shall meet the following requirements:

Cement, Type I or II	75-100 lbs/yd3
Water	See Note 1 below
28-day Compressive Strength	Minimum 125 psi (See Note 2)
Unit Weight	40-50 lbs/ft3

Notes:

1. Mix designs shall produce a consistency that will result in a flowable self-leveling product at the time of placement.
2. Alternate mix designs to that shown above may be accepted by CITY for either ready mix or volumetric on site mixing designs at the discretion of CITY.

B. Perform pre-construction flowable fill field trials at least 30 days prior to initial flowable fill placement operations. Notify CITY or Engineer at least one week prior to trials. Field trials shall consist of preparing, sampling, and testing each proposed mix using the crews, equipment, and materials proposed for the project. Field trials shall demonstrate flowable fill flowability in accordance with ASTM D 6103. Obtain and test six (6) cylinders for each batch, according to the following schedule, with one extra sample retained:

1. 3 days: one test.
2. 7 days: one test.
3. 28 days: three tests.

C. Alternative mix designs to that shown above may be accepted by CITY for either ready mix or volumetric on site mixing designs at the discretion of CITY.

2.3 EQUIPMENT

A. Select and provide all equipment required to complete the work in accordance with the approved work plan.

B. Operate, test and maintain all equipment in accordance with the manufacturer's recommendations.

C. Mixing and pumping rates shall provide continuous flow of flowable fill at the point of placement.

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify that all bulkheads are secure before commencing flowable fill placement.

B. Remove and prevent standing or flowing water in the culvert or pipe prior to placement. Pipes must be dry; no flowing or standing water.

C. Repair all joint separations and/or pipe perforations ¼-inch and larger.

D. Provide and maintain clear breather pipes/vents as necessary to prevent air pockets and to monitor placement and filling.

E. Provide working pressure gauges in flowable fill pipes for monitoring and controlling injection pressures, and values at the point of injection for sample collection.

F. Inform CITY or Engineer at least 24 hours in advance of placement.

3.2 MIXING

A. Ensure volumetric mixed flowable fill is manufactured through the use of volumetric mixers meeting the requirements of GDOT Standard Specification 500.3.02 or other methods approved by the Engineer.

3.3 CONSTRUCTION

A. Place flowable fill as needed to prepare existing CMP pipe for CIPP rehabilitation.

B. Control flowable fill placement, and place flowable fill in multiple lifts, as required to prevent failure of bulkheads.

C. Monitor, record and control flowable fill injection pressures and volumes as required to prevent exceeding maximum allowable values for the carrier pipe, as determined by the carrier pipe manufacturer.

D. Prevent accumulation of flowable fill in the downstream culvert and remove all spilled materials.

E. Control groundwater to prevent groundwater contact with the existing reinforced concrete host pipe and flowable fill during placement and for a minimum of 24-hours after placement of flowable fill.

F. Collect, remove, and treat all waste flowable fill and wastewater.

3.4 FREEZING AND INCLEMENT WEATHER

A. Flowable Fill shall not be mixed at any time during freezing, inclement weather, or at night without explicit permission, and then only at the Contractor's risk.

3.5 QUALITY ASSURANCE AND ACCEPTANCE

A. Obtain one set of 3-inch diameter by 6-inch long test cylinders, with a minimum of four cylinders per set, for each lift of flowable fill.

B. Cast and test all cylinders for unconfined compressive strength as follows:

1. Record and mark each set of test cylinders with date and time of casting, batch number, unit weight (wet density), air content, and placement location.
2. Flowable fill test cylinders: cast in field in accordance with ASTM D 5971 and ASTM D 4832, cure and store in the laboratory and test in accordance with ASTM C 495.
3. Test schedule, following placement:
    a. 3 days: one test.
    b. 7 days: one test.
    c. 28 days: two tests.

C. Tests will be carried out by the Engineer or qualified 3rd party testing firm and test data will be made available to the Contractor. All costs associated with testing performed by the Engineer will be paid for by the CITY. Additional testing and inspecting due to the failed tests shall be at Contractor’s expense.

D. Correct deficiencies in the Work that test reports and inspections indicated do not comply with the Contract Documents.

END OF SECTION 31 23 23.33

SECTION 31 25 00

EROSION AND SEDIMENTATION CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

Section	Title
1.2	References
1.3	Definitions
1.4	Work Included
1.5	Submittals
1.6	Regulatory Compliance
2.1	Check Dam – Stone (Cd-S)
2.2	Construction Exits (Co)
2.3	Temporary Interceptor, Diversion, and Perimeter Dikes and Ditches (Di)
2.4	Rock Filter Dam (Rd)
2.5	Sediment Barrier - Temporary Silt Fence (Sd1-NS, Sd1-S)
2.6	Sediment Barrier – Hay Bales (Sd1)
2.7	Inlet Sediment Trap (Sd2)
2.8	Storm Drain Outlet Protection – Riprap (St)
2.9	Surface Roughening (Su)
2.10	Buffer Zone (Bf)
2.11	Disturbed Area Stabilization - Mulching Only (Ds1)
2.12	Disturbed Area Stabilization – Temporary Seeding (Ds2)
2.13	Disturbed Area Stabilization – Permanent Vegetation (Ds3)
2.14	Disturbed Area Stabilization – Sodding (Ds4)
2.15	Dust Control (Du)
2.16	Permanent Slope Stabilization (Ss)
2.17	Anionic Polyacrylamide – PAM (Pm)
2.18	Tree Protection Fencing (Tp)
3.1	Check Dam – Stone (Cd-S)
3.2	Construction Exits (Co)
3.3	Temporary Interceptor, Diversion, and Perimeter Dikes and Ditches (Di)
3.4	Rock Filter Dam (Rd)
3.5	Sediment Barrier - Temporary Silt Fence (Sd1-NS, Sd1-S)
3.6	Sediment Barrier – Hay Bales (Sd1)
3.7	Inlet Sediment Trap (Sd2)
3.8	Storm Drain Outlet Protection – Riprap (St)
3.9	Surface Roughening (Su)
3.10	Buffer Zone (Bf)
3.11	Disturbed Area Stabilization - Mulching Only (Ds1)
3.12	Disturbed Area Stabilization – Temporary Seeding (Ds2)
3.13	Disturbed Area Stabilization – Permanent Vegetation (Ds3)

3.14 Disturbed Area Stabilization – Sodding (Ds4)
3.15 Dust Control (Du)
3.16 Permanent Slope Stabilization (Ss)
3.17 Anionic Polyacrylamide – PAM (Pm)
3.18 Mud Mats
3.19 Tree Protection Fencing (Tp)
3.20 Notice of Intent (NOI)
3.21 Inspections and Maintenance
3.22 Monitoring and Reporting
3.23 Notice of Termination (NOT)
3.24 Removal of Temporary Sediment Control Structures
3.25 Sequence of Construction of Temporary Sediment Control Measures
3.26 Specific Requirements
3.27 Permitting

1.2 REFERENCES

A. Drawings and general provisions of the Contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this section.

B. Contractor shall be familiar with the following referenced documents and keep them at the construction site at all times. These documents must be complied with as applicable.

1. NPDES General Permit No. GAR100002 State of Georgia Department of Natural Resources Environmental Protection Division Authorization To Discharge Under The National Pollutant Discharge Elimination System Storm Water Discharges Associated With Construction Activity For Infrastructure Construction Projects (the NPDES permit).

2. 2016 Manual for Erosion and Sediment Control in Georgia (the "Green Book").

3. State of Georgia Department of Transportation Standard Specifications, Construction of Roads and Bridges, (GDOT specifications), latest edition.

4. National Stone Association, Aggregate Classification (NSA Classification).

5. City of Brookhaven Soil Erosion and Sediment Control Ordinance, latest edition.

6. Approved and permitted Erosion, Sedimentation, and Pollution Control Plan (ES&PC Plan) utilizing Best Management Practices (BMP), as required by Georgia Erosion and Sedimentation Act and NPDES General Permit.

7. Comprehensive Monitoring Program (the CMP) as required by the NPDES General Permit.

1.3 DEFINITIONS

A. Designer: For the purpose of this item, the term "Designer" means the person who has designed and stamped the Erosion Sedimentation and Pollution Control Plan, as used in language of permits, laws, rules, regulations, ordinances, and other soil erosion and sediment control references. This person has successfully obtained Georgia professional registration, met certain education requirements, and been certified as Level II Certified Design Professional, as prescribed by the Georgia Soil and Water Conservation

Commission in consultation with the Georgia EPD and the Stakeholder Advisory Board.

B. Contractor: For the purposes of this item, the term "Contractor" is synonymous with Contractor, General Contractor, Discharger, Operator, and Primary Permittee, as used in language of permits, laws, rules, regulations, ordinances, and other soil erosion and sediment control references.

C. Qualified Person: For the purposes of this item, the term "Qualified Person" means a person, as used in language of permits, laws, rules, regulations, ordinances, and other soil erosion and sediment control references, who has successfully met certain education requirements and been certified as Level 1A, as prescribed by the Georgia Soil and Water Conservation Commission in consultation with the Georgia EPD and the Stakeholder Advisory Board.

D. Other Definitions: Definitions as listed in the NPDES General Permit GAR 100002, Part I.B. shall apply in this section.

1.4 WORK INCLUDED

A. The Contractor shall furnish all labor, equipment, and materials necessary for implementing best management practices (BMPs) to prevent and minimize erosion and resultant sedimentation in all disturbed areas (cleared and grubbed) during and after construction. This item covers the Work necessary for the installation of structures and measures for the prevention and control of soil erosion and sedimentation. The Contractor shall furnish all material, labor, and equipment necessary for the proper installation, maintenance, inspection, monitoring, reporting, and removal (where applicable) of erosion and sediment control measures, and to cause compliance with the

"NPDES General Permit No. GAR100002 State of Georgia Department of Natural Resources Environmental Protection Division Authorization To Discharge Under The National Pollutant Discharge Elimination System Storm Water Discharges Associated With Construction Activity For Infrastructure Construction Projects", under this item.

B. The Work covered under this item shall include the furnishing, placement, maintenance, and removal of BMPs to include, but not limited to: check dams, construction exits, diversion dikes and ditches, temporary sediment barriers, inlet sediment traps, rock filter dams, storm drain outlet protection, surface roughening, buffer zone, dust control; providing information for, and signing Notice of Intent and Notice of Termination; all monitoring and recording per the Comprehensive Monitoring Program (the CMP); and all temporary and permanent vegetative and non-vegetative ground cover; and all labor, materials, and equipment necessary to complete the Work as specified, as indicated on the Drawings, or as directed by CITY.

C. The Designer, Engineer, or CITY, may at any time during the project, direct the Contractor to provide additional erosion and sediment control measures, as necessary, to adequately control erosion and sedimentation in order to comply with all permits.

1.5 SUBMITTALS

A. Submit for approval, in accordance with Section 01 33 00 SUBMITTAL PROCEDURES all working drawings and schedules of materials and methods proposed to be followed in the execution of the Work under this item.

B. Contractor shall submit to Engineer the proposed schedule for installation, maintenance, and removal of all temporary, permanent erosion, and sediment control measures. The schedule shall reflect the requirements of the section titled, Sequence of Construction of Temporary Sediment Control Measures, and must show the anticipated starting and completion date for all land disturbance activities including:

1. Installation of temporary and permanent erosion and sediment control structures.
2. Stormwater management facilities, if any.
3. Timber salvage operations, Clearing, Grubbing, Demolition.
4. Utility pipe installation.
5. Rough and finished grading.
6. Paving
7. Landscaping, including all temporary mulching and seeding.
8. Cleanup and restoration
9. Landscaping, including all permanent seeding and sodding.
10. Removal of temporary erosion and sediment control structures.

1.6 REGULATORY COMPLIANCE

A. Land disturbance activities are not authorized to begin until after all required erosion and sediment control permits are obtained from the United States, the State of Georgia, and/or the local issuing authority, *and* fourteen (14) calendar days have passed since the Notice of Intent (NOI) has been properly filed with Georgia EPD. Contractor is the Primary Permittee and Operator under the provisions of the NPDES General Permit. As such, Contractor shall be required to sign certain certifications as described in the NPDES General Permit. Contractor shall comply with requirements specified in the Contract Documents, or as directed by the Engineer. Contractor shall also comply with all other laws, rules, regulations, ordinances, and requirements concerning soil erosion and sediment control established in the United States, the State of Georgia, and/or the local issuing authority. The following documents and the documents referenced therein define the regulatory requirements for this item:

1. NPDES GENERAL PERMIT: NPDES General Permit No. GAR100002, State of Georgia Department of Natural Resources Environmental Protection Division Authorization To Discharge Under The National Pollutant Discharge Elimination System Storm Water Discharges Associated With Construction Activity For Infrastructure Construction Projects. Governs land disturbance construction activities of one (1.0) acre or more. On applicable sites, Contractor is responsible for complying with terms and conditions of this Permit.
2. MANUAL FOR EROSION AND SEDIMENT CONTROL: Contractor shall follow Practices and Standards of the Georgia Soil and Water Conservation Commission ***2016 Manual for Erosion and Sediment Control in Georgia***, latest edition.
3. SWP3: When a Stormwater Pollution Prevention Plan (SWP3) is provided in the Contract Documents, the Contractor shall follow the practices described in the

SWP3.

PART 2 - PRODUCTS

2.1 CHECK DAM – STONE (Cd)

A. Geotextile plastic filter fabric underliner shall meet the requirements of the Georgia Department of Transportation, Standard Specifications, Construction of Road and Bridges, Section 881, latest edition.

2.2 CONSTRUCTION EXITS (Co)

A. Geotextile underliner shall conform to AASHTO M288-96, Section 7.3, and shall be used in all instances to separate soil base and graded stone aggregate. Stone aggregate size shall conform to the National Stone Association's (NSA) R-2 Classification (1½" to 3½") stone.

2.3 TEMPORARY INTERCEPTOR, DIVERSION, AND PERIMETER DIKES AND DITCHES (Di)

A. Dike - a ridge of compacted soil, constructed above, across, or below a slope.

B. Ditch – a channel depression in soil, above, across, or below a slope.

2.4 ROCK FILTER DAM (Rd)

A. Aggregate size shall be in accordance with the National Stone Association Size R-3 or Type 3 riprap stone conforming to Section 805.2.01 of the Georgia Department of Transportation Standard Specifications.

2.5 SEDIMENT BARRIER - TEMPORARY SILT FENCE (Sd1-NS, Sd1-S)

A. Non-Sensitive Areas (Type 'A'): Filter fabric shall be thirty-six inch (36") wide, woven fabric slit tape yarns allowed in one direction only, and must meet the requirements set forth in Section 171- Temporary Silt Fence, of the GDOT Standard Specifications,

Construction of Roads and Bridges, latest edition. Contractor shall submit to Engineer copies of delivery invoices, certifications, or other documentation that the filter fabric complies with these specifications. Posts shall be a minimum of four feet (4') long and made of either wood or steel. Wood posts shall be 1½" x 1½" hardwood and made from Ash, Hickory, or Oak. Fabric shall be fastened to wood posts with at least 5 wire staples per post. Staples shall be 17 gauge minimum and shall have a crown at least ¾ inch wide and legs at least ½ inch long. Steel posts shall be "U", "T", or "C" shaped with a minimum weight of 1.3 pounds per foot, and have projections for fastening the filter fabric to the posts.

B. Sensitive Areas (Type 'C'): Filter fabric shall be thirty-six inch (36") wide, non-calendered woven fabric constructed with monofilament yarns only, and must meet the requirements set forth in Section 171- Temporary Silt Fence, of the GDOT Standard Specifications, Construction of Roads and Bridges. Contractor shall submit to Engineer copies of delivery invoices, certifications, or other documentation that the filter fabric complies with these specifications. Wire fence fabric shall be at least thirty- two inch (32") high and shall have at least six (6) horizontal wires. Vertical wires shall have a maximum spacing of twelve inches (12"). Top and bottom wires shall be at least 10 gauge and all other wires shall be at least 12½ gauge. Posts shall be steel and have a minimum length of five feet (5'). Steel posts shall be "U", "T", or "C" shaped with a minimum weight of 1.3 pounds per foot, and have projections for fastening the woven wire and filter fabric to the posts.

2.6 SEDIMENT BARRIER - HAY BALES (Sd1)

A. Hay bales may be made of hay or wheat straw and shall be wire or nylon bound and of rectangular shape.

2.7 INLET SEDIMENT TRAP (Sd2)

A. Filter fabric used on constructing inlet sediment traps shall conform to the requirements listed above in paragraph 2.5.A. SEDIMENT BARRIER - TEMPORARY SILT FENCE (Sd1-A). For gravel drop inlet filters, stone shall conform to NSA's R-3 Specification (3 to 6-inch stone). Baffle Box Inlet Filters shall be constructed of 2-inch x 4 inch posts and 2 inch x 4 inch boards.

2.8 STORM DRAIN OUTLET PROTECTION - RIPRAP (St)

A. Unless otherwise specified, stone furnished for riprap shall meet the requirements of the Georgia Department of Transportation, Standard Specifications, Construction of Road and Bridges, Sections 603 and 805, latest edition.

B. Rock from onsite excavation may be used as stone riprap, provided it meets all of the following requirements:

1. The rock meets GDOT specifications as noted above in paragraph 2.8.A.,

2. CITY construction material testing representative certifies the rock as suitable for the use intended,

3. CITY approves the use of onsite materials.

B. Plastic filter fabric underliner shall meet the requirements of the Georgia Department of Transportation, Standard Specifications, Construction of Road and Bridges, Section 881, latest edition.

2.9 SURFACE ROUGHENING (Su)

A. Soil slope steeper than 3:1.

2.10 BUFFER ZONE (Bf)

A. A strip of undisturbed, original vegetated area bordering streams, ponds, wetlands, and lakes.

2.11 DISTURBED AREA STABILIZATION – MULCHING ONLY (Ds1)

A. Dry straw shall be applied to a depth of 2 to 4 inches, at a rate of two tons per acre (2T/Ac.).

B. Dry hay shall be applied to a depth of 2 to 4 inches, at a rate of two and one-half tons per acre (2½ T/Ac.).

C. Wood waste (chips, sawdust, or bark) shall be applied to a depth of 2 to 3 inches.

2.12 DISTURBED AREA STABILIZATION – TEMPORARY SEEDING (Ds2)

A. Seed shall be clean, delivered in original, unopened packages and bearing an analysis of contents. Guaranteed 95 percent pure with minimum germination rate of 85 percent. Summer seed mix shall be 40 percent by weight Fawn Fescue, 30 percent by weight Perennial Ryegrass, 15 percent by weight Orchard Grass, and 15 percent by weight Dutch White Clover. Winter seed mix shall be 35 percent by weight Fawn Fescue, 30 percent by weight Perennial Ryegrass, 30 percent by weight Hairy Vetch, and 5 percent by weight Dutch White Clover. Alternative mixes may be approved by the Engineer. Fertilizer shall be used as specified, and/or indicated on the Drawings. Fertilizer shall be commercial, chemical type, uniform in composition, free-flowing, conforming to state and federal laws, and suitable for application with equipment designed for that purpose. Fertilizer shall have a minimum percentage of plant food by weight for the following: Summer mix shall be 10 percent nitrogen, 10 percent phosphoric acid, and 6 percent potash. Straw mulch shall be threshed straw of oats, wheat, or rye free from obnoxious weeds and seeds, or shall be clean hay. Average stalk length shall be 6 inches. Wood waste or erosion control matting, such as jute or excelsior, is appropriate alternatives to hay or straw mulch for temporary stabilization.

2.13 DISTURBED AREA STABILIZATION – PERMANENT VEGETATION (Ds3)

A. Permanent grass seeding shall be as indicated on the Contract Drawings and as specified in Section 32 92 00.

2.14 DISTURBED AREA STABILIZATION – SODDING (Ds4)

A. Sodding shall be as indicated on the Contract Drawings and as specified in Section 32 92 00.

2.15 DUST CONTROL (Du)

A. Dry straw shall be applied to a depth of 2 to 4 inches, at a rate of two tons per acre (2T/Ac.).

B. Irrigation provided by use of a water truck to wet down the disturbed area.

C. Asphalt emulsion shall be SS-1, SS-1h, CSS-1 or CSS-1h conforming to the requirements of AASHTO M140-70 or AASHTO M208-72.

2.16 PERMANENT SLOPE STABILIZATION (Ss)

A. All matting and blanket materials shall be listed on the Georgia Department of Transportation Qualified Products List (QPL #49 for matting, and QPL #62 for blankets).

2.17 ANIONIC POLYACRYLAMIDE (Pm)

A. Anionic Polyacrylamide shall be non-toxic and can be water-soluble chemical or log form. All Anionic Polyacrylamide products, whether in Powder, Liquid/Emulsion, or log form, shall meet the USEPA Grade 2 classification, “Generally Regarded as Safe (GRAS)”. The Contractor shall submit Safety Data Sheets (SDS) to Engineer for approval of Anionic Polyacrylamide. Handling and application of the product shall adhere to the SDS requirements and recommendations.

B. Liquid/Emulsion form of Anionic Polyacrylamide shall be Applied Polymer Systems, Series 600, or approved equal. Powder form of Anionic Polyacrylamide shall be Applied Polymer Systems, Series 700, or approved equal. Specific polymer type used shall be as per manufacturer’s recommendation for Fulton County soil classifications.

2.18 TREE PROTECTION FENCING (Tp)

A. Must have the following characteristics:

1. High visibility
2. Lightweight and easy to handle
3. UV stabilized fabric
4. 48” height
5. 100' prefabricated rolls or 300’ fabric rolls

PART 3 - EXECUTION

3.1 CHECK DAM – STONE (Cd-S)

A. Install stone check dams as specified, indicated on the Drawings, or as directed by Designer, Engineer, or CITY.

B. Installation: Install check dams in all ditches, channels, or swales draining disturbed areas of up to two (2) acres, and which are not installed with permanent, non-erodible

lining or a vegetative cover as specified in paragraphs 2.13 and 2.14 of these specifications. The specifications for the design criteria, material, installation, and maintenance of check dams are dependent on the upslope drainage area and are described below. A check dam shall not drain a disturbed area greater than two (2) acres.

1. Construct check dam with graded size 5 to 10 inch stone. Hand placement may be required to ensure complete coverage of the entire width of ditch.
2. The center of the check dam must be at least nine inches (9") lower than the edges. Dam height shall be a maximum of two feet (2'), as measured at center of check dam.
3. Side slopes shall be 2:1 or flatter.
4. Two (2) or more check dams placed in series shall be used for drainage areas greater than one (1) acre. Maximum spacing between dams shall be such that the toe of the upstream dam is at the same elevation as the top of the downstream dam.
5. A geotextile underliner meeting the requirements of paragraph 2.1.A. shall be used as a separator between the graded stone and the soil base.

C. Maintenance: In accordance with paragraph 3.19 titled Inspections and Maintenance, all check dams shall be inspected and maintenance performed, if needed, within 24 hours of inspection. Inspection shall occur at least once every seven (7) calendar days and within 24 hours of a rainfall event that has precipitation of ½ inch or greater. Dress dams with appropriate sized stone, as necessary, to maintain check dams in accordance with these specifications. At the earlier of: 1): Every fourteen (14) calendar days, or 2): when sediment reaches a depth of one-half (½) the original check dam height; all soil, silt, sediment and other material captured by the dam should be removed and returned upgrade on the construction site.

3.2 CONSTRUCTION EXITS (Co)

A. Install construction exits as specified, as indicated on the Drawings, or as directed by the Designer, Engineer, or CITY.

B. Installation: Construction exits shall be installed at all points where traffic shall be leaving the construction site onto a public or private right of way, street, alley, or parking area. All construction exits must be fully installed prior to the commencement of timber salvage, clearing, grubbing, grading, or other land disturbance construction operations.

1. The stone pad thickness shall be a minimum of six (6) inches.
2. The stone pad width shall equal the full width of all points of vehicular egress, but not less than twenty (20) feet wide.
3. If the stone pad does not sufficiently remove the mud from tires prior to entering onto public right-of-way, washing is required. Washing shall be performed on a stabilized area, and the sediment-laden runoff shall be directed into an approved sediment trap.

C. Maintenance: In accordance with paragraph 3.19 titled Inspections and Maintenance, all construction exits shall be inspected and maintenance performed, if needed, within 24

hours of inspection, once every seven (7) calendar days and within 24 hours of rainfall an event that has precipitation of ½ inch or greater. At the earlier of: 1) fourteen (14) calendar days since construction exit was installed or last maintained, or 2) geotextile underliner is visible, or 3) if construction exit does not conform to specifications established in this section. Construction exit pad shall be top dressed with NSA's R-2 (1 ½ inch to 3 ½ inch stone) such that underliner is no longer visible and exit pad conforms to specifications.

3.3 TEMPORARY INTERCEPTOR, DIVERSION, AND PERIMETER DIKES AND DITCHES (Di)

A. Install temporary interceptor, diversion, and perimeter dikes as specified, as indicated on the Drawings, or as directed by the Designer, Engineer, or CITY, to intercept and prevent stormwater runoff from entering disturbed areas from any other upgrade area regardless of whether area is onsite or offsite. Dikes must divert runoff to a drainage ditch, sediment basin, temporary or permanent channel. Dikes shall remain in place until the disturbed area is permanently stabilized. Construct dikes of earth fill free from all perishable matter and refuse, such as scrap forms, wire, brush, rocks larger than six (6) inches or any foreign materials. Ashes, large stones, muck, or other soft materials shall not be used. Compact all dikes using construction equipment. Dikes shall be stabilized immediately after construction with temporary seeding to prevent sediment transport to downstream areas.

B. Install temporary interceptor, diversion, and perimeter ditches as specified, indicated on the Drawings, or as directed by the Designer, Engineer, or CITY. In general, temporary ditches shall be installed parallel and contiguous to, and upgrade of temporary dikes. Construct ditches to the lines and cross section indicated on the Drawings, provided that ditches have a minimum depth of one foot and side slopes have a slope of 2H:1V or flatter. Ditches shall be free of bank projections, trees, brush, stumps, or other objectionable materials or irregularities that shall impede normal flows. Downstream outlets of temporary ditches shall be constructed and stabilized prior to construction of the ditch. The outlet must discharge in such a manner as to not cause an erosion problem

3.4 ROCK FILTER DAM (Rd)

A. Installation: Install rock filter dams across drainageways to serve as a sediment filtering device. The specifications for the design criteria, materials, installation, and maintenance of rock filter dams are dependent on the upslope drainage area and are described below. A rock filter dam shall not drain an area greater than fifty (50) acres unless otherwise specified on the Contract Drawings or as directed by the CITY.

1. The rock filter dam should not be higher than the channel banks or exceed the elevation of the upstream property line. The center of the rock dam should be at least nine (9) inches lower than the outer edges of the dam at the channel banks.
2. The side slopes shall be 2:1 or flatter.
3. The width across the top of dam should be no less than six (6) feet.
4. The dam shall be located where specified on the Contract Drawings or as directed by the CITY.

5. Mechanical or hand placement will be required to ensure that the rock dam extends completely across the channel and securely ties into both channel banks.

B. Maintenance: All rock filter dams shall be inspected and maintenance performed, if needed, within 24 hours of inspection once every 7 calendar days and within 24 hours of a rainfall event that has precipitation of ½-inch or greater. Dress dams with appropriate sized stone as necessary to maintain rock filter dams in accordance with these specifications. At the earlier of 1) Every 14 calendar days; or 2) When sediment reaches a depth of one-half (½) the original rock filter dam height, all soil, silt, sediment and other material captured by the dam should be removed and returned upgrade on the construction site.

3.5 TEMPORARY SEDIMENT BARRIERS - SILT FENCE (Sd1-NS, Sd1-S)

A. Install silt fence as specified, as indicated on the Drawings or as directed by the Designer, Engineer, or CITY.

B. Installation: In general, silt fencing shall be installed on the downgrade side of all areas to be disturbed as well as the perimeter of the project site. All posts used to install silt fence shall comply with the specifications of paragraph 2.5. Posts must be placed at least 18 inches in the ground and spacing cannot be more than four (4) feet center-to-center for Type 'C' fencing, and six (6) feet center-to-center for Type 'A' fencing. Fence fabric must be inserted below ground in a six (6) inch trench, and fence fabric must be fastened to posts according to the specifications of paragraph 2.5. Contractor shall install Type 'A' or Type 'C' silt fence, as specified, as indicated on the Drawings, or when directed by the Designer, Engineer, or CITY.

C. Maintenance: In accordance with paragraph 3.19 titled Inspections and Maintenance, all silt fencing shall be inspected and maintenance performed, if needed, within 24 hours of inspection and once every seven (7) calendar days, and within 24 hours of a rainfall event that had precipitation of ½ inch or greater. All silt fencing materials, including fabric, post and fasteners must be replaced six (6) months after installation. At the earlier of: 1) every fourteen (14) calendar days, or 2) when sediment reaches a depth of one half the installed fence height; all soil, silt, sediment and other material captured by the silt fence should be removed and returned upgrade on the construction site. The silt fence shall be maintained such that it minimizes sediment transport as designed.

3.6 SEDIMENT BARRIER - HAY BALES (Sd1)

A. Install hay or straw bales as specified, as indicated on the Drawings, or as directed by the Designer, Engineer, or CITY.

B. Installation: Place bales in a row with ends tightly abutting the adjacent bales. Corner abutment is not acceptable. Embed bales in the soil a minimum of 4 inches below grade. Build up backfilled soil a minimum of 4 inches above grade on the uphill side of the barrier and conform to grade on the downhill side of the barrier. Anchor each bale in place with 2" by 2" inch wood stakes or No. 3 reinforcing bars. The first stakes shall be driven toward the previously laid bale to force the bales together. Stakes shall be thirty-six (36) inches long and shall be driven a minimum of eighteen (18) inches into the ground.

C. Maintenance: In accordance with paragraph 3.19 titled Inspections and Maintenance, all hay bales shall be inspected and maintenance performed, if needed, within 24 hours of

inspection once every seven (7) calendar days, and within 24 hours of a rainfall event that has precipitation of ½ inch or greater. Hay bales must be replaced thirty (30) calendar days after installation. At the earlier of: 1) every fourteen (14) calendar days, or 2) when sediment and other material captured by the hay bales reaches ½ the height of the original bales, such sediment should be removed and returned upgrade on the construction site. The hay bales shall be maintained such that they minimize sediment transport as designed.

3.7 INLET SEDIMENT TRAP (Sd2)

A. Install inlet sediment traps as specified, as indicated on the Drawings, or as directed by the Designer, Engineer or CITY.

B. Installation: Install in accordance with Chapter Six (6) of the 2016 Manual for Erosion and Sediment Control in Georgia. Excavation may only be used in combination with a filtering device such as stone or silt fence. All sediment traps should provide a minimum of 1.5 feet of sediment storage. Sediment traps must be self-draining.

C. Maintenance: In accordance with paragraph 3.19 titled Inspections and Maintenance, all inlet sediment traps shall be inspected and maintenance performed, if needed, within 24 hours of inspection, once every seven (7) calendar days, and within 24 hours of a rainfall event that has precipitation of ½ inch or greater. Clean and repair traps such that traps meet the specifications of this section and minimize sediment transport. At the earlier of: 1): Every fourteen (14) calendar days, or 2): when sediment reaches a depth of one-half (½) the original check dam height; all soil, silt, sediment and other material captured by the dam should be removed and returned upgrade on the construction site.

3.8 STORM DRAIN OUTLET PROTECTION – RIPRAP (St)

A. Install storm drain outlet protection as specified, as indicated on the Drawings, or as directed by the Designer, Engineer or CITY.

B. Installation: Prepare the ground surface where riprap will be placed to conform with lines and grades as specified, as indicated on the Drawings, or as directed by the Designer, Engineer, or CITY. Ground surface shall be smooth and free from obstructions, depressions, or debris. Place woven plastic filter fabric underliner on the prepared ground surface under all riprap. Place riprap to a uniform thickness as specified, as indicated on the Drawings, or as directed by the Designer, Engineer, or CITY.

C. Maintenance: In accordance with paragraph 3.19 titled Inspections and Maintenance, all storm drain outlets shall be inspected and maintenance performed, if needed, within 24 hours of inspection, once every seven (7) calendar days, and within 24 hours of a rainfall event that has precipitation of ½ inch or greater. Repair storm drain outlet protection such that riprap meets the specifications of this section and minimizes sediment transport.

3.9 SURFACE ROUGHENING (Su)

A. Perform surface roughening as specified, as indicated on the Drawings, or as directed by the Designer, Engineer, or CITY.

B. Roughening is best used on cut and fill slopes steeper than 3H:1V, which will not be

mowed. In those areas use the method of *grooving*, this consists of using machinery to create a series of ridges and depressions, and shall run perpendicular to the slope.

C. Using a bulldozer tread for *tracking* as a method of roughening is discouraged, unless no alternatives are available. This causes undue compaction of surface soils and is counter –productive to establishing vegetative growth. When using *tracking* as a technique, use as few passes of the machinery as possible to minimize compaction of the ground surface.

D. Roughened areas shall be vegetated (mulch, seed, sod, etc.) as specified, indicated on the Drawings, or as directed by the Designer, Engineer, or CITY, as soon as possible to obtain optimum growth.

3.10 BUFFER ZONE (Bf)

A. Construction within a buffer zone of a body of water designated as Waters of the United States must meet the requirements listed below in this specification paragraph.

B. Definition: The buffer zone is officially defined as the distance, in feet, from the edge of the normal high water line (or for wetlands, the distance from the boundary of the wetland). For the purpose of Work in the City of Brookhaven, the buffer zone for small streams (as determined by the Engineer) shall start at the top of the bank and the buffer zone for larger streams (as determined by the Engineer) and rivers shall start at the edge of the vegetation. Buffer zones are specified in the table below.

C.

Type of Waters of the United States	Buffer
Chattahoochee River	100 feet
Tributaries Within 2000 Feet of Chattahoochee River	35 feet
Nancy Creek	50 feet
Other Waters of the United States	25 feet

D. Construction Activity: Construction activity within the buffer zone must be approved by a variance granted by Georgia EPD. Any encroachments must immediately be mulched and/or seeded in accordance with the requirements of paragraph 2.12. titled Disturbed Area Stabilization – Temporary Seeding. All construction within a buffer zone must be complete as soon as possible, and within 24 hours when possible of initial land disturbance within the buffer.

3.11 DISTURBED AREA STABILIZATION – MULCHING ONLY (Ds1)

A. When mulch only is used without subsequent seeding, mulch shall be applied to provide full coverage of the exposed area. Dry straw or hay, and wood chips shall be applied uniformly by hand or mechanical equipment designed for that specific use.

B. For areas to receive mulch only, apply at the following rates, to the following depths, and according to the following specifications:

1. Dry Straw or Hay: Spread at a rate of two and one half (2 ½) tons per acre. Apply to a depth of 6 to 10 inches. Apply uniformly and anchor as necessary.

2. Wood Waste: Spread at a rate of 6 to 9 tons per acre. Apply to a depth of 2 to 3

inches. Apply wood waste only on slopes that are 3:1 or flatter. Anchoring is not necessary.

3. Jute Matting or Excelsior Netting: Apply in accordance with manufacturer's recommendations.

4. Asphaltic Emulsion: Apply at a rate of 1200 gallons per acre. Apply uniformly.

C. If the area will eventually be covered with perennial vegetation, 20-30 pounds per acre of nitrogen, in addition to the normal amount of nitrogen, shall be applied to the area to offset the uptake of nitrogen caused by the decomposition of organic mulches.

3.12 DISTURBED AREA STABILIZATION – TEMPORARY SEEDING (Ds2)

A. This section covers Work necessary for temporary stabilization of soil to prevent erosion following clearing, grubbing, grading or other construction, except wetlands. Temporary stabilization within a buffer zone of Waters of the United States shall meet the requirements of paragraph 3.10 titled Buffer Zone.

B. General Criteria: The stabilization measures specified herein shall be initiated on all disturbed areas including dikes and ditches within 24 hours of completion to minimize erosion and soil transport. However, stabilization measures specified herein do not have to be initiated in the event that construction activities shall resume on that portion of the site within fourteen (14) days from the date activities temporarily ceased. For cleared areas which may not receive permanent vegetative or other stabilization measures for six (6) months or less, and a suitable growing season is not available for seeding to establish an erosion retardant cover, mulch may be applied according to the specifications below:

1. Contractor shall submit to Engineer, certificates of inspection of seed by state or federal authorities and copies of delivery invoices or other documentation of quantities of mulch and fertilizer.

2. Contractor shall give at least a three (3) day notice to CITY for the time and place of the grass planting.

3. Contractor shall keep Engineer and CITY advised of schedule of operations.

C. Application: Planting and seeding shall be performed in accordance with the following schedule:

1. Summer Seeding: No earlier than April 1 and no later than October 15.

2. Winter Seeding: October 16 until weather conditions prohibit further construction operations as determined by the Engineer.

3. Soil Preparation: Prior to seeding operations, and after surface has been shaped, graded, and compacted, scarify surface to a minimum depth of 1 inch.

4. Seeding: All seedbeds shall be a minimum depth of 1 inch. Seedbeds shall be reviewed by CITY, prior to seeding. After soil has been scarified, apply required seed mix, as specified in this section, uniformly with a cyclone seeder, drill, culti-packer seeder, or hydro-seeder. When hydro-seeding is the selected method of seeding, prepare and apply slurry at the rate and proportion specified below:

Seed Mix 100 lbs/acre

Fertilizer 650 lbs/acre
Water as necessary

5. The required fertilizer mix shall be uniformly applied at the time of seeding. Fertilizer shall not be applied to a land area within a buffer zone area of a body of water in a Waters of the United States.

6. Upon completion of the seeding operations, apply straw mulch to a uniform thickness of 1 ½ inches to 2 ½ inches in depth. Mulch shall be loose enough to permit penetration of sunlight and air circulation, but dense enough to shade ground, reduce evaporation rate, and prevent or materially reduce erosion of underlying soil. Retain straw in place by applying asphaltic emulsion at a rate of 100 gallons per acre or mechanically tack the mulch into the soil to approximately 3 inches. Equipment used for tacking shall be specially designed for this use.

D. Maintenance: In accordance with paragraph 3.19 titled Inspections and Maintenance, all stabilized areas shall be inspected and maintenance performed, if needed, within 24 hours of inspection, once every seven (7) calendar days and within 24 hours of a rainfall event that has precipitation of ½ inch or greater. Apply additional stabilization materials as needed.

3.13 DISTURBED AREA STABILIZATION – PERMANENT VEGETATION (Ds3)

A. Permanent Grass seeding shall be as indicated on the Contract Drawings and as specified in Section 32 92 00.

3.14 DISTURBED AREA STABILIZATION – SODDING (Ds4)

A. Sodding shall be as indicated on the Contract Drawings and as specified in Section 32 92 00.

3.15 DUST CONTROL (Du)

A. The stabilization measures contained in this section are for controlling surface and air movement of dust on construction sites.

B. Temporary Methods: Dust may be controlled by use of mulches, tillage, and irrigation. For mulches, refer to paragraphs 2.11 and 3.11 Disturbed Area Stabilization – Mulching Only. For emergency measures to deploy before wind erosion starts, tillage and irrigation may be implemented. The practice of tillage is designed to roughen and bring clods to the surface. Irrigation to be accomplished by sprinkling water on the surface until the surface is wet and no longer produces dust. This must be repeated as necessary to minimize dust production.

C. Permanent Methods: Applying topsoil (a less erosive soil material), crushed stone, and sodding to disturbed areas may be used to permanently control dust.

3.16 PERMANENT SLOPE STABILIZATION (Ss)

A. Matting and blankets shall be installed as specified, as indicated on the Drawings, or as directed by the Designer, Engineer, or CITY.

B. Matting and blankets can be applied in areas of concentrated flows, on slopes steeper than 2½H:1V with a height of ten (10) feet or greater, and cuts and fills within stream buffers.

C. Installation: After the site has been shaped to the lines and grades as indicated on the Drawings, prepare a friable seedbed relatively free from clods and rocks more than one (1) inch in diameter, and any foreign material that will prevent contact of the mat or blanket to the soil surface. Staple mats or blankets to soil surface following manufacturer's recommendations.

D. Maintenance: In accordance with paragraph 3.19 titled Inspections and Maintenance, all erosion control matting and blankets shall be inspected and maintenance performed, if needed, within 24 hours of inspection, once every seven (7) calendar days, and within 24 hours of a rainfall event that has precipitation of ½ inch or greater. Any dislocation or failure shall be repaired immediately. If washouts or breakage occurs, reinstall the matting or blanket after repairing damage to the slope or ditch. Continue to monitor these areas until they become permanently stabilized.

3.17 ANIONIC POLYACRYLAMIDE (Pm)

A. This section covers the use of the chemical anionic Anionic Polyacrylamide to settle out silt and suspend solids from surface water and ground water prior to discharge. Application of Anionic Polyacrylamide shall utilize a method and amount as recommended by the manufacturer and approved by the Engineer. Anionic Polyacrylamide may be applied to disturbed areas in either Powder or Liquid/Emulsion form as described herein.

B. Application: Liquid/Emulsion form of Anionic Polyacrylamide shall be applied to disturbed areas at a rate of 0.5 gallons of emulsion to 1000 gallons of water. Powder form of Anionic Polyacrylamide shall be applied at a rate of 4 pounds per acre of disturbed area.

C. Maintenance: Apply additional Anionic Polyacrylamide as authorized or directed by the Engineer.

3.18 MUD MATS

A. Matting shall be installed as specified, as indicated on the Drawings, or as directed by the Designer, Engineer, or CITY.

B. Mud mats shall be Nilex mud mats or approved equal. Mats shall be pocketed, double-wall, high-strength fabric with high tensile reinforcing ribs confined within each sleeve.

C. The mats must conform to the following mechanical properties:

1. Tensile Grab Strength: 802.6 lbs
2. Apparent Breaking Elongation: 18%
3. Wide Width Tensile: 685.7 lbs
4. Mullen Burst:456.88 psi
5. Puncture Resistance: 374 lbs
6. Trapezoid Tear Strength: 607 lbs
7. Apparent Opening Size:70 US Sieve

8. Constant Head Permittivity: 20.16 g/m/ft2

3.19 TREE PROTECTION FENCING (Tp)

A. The Contractor shall install orange tree save barrier as necessary to exclude the entry of equipment onto designated areas. Said barrier is to be installed at the earliest possible opportunity. Contractor shall be responsible for maintaining fence for its intended purpose until directed to remove fence by the CITY. No work shall be allowed on private property and/or within CITY granted easements until tree save barrier has been installed by the Contractor and inspected/confirmed by the Engineer and/or CITY Inspector. Where necessary, the Contractor shall obtain the services of a land surveyor, registered in the State of Georgia, to stake easement lines, right-of-way lines, and property lines to designate the limits of construction.

3.20 NOTICE OF INTENT (NOI)

A. When land disturbance construction activities are equal to or greater than one (1.0) acre, and an Erosion Sediment & Pollution Control Plan has been approved by the governing jurisdiction, the Contractor, together with CITY shall prepare a Notice of Intent. CITY shall submit a properly executed NOI to Georgia EPD at least fourteen (14) calendar days prior to start of land disturbance activities.

3.21 INSPECTIONS AND MAINTENANCE

A. Contractor shall designate a Qualified Person properly certified as such by Georgia Soil and Water Conservation Commission, to perform inspections required by this item. The following areas are to be inspected and maintenance performed, if needed, at least once every seven (7) calendar days and within twenty-four (24) hours of a rainfall event that has a precipitation of ½ inch or greater. Immediate action shall be taken to correct deficiencies to BMPs (Best Management Practices). CITY reserves the right to stop all construction activities not related to maintaining BMP's until such deficiencies to BMPs are repaired. Areas to be inspected under this item are:

1. Disturbed areas of the construction site that have not undergone final stabilization.
2. Erosion and sediment control structures.
3. All locations where vehicles enter or exit the site.
4. Material storage and construction lay down areas that are exposed to precipitation and have not been, or will not be finally stabilized for more than seven (7) calendar days.

B. In areas that have been finally stabilized, inspections and, if necessary, maintenance by Contractor shall occur at least once per month for the duration of the contract or project, whichever is longer.

C. During inspections the following shall be observed and appropriate maintenance procedures taken:

1. The conformance to specifications and current condition of all erosion and sediment control structures.
2. The effectiveness and operational success of all erosion and sediment control measures.

3. The presence of sediments or other pollutants in stormwater runoff at all runoff discharge points.

4. The presence of sediments or other pollutants in receiving waters.

5. Evidence of offsite tracking at all locations where vehicles enter or exit the site.

D. An inspection checklist is included at the end of this item. This checklist must be completed during each inspection, dated, and signed by the Qualified Person conducting the inspection. Completed inspection checklist shall be kept onsite with the Contract Documents and submitted to CITY on a monthly basis. The Contractor shall repair deficiencies within twenty-four (24) hours of inspection.

3.22 MONITORING AND REPORTING

A. Monitoring: The Contractor shall be responsible for the implementation of the Comprehensive Monitoring Program (CMP) as written by the Designer. The implementation must comply with EPD guidelines as set forth in NPDES Permit No. GAR 100002 – Infrastructure, Part IV.D.6. Sampling Requirements, Part IV.E. Reporting, and Part IV.F. Retention of Records.

B. Reporting: The Contractor shall prepare and submit a summary of the monitoring results to the Engineer, the Designer and the EPD as required in the NPDES permit. The CITY reserves the right to use its own resources to duplicate monitoring and verify the Work required by the Contractor in this section.

C. Payment Procedures: There shall be no separate payment for Work covered under this section titled Monitoring and Reporting including monitoring, sampling, reporting, all labor, materials, and equipment necessary to complete the Work as specified. There shall be no separate payment for monitoring each location in the project that is to be monitored.

3.23 NOTICE OF TERMINATION (NOT)

A. When all construction activities have ceased, final stabilization has been certified, and the site is in compliance with the NPDES permit, the Contractor, together with CITY shall submit a Notice of Termination.

3.24 REMOVAL OF TEMPORARY EROSION AND SEDIMENT CONTROL STRUCTURES

A. At such time that temporary erosion and control structures are no longer required under this item, the Contractor shall notify the Designer, and Engineer of Contractor’s intent and schedule for the removal of the temporary structures, and obtain Designer’s and Engineer’s approval in writing prior to removal. Once the Contractor has received such written approval from the Designer and Engineer, the Contractor shall remove, as approved; the temporary structures and all sediments accumulated at the removed structure shall be returned upgrade. In areas where temporary control structures are removed, the site shall be left in a condition that shall restore original drainage. Such areas shall be evenly graded and seeded as specified in paragraph 3.13 Disturbed Area Stabilization – Permanent Vegetation (Ds3) or paragraph 3.14 Disturbed Area Stabilization with Sodding (Ds4).

3.25 SEQUENCE OF CONSTRUCTION OF TEMPORARY SEDIMENT CONTROL MEASURES

A. Install all erosion and sediment control structures as specified, indicated on the Drawings, or as directed by the Designer, Engineer, or CITY, as the first item of Work within a given drainage area. Construction and installation of all erosion and sediment control structures shall begin downgrade of the area to be disturbed and proceed upgrade. Contractor shall, at all times, maintain all soil erosion and sediment control structures and practices throughout construction and until permanent vegetative cover is established.

B. Time: Land disturbance activities are not authorized to begin until after all required erosion and sediment control permits are obtained from the United States, the State of Georgia, and/or the local issuing authority, *and* fourteen (14) calendar days have passed since Notice of Intent (NOI) is properly filed with Georgia EPD.

3.26 SPECIFIC REQUIREMENTS

A. The requirements as specified, as indicated on the Drawings, are minimum requirements for the preventing or minimizing soil erosion and sediment transport. Contractor shall install and maintain soil erosion and sediment control measures in accordance with the requirements set forth in the 2016 Manual for Erosion and Sediment Control in Georgia, and said manual shall govern in case of conflicting information, unless an item is clearly identified on the Drawings as a deviation from the Manual.

3.27 PERMITTING

A. Land disturbance activity shall not commence until the Land Disturbance Permit has been issued by the local issuing authority, *and* fourteen (14) calendar days have passed since Notice of Intent (NOI) was properly filed with Georgia EPD.

B. A Certified Design Professional properly certified as such by the Georgia Soil and Water Conservation Commission shall be responsible for performing the following duties with respect to the Erosion and Sedimentation Control Permit.

1. Certified Design Professional shall prepare an Erosion, Sedimentation and Pollution Control Plan (ES&PCP), and shall submit same to the local issuing authority for approval, and shall provide Contractor with three (3) approved copies of the ES&PCP.

2. Engineer shall obtain Land disturbance permits from local governments as required.

3. The same Certified Design Professional who prepared the ES&PCP shall conduct the initial seven (7) day inspection after initial installation of BMPs.

C. Contractor shall be responsible for performing the following duties with respect to the Erosion and Sedimentation Control Permit.

1. Contractor shall execute the NOI as “Operator” and submit to CITY along with required fees, and CITY shall execute the NOI as “Owner” and then properly submit fully executed NOI and the required fees to Georgia EPD. No land disturbance activity shall be started until fourteen (14) calendar days have passed

after the Notice of Intent (NOI) is properly submitted to Georgia EPD.

2. Contractor shall employ a Qualified Person who shall perform inspections of BMPs as outlined in NPDES General Permit GAR 100002, Part IV, D.4.

3. Contractor shall employ a Qualified Person who shall gather samples of storm water as outlined in NPDES General Permit GAR 100002, Part IV, D.6., and as further defined in the ES&PCP.

D. Contractor shall employ a Qualified Person who shall prepare, submit and maintain all reporting and report submittal requirements as outlined in NPDES General Permit GAR 100002, Part IV, E. and F.

Erosion and Sediment Control Checklist

Instructions: Complete this checklist at least once per week and within 24 hours of any rainfall greater than ½ inch. Summarize deficiencies on this page (attach additional pages if necessary). Take action to correct problems within 24 hours. Keep this form in the project file.

Inspection Done by: _____ ***Date:*** _____

Item No.	Explanation of Deficiency or Deficiencies	Corrective Action Taken	Date Completed

Temporary Interceptor, Diversion and Perimeter Dikes Check List (Di)

Item No.	Installation or Maintenance	Explanation	N/A	Yes	No
TDK –1	Installation	Are dikes properly placed to divert water to drainage ditches, sediment basins, or temporary or permanent channels?			
TDK –2	Installation	Are dikes constructed of earth fill free of refuse, such as wire, brush, rocks over 6 inches in diameter, ashes, muck, etc?			
TDK –3	Installation	Have dikes been compacted using construction equipment?			
TDK –4	Installation	Do dikes have a top width of at least 2 feet?			
TDK –5	Installation	Are dikes at least 18 inches above surrounding grade?			
TDK –6	Installation	Are side slopes of dikes 2:1?			
TDK –7	Installation	Have dikes been stabilized with vegetative cover (temporary seeding)?			
TDK –8	Maintenance	Are dikes still 2 feet across top and at least 18 inches high even after weathering?			
TDK –9	Maintenance	Do dikes have vegetative cover?			

Inspection done by: _____ ***Date:*** _____

Temporary Interceptor, Diversion, and Perimeter Ditches (Di)

Item No.	Installation or Maintenance	Explanation	N/A	Yes	No
TDD –1	Installation	Are ditches properly placed parallel to, contiguous to, and upslope of temporary dikes?			
TDD –2	Installation	Do ditches have a minimum depth of one (1) foot?			
TDD –3	Installation	Are ditch side slopes 2:1 or flatter?			
TDD –4	Installation	Are ditch sides and bottoms free of projections, trees, brush, stumps, etc?			
TDD –5	Installation	Are ditches stabilized with a vegetative cover?			
TDD –6	Maintenance	Ditch side slopes have not eroded to be steeper than 2:1?			
TDD –7	Maintenance	Are ditches free of sediment and debris?			
TDD –8	Maintenance	Do ditches have vegetative cover?			

Inspection done by: _____ ***Date:*** _____

Temporary Sediment Barrier - Silt Fence (Sd1-S or Sd1-NS)

Item No.	Installation or Maintenance	Explanation	N/A	Yes	No
SF –1	Installation	Is silt fence installed at proper intervals? Slope (feet) — Maximum Interval <2% — 100 2% to 5% — 75 5% to 10% — 50 10% to20% — 25 >20% — 15			
SF –2	Installation	Is proper type of silt fence installed? **Type A (Sd1-NS)**- Project duration is 6 months or greater or slope is greater than 3:1. Post spacing 6 feet max. **Type C (Sd1-S)**- Where fill slopes exceed a vertical height of 10ft and the slope is greater than 3:1. Post spacing 4 feet maximum. Has woven wire fabric.			
SF –3	Installation	Has silt fence been installed with a trench 6 inches into the ground?			
SF –4	Installation	Has silt fence post been installed at least 18 inches into the ground?			
SF –5	Maintenance	Has silt fence been in place less than 6 months?			
SF –6	Maintenance	Is silt fence controlling offsite migration of sediment?			
SF –7	Maintenance	Has sediment been removed from the up-slope side of the silt fence in the last 14 days?			
SF –8	Maintenance	Is sediment build-up less than one-half (½) the installed silt fence height?			
SF –9	Maintenance	Is silt fence free of damage, including Tears and holes?			
SF –10	Maintenance	Is silt fence horizontally tight?			
SF –11	Maintenance	Are post intact (unbroken and unbent)?			

Inspection done by: _____ ***Date:*** _____

Temporary Sediment Barrier – Hay Bales (Sd1)

Item No.	Installation or Maintenance	Explanation	N/A	Yes	No
HB –1	Installation	Have hay bales been installed at the toe of all slopes higher than 3 feet or steeper than 5:1?			
HB –2	Installation	Have hay bales been installed at a maximum of 100ft intervals, if slope persist?			
HB –3	Installation	Are hay bales wire or nylon bound and rectangular shaped?			
HB –4	Installation	Are hay bales placed end to end with ends tightly abutting adjacent hay bale?			
HB –5	Installation	Are hay bales embedded into the soil a minimum of 4 inches below grade?			
HB –6	Installation	Are hay bales anchored with 2 inch x 2 inch wooden stakes or no. 3 reinforced bars, with a minimum length of 36 inches?			
HB –7	Installation	Are stakes driven in at an angle toward the previously placed hay bale, at least 18” into the ground?			
HB –8	Maintenance	Are hay bales intact?			
HB –9	Maintenance	Are stakes unbroken or unbent?			
HB –10	Maintenance	Is sediment build up less than one half (½) the original bale height?			
HB –11	Maintenance	Has sediment been removed from the upslope side of hay bale in last 14 days?			
HB –12	Maintenance	Have hay bales been installed less than thirty (30) calendar days ago?			
HB –13	Maintenance	Are hay bales in firm contact with ground surface with no undermining of soil?			

Inspection done by: _____ ***Date:*** _____

Construction Exits (Co)

Item No.	Installation or Maintenance	Explanation	N/A	Yes	No
CE –1	Installation	Have construction exits been constructed prior to any construction operations at all points where traffic leaves the site to a right-of-way, street, alley, or parking area?			
CE –2	Installation	Are construction exits a minimum of 50 feet long and a right angle to the street, alley, etc?			
CE –3	Installation	Are construction exits a minimum of 20 feet wide?			
CE –4	Installation	Are construction exit pads a minimum of 6 inches in depth?			
CE –5	Installation	Have geotextile underliners been placed under the construction exit pads?			
CE –6	Installation	Have the construction exit pads been constructed of 1 ½ to 3 ½ inch diameter stone?			
CE –7	Maintenance	Are construction exit length, width, and depth being maintained?			
CE –8	Maintenance	Have construction exits been maintained within the last 14 days?			
CE –9	Maintenance	Is geotextile underliner still covered by stone (not visible)?			

Inspection done by: _____ ***Date:*** _____

Check Dams – Stone (Cd-S)

Item No.	Installation or Maintenance	Explanation	N/A	Yes	No
CD –1	Installation	Were check dams constructed of appropriate materials? < 2 acres draining graded size 5 to 10 inch diameter stone			
CD –2	Installation	Is center of check dam at least 9 inches lower than the outer edges?			
CD –3	Installation	Is check dam height 2 feet maximum at center of check dam?			
CD –4	Installation	Are side slopes of check dam 2:1 maximum?			
CD –5	Installation	Are check dams properly spaced in series (toe of upstream check dam at same elevation as top of downstream check dam)?			
CD –6	Installation	Do check dams cover entire width of ditch or swale?			
CD –7	Installation	Are check dam heights lower than channel banks?			
CD –8	Installation	Are check dam heights lower than upstream property line elevation?			
CD –9	Maintenance	Are check dam dimensions and slopes being maintained?			
CD –10	Maintenance	Is sediment less than one-half (½) the original check dam height?			
CD –11	Maintenance	Are check dams in good contact with ground surface with no undermining of soil?			

Inspection done by: _____ ***Date:*** _____

Rock Filter Dams (Rd)

Item No.	Installation or Maintenance	Explanation	N/A	Yes	No
RD –1	Installation	Were rock filter dams constructed of appropriate materials?			
RD –2	Installation	Is center of filter dam at least 9 inches lower than the outer edges?			
RD –3	Installation	Is filter dam height no higher than the channel banks or exceed elevation at upstream project limits?			
RD –4	Installation	Are side slopes of filter dam 2:1 maximum?			
RD –5	Installation	Are filter dams properly located in the drainage way?			
RD –6	Installation	Do filter dams cover entire width of drainage way?			
RD –9	Maintenance	Are filter dam dimensions and slopes being maintained?			
RD –10	Maintenance	Is sediment less than one-half (½) the original filter dam height?			
RD –11	Maintenance	Are filter dams in good contact with ground surface with no undermining of soil?			

Inspection done by: _____ ***Date:*** _____

Inlet Sediment Trap (Sd2)

Item No.	Installation or Maintenance	Explanation	N/A	Yes	No
SD –1	Installation	Are inlet sediment traps constructed around all storm drain inlets that receive runoff from disturbed areas?			
SD –2	Installation	Are sediment traps constructed according to design?			
SD –3	Installation	Do sediment traps provide for a minimum of 1½ feet of sediment storage?			
SD –4	Installation	Are sediment traps self-draining?			
SD –5	Installation	If gravel is used for the filtering media, is it 3 to 6 inches in diameter?			
SD –6	Installation	If baffle box inlet filters were used, are they constructed of 2”x 4” or 4”x 4” posts and 2”x 4” boards?			
SD –7	Maintenance	Does sediment trap have adequate storage volume for subsequent rains?			
SD –8	Maintenance	Are sediment traps intact?			
SD –9	Maintenance	Are wooden components unbroken?			
SD –10	Maintenance	Is gravel overtaken with sediment?			
SD –11	Maintenance	Are filter fabrics free of tears or holes?			

Inspection done by: _____ ***Date:*** _____

Disturbed Area Stabilization (Ds1, Ds2, Ds3, Ds4)

Item No.	Installation or Maintenance	Explanation	N/A	Yes	No
VS –1	Installation	Have disturbed areas been stabilized with temporary vegetation and mulched within 24 hours of completion?			
VS –2	Installation	Have disturbed areas awaiting permanent stabilization cover, where suitable growing season is not available, been stabilized with temporary vegetation and/or mulch?			
VS –3	Installation	Was surface prepared for seeding (by scarifying soil a minimum of 1 inch deep)?			
VS –4	Installation	Has seeding been performed according to growing seasons and required mixtures of seed and fertilizer?			
VS –5	Installation	Has mulch been loosely applied, after seeding, to a thickness of 1 ½ to 2 ½ inches?			
VS –6	Installation	Has mulch been retained using an asphaltic emulsion or mechanically tacked?			
VS –7	Installation	For areas which have not received temporary vegetation and have received mulch only: Has dry straw or hay mulch been applied to a thickness of 2 to 4 inches? Has wood waste been applied to a thickness of 2 to 3 inches?			
VS –8	Maintenance	Are stabilized areas intact with no signs of eroded areas?			
VS –9	Maintenance	Do disturbed areas that have been stabilized with mulch have the proper thickness of mulch?			
VS –10	Maintenance	Are previously stabilized areas intact and not in need of touch up seeding or mulching?			

Inspection Done by:_____Date:_____

Storm Drain Outlet Protection (St)

Item No.	Installation or Maintenance	Explanation	N/A	Yes	No
St –1	Installation	Are storm drain outlet protections constructed around all storm drain outlets?			
St –2	Installation	Are storm drain outlet protections constructed according to design?			
St –4	Installation	Is geotextile filter fabric present between soil and quarried stone?			
St –5	Installation	Is minimum thickness of stone pad in compliance with the drawings?			
St –6	Installation	Is apron constructed at appropriate grade?			
St –7	Maintenance	Has erosion occurred around or below riprap?			
St –8	Maintenance	Have riprap stones been dislodged?			
St –9	Maintenance	Are filter fabrics free of tears or holes?			

Inspection done by: _____ ***Date:*** _____

Permanent Slope Stabilization (Ss)

Item No.	Installation or Maintenance	Explanation	N/A	Yes	No
Ss –1	Installation	Are mats installed in concentrated flow areas?			
Ss –2	Installation	Are mats installed on slopes steeper than 2½:1 with a height 10 feet or greater?			
Ss –3	Installation	Are mats installed in cuts and fills within stream buffers?			
Ss –4	Installation	Are mats in direct contact with soil surface (no foreign materials between mats and ground)?			
Ss –5	Installation	Are mats stapled to the ground with U-shaped staples having legs at least 6 inches long?			
Ss –6	Maintenance	Do mats show signs of erosion or undermining?			
Ss –7	Maintenance	Are mats dislocated, broken, or washed out?			

Inspection done by: _____ ***Date:*** _____

END OF SECTION 31 25 00

SECTION 31 37 00

RIPRAP

PART 1 – GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

Section	Title
1.2	References
1.3	Work Included
1.4	Submittals
2.1	Products
3.1	Materials
3.2	Construction

1.2 REFERENCES

A. Drawings and general provisions of the Contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this section.

1.3 WORK INCLUDED

A. The Contractor shall furnish all labor, equipment, and materials necessary for hauling and properly placing stone riprap at the locations and to the limits indicated on the Contract Documents and/or Drawings or as directed by CITY.

1.4 SUBMITTALS

A. The Contractor shall submit for approval, in accordance with Section 01 33 00 SUBMITTAL PROCEDURES all working Contract documents and/or drawings and schedules of materials and methods proposed to follow in the execution of the Work under this item.

B. Submittals shall show in detail the type, size, and location of all riprap and accessories to be used in construction.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Unless otherwise specified, stone furnished for riprap shall meet the requirements of the Georgia Department of Transportation Standard Specifications for Road and Bridge Construction, Sections 603 and 805, latest edition.

B. Suitable rock from onsite excavation may be used as stone rip rap. Rock shall meet the requirements identified above, as determined by CITY's materials testing firm and be subject to the CITY's approval.

C. Geotextile filter fabric shall be woven and meet the requirements of Georgia Department

of Transportation Standard Specifications for Road and Bridge Construction, Section 881, latest edition.

PART 3 - EXECUTION

3.1 CONSTRUCTION

A. Lower the groundwater table to at least 3-ft below the bottom of the excavation base.

B. Excavate foundation surface where the riprap will be placed to conform with the correct lines and grades before beginning the placement. Subgrade shall be clean and free of organic matter, loose soil, obstructions, debris, and standing water.

C. Place woven plastic filter fabric on the subgrade under all riprap.

D. Place riprap to a uniform thickness as specified in the Project Specific scope of work, Contract Documents, and/or Contract Drawings.

END OF SECTION 31 37 00

SECTION 31 52 00

COFFERDAMS

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

Section	Title
1.2	References
1.3	Work Included
1.4	Submittals
1.5	Quality Assurance
1.6	Pre-Installation Conference
1.7	Delivery, Storage, and Handling
1.8	Project Conditions
1.9	Warranty
2.1	Water-Inflated Dams
3.1	Examination
3.2	Preparation
3.3	Installation
3.4	Field Quality Control
3.5	Cleaning and Protection

1.2 REFERENCES

A. Drawings and general provisions of the Contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this section.

B. ASTM D-3776, Standard Test Methods for Mass Per Unit Area (Weight) of Fabric.

C. ASTM D 751, Standard Test Methods for Coated Fabrics.

1.3 WORK INCLUDED

A. This Specification shall govern the work required for the providing temporary cofferdams required as part of flow diversion and/or bypass pumping needs of the Work of this Contract.

B. Cofferdams shall be temporary in nature, and be made of water inflated dams or other approved materials.

C. Cofferdams are considered incidental to the control of water line item and shall not be measured or paid for separately.

1.4 SUBMITTALS

A. The Contractor shall submit for approval, in accordance with Section 01 33 00 SUBMITTAL PROCEDURES and to Georgia DOT when work is within a state road

right-of-way, all working drawings and schedules of materials and methods proposed to follow in the execution of the Work under this item.

B. Submittals shall include shop drawings showing the design calculation, details, dimensions, materials, products, and installation methods for the cofferdam.

C. Product data:
1. Manufacturer's data sheets on each product to be used.
2. Preparation instructions and recommendations.
3. Storage and handling requirements and recommendations.
4. Typical installation methods.

D. Verification Samples: Two representative units of each type, size, pattern and color.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.

1. Company must have an active certified quality management system in place such as ISO 9001:2015 or equivalent.

B. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.

C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

1.6 PRE-INSTALLATION CONFERENCE

A. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include City, Engineer, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store and handle in strict compliance with manufacturer's written instructions and recommendations.

B. Protect from damage due to weather, excessive temperature, and construction operations.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.9 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's standard limited warranty.

PART 2 - PRODUCTS

2.1 Water-Inflated Dams

A. Aqua-Barrier, Water-Inflated Dams by HSI Services, or equal.
   1. Description: Water-inflated dam consisting of a self-contained, single tube with an inner restraint baffle stabilization system, used to control water and liquids.
   2. Fabric: UV protected; heavy gauge polyvinyl chloride (PVC) reinforced with polyester.
   3. Additional Support: May be required in case of slick or weak soils, excess slope, high water velocities, dynamic loads from wave action, surface irregularities, or changes in interrelated hydrological conditions.
   4. Application:
      a. Water management for controlling surface water for construction and maintenance operations.
   5. Height: 4 ft minimum.
      a. Inflated Barrier Width: 9 ft maximum
      b. Minimum Retained Water Height: 3 ft
   6. Configuration:
      a. As indicated on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until ground surface have been properly constructed and prepared.

B. Remove all ground objects that could puncture water-inflated dams.

3.2 PREPARATION

A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.

B. Follow manufacturer’s safety recommendations for installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

B. Manufacturer’s Services: Coordinate manufacturer’s services in accordance with appropriate sections in Division 01. Services to include but are not limited to the following:
   1. Phone and Virtual Support:
   2. Onsite Support:

3.5 CLEANING AND PROTECTION

A. Clean products in accordance with the manufacturer’s recommendations.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 31 52 00

SECTION 32 12 16

ASPHALT PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

Section	Title
1.2	References
1.3	Work Included
1.4	Submittals
2.1	Materials
2.2	Delivery, Storage, and Handling
2.3	Equipment
3.1	Preparation
3.2	Construction
3.3	Quality Acceptance

B. This section provides general requirements for asphalt paving work associated with pipeline installation. However, it is the Contractor's responsibility to ensure all asphalt paving work meets the requirements of the Georgia Department of Transportation Standard Specifications for Road and Bridge Construction.

1.2 REFERENCES

A. Drawings and general provisions of the Contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this section.

B. Georgia Department of Transportation Standard Specifications for Road and Bridge Construction.

1.3 WORK INCLUDED

A. The Contractor shall furnish all labor, equipment, and materials necessary to install asphalt paving as required for the installation of proposed stormwater drainage systems, sanitary sewer systems, water mains and related appurtenances.

1.4 SUBMITTALS

A. The Contractor shall submit for approval, in accordance with Section 01 33 00 SUBMITTAL PROCEDURES all working Contract documents and/or drawings and schedules of materials and methods proposed to follow in the execution of the Work under this item.

B. PAVING PLAN

1. Before starting asphaltic concrete construction, submit a written paving plan to CITY and/or the Engineer for approval. Include the following on the paving plan:
   a. Proposed starting date

b. Location of plant(s)
c. Rate of production
d. Average haul distance(s)
e. Number of haul trucks
f. Paver speed feet (meter)/minute for each placement operation
g. Mat width for each placement operation
h. Number and type of rollers for each placement operation
i. Sketch of the typical section showing the paving sequence for each placement operation
j. Electronic controls used for each placement operation
k. Temporary pavement marking plan

2. If staged construction is designated in the Plans or contract, provide a paving plan for each construction stage.
3. If segregation is detected, submit a written plan of measures and actions to prevent segregation. Work will not continue until the plan is submitted to and approved by the Department.

C. JOB MIX FORMULA

1. Submit to CITY and/or the Engineer a written job mix formula proposed for each mixture type to be used based on an approved mix design. Furnish the following information for each mix:
   a. Specific project for which the mixture will be used
   b. Source and description of the materials to be used
   c. Mixture I.D. Number
   d. Proportions of the raw materials to be combined in the paving mixture
   e. Single percentage of the combined mineral aggregates passing each specified sieve
   f. Single percentage of asphalt by weight of the total mix to be incorporated in the completed mixture
   g. Single temperature at which to discharge the mixture from the plant
   h. Theoretical specific gravity of the mixture at the designated asphalt content
   i. Name of the person or agency responsible for quality control of the mixture during production
2. Do the following to have the formulas approved and to ensure their quality:
   a. Submit proposed job mix formulas for review at least two weeks before beginning the mixing operations.
   b. Do not start hot mix asphaltic concrete work until CITY and/or the Engineer has approved a job mix formula for the mixture to be used. No mixture will be accepted until CITY and/or the Engineer has given approval.
   c. Provide mix designs for all Superpave and 4.75 mm mixes to be used. The Department will provide mix design results for other mixes to be used.
   d. After a job mix formula has been approved, assume responsibility for the quality control of the mixtures supplied according to Section 106.

D. Photographs or videotape, sufficiently detailed, of existing conditions of project site that might be misconstrued as damage, caused by debris, or construction material removal.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Ensure that materials comply with the specifications listed in Table 1.

Table 1—Materials Specifications

Material	GDOT Subsection
Asphalt Cement, Grade Specified	820.2
Coarse Aggregates for Asphaltic Concrete	802.2.02
Fine Aggregates for Asphaltic Concrete	802.2.01
Mineral Filler	883.1
Heat Stable Anti-Stripping Additive	831.2.04
Hydrated Lime	882.2.03
Silicone Fluid	831.2.05
Bituminous Tack Coat: PG 58-22, PG 64-22, PG 67-22	820.2
Hot Mix Asphaltic Concrete Mixtures	828
Fiber Stabilizing Additives	819

B. When required, provide Uintaite material, hereafter referred to by the common trade name Gilsonite, as a reinforcing agent for bituminous mixtures. Supply a manufacturer's certification that the Gilsonite is a granular solid which meets the following requirements:

1.	Softening Point (AASHTO: T-53)	300-350°F (150-175°C)
2.	Specific Gravity, 77°F (25°C) (AASHTO: T-228)	1.04±0.02
3.	Flash Point, COC (AASHTO: T-48)	550 °F (290°C) Min.
4.	Ash Content (AASHTO: T-111)	1.0% Max
5.	Penetration, 77°F (25°C),100 gm, 5 sec. (AASHTO: T-49)	0

2.2 DELIVERY, STORAGE, AND HANDLING

A. Storage of material is allowed in a properly sealed and insulated system for up to 24 hours except that Stone Matrix Asphalt (SMA), Open-Graded Friction Course (OGFC), or Porous European Mix (PEM) mixtures shall not be stored more than 12 hours. Mixtures other than SMA, OGFC, or PEM may be stored up to 72 hours in a sealed and insulated system, equipped with an auxiliary inert gas system, with CITY and/or the Engineer's approval. Segregation, lumpiness, drain-down, or stiffness of stored mixture is cause for rejection of the mixture. CITY and/or the Engineer will not approve using a storage or surge bin if the mixture segregates, loses excessive heat, or oxidizes during storage.

B. CITY and/or the Engineer may obtain mixture samples or recover asphalt cement according to GDT 119. AASHTO T 202 and T 49 will be used to perform viscosity and penetration tests to determine how much asphalt hardening has occurred:

C. Vehicles for Transporting and Delivering Mixtures:
   1. Ensure that trucks used for hauling bituminous mixtures have tight, clean, smooth beds.
   2. Follow these guidelines when preparing vehicles to transport bituminous mixtures:
      a. Use an approved releasing agent from QPL 39 in the transporting vehicle beds, if necessary, to prevent the mixture from sticking to the bed. Ensure that the releasing agent is not detrimental to the mixture. When applying the agent, drain the excess agent from the bed before loading. Remove from the project any transporting vehicles determined to contain unapproved releasing agents.
      b. Protect the mixture with a waterproof cover large enough to extend over the sides and ends of the bed. Securely fasten the waterproof cover before the vehicle begins moving.
      c. Insulate the front end and sides of each bed with an insulating material with the following specifications:
         1) Consists of builders insulating board or equivalent.
         2) Has a minimum “R” value of 4.0.
         3) Can withstand approximately 400 °F (200 °C) temperatures.
      d. Install the insulating material so it is protected from loss and contamination. A “Heat Dump Body” may be used in lieu of insulation of the bed. “Heat Dump Body” refers to any approved transport vehicle that is capable of diverting engine exhaust and transmitting heat evenly throughout the dump body to keep asphalt at required temperature. Mark the “Heat Dump Body” clearly with “OPEN” and “CLOSE” position at the exhaust diverter. Install a padlock and lock it in the “OPEN” position when the “Heat Dump Body” is used to transport bituminous mixtures.
      e. Mark each transporting vehicle with a clearly visible identification number.
      f. Create a hole in each side of the bed so that the temperature of the loaded mixture can be checked. The placement of these holes shall be located to assure that the thermometer is being placed in the hot mix asphaltic concrete.
      g. Ensure that the mixture is delivered to the roadway at a temperature within ± 20 °F (± 11 °C) of the temperature on the job mix formula.
      h. If CITY and/or the Engineer determines that a truck may be hazardous to the Project or adversely affect the quality of the work, remove the truck from the project.

D. Containers for Transporting, Conveying, and Storing Bituminous Material:
   1. To transport, convey, and store bituminous material, use containers free of foreign material and equipped with sample valves. Bituminous material will not be accepted from conveying vehicles if material has leaked or spilled from the containers.

2.3 EQUIPMENT

A. PLANT EQUIPMENT

1. Hot mix asphaltic concrete plants that produce mix for use on paving projects shall be governed by Quality Assurance for Hot Mix Asphaltic Concrete Plants in Georgia, Laboratory Standard Operating Procedure No. 27. Plants shall meet all requirements as defined in the GDOT Standard Specifications for Hot Mix Asphaltic Concrete Construction.

B. PROJECT SITE EQUIPMENT

1. The following equipment shall be used at the project site as required for paving work. The equipment shall meet all requirements of the GCDOT Standard Specifications for Hot Mix Asphaltic Concrete Construction.
   a. Cleaning equipment
   b. Pressure distributor
   c. Bituminous pavers
   d. Compaction equipment
   e. Materials transfer vehicles

PART 3 - EXECUTION

3.1 PREPARATION

A. The existing surface shall be prepared as follows:

1. Clean the Existing Surface. Before applying hot mix asphaltic concrete pavement, clean the existing surface to CITY and/or the Engineer's satisfaction.
2. Patch and Repair Minor Defects
   a. Before placing leveling course:
      1) Correct potholes and broken areas that require patching in the existing surface and base as directed by CITY and/or the Engineer.
      2) Cut out, trim to vertical sides, and remove loose material from the areas to be patched.
      3) Prime or tack coat the area after it has been cleaned. Compact patches to CITY and/or the Engineer's satisfaction. Material for patches does not require a job mix formula, but shall meet the gradation range shown in Section 828. CITY and/or the Engineer must approve the asphalt content to be used
3. Apply Bituminous Tack Coat
   a. Apply the tack coat according to Section 413. CITY and/or the Engineer will determine the application rate, which must be within the limitations Table 2.

Table 2—Application Rates for Bituminous Tack, gal/yd² (L/m²)

	Minimum	Maximum
Under OGFC and PEM Mixes	0.06 (0.270)	0.08 (0.360)
All Other Mixes	0.04 (0.180)	0.06(0.270)

*On thin leveling courses and freshly placed asphaltic concrete mixes, reduce the application rate to 0.02 to 0.04 gal/yd² (0.09 to 0.18 L/m²).

B. PLACE PATCHING AND LEVELING COURSE

1. When the existing surface is irregular, bring it to the proper cross section and grade with a leveling course of hot mix asphaltic concrete materials.
2. Place leveling at the locations and in the amounts directed by CITY and/or the Engineer.
3. Use leveling course mixtures that meet the requirements of the job mix formulas defined in:
   a. Subsection 400.3.05.A, "Observe Composition of Mixtures" in the GDOT Standard Specifications for Hot Mix Asphaltic Concrete Construction.
   b. Section 828
   c. Leveling acceptance schedule in Subsection 400.3.06.A, "Acceptance Plans for Gradation and Asphalt Cement Content" in the GDOT Standard Specifications for Hot Mix Asphaltic Concrete Construction.
4. If the leveling and patching mix type is undesignated, determine the mix type by the thickness or spread rate according to Table 3.

Table 3—Leveling and Patching Mix Types

Thickness	Rate of Spread	Type of Mix
Up to 0.75 in (19 mm)	Up to 85 lbs/yd² (45 kg/m²)	4.75 mm Mix or 9.5 mm Superpave Type 1
0.75 to 1.5 in (19 to 38 mm)	85 to 165 lbs/yd²(45 to 90 kg/m²)	9.5 mm Superpave Type 2
1.5 to 2 in (38 to 50 mm)	165 to 220 lbs/yd² (90 to 120 kg/m²)	12.5 mm Superpave *
2 to 2.5 in (50 to 64 mm)	220 to 275 lbs/yd² (120 to 150 kg/m²)	19 mm Superpave *
Over 2.5 in (64 mm)	Over 275 lbs/yd² (150 kg/m²)	25 mm Superpave

* These mixtures may be used for isolated patches no more than 6 in. (150 mm) deep and no more than 4 ft. (1.2 m) in diameter or length.

3.2 CONSTRUCTION

A. Provide CITY and/or the Engineer at least one day's notice prior to beginning construction or prior to resuming production if operations have been temporarily suspended.

B. All paving operations shall meet the requirements of Section 400 – Hot Mix Asphaltic Concrete Construction of the GDOT Standard Specifications.

3.3 QUALITY ACCEPTANCE

A. ACCEPTANCE PLANS FOR GRADATION AND ASPHALT CEMENT CONTENT

1. The Contractor shall randomly sample and test mixtures for acceptance on a lot basis. All sampling and testing shall be in compliance with Section 400 – Hot Mix

Asphaltic Concrete Construction of the GDOT Standard Specifications.

B. COMPACTION

1. The Contractor shall determine the mixture compaction using either GDT 39 or GDT 59. The compaction is accepted in lots defined in Subsection 400.3.06. An "Acceptance Plans for Gradation and Asphalt Cement Content" of the GDOT Standard Specifications for Hot Mix Asphaltic Concrete Construction and is within the same lot boundaries as the mixture acceptance.

C. SURFACE TOLERANCE

1. The Contractor shall verify the paved road meets the surface tolerance requirements as defined in Section 400 – Hot Mix Asphaltic Concrete Construction of the GDOT Standard Specifications.
2. The CITY may conduct its own acceptance testing for surface tolerance using the Laser Road Profiler method in accordance with GDT 126. Any deficiencies found shall be corrected by the Contractor.

END OF SECTION 32 12 16

SECTION 32 16 13

SIDEWALKS, CURBS, AND GUTTERS

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

Section	Title
1.2	References
1.3	Work Included
1.4	Submittals
1.5	Quality Control
2.1	Materials
3.1	Preparation
3.2	Joints
3.3	Finishes
3.4	Construction
3.5	Curing

B. This section provides general requirements for providing labor, materials, and equipment for the replacement of concrete sidewalks, wheelchair ramps, curbs, and gutters disturbed by construction. However, it is the Contractor's responsibility to ensure all work meets the requirements of the Georgia Department of Transportation Standard Specifications.

1.2 REFERENCES

A. Drawings and general provisions of the Contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this section.

B. Georgia Department of Transportation Standard Specifications for Road and Bridge Construction.

1.3 WORK INCLUDED

A. The Contractor shall furnish all labor, equipment, and materials necessary to remove, handle, haul-off, and install concrete sidewalks, curbs, and gutters, as required for the rehabilitation, replacement, and/or installation of storm drainage systems and related appurtenances.

1.4 SUBMITTALS

A. The Contractor shall submit for approval, in accordance with Section 01 33 00 SUBMITTAL PROCEDURES all working Contract documents and/or drawings and schedules of materials and methods proposed to follow in the execution of the Work under this item.

1.5 QUALITY CONTROL

A. Tolerances: Construct concrete surfaces within 0.05 feet of the indicated elevation, and deviating not more than 3/8-inch from a ten-foot straightedge placed anywhere on the surface.

B. Strictly conform to requirements for compaction of subgrade, air entrainment of concrete and curing of concrete.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Concrete: All concrete shall have a 28-day compressive strength of 4,000 psi.

B. Joint filler: Nonextruding joint material, furnished in a single piece for the full depth and width required for the joint unless otherwise specified by CITY and/or the Engineer.

PART 3 - EXECUTION

3.1 PREPARATION

A. Excavate and compact the subgrade as specified in Section 31 23 00.3.2.E, true to the indicated grade and cross section.

B. Place forms or extrusion machine guides to exact elevation and location required. Visually check forms and machine guides and adjust where necessary to ensure smooth curves and transitions in grade. Provide close spacing on curves to maintain a smooth curve.

3.2 JOINTS

A. Expansion Joints: Install expansion joints at intervals as indicated, but not exceeding 30 feet for walks and curbs, and wherever new concrete abuts existing construction. Additional joints are to be placed at tangent points of circular curbs and other places where stresses may develop.

B. Contraction (Control) Joints:

1. Sidewalks: Cut joints with a saw immediately after concrete reaches adequate hardness to allow sawing. . Contraction joints in sidewalks shall be 3/4 inch deep and spaced at a distance equal to the width of the walk.

2. Curb and Gutter: For formed work, use full depth steel forms to achieve contraction joints. For extruded work, cut contraction joints with a saw immediately after concrete reaches adequate hardness to allow sawing. Contraction joints in curb and gutters shall be 1 ½ inch deep and spaced at 10 feet intervals.

3. Concrete flatwork: Cut joints with a saw immediately after concrete reaches adequate hardness to allow sawing. Contraction joint depth shall be ¼ of the concrete thickness. Spacing and pattern shall be as shown on plans or determined by CITY and/or the Engineer.

4. Locate and form expansion joints for curb cut wheelchair ramp according to GDOT

Standard Detail A-3.

C. Premolded expansion joint filler must be cut to full cross section of the proposed construction and shall extend the full depth, width, and length of the construction. Trim expansion joint material protruding after the concrete has been finished as directed by CITY and/or the Engineer. All longitudinal expansion joints shall be placed as indicated on the Contract documents and/or drawings.

3.3 FINISHES

A. Pedestrian and Wheelchair Ramps: Non-slip finish.

B. All others: Broom finish.

3.4 CONSTRUCTION

A. Place forms true to line, grade, and cross section.

B. Brace forms adequately before placing the concrete. Place concrete in forms and thoroughly tamp, vibrate or work it into all corners, removing air pockets. Allow forms to remain in place until the concrete has set sufficiently to hold its shape.

C. Begin each phase of screed, float, trowel and finish work as soon as the concrete can be properly worked. Completely finish sidewalks and flat work with forms in place.

D. Remove forms on the front face of curbs as soon as the concrete will hold its shape and finish the face. For gutters, a strike-off template of the form and shape of the gutter shall be used to shape the top surface of the gutter. Round top edges of curb and edges of gutter using a radius tool matching the radius shown on the Contract documents and/or drawings. Finish the edges where templates have been removed or expansion joint material has been placed with an edging tool with a radius of not over 1/4-inch and then all lines or marks removed with a wet brush.

E. Remove all tool marks with a wetted brush or wooden float, and the finished surface shall present a uniform and smooth appearance.

3.5 CURING

A. Cure concrete as specified in Section 03 30 00.

END OF SECTION 32 16 13

SECTION 32 73 00

WETLAND PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

Section	Title
1.2	References
1.3	Definitions
1.4	Overview
1.5	Work Included
1.6	Submittals
3.1	Construction Activities Near Wetlands
3.2	Enforcement

1.2 REFERENCES

A. Drawings and general provisions of the Contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this section.

1.3 DEFINITIONS

A. Contractor: For the purposes of this item, the term “Contractor” is synonymous with Discharger, Equipment Operator, and Construction Manager, as used in the Individual or NWP, laws, rules, regulations, ordinances and other wetland protection and permitting references.

B. Designer: For the purpose of this item the term “Designer” is synonymous with Consulting Engineer, Licensed Professional and Consultant used in permits, laws, rules, regulations, ordinances and other soil erosion and sediment control references.

1.4 OVERVIEW

A. The Contractor shall comply with all laws, rules, regulations, ordinances, and/or other requirements concerning stream buffers, jurisdictional water, and wetlands protection and permitting designated by CITY and established by the United States, the State of Georgia, and the CITY.

B. Time: Land disturbing activities are not authorized to begin until after all required wetland permits and buffer variances are obtained from the U.S. Army Corps of Engineers (USACE), the State of Georgia, and the CITY.

C. For the purposes of this item the Designer, may at any time during the project, provide direction. This direction shall be considered equivalent to direction from CITY.

1.5 WORK INCLUDED

A. The Contractor is responsible for using construction techniques and implementing other

measures that ensure compliance with all local, state, and federal laws, rules, ordinances, and/or other requirements concerning stream buffers, jurisdictional waters, and wetlands protection. In addition, the Contractor is also responsible for complying with all project-specific conditions outlined in the Drawings and/or Contract Documents, or Project Specific Scope of Work.

B. This item covers the Work necessary to comply with the above referenced regulations before, during, and after construction in and adjacent to stream buffers, jurisdictional waters, and wetlands. The Contractor shall furnish all material and labor necessary for compliance under this item. No separate measurement and payment will be made for work under this section. All costs in connection with this work specified herein is consider to be incidental to the Work.

1.6 SUBMITTALS

A. The Contractor for approval, in accordance with Section 01 33 00 SUBMITTAL PROCEDURES, the following documents proposed to follow in the execution of the Work under this item.

B. Spill Plan: The Contractor shall prepare a Spill Plan that addresses handling of fuels, lubricants, chemicals, and other toxic materials that may be used. The plan must include:
   1. Identification of refueling sites.
   2. Identification of storage areas for fuels, lubricants, chemicals, and other toxic materials.
   3. Procedures for refueling and maintaining pontoon-mounted backhoes, trench dewatering pumps, and other similar equipment used in wetlands or other water bodies.
   4. Contingency plan for cleaning up spills and other releases of fuels, lubricants, chemicals, and other toxic materials.

C. Certification of Completed Work: The Contractor shall submit to CITY and/or the Engineer a signed certification regarding the completed Work and any required mitigation. CITY shall forward this certification to the USACE with the authorization letter. The certification shall include:
   1. A statement that the authorized Work was done in accordance with the USACE authorization, including any general or specific conditions.
   2. A statement that any required mitigation was completed in accordance with the permit conditions if completed by the Contractor.
   3. The signature of the Contractor certifying the completion of the Work and mitigation if completed by the Contractor.

PART 2 - PRODUCTS – (NOT USED)

PART 3 - EXECUTION

3.1 CONSTRUCTION ACTIVITIES NEAR WETLANDS

A. The Contractor shall complete the following:

1. Marking of Locations: Wetland locations affected by the project shall be permanently marked (staked, flagged, and surveyed**)** so that inadvertently removed markers can be relocated. The marking shall be clearly visible to all site personnel and equipment operators. Markings shall be maintained during the construction period.
2. Access: All site personnel, including all equipment operators, shall use pre-designated access and egress points to the site and pre-designated access roads within the construction site. No access or egress point shall be located in a wetland or other water of the United States. Access roads through wetlands and other waters of the United States shall be limited to those directed by CITY and approved by the USACE, State of Georgia, and the Designer.
3. Staging Areas: All staging areas, spoil storage areas, and additional work areas shall be placed at least 50 feet from wetlands and other water bodies. No clearing of vegetation between these areas and adjacent wetlands is permitted.
4. Right-of-Way Stabilization: Dirt, rockfill, tree stumps, brush, rip rap, or other material that would not promote a natural system shall not be used to stabilize a right-of-way.
5. Equipment: Low-ground-weight equipment shall be used, or conventional equipment shall be operated from mats or other approved bedding material in wetlands and other water bodies.
6. Trench Breakers: Trench breakers shall be constructed or the bottom of the trench shall be sealed with approved material in areas where the trench could drain adjacent wetlands or other water bodies.
7. Equipment, Fuel, and Hazardous Material Storage: Equipment, fuels, and hazardous materials shall be stored at least 100 feet from wetlands and other water bodies. In addition, land-based equipment shall not be refueled or maintained within 100 feet of a wetland or other water body.
8. Sediment and Erosion Control: Appropriate sediment and erosion control devices shall be installed and maintained to prevent sediment or other materials from reaching adjacent wetlands and water bodies. All exposed soil and other fills, as well as any Work below the ordinary high water mark, must be permanently stabilized at the earliest practicable date. Erosion and sediment control devices shall be installed in advance of the start of construction and shall be maintained in accordance with the requirements of item titled Erosion and Sedimentation Controls.
9. Crossings: Wetland and water body crossings shall be limited to the minimum size required to safely construct the project. Crossings shall be constructed perpendicular to the water body channel unless prior approval for other methods is obtained from CITY and/or the Engineer, the USACE, the State of Georgia, and the Designer.
10. Flow in Water Bodies: Flows in all water bodies affected by a project shall be maintained at all times unless prior approval is obtained from CITY and/or the Engineer, the USACE, the State of Georgia, and the Designer.
11. Water Quality Standards: State water quality standards in streams and other water bodies affected by or adjacent to the project area shall be maintained in accordance with Chapter 391-3-6 of the Georgia Rules and Regulations for Water

Quality Control. Water quality in adjacent waterways shall be maintained as specified by CITY and/or the Engineer, the USACE, the State of Georgia, and the Designer.

12. Schedule: All wetland and water body crossings shall be completed using a compressed schedule to minimize disturbance in these areas.
13. Temporary Roads and Bridges: Temporary roads and bridges shall be removed as soon as the wetland or water body crossing has been constructed and the project has been completed.
14. Metropolitan River Protection Act: The terms, provisions, and requirements of the Metropolitan River Protection Act shall be abided by at all times.
15. Restoration: Disturbed areas shall be restored through seeding and planting of trees and shrubs as directed by CITY and/or the Engineer, the USACE, the State of Georgia, and the Designer. Liquid and granular fertilizers shall not be spread within 25 feet of the stream bank.
16. Long-Term Maintenance: The site shall be inspected as specified by CITY and/or the Engineer, the USACE, the State of Georgia, and the Designer to assure re-establishment of vegetation.
17. Topsoil: Topsoil shall be segregated from spoil and stored within sediment-filtering enclosures. Topsoil shall be backfilled into the top 6-12 inches of any trench through wetlands.
18. Access Barriers: Barriers shall be installed to prevent access to the site and any adjacent rights-of-way by off-road vehicles.
19. Navigation: No activity may cause more than a minimal adverse effect on navigation.
20. Maintenance: Any structure or fill authorized by the permit shall be properly maintained, including maintenance to ensure public safety.
21. Aquatic Life Movements: No activity may substantially disrupt the movement of those species of aquatic life indigenous to the water body, including those species which normally migrate through the area, unless the activity's primary purpose is to impound water. The Contractor shall not construct perennial water body crossings from March 1 through May 30 unless otherwise authorized by CITY, the USACE, the State of Georgia, and the Designer.
22. Regional and Case-by-Case Conditions: The activity must comply with any regional or case-by-case conditions which may have been added by the USACE.
23. Wild and Scenic Rivers: No activity may occur in a component of the National Wild and Scenic River system, or in a river officially designated by Congress, as a study river for possible inclusion in the system.
24. Tribal Rights: No activity or its operation may impair reserved tribal rights, including but not limited to, reserved water rights and treaty fishing and hunting rights.
25. Endangered Species: No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species, or a species proposed for such designation as identified under the Federal Endangered Species Act, or which is likely to destroy or adversely modify the critical habitat of such species.
26. Historic Properties: No activity which may affect historic properties listed, or

eligible for listing in the National Register of Historic Places, is permitted unless authorized by CITY, State Historic Preservation Office (SHPO), the USACE, the State of Georgia, and the Designer (33 CFR part 325, appendix C).

27. Discharge of Dredged or Fill Material: The following conditions apply to activities that involve the discharge of dredged or fill material into waters of the U.S.
    a. Water Supply Intakes: No discharge of dredged or fill material may occur in proximity to a public water supply intake except where the discharge is for repair of the public water supply intake structures and/or adjacent bank stabilization.
    b. Suitable Material: No discharge of dredged or fill material may consist of unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.) and material discharged must be free from toxic pollutants in toxic amounts (as defined in section 307 of the Clean Water Act).
    c. Spawning Areas: Discharges in spawning areas during spawning seasons must be avoided to the maximum extent practicable. The Contractor shall not construct perennial water body crossings from March 1 through May 30 unless otherwise authorized by CITY, USACE, the State of Georgia, and the Designer.
    d. Obstruction of High Flows: Discharges must not permanently restrict or impede the passage of normal or expected high flows or cause the relocation of the water (unless the primary purpose of the fill is to impound waters) unless authorized by CITY, the USACE, the State of Georgia, and the Designer.
    e. Adverse Effects from Impoundments: If the discharge creates an impoundment of water, the accelerated passage of water and/or restriction of its flow shall not adversely affect the aquatic system unless authorized by CITY, the USACE, the State of Georgia, and the Designer.
    f. Waterfowl Breeding Areas: Discharges into breeding areas for migratory waterfowl must be avoided unless authorized by CITY, the USACE, the State of Georgia, and the Designer.
    g. Removal of Temporary Fills: Any temporary fills must be removed in their entirety and the affected areas returned to their preexisting elevation.

3.2 ENFORCEMENT

A. The Contractor is responsible for conducting any restoration and/or paying any fine resulting from a violation of the requirements of these specifications or of an applicable permit or regulatory requirement (including work outside an easement). This responsibility is in effect even if the action is initially directed at the CITY.

END OF SECTION 32 73 00

SECTION 32 92 00

TURFS AND GRASSES

PART 1 – GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

Section	Title
1.2	References
1.3	Work Included
1.4	Submittals
1.5	Warranty
2.1	Seed
2.2	Sod
2.3	Plugs
2.4	Topsoil
2.5	Landscape Mulch
3.1	Preparation
3.2	Seeding and Sod Replacement
3.3	Sod Removal/Replacement
3.4	Topsoil
3.5	Mulching
3.6	Watering
3.7	Landscape Mulch
3.8	Maintenance

1.2 REFERENCES

A. Drawings and general provisions of the Contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this section.

1.3 WORK INCLUDED

A. The Contractor shall furnish all labor, equipment, and materials necessary for and to properly restore to the satisfaction of CITY, all ground surfaces irrespective of the type, which may be disturbed in the progress of Work required under this contract.

B. These items shall include in general, but without limitation, the spreading of topsoil, seeding, sod placement/replacement, fertilizing, and mulching required to restore disturbed areas as necessary for the proper completion of the Work as may be required, directed, or as specified herein. It is the intent of these specifications to place seed over all disturbed easement areas and to place topsoil and sod where established lawns or other well improved grass areas existed prior to construction. All disturbed areas are to be restored to same or better general conditions that existed prior to commencement of the Work or to the satisfaction of the CITY Inspector. Items covered under this section are considered as permanent restoration, as compared to grassing required in the item

titled Erosion and Sedimentation Controls, which is for temporary erosion and sediment control. Areas disturbed outside the lines and limits of the right-of-way and easements indicated on the plans shall be restored at the expense of the Contractor unless directed by CITY.

C. Standard Specifications: The requirements of the manual for Erosion and Sediment Control in Georgia and as revised to date, shall apply insofar as they are applicable.

1.4 SUBMITTALS

A. The Contractor shall submit for approval, in accordance with Section 01 33 00 SUBMITTAL PROCEDURES all working Contract documents and/or drawings and schedules of materials and methods proposed to follow in the execution of the Work under this item.

B. Submittals shall include, but not be limited to product data for seed, fertilizer, agricultural limestone, vegetative mulch, landscape, mulch, plugs, sod and topsoil.

C. The Contractor shall submit plans showing in detail the type, location, fertilizer ratios, and percentage cover of all seeding, plugs, and sodding to be used in construction.

1.5 WARRANTY

A. All plantings, seeded, plugged, or sodded, shall be guaranteed for a period of one (1) year after Final Completion of the project. Any areas showing evidence of settlement or loss of topsoil shall be rebuilt and replanted as required. Any plantings that are dead or dying during the Warranty Period must be replaced, and at Contractor’s expense.

PART 2 – PRODUCTS

2.1 SEED

A. Riparian Buffer Mix, ERNMX 178 or equivalent.

B. Seed shall meet the requirements of the Georgia Seed Laws and Rules and Regulations.

C. The aggregate percent of material other than grass seed shall include all non-viable seed, chaff, bulbs, live seed of crop plants other than those specified above, harmless inert matter, and weed seed not exceeding 1.0% by weight of pure live seed and other material in the mixture.

D. Commercial fertilizer shall be composed of a formula of 20-12-10 and shall conform to applicable Georgia fertilizer laws. It shall be uniform in composition, dry, and free flowing and shall be delivered to the site in the original unopened containers, each bearing the manufacturer's guaranteed analysis. Any fertilizer, which becomes caked or otherwise damaged making it unsuitable for use, shall not be accepted.

E. Agricultural limestone shall be an acceptable grade of ground limestone, ground dolomite, or a mixture of limestone and dolomite meeting the following physical and chemical requirements:

1. Gradation

Standard Sieve Size	Maximum Percent (%) Retained
No. 8, maximum	10
No. 100, maximum	75

F. The vegetative mulch shall be the cereal straw from stalks of oats, rye, wheat, or barley. The straw shall be free of prohibited weed seeds and shall be relatively free of all other noxious and undesirable seeds. The straw shall be clean and bright, relatively free of foreign material and be dry enough to spread properly. If the above straw specifications cannot be met practicably, the foliage of the following plants may, with CITY's approval, be substituted: Smooth Brome, Timothy, Orchard Grass, Red Canary Grass, Tall Fescue, Red Top, Millet, Blue Stem, Indian Grass, Red Clover, White Clover, Alfalfa, Crimson Clover, Birds Foot Trefoils, and Vetch. The foliage shall be taken relatively free of noxious and undesirable seeds and foreign material.

2.2 SOD

A. Turfgrass Sod: Emerald Zoysia.

B. Use living, growing sod for block or big roll sod. This includes sod that is dormant during the cold or dry season and capable of renewing growth after the dormant period.

C. Obtain sod from approved nurseries that have a Georgia Live Plant License.

D. Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted.

2.3 PLUGS

A. Shoreline Protection: Maidencane.

2.4 TOPSOIL

A. Topsoil: ASTM D 5268, pH range of 5.5 to 7.4 percent organic material minimum, free of stones 1 inch or larger in any dimension, and other extraneous materials harmful to plant growth.

1. Topsoil Source: Reuse surface soil stockpiled on the site. Verify suitability of surface soil to produce topsoil meeting requirements and amend when necessary. Supplement with imported topsoil when quantities are insufficient. Clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.
2. The Contractor shall furnish topsoil free from objectionable materials such as hard clods, stiff clay, sods, hardpan, partially disintegrated stone, plant stumps, large roots, litter, or other materials that are not integrally a natural component of good agricultural soils and which are harmful to or unnecessary for successful plant

growth.

2.5 LANDSCAPE MULCH

A. Shredded Bark Mulch: Shredded bark mulch shall consist of shredded bark and wood to match the existing landscape mulch to the extent practicable. Maximum length of any individual component shall be two inches (2") and a minimum of seventy-five percent (75%) of the mulch shall pass through a one inch (1") screen. Mulch shall be free of germination-inhibiting ingredients. The bark mulch shall have the characteristics of retaining moisture, forming a mat not susceptible to spreading by wind or rain, and providing a good growth medium for plants. Shredded bark much may contain up to fifty percent (50%) shredded wood material. Wood chips are not acceptable. Bark mulch containing shredded wood shall be aged a minimum of one year prior to installation. Bark mulch shall be free of soil, rocks, and weeds.

PART 3 - EXECUTION

3.1 PREPARATION

A. The sub grade for the areas to be seeded or sodded shall be brought to a uniform grade, free of large stones. Where topsoil is required by CITY, the topsoil shall be uniformly graded, trimmed, and raked free from unsuitable material, ridges, bumps, or depressions. Over this area, spread agricultural lime at the rate of 40 pounds per 1000 square feet, and spread fertilizer uniformly on the surface of the ground at the rate of 1500 pounds per acre. Mix the lime and fertilizer uniformly into the top four (4) inches of the soil by suitable harrows, rotary tillers, or other approved equipment.

3.2 SEEDING, SODDING, AND PLUGGING

A. Refer to the contract drawings for location, details, and planting rates.

B. Contractor shall stake out planting zones for review by the CITY prior to installing plantings.

C. The subgrade for areas to be seeded, plugged, or sodded shall be brought to a uniform grade, free of large stones. Topsoil shall be uniformly graded, trimmed, and raked free from unsuitable material, ridges, bumps, or depressions. Over this area, spread agricultural lime at the rate of 50 pounds per 1000 square feet, and spread fertilizer uniformly on the surface of the ground at the rate of 35 pounds per 1000 square feet. Mix the lime and fertilizer uniformly into the top four (4) inches of the soil by suitable harrows, rotary tillers, or other approved equipment.

D. All seeded areas shall be uniformly mulched immediately after seeding.

E. Maidencane should be planted in parallel rows beginning at the waterline, and the rows are to be spaced at approximately 18-inches. Plugs should be staggered in adjacent rows.

F. Sod shall be carefully placed and rolled to insure good soil contact, and sod shall be stapled on slopes 4:1 and steeper.

G. The Contractor shall be responsible for maintaining all areas including, watering, and reseeding defective area until a satisfactory stand of grass covering at least ninety percent (90%) of the entire stabilized area is established and Final Acceptance of the Work by CITY and/or the Engineer is obtained. Areas showing evidence of settlement or loss of topsoil shall be rebuilt and reseeded, replugged, or resodded as required.

3.3 TOPSOIL

A. Where directed by CITY, areas to be seeded shall be covered with a layer of topsoil. The topsoil shall be of sufficient thickness that when spread and compacted, a minimum of four (4) inches shall be available. The Contractor shall furnish natural topsoil of a good condition and tillable structure. Obtain topsoil as borrow from an outside source and from piles of uniform texture, drainage, and other characteristics so as to constitute a homogenous soil meeting the requirements of the Georgia Department of Transportation (GDOT) of and approved by CITY. Do not place topsoil containing frost or in muddy conditions. If utilizing existing material obtained from the initial excavation of the worksite for reuse as top soil, the Contractor must first obtain approval from CITY as to suitability of its content, including approval of location and method of storage of topsoil for reuse.

3.4 MULCHING

A. Uniformly mulch all seeded areas in a continuous blanket immediately after seeding. Apply the mulch so as to permit some sunlight to penetrate and the air to circulate and at the same time shade the ground, reduce erosion, and conserve soil moisture. Approximately 25 percent of the ground shall be visible through the mulch blanket.

B. Hold mulch on slopes greater than 3 to 1 ratio in place by the use of an approved mulch binder. Thoroughly mix binder and apply with the mulch. Apply emulsified asphalt or cutback asphalt at the approximate rate of 5 gallons per 1,000 square feet as required to hold the mulch in place.

C. Cover structures, poles, fence, and appurtenances if the mulch binder is applied in such a way that it would come in contact with or discolor the structures.

D. Apply mulch and binder by suitable blowing equipment at closely controlled application rates.

3.5 WATERING

A. Maintain the proper moisture content of the soil to insure adequate plant growth until a satisfactory stand is obtained. If necessary, perform watering to maintain an adequate water content in the soil.

B. Accomplish watering by hoses, tank truck, or sprinklers in such a way to prevent erosion, excessive runoff, and overwatered spots.

3.6 LANDSCAPE MULCH

A. Apply landscape mulch at least 2 inches for shredded bark and at least 4 inches loose depth for pine straw to obtain a compacted depth of at least 2 inches depth. Compaction to occur naturally.

3.7 MAINTENANCE

A. After the grass has grown to a height of 2 inches and before final acceptance, apply one additional application of nitrogen at the rate of 50 lbs/acre.

B. Apply nitrogen with mechanical hand spreaders or other approved spreaders capable of uniformly covering the grassed areas. Do not apply nitrogen on windy days or when the foliage is damp. Do not apply nitrogen between October 15 and March 15 except in Zone 4. Mow grass at regular intervals to maintain at a maximum height of 2-1/2 inches. Do not cut more than 1/3 of grass blade at any one mowing.

C. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.

D. Immediately reseed areas that show bare spots.

E. Apply fertilizer at approximately 600 lbs/acre each spring after initial plant establishment until Final Acceptance.

F. CITY and/or the Engineer may require replanting of an area that shows unsatisfactory growth for any reason at any time. Except as otherwise specified or permitted, prepare replanting areas according to the Specifications as if they were the initial planting areas.

G. If the compaction depth of landscape mulch is less than 2 inches prior to Final Acceptance, apply additional landscape mulch to deficient areas.

END OF SECTION 32 92 00

SECTION 32 93 43

TREES, SHRUBS, AND PLANTS

PART 1 – GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

Section	Title
1.2	References
1.3	Work Included
1.4	Submittals
2.1	Trees, Shrubs, and Plants
3.1	Warranty
3.2	Workmanship

1.2 REFERENCES

A. Drawings and general provisions of the Contract, including general and supplementary conditions as applicable, apply to this section.

1.3 WORK INCLUDED

A. The Contractor shall, under this item, furnish all materials, tools, labor, and equipment necessary to install select nursery trees, riverbank joint plantings, shrubs, and plants as indicated on the Contract Documents and/or Drawings or as directed by CITY.

1.4 SUBMITTALS

A. The Contractor shall submit for approval, in accordance with Section 01 33 00 SUBMITTAL PROCEDURES all working Contract documents and/or drawings and schedules of materials and methods proposed to follow in the execution of the Work under this item.

B. The Contractor shall submit detailed plans for planting, including type, number, location and spacing, hole size, fertilizer rates, and staking requirements.

PART 2 – PRODUCTS

2.1 TREES, SHRUBS, AND PLANTS

A. All trees, shrubs and plants shall be nursery grown.
   1. CITY will not accept trees, shrubs, and/or plants that are severely cut back or pruned to conform to size requirements.
   2. CITY will reject trees, shrubs, and plants that are undersized, have poorly developed tops or root systems, or are infected with disease or infested with insects.

B. Refer to Contract Drawings for type, size, and quantity.

PART 3 - EXECUTION

3.1 WARRANTY

A. All trees, riverbank plantings, shrubs, and plants shall be guaranteed for a period of one (1) year after substantial completion of the project. Any trees, shrubs, or plantings that are dead or dying must be replaced.

3.2 WORKMANSHIP

A. The proposed location of trees, plants, and shrubs must be marked with a stake and approved by CITY prior to planting.

END OF SECTION 32 93 43

SECTION 33 03 30.16

TELEVISION INSPECTION

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

Section	Title
1.2	Work Included
1.3	Safety
2.1	Equipment
3.1	Execution
3.2	Bypass Pumping/Flow Control
3.3	Acceptance

1.2 WORK INCLUDED

A. The work in this Section consists of providing the inspection of pipelines utilizing closed-circuit television techniques to identify the location and extent of storm drain defects to allow for a determination of rehabilitation needs, to document pre-rehabilitation pipeline condition, and/or to document post-rehabilitation pipeline condition.

B. Prior to performing closed circuit television inspection activities, Contractor shall thoroughly clean the sewer(s) designated to be televised. Sewer cleaning requirements are contained in Technical Specification Section 33 01 30.52 – Storm Sewer Pipeline Cleaning.

1.3 SAFETY

A. Contractor shall be solely responsible for safety during the performance of all Work. Contractor shall not enter into any sewer segment where hazardous conditions may exist until such time as the source of those conditions is identified and eliminated by Contractor. Contractor shall perform all work in accordance with the latest OSHA confined space entry regulations. Contractor shall coordinate his work with local fire, police and emergency rescue units.

B. Contractor shall be responsible for any damage to public or private property resulting from his/her televising activities and shall repair or otherwise make whole such damage at no cost to CITY.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Television inspection equipment shall have an accurate footage counter that displays on a remote monitor the exact distance of the camera from the centerline of the starting manhole. The camera shall be of the remotely operated pan and tilt type. The rotating camera and lighthead configuration shall provide 240 degrees of pan and tilt angle measuring centerline to centerline and 70 degree lens viewing angle.

B. The camera shall be color and shall provide a minimum of 460 lines of horizontal resolution and 400 lines of vertical resolution. The image pick-up device shall contain in excess of 379,000 picture elements (pixels). Geometrical distortion of the image shall not exceed one percent.

C. The color camera shall be equipped with the necessary circuitry to allow for the remote adjustment of the optical focus and iris from the power control unit at the viewing station.

PART 3 - EXECUTION

3.1 EXECUTION

A. Inspection of pipelines shall be performed by experienced personnel trained in locating breaks, obstacles, and service connections by closed-circuit television inspection techniques. The interior of the pipeline shall be carefully inspected to determine the location and extent of all pipeline defects. The location of any conditions which may result in a limitation of rehabilitation techniques that could be used and/or prevent proper installation of designated rehabilitation materials in the pipelines shall be noted so that these conditions can be considered and, if necessary, corrected prior to actual rehabilitation.

B. Contractor shall internally inspect, via closed circuit television inspection, the sewer segments as required. Generally, inspection shall be completed one sewer section at a time. Access for televising purposes shall only be via existing manholes. Should access to particular sewer section be difficult and adjacent sections require television inspection, Contractor may be allowed to complete inspection in multiple sewer sections. When multiple sewer sections are inspected using one setup, Contractor shall zero the camera's footage metering device at each subsequent sewer manhole to establish uniform starting location of Station 0+00 for each sewer section televised.

C. Contractor shall inspect not less than ninety percent (90%) of the internal pipe surface at all times, including sags in sewer pipelines. Contractor shall re-clean and televise any segment for which video tape does not present a clear image of at least 90% of the internal pipe surface at all times. Maximum acceptable speed of camera through sewer shall be thirty (30) feet

per minute. Lighting system shall be adequate for quality color picture at least 5 feet in front of the camera's lens.

D. At all defects and service connections, the camera shall be stopped and the pan and tilt features shall be used to obtain a clear picture. Where possible, the camera shall be panned to view up each lateral or point of connection.

E. Contractor shall record these inspections on extra-high quality color video and on a suitable log. Video shall include a visual and audio narrative noting:
1. Date, time of day, and depth of flow;
2. Sewer segment number. Segment numbers shall be designated by CITY.
3. Upstream manhole number.
4. Downstream manhole number.
5. Size of sewer.
6. Sewer materials of construction.
7. Closest street address and street name on which sewer is located.
8. Beginning and ending tape counter numbers for each run (manhole to next manhole) of sewer inspected.
9. Direction of movement of camera, heading, and direction of flow.
10. Locations of service connections into sewer by clock position and with counter distance in feet from beginning manhole's centerline
11. Location (start and end counter distances in feet from the beginning manhole's centerline) and description of obstructions, structural defects, missing pieces of pipe, longitudinal and/or circumferential cracking, joint deterioration including open and/or offset joints, ovality, leakage or evidence thereof, corrosion, erosion, break-in connections, protruding connections, mineral deposits, roots, previous repairs, grease/fats/oil deposits on pipe walls, sags, and other abnormalities with respect to the sewer's condition with counter distance in feet from the beginning manhole's centerline

Contractor's log shall contain the same information.

F. Video shall visually display at a minimum the date, pipe segment number (manhole number) and distance from the centerline of the upstream manhole. The distance between manholes shall be verified by measuring tape. If the counter distance and the taping distance differ by more than 2 feet per 100 feet, the run shall be re-televised by Contractor at no additional cost to CITY.

G. Video shall be maintained and delivered in a case, which shall display the project name, project number, date of inspection, manhole/structure segment number(s) inspected, and crew ID number. The entire length of any one sewer segment shall be on one tape. No segment shall be split between two tapes. A tape may have multiple segments, so long as an entire section is on one tape. Original videotapes of all sections will be provided to CITY along with the respective television inspection field logs.

H. If during television operation television camera will not pass safely through entire sewer section being investigated, Contractor shall, at no additional cost to CITY, set up equipment so that inspection can be performed from opposite (downstream) manhole. Where an obstruction is encountered and a reverse set up is required, the distance shall be entered into the log and verbally noted on the video from which manhole the measurements are being made. If under the reverse set-up the camera again fails to pass through the entire sewer section, inspection shall be considered complete. All obstructions in the sewer segment that prohibit passage of the television camera shall be immediately reported to the CITY by Contractor referencing location and nature of the obstruction. No rehabilitation work shall proceed until Contractor receives direction from CITY regarding removal of the obstruction.

I. Should Contractor's televising equipment become lodged in any sewer pipe, it shall be removed by Contractor at his expense. This shall include, if necessary, excavation and repair of the sewer, underground utility locates and repairs, backfilling and surface restoration. The CITY shall be notified before the Contractor performs any excavation operation to remove camera. Any repair work to the sanitary sewer system shall be approved and authorized by the CITY. Contractor shall re-televise any sewer segment in which his equipment became lodged after said equipment has been removed to demonstrate to the CITY that no damage exists as a result of his televising operations.

3.2 BYPASS PUMPING/FLOW CONTROL

A. Should bypass pumping or other form of flow control be required by/of Contractor to facilitate televising, Contractor shall be solely responsible for providing all labor, equipment and materials necessary to control the flow of in and/or around segment(s) being televised. Requirements for flow control and bypass pumping are contained in Section 31 23 19 DEWATERING.

3.3 ACCEPTANCE

A. Contractor shall present on videotape a continuous image in complete conformance with these Specifications of not less than ninety percent (90%) of the internal pipe surface at all times, including sags in sewer pipelines. The video tape shall be accompanied by a complete log. Maximum acceptable speed of camera through sewer shall be thirty (30) feet per minute. Lighting system shall be adequate for quality color picture at least 5 feet in front of the camera's lens. Contractor shall re-clean and televise any segment for which video tape does not present a clear image of at least 90% of the internal pipe surface at all times, and/or is accompanied by an incomplete log.

END OF SECTION 33 01 30.16

SECTION 33 01 30.52

STORM SEWER PIPE CLEANING

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

Section	Title
1.2	Work Included
1.3	Safety
2.1	Equipment
3.1	Execution
3.2	Bypass Pumping/Flow Control
3.3	Acceptance

1.2 WORK INCLUDED

A. The work in this Section consists of providing for the cleaning of pipelines and/or storm sewer line rehabilitation. Pipes shall be clean to allow for a closed-circuit television camera to discern 95% of the internal pipe surface, to discern all pipeline defects, and to facilitate installation of rehabilitation materials.

B. Contractor shall clean all storm sewer segments designated for inspection and/or rehabilitation prior to performing Work. Contractor shall be solely responsible for his means and methods of storm sewer cleaning. Cleaning of the storm sewers shall consist of the removal of all grease, sand, silt, solids, rags, roots, rocks and other debris from each storm sewer segment, including sags within any storm sewer segment and including manholes/structures. Selection of cleaning equipment and the method for cleaning shall be based on the condition and/or pipe material of the storm sewer segment at the time work commences, and shall comply with this Specification. FLUSHING OF ANY STORM SEWER TO FACILITATE CLEANING ACTIVITIES WITHOUT THE CAPTURE OF SOLIDS AND DEBRIS IS EXPRESSLY PROHIBITED.

1.3 SAFETY

A. Contractor shall be solely responsible for safety during the performance of all Work. Contractor shall take satisfactory precautions to protect the storm sewer segments and appurtenances from damage that might be inflicted upon them by the use of cleaning equipment. Any damage inflicted upon a storm sewer segment or other public or private property as a result of the Contractor’s cleaning operations, regardless of the cleaning method used and regardless of any other circumstance which may contribute to the damage, shall be repaired by Contractor at his sole expense.

B. Contractor shall not enter into any storm sewer segment where hazardous conditions may exist until such time as the source of those conditions is identified and eliminated by Contractor. Contractor shall perform all work in accordance with the latest OSHA confined space entry regulations. Contractor shall coordinate his work with local fire, police and emergency rescue units. Whenever hydraulically propelled cleaning tools, which depend upon water pressure to provide their cleaning force, or any tools which retard the flow of water in the storm sewer segment are used, precautions shall be taken by Contractor to ensure that the water pressure utilized does not result in any damage or flooding to public or private property being served by the storm sewer segment(s) involved.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Only hydraulic and/or mechanical equipment shall be used by Contractor to accomplish cleaning activities. Accuracy of equipment and operating method for cleaning shall be judged by the results obtained. When hydraulic or high velocity cleaning equipment is used, a suitable sand trap, weir, or dam shall be constructed in the downstream manhole/structure in such a manner that all solids and debris are trapped and removed thereby preventing such material from passing into the next storm sewer segment reach. The following are general equipment and performance requirements:

1. Hydraulically Propelled Equipment

a. The equipment used shall be of a movable dam type and be constructed in such a way that a portion of the dam may be collapsed at any time during the cleaning operation to protect against flooding of the storm sewer, damage to the storm sewer, and/or damage to public or private property.

2. High-Velocity Jet Equipment

a. The storm sewer pipeline cleaning equipment shall be a combination of high-velocity (hydro-cleaning) jet and vacuum system, truck-mounted for mobility and ease of operation. The hydro-cleaning equipment for storm sewer lines shall include a minimum 1000 gallon water storage tank, auxiliary engines and pumps, and a minimum of 600 feet of pressure hose on a power-driven hose reel.

b. The pump nozzle combinations shall be capable of producing water flow rates up to 120 gpm at a working pressure up to 2000 PSI. The vacuum system shall be a positive displacement blower with a minimum of 4200 cfm at 15 inches of mercury.

c. All high-velocity storm sewer cleaning equipment shall be constructed for ease and safety of operation. The equipment shall have a selection of two or more high-velocity nozzles. The nozzles shall be capable of producing a scouring action from 15 to 45 degrees in all sizes of line designated to be cleaned. Equipment shall also include a high-velocity gun for washing and scouring manhole walls and floor. The gun shall be capable of producing flows from a fine spray to a solid stream.

d. During all sewer cleaning operations, satisfactory precautions shall be taken to protect the storm sewer lines from damage that might be inflicted by improper use of cleaning equipment. Whenever hydraulically-propelled cleaning tools, which depend upon water pressure to provide their cleaning force, or any tools which retard the flow of stormwater in the sewer line are used, precautions shall be taken to ensure that the water pressure does not cause any damage to or flooding of public or private property being served by the storm sewer system.

3. Mechanically Powered Equipment

a. Power rodding machines shall be either a sectional or continuous rod type capable of holding a minimum of 750 feet of rod. The rod shall be specifically heat-treated steel. To insure safe operation, the machine shall be fully enclosed and have an automatic safety clutch or relief valve.

b. Buckets, scrapers, scooters, porcupines, brushes and other mechanical equipment may also be utilized. All equipment and devices shall be operated by experienced personnel so that storm sewer lines are not damaged in the process of cleaning.

PART 3 - EXECUTION

3.1 EXECUTION

A. Access for cleaning purposes shall only be via existing manhole/structure openings.

B. Blockages Preventing Cleaning

1. If cleaning or an entire storm sewer section cannot be successfully performed from one manhole/structure, equipment shall be set up on another manhole/structure and cleaning again attempted. No additional payment allowance shall be made for reverse set-ups. If on reverse setup successful cleaning also cannot be performed or equipment fails to traverse entire storm sewer line section, it shall be assumed that a major blockage or defect exists and cleaning effort shall be abandoned.
2. Contractor shall determine the location of major blockage(s) by measuring length of hose or rod inserted from manholes at each end and immediately report location of blockage(s) to CITY and Contractor shall note these

conditions in its field log.

3. Contractor shall recognize that there are some conditions such as broken pipe and major blockages that prevent cleaning from being accomplished or where damage could result if cleaning were attempted or continued. CITY shall be immediately notified by Contractor of any and all conditions which in the opinion of Contractor warrant termination of cleaning activities. If Contractor's cleaning equipment becomes lodged in a storm sewer, it shall be removed by Contractor at his expense. This shall include excavation and repair of the storm sewer, underground utilities, backfilling, and surface restoration.

C. Debris Removal and Disposal

1. Contractor shall remove all sludge, dirt, sand, rocks, grease and other solid or semisolid material and debris resulting from the cleaning operations from the downstream manhole/structure of the storm sewer segment being cleaned. Passing material from storm sewer segment to storm sewer segment shall not be permitted. In the event that sludge, dirt, sand, rocks, grease and other solid or semisolid material or debris resulting from the cleaning operations are observed and/or detected by CITY as passing to downstream storm sewer segment(s), Contractor shall be responsible for cleaning such downstream storm sewer segment(s) at no additional cost to CITY.

2. Contractor shall be responsible for the handling, hauling and disposal of all debris, silt, and accumulated solids removed from the storm sewer. All debris, silt and solids removed by Contractor shall be disposed of at a facility licensed for the handling and disposal of such materials in accordance with all appropriate codes, rules and regulations for the handling and disposal of such materials. Under no circumstances shall the removed solids be dumped onto streets or into ditches, catch basins, storm drains, manholes, or any other stormwater structure. Improper disposal of solids removed from the sewers may subject Contractor to fines imposed by CITY or other regulatory entities. In addition, Contractor may be subject to civil and/or criminal penalties for improper disposal of removed materials under the law.

3.2 BYPASS PUMPING/FLOW CONTROL

A. Should bypass pumping or other form of flow control be required by/of Contractor to facilitate storm sewer line cleaning, Contractor shall be solely responsible for providing all labor, equipment and materials necessary to control the flow of stormwater in and/or around storm sewer segment(s) being televised. Requirements for sewage flow control and bypass pumping are contained in Section 31 23 19 DEWATERING.

3.3 ACCEPTANCE

A. Acceptance of sewer line cleaning will be based on site inspection and

viewing of video tape completed following cleaning. A line will be considered clean if the depth of debris remaining after cleaning is less than or equal to the following:

Pipe Size	Maximum Debris Remaining
Less than 18 inches	Negligible
18 inches through 30 inches	1/4 inch
33 inches through 54 inches	1/2 inch
60 nches and above	3/4 inch

B. If cleaning is deemed unsatisfactory, Contractor shall re-clean and re-inspect the sewer line until cleaning is shown to be satisfactory.

END OF SECTION 33 01 30.52

SECTION 33 01 30.72

RELINING STORM SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

Section	Title
1.2	References
1.3	Work Included
1.4	Submittals
1.5	Qualification Requirements
1.6	Quality Assurance
1.7	Responsibility for Overflows and Spills
1.8	Delivery, Storage, and Handling
2.1	Cured-in-Place Liner
2.2	Sluice Gate Structure
3.1	Preparation
3.2	Installation
3.3	Post-Installation
3.4	Remote Connection Reinstatement
3.5	Testing
3.6	Television Inspection
3.7	Acceptance
3.8	Prosecution of Work
3.9	Warranty

1.2 REFERENCES

A. This specification references standards from the American Society for Testing and Materials (ASTM), including the following. These standard specifications are made a part hereof by such reference and shall be the latest edition and revision thereof. In case of conflicting requirements between this Specification and the referenced ASTM documents, the requirements of this Specification will govern.

1. ASTM D543 Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents
2. ASTM D578 Standard Specification for Glass Fiber Strands
3. ASTM D638 Standard Test Method for Tensile Properties of Plastics
4. ASTM D790 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
5. ASTM D792 Standard Test Methods for Density and Specific Gravity of Plastics by Displacement
6. ASTM D1238 Standard Test Method for Melt Flow Rates of

Thermoplastics

7. ASTM D2122 Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings
8. ASTM D2990 Standard Test Method for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics
9. ASTM D3567 Standard Practice for Determining Dimensions of Fiberglass (GlassFiber-Reinforced Thermosetting Resin) Pipe and Fittings
10. ASTM D3681 Standard Test Method for Chemical Resistance of "Fiberglass (Glass Fiber Reinforced Thermosetting Resin) Pipe in a Deflected Condition
11. ASTM D5813 Standard Specification for Cured-in Place Thermosetting Resin Sewer Pipe
12. ASTM F1216 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
13. ASTM F1743 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Pull in and Inflate and Curing of a Resin-Impregnated Tube
14. ASTM F2019 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Pulled in Place Installation of Glass Reinforced Plastic (GRP) Cured-in-Place Thermosetting Resin Pipe (CIPP)

1.3 WORK INCLUDED

A. The work in this Section consists of the rehabilitation of pipelines using Cured-in-Place Pipe Liner (CIPP). CIPP is defined as a hollow cylinder consisting of a flexible fabric tube with cured (cross linked) thermosetting cured resin or a flexible glass fiber reinforced tube with ultra-violet (UV) cured resin. Interior or exterior coatings/films, or both, may be included. The CIPP is formed within an existing pipe and takes the shape of and fits tightly to the pipe. The Contractor shall provide all materials, labor, equipment and services necessary for bypass pumping stormwater flows, cleaning and television inspection of pipe to be lined, complete installation of new pipe liner, pipe sealing at manholes, and final television inspection and testing of the pipe.

B. The work in this section also includes replacing the existing stem guides and hoist head for the sluice gate apparatus, as well as any inoperable apparatuses that shall be repaired or replaced in kind. The Contractor shall provide all materials, labor, equipment and services necessary to ensure a functional and operational sluice gate structure.

1.4 SUBMITTALS

A. The Contractor shall submit for approval, in accordance with Section 01 33 00 SUBMITTAL PROCEDURES all working Contract documents and/or drawings and schedules of materials and methods proposed to follow in the execution of the Work under this item.

B. The Contractor shall submit the following information:

1. Manufacturer's certificate that the materials to be used meet the referenced standards and these specifications.
2. License or certificate verifying Manufacturer's/Licensor's approval of the installer.
3. Field measurements.
4. Television inspection reports and video tapes made prior to and after CIPP rehabilitation.
5. Design wall thickness calculations, signed and sealed by a registered professional engineer proficient in the design of the particular system.
6. Contractor's procedures, equipment, and materials for installation of the rehabilitation system including the duration expected for the particular location.
7. Bypass pumping plan (if required) for review by the CITY at least five (5) days prior to beginning pipe rehabilitation. This should include an emergency response plan in the event of a failure of the bypass pumping system. The Contractor shall receive written acceptance of the plan from the CITY.
8. Sampling procedures and locations for obtaining representative samples of the finished rehabilitation system.
9. A final certificate of compliance with this specification shall be provided by the manufacturer for all rehabilitation material furnished. Tests for compliance by an independent third-party laboratory approved by the CITY shall be made according to the applicable ASTM specification and the manufacturer's quality control program.

1.5 QUALIFICATION REQUIREMENTS

A. The system proposed (material, methods, workmanship) must have been proven through previous successful installations to an extent and nature satisfactory to the CITY. All products and their licensed installers must be pre-approved by the CITY.

B. Only CIPP products with a 50-year design life will be considered for approval.

C. For a CIPP product to be considered commercially proven it shall have been successfully in service in applications similar to this project for a minimum of five (5) years. Additionally, a minimum of 250,000 linear feet and 1,000 line sections must have successfully been installed in the USA. The Manufacturer (Licensor) shall have completed sufficient enough testing to document the material and the method(s) of installation proposed will produce the desired long- term performance.

D. For the Installer to be considered commercially proven, the Installer must have successfully installed in the last five (5) years a minimum of 25,000 linear feet of CIPP greater than 18-inches in diameter and at least one (1) project of proposed CIPP equal to or greater than 42-inches in diameter. In addition, the Installer must satisfy all insurance, financial, and bonding requirements of the CITY. The Installer shall be "ISO" certified or demonstrate that he/she has a similar quality assurance system in place.

1.6 QUALITY ASSURANCE

A. Correction of any failed liner deemed unacceptable as a result of the post video inspection and/or independent test results for required structural values (thickness, chemical resistance, etc.,) shall be the responsibility of the Contractor, at no extra cost to the CITY.

B. The Contractor shall televise the existing pipeline within two (2) working days prior to beginning construction and the inspection video shall be provided to the CITY.

C. The Contractor shall televise the installed liner after all existing services have been reconnected and the structure work has been completed. The Contractor shall repair all damage found during the review of these final TV inspection video tapes. The damage shall include, but is not limited to, sags, leaks, cracks, insecure joints, visual defects, and flaws which, in the opinion of the CITY, are not acceptable and would impair the operation and serviceability of the new piping system.

D. The Contractor shall carry out all operations in strict accordance with all applicable OSHA regulations. Particular attention should be paid to those safety requirements involving work on an elevated platform and/or entry into a confined space.

1.7 RESPONSIBILITY FOR OVERFLOWS AND SPILLS

A. It shall be the responsibility of the Contractor to schedule and perform his work so as to result in no overflows or spills from the system. If flows are such that they interfere with the Contractor's ability to perform work, the Contractor shall be responsible for scheduling his work during low flow periods or provide bypass pumping. Bypass pumping shall be provided only with the specific approval of the CITY.

B. Contractor will indemnify and hold harmless the CITY for any fines or third-party claims for personal or property damage arising out of a spill or overflow that is fully or partially the responsibility of the Contractor. Should fines subsequently be imposed as a result of any overflow for which the Contractor is fully or partially responsible, the Contractor shall pay all such fines and all of the CITY's legal, engineering, and administrative costs in defending such

fines and claims associated with the overflow.

1.8 DELIVERY, STORAGE, AND HANDLING

A. The Contractor shall be responsible for the delivery, storage, and handling of products. No products shall be shipped to the job site without the approval of CITY's Representative.

B. Keep products safe from damage. Promptly remove damaged products from the job site. Replace damaged products with undamaged products.

PART 2 - PRODUCTS

2.1 CURED-IN-PLACE LINER

A. The finished CIPP liner shall be fabricated from materials which when complete are chemically resistant to and will withstand internal exposure to common flow having a pH range of 5 to 11 and temperatures up to 150ºF.

B. CIPP liner design may be based on material properties of the liner that exceed the minimum values specified in ASTM F1216. However, the initial flexural modulus used in structural design calculations shall not exceed 400,000 psi.

C. CIPP liner design shall be based on achieving test parameters as follows:

	Water/Steam Cured CIPP
Flexural Modulus	250,000 psi
Flexural Strength	4,500 psi
Tensile Strength	3,500 psi
Thickness	Per work order design calculations (19 mm minimum)

D. The minimum length shall be that deemed necessary by the Contractor to effectively span the distance from the inlet to the outlet of the respective manholes/structures unless otherwise specified. The Contractor shall verify the lengths in the field before manufacturing.

E. Prior to design and manufacture of the liner the Contractor shall take all necessary field measurements (including, but not limited to, the condition of the host pipe, diameter, ovality, deflection and length of the host pipe, bury conditions, soil type, soil loading factor and hydrostatic load) to ensure the liner is designed for the particular location’s conditions.

F. The liner must be designed for a minimum service life of 50 years.

G. The minimum liner thickness installed shall be calculated according to ASTM standards, and based on 1.5mm increments.

H. Unless field measurements determine other conditions, the liner shall be structurally designed for minimum conditions of: earth load of 21.5 feet at the

pipe invert; hydrostatic load at the pipe invert of 80% of the pipe's depth or 19.0 feet (whichever is greater); fully deteriorated host pipe/direct bury condition; prism loading; soil loading of 120 pcf; factor of safety of 2.0; 2% ovality; maximum deflection of 5%; soil modulus of 1000 psi, maximum lining enhancement factor of 7; HS20 live loading; and 50% long-term modulus reduction factor.

I. The seamless flexible tube shall be fabricated to a size that when installed will neatly fit the internal circumference of the existing storm sewer lines. Allowance shall be made for circumferential stretching during insertion so that the final cured product is snug against the wall of the host pipe.

J. Unless otherwise specified, the Contractor shall furnish a general purpose, unsaturated, polyester or vinyl ester resin and catalyst system compatible with the reconstruction inversion process that provides cured physical strengths specified herein.

K. Resin system shall not contain non-structural enhancing fillers of any kind. The Contractor shall submit for approval, by the CITY, the proposed resin system.

L. The wall color of the interior pipe surface of CIPP after installation shall be a light reflective color so that a clear detailed examination with closed circuit television inspection equipment may be made.

2.2. SLUICE GATE STRUCTURE

M. Sluice gate structure component systems include:

1. Stem Guides Complete
   a. Shall be replaced with Rodney Hunt 1.25" guides or approved equal and appurtenant parts.
2. Hoist Head Complete
   a. Shall be replaced with Rodney Hunt 5001.5 Hoist Head Only, 1.25" or approved equal and appurtenant parts.
3. Pedestal Complete
   a. Replace if damaged or inoperable with pedestal associated with Rodney Hunt 5001.5 Hoist Head Only, 1.25" or approved equal, Cast Iron ASTM A126, Class B / Stainless Steel 304, and appurtenant parts.
4. Operating Stem Complete
   a. Replace if damaged or inoperable with Rodney Hunt 1.25" diameter stem or approved equal, Stainless Steel ASTM A276 Type 304, and appurtenant parts.
5. Gate Complete
   a. Replace if damaged or inoperable with 24" x 24" Rodney Hunt sluice gate or approved equal, Max Seating Head = 17.0 feet, Cast Iron ASTM A126, Class B, including all required wedges (Bronze ASTM B-584), seat facings (Bronze ASTM B98 or B21), thrust and lift nuts (Bronze ASTM B-584), and gate assembly nuts and bolts (Stainless Steel

304), and appurtenant parts.

PART 3 - EXECUTION

3.1 PREPARATION

A. The following installation procedures shall be adhered to unless otherwise approved by the CITY.

B. The Contractor shall carry out his operations in strict accordance with all OSHA, State, local, and manufacturer's safety requirements. Particular attention is drawn to those safety requirements involving entering confined spaces (follow OSHA requirements) and steam curing. Curing with pressurized steam creates additional safety concerns with regard to high temperatures, quick burn times, potential blow offs, etcetera. Contractors shall take additional precautions to secure the work area and insure the safety of everyone in or around the curing apparatus. Contractors utilizing this method shall provide the CITY a copy of their company's standard operating procedure that addresses safety issues for this methodology.

C. It shall be the responsibility of the Contractor to remove all internal debris and clean the existing storm system prior to installation of the rehabilitation system. Cleaning and disposal of material shall be performed in conformance with Section 33 01 30.52, Storm Sewer Pipeline Cleaning.

D. Experienced personnel trained in locating breaks, obstacles and remote connections by closed circuit television shall perform inspection of existing storm lines. The interior of the line shall be carefully inspected to determine the location of any conditions that may prevent proper installation of the rehabilitation system into the lines, and such conditions shall be noted so they can be corrected. A video recording and suitable log shall be kept for later reference by the CITY as specified in Section 33 01 30.16, Closed Circuit Television Inspection.

E. The Contractor shall provide for the flow of stormwater around the section or sections of pipe designated for lining as specified in Section 31 23 19 DEWATERING if necessary.

F. The Contractor shall clear the line of obstructions such as solids, dropped joints, protruding remote connections and/or collapsed pipe. If inspection reveals an obstruction that cannot be removed by conventional cleaning equipment, the Contractor shall make a point repair excavation to uncover and remove or repair the obstruction prior to rehabilitation.

G. Where practicable, CIPP liners can be installed in continuous runs through manholes/structures where there are two or more continuous segments, especially to connect several short segments with a continuous lining. When

this situation occurs, the CIPP may be used as the basis for the invert in the intermediate structure(s), provided there are no other joining pipes. Should this be the case, the CIPP liner shall be cut and trimmed at the mid- point of the exiting pipe and the bench built behind the CIPP.

3.2 INSTALLATION

A. Alternative methods of liner insertion, pressurization, and processing may be used for products and processes approved by the Georgia Department of Natural Resources and the CITY, and when the final liner product meets the intent of the applicable ASTM installation procedures as determined by the CITY. Installation shall be in accordance with manufacturer's recommendations, which shall be available for verification by the inspector.

B. Seal the area where the line enters or leaves each manhole/structure. Leave approximately two (2) inches of cured liner exposed in each manhole/structure. Dress the end of the cured liner. This space may be sealed with a mechanical seal, chemical seal, or combination of both. The CITY and the rehabilitation system manufacturer must approve the chosen method. The material used SHALL not be cementitious based.

C. If the pipe liner fails to make a tight seal due to broken or misaligned pipe at the manhole/structure wall or other reason, the Contractor shall apply a seal at that point. The CITY and the rehabilitation system manufacturer shall approve the seal. This seal SHALL not be cementitious based.

D. The temperature of water discharged to the sanitary sewer system from processing liners shall not exceed 90°F maximum or the level allowed by State or local standards. 100% OF CIPP LINER WATER MUST BE DISCHARGED TO THE NEAREST SANITARY SEWER. A DISCHARGE PLAN MUST BE SUBMITTED AND APPROVED PRIOR TO THE COMMENCEMENT OF WORK. NO SEPARATE PAYMENT WILL BE MADE FOR ADDITIONAL CONTAINMENT METHODS UTILIZED TO ACHIEVE THIS.

E. After the liner has been installed, all active, existing remote connections shall be reinstated to 100% of the original opening. This shall be done without excavation in pavement areas, and in the case of non-man-entry pipes, from the interior of the pipeline by means of a 360° television camera and a cutting device that re- establishes the remote connection.

F. The Contractor shall designate a location where the reconstruction tube will be vacuum impregnated prior to installation. The Contractor shall allow the CITY to inspect the materials and "wet out" procedure. A catalyst system compatible with the resin and reconstruction tube shall be used. Sufficient resin will be provided to insure the tube is completely saturated with additional resin as necessary to flow into cracked pipe and or joints of the pipe after curing.

G. The wet out reconstruction tube shall be inserted through an existing manhole/structure or other approved access by means of an inversion process, pulled in place process, or other approved method, and the application of a hydrostatic head, or equivalent pressure sufficient to fully extend it to the next designated manhole/structure or termination point. The reconstruction tube shall be inserted into the vertical inversion standpipe with the impermeable plastic membrane side out. The inversion head will be adjusted to be of sufficient height to cause the impregnated tube to invert from manhole/structure to manhole/structure and hold the tube tight to the pipe wall, produce dimples at side connections and flared ends at the manholes/structures. Groundwater levels shall be taken into account when considering the necessary hydrostatic pressure on the CIPP liner. The use of a lubricant is recommended. All lubricants shall be non-petroleum based. Care shall be taken during the elevated curing temperature so as not to overstress the liner.

H. After inversion is completed the Contractor shall supply suitable heat source and recirculation equipment. The equipment shall be capable of delivering the heat source throughout the section uniformly to raise the temperature above the temperature required to affect a cure of the resin. This temperature shall be determined by the resin/catalyst system employed. Remote temperature sensors shall be provided to document the temperature and curing times.

I. The heat source shall be fitted with suitable monitors to gauge the temperature of the incoming and outgoing heat source all along and through the pipe. Another such gauge shall be placed between the impregnated reconstruction tube and the pipe invert at the remote manhole to determine the temperatures during cure. The resin manufacturer shall recommend temperature in the line during the cure period. If utilizing steam curing, a plan must be submitted indicating the duration and temperature of the curing.

J. Initial cure shall be deemed to be completed when inspection of the exposed portions of cured pipe appear to be hard and sound and the remote temperature sensor indicates that the temperature is of a magnitude to realize the exothermal properties of the resin system. The cure period shall be of a duration recommended by the resin manufacturer, as modified for the cured-in-place inversion process, during which time the recirculation of the heat source and cycling of the heat exchanger to maintain the temperature continues.

K. The Contractor shall cool the hardened pipe to a temperature of 90°F or below before relieving the static head in the inversion standpipe. Cool-down may be accomplished by the introduction of cool water into the inversion standpipe to replace water being drained from a small hole made in the downstream end discharging to the sewer. Care shall be taken in the release of the static head so that a vacuum will not be developed that could damage the newly installed CIPP liner.

L. The Contractor shall maintain records and logs of all installations. These records shall record, at a minimum, the date, location, length, diameter, rehabilitation system employed, wall thickness, pounds/types of resin, pounds/types of catalyst(s) used, inversion start/stop times, curing temperatures every fifteen (15) minutes of the curing process from initiation through cool down, crew member names, weather, visitors names, and any other pertinent information germane to the installation. These records shall be transmitted to the CITY with the pre and post CCTV inspections of each installation.

3.3 POST INSTALLATION

A. Where rehabilitation systems of any type are installed in two or more continuous segments, the invert through the intermediate manholes/structure shall be left intact. Final finishing of the installation in those intermediate manholes/structures shall require removal of the top of the exposed rehabilitation system and neat trimming of the edge at the midpoint of the exiting pipe. The remaining rehabilitation material may be used as a form for the installation of the invert.

B. Portions of any piece of rehabilitation material removed during installation shall be available for inspection and retention by the CITY.

C. Each line segment lined shall be TV inspected as soon as practical after processing to assure complete curing and/or installation. Segments not fully conforming to these Specifications must be immediately brought to the CITY's attention with a proposed method of correction, which is accordance with manufacturer's recommendations.

3.4 REMOTE CONNECTION REINSTATEMENT

A. After the rehabilitation system has been installed, all active, existing remote connections shall be reinstated to 100% of the original opening. This shall be done without excavation in pavement areas, and in the case of non-man-entry pipes, from the interior of the pipeline by means of a 360° television camera and a cutting device that re-establishes the remote connection.

B. Remote connection reinstatements in smaller diameter pipes shall be made using robotic cutters. As pipe sizes allow, man-entry options may be utilized. When man- entry methods are used, the connection interface between the main line pipe and the remote connection pipe shall be treated with the same product approved for end of line sealing. The intent of this treatment is to provide a watertight seal between the main line pipe and the remote connection pipe.

3.5 TESTING

A. The Contractor shall have an independent, third party testing lab, approved by

the CITY, analyze finished liner samples taken from the lined pipe sections in accordance with the manufacturer's recommendations, or in accordance with the specified testing standard.

B. A minimum of 1 sample shall be taken for every 500 linear feet of each pipe diameter installed.

C. These may be plate samples cured within the installation process.

D. Tests in accordance with ASTM standards for Flexural Modulus, Flexural Strength and Tensile Strength per these specifications and liner thickness per the particular work order design calculations.

E. The Contractor shall determine sampling location and procedures to ensure representative samples are obtained from the finished liner, subject to approval by the CITY.

F. The Contractor shall be responsible for the cost of sample preparations and testing as these activities are considered incidental to the rehabilitation system employed. Additionally, the Contractor is responsible for all repairs necessitated by destructive testing techniques. Repairs to rehabilitation systems following destructive testing shall be approved by the rehabilitation system manufacturer and the CITY.

G. Sample testing results shall be transmitted to the CITY within 60 days following the completion of the work order.

H. The CITY will accept test results only from CITY pre-approved third party laboratories.

I. The CITY reserves the right to perform confirmation testing of rehabilitated storm systems with its own forces, or with contracted firms specializing in this type testing. In these cases, the findings of this audit process will be considered to supersede any other results previously presented.

3.6 TELEVISION INSPECTION

A. After completing rehabilitation, remote connection renewals where directed by the CITY, and manhole/structure rehabilitation/replacement, every rehabilitated section and manhole/structure shall be CCTV inspected with a 360º integral lighthead camera as soon as practical to verify proper installation.

B. All rehabilitated sections must be CCTV inspected following the protocols and formats as outlined in Section 33 01 30.16, Closed Circuit Television Inspection. Care shall be taken to fully examine the rehabilitated storm system, with particular attention to adequate lighting and camera travel speed.

3.7 ACCEPTANCE

A. It is the intent of these specifications that the completed rehabilitation system with all appurtenances shall be essentially equivalent in final quality and appearance to new pipe installation. The conditions of the existing host pipe will be taken into consideration.

B. The finished rehabilitation system shall be continuous over the entire segment between manholes/structures and homogenous throughout.

C. The finished rehabilitation system shall be fully rounded and as free as commercially practicable from visible defects, including but not limited to damage, deflection, holes, delamination, ridges, cracks, uncured resin, foreign inclusions or other objectionable defects.

D. There shall be no visible infiltration through the rehabilitation system, around the system at manhole/structure connections, or at remote connections. Contractor shall repair any visible leaks.

E. Where a defect in the rehabilitation system requires removal of a section of the rehabilitated pipe, in the CITY's opinion, the Contractor shall make all repairs as required by the CITY and shall install a segmental repair, compatible with the rehabilitation system, to accomplish a continuous finished section. No separate payment will be made for such defect repair.

3.8 PROSECUTION OF WORK

A. If the Contractor discovers remote connections the Contractor shall receive CITY approval before re-instating.

B. The Contractor shall note that not all segments have been televised in their entirety due to obstructions blocking further entry, etc. These obstructions shall be cleared to allow CCTV viewing of the entire segment length before rehabilitation is commenced.

3.9 WARRANTY

A. The Contractor shall guarantee his work for a warranty period of one (1) year from the date of final acceptance. If, at any time during the warranty period, any leakage, cracking, loss of bond, or other discontinuity is identified, the Contractor shall make repairs acceptable and at no additional cost to the CITY.

END OF SECTION 33 41 13

SECTION 34 41 16.10

TRAFFIC CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

Section	Title
1.2	References
1.3	Work Included
1.4	Submittals
2.1	Materials
2.2	Worker Safety Apparel
2.3	Traffic Control Devices
3.1	Maintaining Traffic
3.2	Traffic Control

1.2 REFERENCES

A. Drawings and general provisions of the Contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this section.

B. Georgia Department of Transportation Standard Specifications for Road and Bridge Construction.

C. Manual on Uniform Traffic Control Devices for Streets and Highways.

1.3 WORK INCLUDED

The Contractor shall furnish all materials, equipment, and labor necessary to maintain traffic control during construction. This Work shall consist of furnishing, installing, maintaining, and removing necessary

1. Traffic signs, pedestrian signs, barricades, lights, signals, cones, pavement markings, and other traffic control devices, as specified by MUTCD, indicated on the Drawings, or as directed by the Engineer or CITY
2. Flagging and other means for guidance and protection of vehicular, worker, and pedestrian traffic, including off-duty Police Officers.

1.4 SUBMITTALS

A. Submit for approval, in accordance with Section 01 33 00 SUBMITTAL PROCEDURES all working drawings and schedules of materials and methods proposed to be followed in the execution of the Work under this item.

B. Submittals shall show in detail, the type, number, and location of all traffic control measures to be used in the execution of the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Unless otherwise specified, all materials furnished for traffic control shall meet the requirements of the Georgia Department of Transportation Standard Specifications, Construction of Roads and Bridges, Sections 148 and 150, latest edition; Georgia Department of Transportation, Special Provision, Section 150-Traffic Control, latest edition; and the Manual on Uniform Traffic Control Devices (MUTCD), latest edition.

2.2 WORKER SAFETY APPAREL

A. All workers within the right-of-way who are exposed to traffic or to work vehicles and construction equipment shall wear high-visibility safety apparel that meets the Performance Class for the risk exposure.

2.3 TRAFFIC CONTROL DEVICES

A. All traffic control devices used during the execution of the Work shall meet the Standards utilized in the Manual on Uniform Traffic Control Devices (MUTCD), latest edition.

PART 3 - EXECUTION

3.1 MAINTAINING TRAFFIC

A. All roadwork and lane closures shall be limited to between the hours of 7:00 am and 4:00 pm, Monday through Friday.

B. All working operations of the Contractor, Subcontractors, and/or their agents or employees must be subordinated to the free and unobstructed use of the roadway, and structures encountered in the prosecution of the Work under this item.

The Contractor shall proceed with the Work in such manner as shall permit regular transaction of business by the CITY and/or property owner without delay or danger to life or property, and shall place necessary barricades, warning signs, signals, and lights for the protection of the traveling public.

C. In making open-cut street crossings, Contractor shall not block more than one-half (½) of the street at a time. Whenever possible, Contractor shall widen the shoulder on the opposite side of the street to facilitate traffic flow.

3.2 TRAFFIC CONTROL

A. Contractor’s proposed plan of operation shall supplement the approved traffic control plan as specified, as indicated on the Drawings, or as directed by the Engineer or CITY.

B. All traffic control devices shall be in an acceptable condition when first installed on the

Project and shall be maintained throughout the construction period. All unacceptable traffic control devices shall be replaced within twenty-four (24) hours.

C. In the execution of the Work, if it becomes necessary to remove any existing signs, markers, etc., they shall be removed, stored and reinstalled as directed by the Engineer or CITY, to line and grade in the same condition as when removed.

D. All temporary traffic control devices shall be removed within seven (7) calendar days after completion of construction.

E. When necessary to provide a safe work zone for the Contractor and CITY employees, off-duty Police Officer(s) may be utilized to assist in maintaining safe traffic control. Use of Police Officer(s) shall be used when safety necessary, in areas of high traffic volume, installation in roadways, road closures and lane closures, or in areas of low visibility. The Contractor shall contact the City of Brookhaven Police Department at 404-637-0600 to schedule an off-duty Police Officer(s). Arrangements for Police Officer(s) must be made a minimum of forty-eight (48) hours prior to the Work to allow time for Police Officer(s) to be scheduled. Depending on the situation, the Police Officer(s) onsite may request additional Police Officer(s), if needed.

END OF SECTION 34 41 16.10

SECTION 34 71 00

ROADWAY CONSTRUCTION

PART 1 - GENERAL

1.1 SUMMARY

A. SECTION INCLUDES:

Section	Title
1.2	References
1.3	Work Included
1.4	Submittals
2.1	Materials
3.1	General Conditions
3.2	Materials and Workmanship
3.3	Restoring Curbs, Gutters, and Sidewalks
3.4	Restoring Driveway and Parking Area Pavements
3.5	Restoring Roadway Pavements
3.6	Roadway Appurtenances

1.2 REFERENCES

A. Drawings and general provisions of the Contract, including general and supplementary conditions and Division 1 Specification Sections, apply to this section.

B. Georgia Department of Transportation Standard Specifications for Road and Bridge Construction.

C. Manual on Uniform Traffic Control Devices for Streets and Highways.

1.3 WORK INCLUDED

A. The Contractor shall furnish all materials for, and properly restore to the satisfaction of CITY, all pavements, parking areas, driveways, sidewalks and curbs, of whatever construction and irrespective of the type, which may be required to be removed, damaged or disturbed in the progress of Work required under this Contract.

B. These items shall include in general, but without limitation, all necessary concrete, reinforcing steel, stone, gravel, asphalt and other bituminous material necessary for the proper completion of the Work as may be required, directed, or as specified herein.

1.4 SUBMITTALS

A. The Contractor shall submit for approval, in accordance with Section 01 33 00 SUBMITTAL PROCEDURES all working Contract documents and/or drawings and schedules of materials and methods proposed to follow in the execution of the Work under this item

B. The Contractor shall furnish samples, manufacturer’s product data, test reports, and material certifications as required in reference sections for concrete, joint fillers, and

sealers.

PART 2 - PRODUCTS

2.1 MATERIALS

A. For asphalt and other bituminous paving, refer to Specification SECTION 32 12 16 ASPHALT PAVING, PART 2 – PRODUCTS.

B. For concrete paving, sidewalks, curbs, and gutters, refer to Specification SECTION 32 16 13 SIDEWALKS, CURBS, AND GUTTERS.

C. Traffic striping shall conform to the Georgia Department of Transportation Standard Specifications for Construction of Transportation Systems, Section 653.

D. Guardrail shall conform to the Georgia Department of Transportation Standard Specifications for Construction of Transportation Systems, Section 859.

PART 3 - EXECUTION

3.1 GENERAL CONDITIONS

A. The Contractor's attention is directed to the provisions of the Specifications for the Section titled Excavation and Fill**,** requiring special backfill material and tamping of backfill under areas to be paved. Any settlement which may occur during the guarantee period of one (1) year shall be corrected at the Contractor's expense including repaving and/or replacing of streets, curbs, gutters, parking areas, and driveways which settle during the guarantee period.

B. The Unit Prices Bid for all paving and curbing items, shall include bituminous concrete repaving and/or relaying of roadways, parking areas, driveways, wheelchair ramps, curbs, gutters, and sidewalks which settle during the guarantee period.

C. The Contractor shall repave all areas over excavations in public streets as defined in the Paragraph 3.6 "Restoring Roadway Pavements" below promptly after completion of backfill to provide full use of the street with a minimum of delay.

D. No additional payment shall be made for excavation or disposal of excavated material required for placement or removal of backfill placed above the foundation of the pavement and for preparation of sub grade, and the cost thereof shall be considered as being included in the Unit Prices Bid for paving and curbing items.

E. Should settlements, cracks, or other indications of failure appear in adjoining pavements, the adjoining paving shall be removed per provisions of SECTION 02 41 13.13 PAVING REMOVAL, Paragraph 3.1 TRENCH PAVING REMOVAL, to the extent necessary to secure firm, undisturbed bearing, and shall be repaved to Standards as specified, as indicated on the Contract Documents and/or Drawings, or as directed by the Engineer or CITY construction material testing representative.

F. When directed by CITY, the Contractor shall backfill the entire excavation under a paved surface with crusher run material.

G. Where necessary to cut a sidewalk, driveway, wheelchair ramp, or parking area, entire

slabs or squares shall be removed and replaced to an edge of paving or joint, unless otherwise directed by CITY.

H. The Contractor shall replace all sidewalks removed or disturbed by the Contractor in the process of the Work in accordance with SECTION 32 16 13 SIDEWALKS, CURBS, AND GUTTERS. Sidewalks shall be constructed to the same dimensions and materials as were originally placed. The sub-base shall be thoroughly rolled or tamped and shall be wet just before, if necessary, the concrete is placed but shall show no pools of water.

I. The Contractor shall restore all curbs, combination curbs, and gutters which have been removed or disturbed in the progress of the Work in accordance with SECTION 32 16 13 SIDEWALKS, CURBS, AND GUTTERS. Curbs and gutters shall be made to conform accurately in size, line, grade, and materials with the adjoining. In restoring curbs and gutters, the subsoil and foundation material shall be well compacted so as to prevent any settlement of concrete curbing and guttering.

J. In paved areas, the Contractor shall adjust all utility structures (manhole frame/cover, vault tops, valve boxes, etc.) to final grade.

3.2 MATERIALS AND WORKMANSHIP

A. Materials to be used in the repair and restoration of pavements, drives, sidewalks, and curbs shall be as specified above in this section in Paragraph 2.1 MATERIALS. All materials removed during the excavation of the Work shall be disposed of by the Contractor per provisions of SECTION 02 42 11 REMOVAL OF CONSTRUCTION MATERIAL. All workmanship shall be first class. All concrete shall be 3,000 psi.

3.3 RESTORING CURBS, GUTTERS, WHEELCHAIR RAMPS, AND SIDEWALKS

A. PREPARATION

1. Excavate and compact the subgrade as specified in Section 31 23 00.3.2.E, true to the indicated grade and cross section.

2. Place forms or extrusion machine guides to exact elevation and location required. Visually check forms and machine guides and adjust where necessary to ensure smooth curves and transitions in grade. Provide close spacing on curves to maintain a smooth curve.

B. JOINTS

1. Expansion Joints: Install expansion joints at intervals as indicated, but not exceeding 40 feet for walks and curbs, and wherever new concrete abuts existing construction. Additional joints are to be placed at tangent points of circular curbs and other places where stresses may develop.

2. Contraction (Control) Joints:

   a. Sidewalks: Cut joints with a saw immediately after concrete reaches adequate hardness to allow sawing. Contraction joints in sidewalks shall be ¾-inch deep and spaced at a distance equal to the width of the walk.

   b. Curb and Gutter: For formed work, use full depth steel forms to achieve contraction joints. For extruded work, cut contraction joints with a saw

immediately after concrete reaches adequate hardness to allow sawing. Contraction joints in curb and gutters shall be 1 ½ inch deep and spaced at 10 feet intervals.

c. Concrete flatwork: Cut joints with a saw immediately after concrete reaches adequate hardness to allow sawing. Contraction joint depth shall be ¼ of the concrete thickness. Spacing and pattern shall be as shown on plans or determined by CITY and/or the Engineer.

d. Locate and form expansion joints for curb cut wheelchair ramp according to GDOT Standard Detail A-3.

3. Premolded expansion joint filler must be cut to full cross section of the proposed construction and shall extend the full depth, width, and length of the construction. Trim expansion joint material protruding after the concrete has been finished as directed by CITY and/or the Engineer. All longitudinal expansion joints shall be placed as indicated on the Contract documents and/or drawings.

C. FINISHES

1. Pedestrian and Wheelchair Ramps: Non-slip finish.

2. All others: Broom finish.

D. CONSTRUCTION

1. Place forms true to line, grade, and cross section.

2. Brace forms adequately before placing the concrete. Place concrete in forms and thoroughly tamp, vibrate or work it into all corners, removing air pockets. Allow forms to remain in place until the concrete has set sufficiently to hold its shape.

3. Begin each phase of screed, float, trowel and finish work as soon as the concrete can be properly worked. Completely finish sidewalks and flat work with forms in place.

4. Remove forms on the front face of curbs as soon as the concrete will hold its shape and finish the face. For gutters, a strike-off template of the form and shape of the gutter shall be used to shape the top surface of the gutter. Round top edges of curb and edges of gutter using a radius tool matching the radius shown on the Contract documents and/or drawings. Finish the edges where templates have been removed or expansion joint material has been placed with an edging tool with a radius of not over 1/4- inch and then all lines or marks removed with a wet brush.

5. Remove all tool marks with a wetted brush or wooden float, and the finished surface shall present a uniform and smooth appearance.

6. All Concrete shall conform to Specification SECTION 03 30 00 CAST-IN-PLACE CONCRETE.

3.4 RESTORING DRIVEWAY AND PARKING AREA PAVEMENTS

A. The Contractor shall restore driveway and parking area pavements removed or disturbed during construction. After the pipe has been laid, appurtenant work constructed and backfill completed, the Contractor shall furnish, place and maintain wherever the

pavements have been removed or damaged in the pursuit of the Work, bituminous concrete surfaces, stone surfaces, concrete surfaces as indicated or shown on the Contract Documents and/or Drawings. Driveways and parking areas shall be constructed to the thickness of the existing, but concrete shall not be less than 4 inches thick. Surface finish is to match existing; edges to be sawn vertically; expansion joints to be used as directed. In general, Concrete driveways shall be replaced ten (10) feet from back of curb or to the closet expansion joint. The limits of this restoration shall be approved/agreed upon by the CITY Project Inspector for payment quantities.

B. All Concrete shall conform to Specification SECTION 03 30 00 CAST-IN-PLACE CONCRETE.

C. If the Contractor chooses to use uncased bores for crossing driveways, without the prior written approval of the CITY Inspector, compensation will be made using the unit price bid for Driveway Cut Restoration based on the allowable trench width for the respective size pipe installed.

3.5 RESTORING ROADWAY PAVEMENTS

A. The Contractor shall restore roadway pavements removed or disturbed during construction. After work in excavated paved areas is complete, appurtenant work constructed, and backfill completed, the Contractor shall furnish, place, restore and maintain wherever the pavements or road surfaces have been removed or damaged in the pursuit of the Work, bituminous concrete roadways, stone road surfaces, bituminous concrete over concrete base, and complete bituminous concrete roadway resurfacing as indicated or shown on the Contract Documents and/or Drawings.

B. All roadway restoration shall be done in accordance with the lawful requirements of the authorities within whose jurisdiction such pavement is located. All highway utilities and traffic controls are to be maintained, and Work shall conform to the rules and regulations of the County, including the use of standard signs. The Contractor shall provide all such bonds or checks, which may be required by the highway authorities to insure proper restoration of paved areas, at no cost to the Owner. All road closures and detours must be submitted and approved with the authorities within whose jurisdiction they are located.

C. The Contractor shall resurface the entire street from curb to curb, or any other area designated by CITY. Bituminous concrete paving shall conform to the requirements of Section 32 12 16 – Asphalt Paving, of these specifications.

D. If, prior to the expiration of the period of maintenance, the bituminous concrete pavements or stone road surfaces within the lines of excavation or adjacent thereto, shall have been damaged or injured, due to undermining, or for any other cause which may be attributed to the Work of the Contractor, then the Contractor shall remove such damaged or injured surfaces, foundations of same, and all loose earth. He/she shall then backfill with sand properly rammed and furnish, place, and maintain a bituminous concrete pavement or stone road surface until such time as the final acceptance of the Work.

E. Bituminous concrete pavements or stone road surfaces, which the Contractor is required to replace shall, at the expiration of the period of maintenance be in at least as good condition as at the time of awarding the Contract.

F. Work which the Contractor may do in connection with opening up or replacing of

pavements, or stone road surfaces, shall be done at his/her expense, in accordance with the rules and requirements of the authority within whose jurisdiction such pavement is located, and in accordance with the additional requirements of the Specifications, and the Contractor shall furnish evidence to CITY that the Work has been completed to the satisfaction of such authority. Payment for replacing of pavements or stone road surfaces shall not be made until such evidence is presented.

G. All cuts shall be made by channeling machine, by pneumatic tools, or by such other methods as shall furnish a clean cut in the pavement and pavement base without undue shattering.

3.6 ROADWAY APPURTENANCES

A. Resetting Highway Signs: The Contractor shall reset all disturbed highway signs in accordance with the applicable GDOT and CITY standards and specifications. The Contractor shall preserve and protect all disturbed signs during construction. Any damage to signs shall be either repaired at the Contractor's expense, or the damaged signs replaced in like and kind with new materials at no additional cost to the Owner.

B. Traffic Striping, General and Gore Area: The Contractor shall restripe all disturbed pavements to meet preconstruction conditions. Striping shall be thermoplastic materials conforming to the applicable GDOT specifications or as otherwise called for in the Contract Documents.

C. Raised Traffic Markers: The Contractor shall replace all disturbed raised traffic markers in like and kind with new materials.

D. Guardrails: The Contractor shall replace all disturbed guardrails in like and in kind conforming to GDOT specifications or as otherwise called for in the Contract Documents.

END OF SECTION 34 71 00

MURPHEY CANDLER PARK DAM MAINTENANCE

CITY OF BROOKHAVEN

Brookhaven GEORGIA

AUGUST 2, 2018

INDEX		
SHEET	G-001	COVER
SHEET	C-001	MAINTENANCE (1)
SHEET	C-002	MAINTENANCE (2)
SHEET	C-003	RIPRAP DETAIL

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MURPHEY CANDLER PARK DAM
MAINTENANCE
CITY OF BROOKHAVEN GA
4362 PEACHTREE ROAD NE
BROOKHAVEN, GA 30319

SEAL

KEY PLAN

SCALE

NO.	DESCRIPTION	DATE

REVISIONS

DRAWN BY	HD
APPROVED BY	SC
CHECKED BY	SC
DATE	08-02-2018

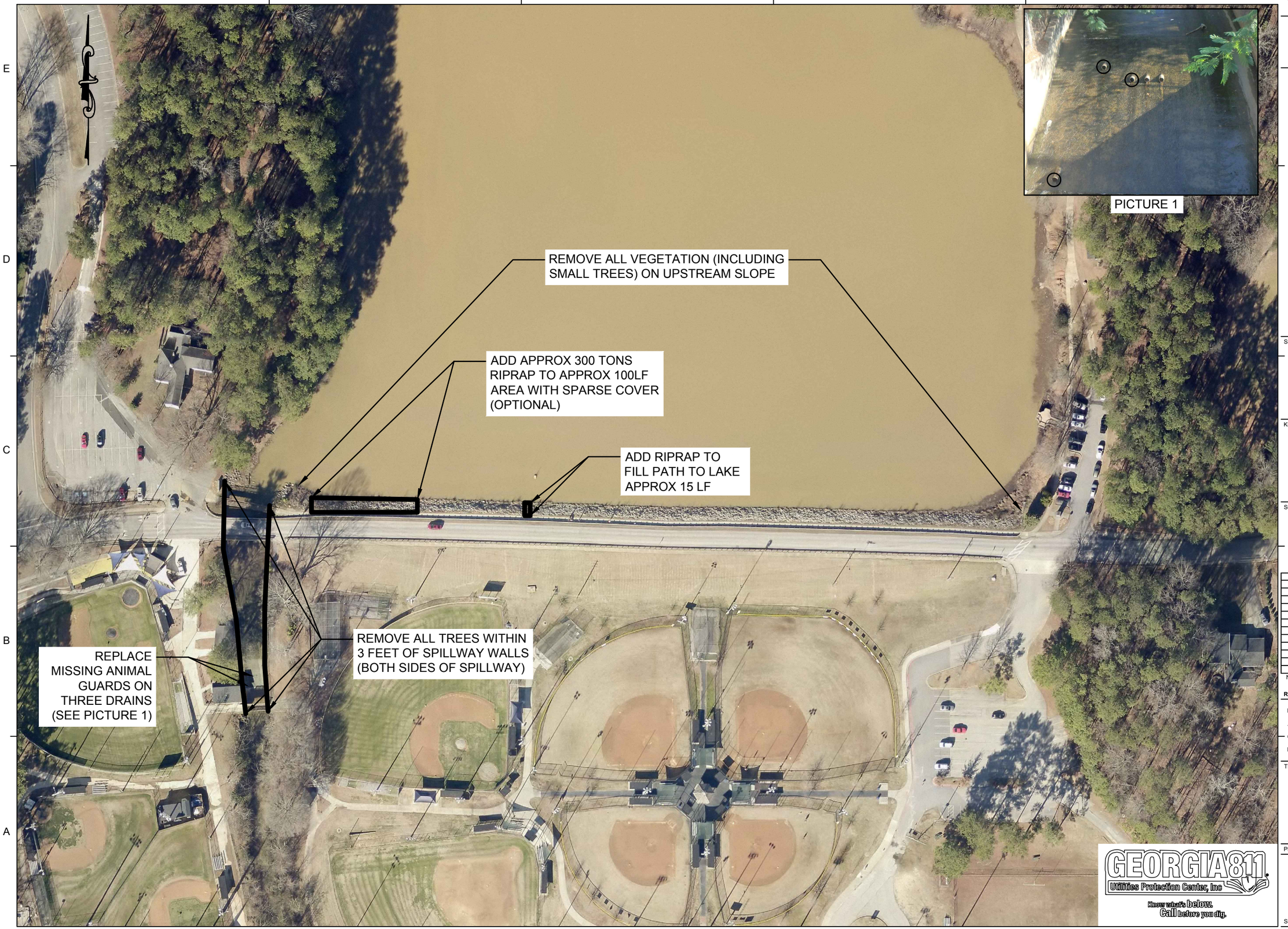
TITLE

COVER

PROJECT NO. 50103407

G-001

SHEET NO.



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CITY OF BROOKHAVEN GA
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BROOKHAVEN, GA 30319

SEAL

KEY PLAN

SCALE

0' 50' 100' 200'
SCALE: 1" = 100'

NO.	DESCRIPTION	DATE

REVISIONS

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DATE	08-02-2018

TITLE

MAINTENANCE
(1)

PROJECT NO. 50103407

C-001

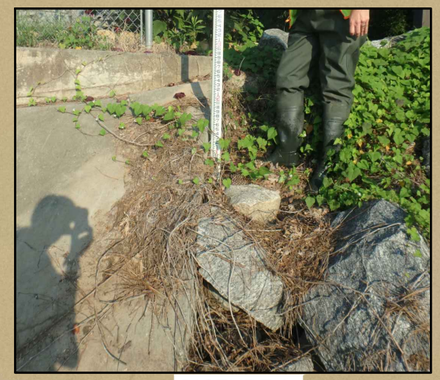
SHEET NO.

1 2 3 4 5

E D C B A

ADD RIPRAP TO BE FLUSH WITH TOP OF TRAINING WALL (SEE PICTURE 2)

REMOVE EXISTING BOULDERS, PLACE GRADED FILTER, AND REPAIR EROSION; REPLACE AND COMPACT ERODED SOIL BEHIND BOULDERS AND SMALL (12"-28") SCOUR HOLE AT END OF SPILLWAY WING WALL; BOULDERS CAN BE PLACED BACK ON TOP OF FILTER (SEE RIPRAP DETAIL SHEET C-003 AND SPEC "SECTION 603-RIP RAP")



PICTURE 2

REPAIR AND SEAL JOINTS ON SPILLWAY FLOOR AS NEEDED APPROX 250 LF EITHER SIDE AND REPAIR ALL BROKEN CONCRETE (SEE SPEC "JOINT AND CRACK SEALANT")

REMOVE ALL VEGETATION GROWING THROUGH AND ON MASONRY WALL AND REPAIR WALL GROUT WHERE ERODED, BROKEN, OR MISSING AND SEAL ALL TRANSVERSE JOINTS WHERE BROKEN (SEE SPEC "JOINT AND CRACK SEALANT")

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MAINTENANCE

CITY OF BROOKHAVEN GA
4362 PEACHTREE ROAD NE
BROOKHAVEN, GA 30319

SEAL

KEY PLAN

SCALE

0' 25' 50' 100'
SCALE: 1" = 50'

NO.	DESCRIPTION	DATE

REVISIONS

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CHECKED BY	SC
DATE	08-02-2018

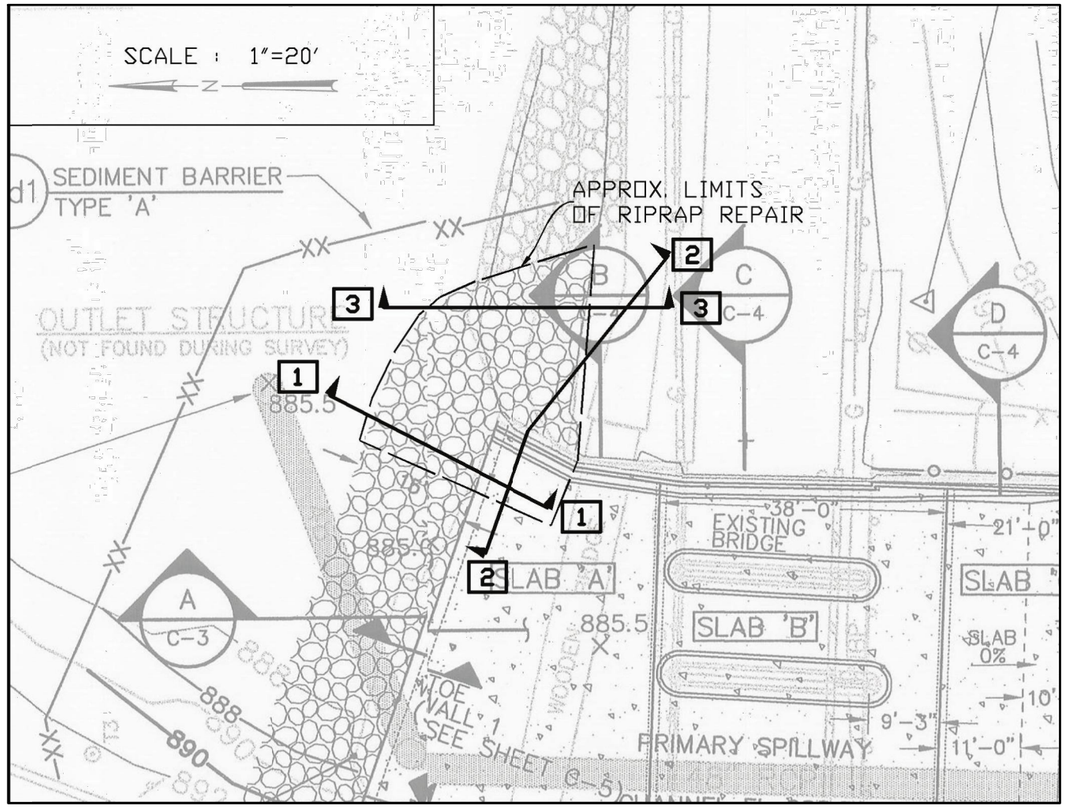
TITLE

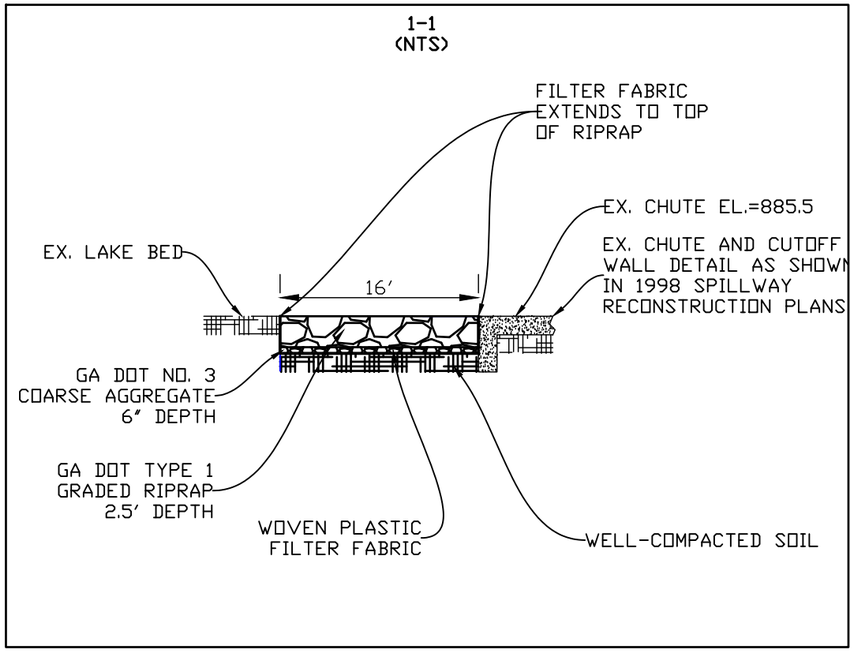
MAINTENANCE (2)

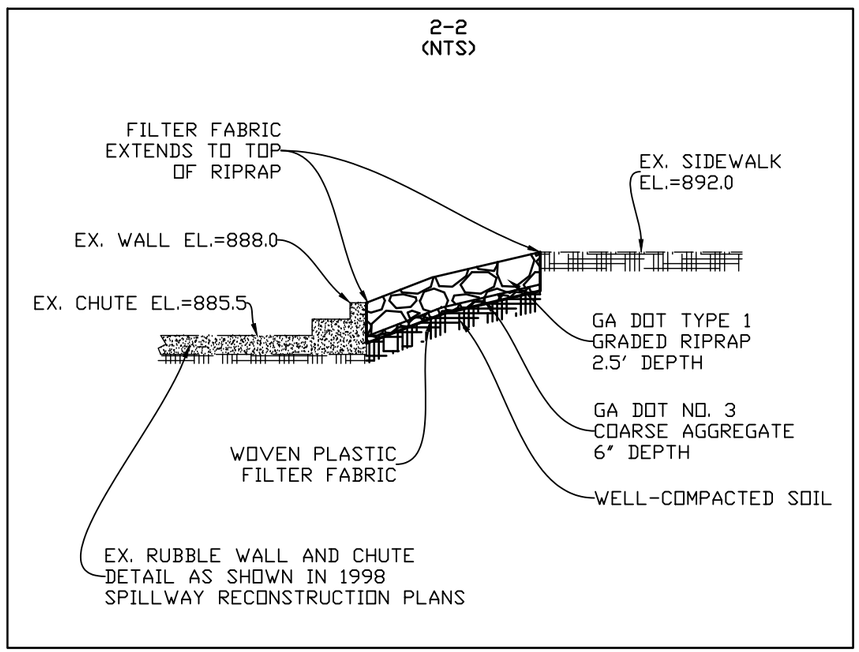
PROJECT NO. 50103407

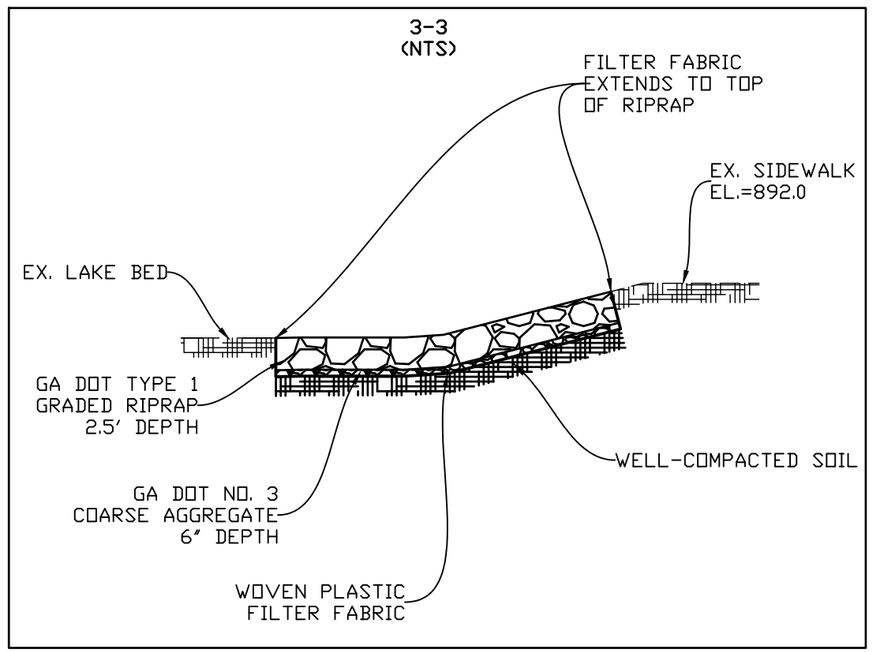
C-002

SHEET NO.









ALL ELEVATIONS ARE APPROXIMATE. CHUTE AND CUTOFF WALL DATA TAKEN FROM 1998 SPILLWAY RECONSTRUCTION PLANS. RUBBLE WALL AND SIDEWALK DATA ESTIMATED FROM GIS 2' CONTOURS.

RIPRAP: GA DOT SS603 & SS805
COARSE AGGREGATE: GA DOT SS800
FILTER FABRIC: GA DOT SS881

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KEY PLAN

SCALE

NO.	DESCRIPTION	DATE

REVISIONS

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DATE	08-02-2018

TITLE

RIPRAP DETAIL

PROJECT NO. 50103407

C-003

SHEET NO.

Section 603—Rip Rap

603.1 General Description

This work includes placing protective coverings of sand-cement bag rip rap or stone rip rap.

When required, this work includes placing crushed stone filter material or plastic filter fabric beneath stone rip rap on:

- Fill slopes
- Cut slopes
- End rolls
- Shoulders
- Ditches
- Stream banks
- Channel banks
- Other locations

603.1.01 Definitions

General Provisions 101 through 150.

603.1.02 Related References

A. Standard Specifications

Section 800—Coarse Aggregate

Section 801—Fine Aggregate

Section 805—Rip Rap and Curbing Stone

Section 815—Graded Aggregate

Section 830—Portland Cement

Section 832—Curing Agents

Section 880—Water

Section 881—Fabrics

B. Referenced Documents

AASHTO T 134

QPL 28

603.1.03 Submittals

General Provisions 101 through 150.

603.2 Materials

Ensure that the materials meet the requirements of the following Specifications:

Material	Specification
Portland cement	830.2.01
Rip Rap (Stone)	805.2.01

Material	Specification
Membrane Curing Compound	832.2.03
Stone Filter Blanket	815.2.01 or 800.2.01 (Size No. 467*)
Fine Aggregate for Sand Cement Rip Rap	801.2.03
Water	880.2.01
Woven Plastic Filter Fabric	881.2.05
*Except that up to 10% is allowed to pass the No. 4 (4.75 mm) sieve.	

A. Bags for Sand-Cement Bag Rip Rap

Use cotton, burlap, or fiber reinforced paper bags that can contain the sand-cement mixture without leaking during handling and placing. Do not use bags that previously held sugar or other material that will adversely affect the sand-cement mixture.

Ensure that the capacity is at least 0.75 ft^3 (0.02 m^3) but not greater than 2 ft^3 (0.5 m^3).

B. Stone Dumped Rip Rap

Stone dumped rip rap is designated on the Plans as Type 1 or Type 3 as defined in Subsection 805.2.01.

603.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

603.3 Construction Requirements

603.3.01 Personnel

General Provisions 101 through 150.

603.3.02 Equipment

General Provisions 101 through 150.

603.3.03 Preparation

General Provisions 101 through 150.

603.3.04 Fabrication

General Provisions 101 through 150.

603.3.05 Construction

Construct this Work according to the following requirements:

A. Preparing the Foundations

Prepare the ground surface where the rip rap will be placed to conform with the correct lines and grades before beginning the placement.

1. When filling depressions, compact the new material with hand or mechanical tampers.

   Dispose of excess material by spreading it neatly within the right-of-way as an incidental part of the work.
2. Unless otherwise shown or provided below, begin placing the rip rap in a toe ditch constructed in original ground around the toe of the fill or the cut slope.

Ensure that the toe ditch is 2 ft (600 mm) deep in original ground and the side next to the fill or cut has the same slope.

3. After placing the rip rap, backfill the toe ditch and spread the excess dirt neatly within the right-of-way as an incidental part of the work.
4. When beginning rip rap in water or below normal water level, substitute an apron of rip rap for the toe ditch.

   Ensure that the width and thickness of this apron is as shown on the Plans or determined by the Engineer.

B. Placing Stone Rip Rap

Place rip rap to the limits shown on the Plans or as directed by the Engineer. Place and classify rip rap as follows:

1. Stone Plain Rip Rap

   Dump and handle stone plain rip rap into place to form a compact layer to the design thickness.

   Ensure that the thickness tolerance for the course is plus 12 in (300 mm) with no under-tolerance. If the Plans do not show a thickness, place stone rip rap to at least 12 in (300 mm) thick, but no greater than 2 ft (600 mm) thick.
2. Stone Dumped Rip Rap

   Dump stone dumped rip rap into place to form a uniform surface as thick as specified in the Plans.

   a. Ensure that the thickness tolerance for the course is minus 6 in (150 mm) and plus 12 in (300 mm). If the Plans or Proposal do not specify a thickness, place the course to at least 2 ft (600 mm) thick.
   b. Recycled concrete that meets the requirements of Subsection 805.2.01 may be used instead of stone when shown on the Plans or approved by the Engineer.

      Use recycled concrete only when materials do not contain steel after processing.

      NOTE: Do not use recycled concrete in aesthetically sensitive areas.
3. Stone Grouted Rip Rap

   Place stone grouted rip rap according to specifications for stone plain rip rap and these guidelines:

   a. Prevent earth from filling the spaces between the stones.
   b. After placing the stone, fill the spaces between them with 1:3 grout composed of Portland cement and sand mixed thoroughly with enough water to make a thick, creamy consistency.
   c. Place the grout beginning at the toe. Finish it by sweeping with a stiff bristle broom.
   d. After grouting, cover the rip rap and keep it wet for 5 days, or cover and keep wet for 24 hours and then coat with white pigmented membrane curing compound.

C. Placing Filter

Place woven plastic filter fabric under all rip rap. Follow these requirements for placing the filter fabric:

1. Prepare the surface to receive the fabric until it is smooth and free from obstructions, depressions, and debris.
2. Place the fabric with the long dimension running up the slope. Minimize the number of overlaps.
3. Place the strips to provide a width of at least 1 ft (300 mm) of overlap for each joint.
4. Anchor the filter fabric in place with securing pins of the type recommended by the fabric manufacturer. Place the pins on or within 3 in (75 mm) of the centerline of the overlap.
5. Place the fabric so that the upstream strip will overlap the downstream strip.
6. Loosely place the fabric to prevent stretching and tearing during stone placement.

   Do not drop the stones more than 3 ft (1 m) during construction.
7. Always protect the fabric during construction from clogging due to clay, silts, chemicals, or other contaminants.

8. Remove contaminated fabric or fabric damaged during installation or rip rap placement. Replace with uncontaminated or undamaged fabric at no expense to the Department.

D. Placing Sand-Cement Bag Rip Rap

Place rip rap to the limits shown on the Plans or as directed by the Engineer.

1. Proportioning Materials

   Mix sand and Portland cement at the maximum ratio of 5:1 by weight.

   a. Obtain a minimum compressive strength of 500 psi (3 MPa) in 7 days.
   b. For sand-cement bag rip rap, use enough water to make up the optimum moisture content of the aggregate and cement as determined by AASHTO T 134.
   c. When sand-cement rip rap is to be prebagged, mix the sand cement dry. After placing each course, wet the bags until the bags are wet enough for proper cement hydration.

2. Placement

   Before placing sand-cement bag rip rap, fill the bags full, but allow room to tie the bags.

   a. Place the bagged rip rap by hand with the tied ends facing the same direction. Produce close, broken joints.
   b. Place header courses when directed by the Engineer or required by the Plans.
   c. After placing the bags, ram or pack them against one another to produce the required thickness and form a consolidated mass.
   d. Do not allow the top of each bag to vary more than 3 in (75 mm) above or below the required plane.

E. Placing Stone Blanket Protection

Ensure that the stone blanket protection meets the materials Specifications for stone filter blanket as specified in Subsection 603.2, "Materials," except stone size No. 357 will be allowed instead of size No. 467.

Place stone blanket protection to the limits shown on the Plans, or as directed by the Engineer.

Uniformly place this material to the thickness shown on the Plans and to a thickness tolerance of 0.5 in (± 15 mm).

Do not use stone blanket protection on slopes steeper than two horizontal to one vertical or in areas highly susceptible to erosion. Do not use plastic filter fabrics with stone blanket protection.

603.3.06 Quality Acceptance

General Provisions 101 through 150.

603.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

603.4 Measurement

This work is measured for payment in square yards (meters) of accepted material of the specified thickness. Area measurements are made parallel to the surface on which the material is placed. Plastic filter fabric will be measured as the area of rip rap placed and accepted. No separate measurement will be made for fabric overlap joints, seams, or vertical sections at toe of slopes. No separate measurement is made for grout or cushioning sand.

Plan dimensions are figured by the use of filled bags 12 by 18 by 6 in. (300 by 450 by 150 mm) thick.

When filled bags are less than Plan dimensions or are of varying lengths or width, Plan square yards (meters) will be used to determine pay quantities, if overall dimensions are equal to or greater than those shown on the Plans.

603.4.01 Limits

General Provisions 101 through 150.

603.5 Payment

This work will be paid for at the Contract Price per square yard (meter) of material complete in place.

Payment will be made under:

Item No. 603	Stone plain rip rap ___ in (mm) thick	Per square yard (meter)
Item No. 603	Stone dumped rip rap (type)____ in (mm) thick	Per square yard (meter)
Item No. 603	Stone grouted rip rap (thick)	Per square yard (meter)
Item No. 603	Filter blanket	Per square yard (meter)
Item No. 603	Sand-cement bag rip rap, ____ in (mm) thick	Per square yard (meter)
Item No. 603	Stone blanket protection, ____ in (mm)	Per square yard (meter)
Item No. 603	Plastic filter fabric	Per square yard (meter)

603.5.01 Adjustments

General Provisions 101 through 150.

Section 800—Coarse Aggregate

800.1 General Description

This section includes requirements for coarse aggregate. All aggregate shall be the specified type, class, and grade, and shall meet the requirements for the intended use.

800.1.01 Related References

A. Standard Specifications

Section 424—Bituminous Surface Treatment

B. Referenced Documents

AASHTO	ASTM	
T 11	C 277	C 295
T 27	C 289	C 586
T 96	C 294	E 30
T 104		G 23

GDT 104

GDT 129

GDT 133

QPL 2

800.2 Materials

800.2.01 Coarse Aggregate

A. Requirements

The Contractor shall use the type, group, class, and grade of coarse aggregate specified. For coarse aggregate sources, see QPL 2.

1. Coarse Aggregate Types

Type	Characteristics
Crushed stone	Sound, durable rock particles.
Gravel	Sound, durable rock without damaging coatings.
Air-cooled blast furnace slag	Sound, durable particles with uniform density and quality, or other slags that have a good service record. Dry slag shall weigh at least 70 lb/ft³ (1120 kg/m³) compacted and shall contain less than 30% glassy particles by weight. Do not use slag as aggregate for Portland cement concrete.
Synthetic aggregate	Sound, durable, expanded clay, shale, or other manufactured product.

2. Coarse Aggregate Groups
   a. Group I: Limestone, dolomite, marble, or any combination thereof. Ensure Group I aggregates meet the abrasion requirement for Class A stone when used in Portland cement concrete of any type or class.
   b. Group II: Slag, gravel, granitic and gneissic rocks, quartzite, synthetic aggregate, or any combination thereof.
3. Classes

   Aggregates are classified by physical properties that determine how they are used.
   a. Do not blend aggregates that meet abrasion requirements with aggregates that do not meet requirements.
   b. “Class A“ and “Class B” aggregate used in Portland cement concrete, asphaltic concrete, and bituminous surface treatment shall meet these limits:

Percent Wear AASHTO T 96 ("B" Grading)		
	Class A	Class B
Group I Aggregates	0-40	41-55
Group II Aggregates	0-50	51-60

c. "Class B" aggregates used in all applications other than Portland cement concrete, asphaltic concrete, or bituminous surface treatment shall meet these limits:

Percent Wear AASHTO T 96 ("B" Grading)	
	Class B
Group I Aggregates	41-55
Group II Aggregates	51-65

4. Soundness

Test coarse aggregate used in Portland cement concrete, bituminous surfaces, bituminous bases, aggregate bases, or surface treatment with five alternations of the magnesium sulfate soundness test.

a. Use aggregate with a weight loss of less than 15 percent.

b. The 15 percent soundness loss for a Class "CS" concrete is waived if it has a 5-year service record.

c. If the material meets all the requirements except for the 15 percent soundness requirement, the material may be used in Zones 3 and 4 (see Subsection 424.3.05, "Construction Requirements") under the following conditions:

1) The aggregate in bituminous courses and in all types and classes of Portland cement concrete construction, except as stated in Group I, has a satisfactory five-year service record under similar service and exposure.

2) The Engineer's investigation shows that it equals or exceeds the quality of approved aggregate (in cases where the material's uniformity changes at the source, or does not have a five-year service record).

5. Grades

Use coarse aggregate that is well graded within the limits and sizes specified in Table 800.1.

6. Detrimental Substances

a. Detrimental substances include shale, weathered or decomposed rock, friable particles, or any substance that may be detrimental for the use intended..

b. Do not use any aggregate that can cause a deleterious reaction.

c. Do not use aggregates that contain Chrysotile (defined as fibrous serpentinite) as a temporary or permanent unbound surfacing for roads, nor as stabilizer for soil used as subgrade, base, or surface course.

d. Detrimental substances shall not exceed the following limits:

1) For Portland Cement Concrete:

Substance	Max % Allowed
Mica schist—Materials defined in ASTM C 294 as phyllite or schist. Use GDT 104 to analyze these materials.	5
Materials that pass the No. 200 (75 µm) sieve.	1.5
Flat and elongated pieces (with lengths more than five times the average thickness).	10
Sulphur content computed as sulfide sulphur (for bridge-type structures)—If the sulphur content exceeds 0.01%, do not use the aggregate unless it passes a petrographic analysis and a weathering test equivalent to 6 months or more of exposure.	0.01
Other local detrimental substances. (Any Combination)	2.0
NOTE: Do not use aggregate in Portland Cement concrete that is capable of producing a deleterious reaction when combined with Portland Cement.	

2) For Asphaltic Concrete:

Substance	Max. % Allowed
Mica schist—Materials defined in ASTM C 294 as phyllite or schist. Use GDT 104 to analyze these materials. (Use this requirement for Interstate Construction only.)	10
Flat or elongated particles (with lengths more than five times the average thickness).	10
Glassy particles (slag).	30
Other local detrimental substances. (Any combination)	2.0

3) For Bituminous Surface Treatment:

Substance	Max. % Allowed
Mica schist—Materials defined in ASTM C 294 as phyllite or schist. Use GDT 104 to analyze these materials.	10
Material finer than No. 200 (75 µm) sieve. #5 Stone #6 Stone #7 Stone #89 Stone	 0.5 0.7 0.7 1.0
Flat and elongated particles (with lengths more than five times the average thickness).	10
Glassy particles (slag).	30
Other local detrimental substances. (Any combination)	2

e. Ensure that gravel used in asphaltic concrete and bituminous surface treatment meets the following additional requirements:

- Consists of siliceous particles.
- A minimum of 85%, by count, of the material retained on the No. 4 (4.75 mm) sieve has one or more fractured faces.
- The fracture is for the approximate average diameter or thickness of the particle.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test as follows:

Test	Method
Material that passes the No. 200 (75 µm) sieve	AASHTO T 11
Sulphur content	ASTM E 30, Leco method
Weathering	ASTM G 23
Petrographic analysis	ASTM C 295
Soundness (magnesium sulfate)	AASHTO T 104
Percent wear	AASHTO T 96
Aggregate gradation	AASHTO T 27
Reactivity	ASTM C 227, C 289, and C 586
Schist or phyllite	GDT 104
Flat and elongated particles	GDT 129
Friable Particles	GDT 133

D. Materials Warranty

General Provisions 101 through 150.

TABLE 800.1 - SIZES OF COARSE AGGREGATES

SIZE NO	NOMINAL SIZE SQUARE OPENINGS		AMOUNTS FINER THAN EACH LABORATORY SIEVE (SQUARE OPENINGS). %, BY WEIGHT										
	(1)	mm	2 ½"	2"	1 ½"	1"	¾"	½"	3/8"	No. 4	No. 8	No- 16	No. 50
			63 mm	50 mm	37.5mm	25 mm	19 mm	12.5 mm	9.5 mm	4.75 mm	2.36mm	1.18 mm	300 µm
3	2-1	50 - 25	100	90-100	35-70	00-15	-----	00-5	----	-----	-----	-----	-----
357	2-No. 4	50 - 4.75	100	95-100	-----	35-70	-----	10-30	----	00-5	-----	-----	-----
4	1 ½ -3/4	37.5 - 19	-----	100	90-100	20-55	00-15	-----	00-5	-----	-----	-----	-----
467	1 ½- No. 4	37.5 - 4.75	-----	100	95-100	-----	35-70	-----	10-30	00-5	-----	-----	-----
5	1-1/2	25 – 12.5	-----	-----	100	90-100	20-55	00-10	00-5	-----	-----	-----	-----
56	1-3/8	25 – 9.5	-----	-----	100	90-100	40-75	15-35	00-15	00-5	-----	-----	-----
57	1-No. 4	25 – 4.75	-----	-----	100	95-100	-----	25-60	-----	00-10	00-5	-----	-----
6	¾-3/8	19 – 9.5	-----	-----	-----	100	90-100	20-55	00-15	00-5	-----	-----	-----
67	¾-No. 4	19 – 4.75	-----	-----	-----	100	90-100	-----	20-55	00-10	00-5	-----	-----
68	¾-No. 8	19 –2.36	-----	-----	-----	100	90-100	-----	30-65	05-25	00-10	0-5	-----
7	½-No. 4	12.5 – 4.75	-----	-----	-----	-----	100	90-100	40-70	00-15	00-5	-----	-----
78	½-No. 8	12.5 – 2.36	-----	-----	-----	-----	100	90-100	40-75	05-25	00-10	0-5	-----
8	3/8-No. 8	9.5 – 2.36	-----	-----	-----	-----	-----	100	85-100	10-40	0-10	0-5	-----
89	3/8-No. 16	9.5 – 1.18	-----	-----	-----	-----	-----	100	90-100	20-55	0-15	0-10	0-5
9	No. 4-No. 16	4.75 – 1.18	-----	-----	-----	-----	-----	-----	100	85-100	10-40	0-10	0-5

(1) In inches, except where otherwise indicated. Numbered sieves are those of the United States Standard Sieve Series.

Section 805—Rip Rap and Curbing Stone

805.1 General Description

This section includes the requirements for rip rap and curbing stone. Construction and material will be covered under the Special Provisions.

805.1.01 Related References

A. Standard Specifications

General Provisions 101 through 150.

B. Referenced Documents

AASHTO T 96

AASHTO T 104

ASTM C 295

GDT 64

805.2 Materials

805.2.01 Rip Rap

A. Requirements

1. Aggregate Quality

   All rip rap stone shall be made of sound, durable rock pieces that meet these requirements:

Aggregate Quality	Maximum Percent
Abrasion loss “B” grading	65
Soundness loss	15
Flat and slabby pieces (length five times more than the average thickness)	5
Weathered and/or decomposed pieces and shale	5

2. Gradation for Stone-Dumped rip rap Type 1 and Type 3:

Severe Drainage Conditions or Moderate Wave Action (Type 1)*		
Size By Volume	**Approx. Weight**	**Percent Smaller Than**
4.2 ft³ (0.12 m³)	700 lbs (320 kg)	100%
1.8 ft³ (0.05 m³)	300 lbs (135 kg)	50% - 90%
0.8 ft³ (0.02 m³)	125 lbs (55 kg)	20% - 65%
*Between 0% and 15% of the Type 1 rip rap shall pass a 4 in (100 mm) square opening sieve.		

General Use Normal Drainage Conditions (Type 3)*		
Size By Volume	**Approx. Weight**	**Percent Smaller Than**
1.0 ft³ (0.03 m³)	165 lbs (75 kg)	100%
0.1 ft³ (0.003 m³)	15 lbs (7 kg)	10% - 65%
*Between 0% and 15% of the Type 3 rip rap shall pass a 2 in (50 mm) square opening sieve.		

3. Stone for Plain Rip Rap

   The stones shall be clean and free of rock dust and fines.

   a. Process the stone so that the largest pieces have a volume of 2 ft³ (0.06 m³) or less.

b. Ten percent or less of the total rip rap weight can consist of spalls that pass a 5 in (125 mm) sieve.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test as follows:

Test	Method
Percent wear	AASHTO T 96
Petrographic analysis	ASTM C 295
Soundness (magnesium sulfate)	AASHTO T 104

D. Materials Warranty

General Provisions 101 through 150.

805.2.02 Curbing Stone

A. Requirements

1. Type 1:

   Provide Type 1 curb that meets these requirements:

   a. Curb thickness and height as shown on the Plans
   b. Cut in lengths of not less than 5 ft (1.5 m) nor more than 10 ft (3 m)
   c. Tops dressed to an even, smooth surface for the full length
   d. Have straight, even edges
   e. Top sloped ¼ in (6 mm) from back to front
   f. Have squared ends to permit joints to be constructed not more than ½ in (13 mm) wide for the full depth of the curb.
   g. Backface hand dressed at least 4 in (100 mm) below that part of the back that will be exposed
   h. Front face hand dressed to a depth of 1 in (25 mm) below the indicated elevation of the base course, pavement or gutter
   i. Have ends of circular curb sections cut along radial lines to permit joints to be constructed not more than ½ in (13 mm) wide
   j. Circular curb conforms accurately to the required radius
   k. Dressed surfaces do not contain projections or depressions more than 3/8 in (10 mm) from the plane surface of the curb

2. Type 2:

   Provide Type 2 curb that meets these requirements:

   a. Dimensions shall be 5 in (125 mm) thick, 17 in (425 mm) deep, and 5 ft (1.5 m) long, unless otherwise specified.
   b. Front face to have a top margin draught with a smooth face 10 in (250 mm) deep
   c. Have a smooth face (Note: A quarry face may be considered a smooth face if free from holes and all bumps exceeding allowed tolerances are pointed level
   d. Tops of curbs present even, smooth faces for the full length
   e. Have squared joints that when abutted with adjacent sections, present no crack or joint exceeding ½ in (13 mm) in width
   f. Have ends of circular curb sections cut along radial lines to permit joints to be constructed not more than ½ in (13 mm) wide
   g. Circular curb conforms accurately to the required radius

h. The allowable tolerances for Type 2 Curb dimensions are as follows:

Measurement Item	Dimension & Tolerance
Thickness	5 ¼ in (131 mm) +/- ¼ in (6mm)
Depth	17 in (425 mm) +/- 1 in (25 mm)
Top Surface	¼ in (6 mm) in 5 ft (1.5 m)
Side Surface	½ in (13 mm) in 5 ft (1.5 m)

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test for Percent Wear according to AASHTO T 96

D. Materials Warranty

General Provisions 101 through 150.

Section 881—Fabrics

881.1 General Description

This section includes the requirements for the following fabrics:

- Plain cotton duck
- Rubber-impregnated cotton duck
- Burlap and cotton bags
- Plastic filter fabric
- Pavement reinforcement fabric
- Silt fence filter fabric

881.1.01 Related References

A. Standard Specifications

Section 106—Materials Certification

B. Referenced Documents

Federal Specification CCC-C 419 Type III

ASTM D 36

ASTM D 146

ASTM D 412

ASTM D 1777

ASTM D 3786

ASTM D 4355

ASTM D 4632, GRAB

ASTM D 4751

ASTM D 4833

GDT 87

GDT 88

GDT 95

QPL 28

QPL 36

QPL 40

QPL 47

881.2 Materials

881.2.01 Plain Cotton Duck

A. Requirements

1. Use plain cotton duck that meets the requirements of Federal Specification CCC-C 419 Type III.

2. Ensure that the duck weighs at least 8 oz./yd² (270 g/m²).

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

General Provisions 101 through 150.

D. Materials Warranty

General Provisions 101 through 150.

881.2.02 Rubber-Impregnated Cotton Duck

A. Requirements

1. Use preformed rubber-impregnated fabric pads made of multiple layers of 8 oz (270 g) cotton duck, impregnated and bound with high quality natural rubber, or made of equivalent materials compressed into resilient pads of uniform thickness.
2. Use enough plies to reach the specified thickness after compression and vulcanizing.
3. Ensure that the finished pad withstands compression loads of not less than 10,000 psi (70 MPa) when applied perpendicular to the plane of the laminations. Ensure that the pad does not extrude or harmfully reduce in thickness.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

General Provisions 101 through 150.

D. Materials Warranty

General Provisions 101 through 150.

881.2.03 Burlap Bags

A. Requirements

1. Use burlap bags made of at least 95 percent jute and manila fibers.
2. Use burlap that weighs 8 to 18 oz/10 ft² (250 to 550 g/m²).
3. Use bags with a capacity of 1 to 2 ft³ (0.03 to 0.06 m³).

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

General Provisions 101 through 150.

D. Materials Warranty

General Provisions 101 through 150.

881.2.04 Cotton Bags

A. Requirements

1. Use cotton bags with Osnaburg 40 x 26 thread count and a nominal fabric weight of 6.8 oz/yd^2 (230 g/m^2).
2. Use bags that have 1/2 in (13 mm) sewn seams with at least 1 stitch per 1/5 in (5 mm).

3. Use 4 or 5 ply, 12 cotton yarn or equivalent for the stitches.
4. Ensure that seam efficiency is at least 80 percent. Ensure that the inside measurements tolerance is ± 1/2 in (13 mm).

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

General Provisions 101 through 150.

D. Materials Warranty

General Provisions 101 through 150.

881.2.05 Plastic Filter Fabric

A. Requirements

1. Use pervious sheets of plastic yarn made from a long-chain synthetic polymer. Use polymer composes of at least 85 percent by weight of propylene, ethylene, amide, ester, or vinylidene chloride.

   Use a sheet of plastic yarn that contains stabilizers and/or inhibitors added to the base plastic to make the filaments resistant to deterioration due to ultra-violet and/or heat exposure.
2. Ensure that the fabric is finished so that the filaments will retain their relative position with respect to each other.
3. Use fabric without defects, rips, holes, or flaws.
4. Use fabric that meets the following physical requirements for woven and non-woven fabric:

Woven Fabrics	
Tensile strength (any direction)	200 lbs (890 N) minimum
Bursting strength	500 psi (3.5 MPa) minimum
Elongation before breaking	10% to 35%
Percent open area	4.0% to 6.5%
Non-woven Fabrics	
Puncture resistance	30 lbs (135 N) minimum
Grab tensile strength	65 lbs (290 N) minimum
Grab elongation	40% minimum
Flow rate [H from 3 to 1 in (75 to 25 mm)]	50 gal/min/ ft² (34 liters/second/m²) (minimum) to 350 gal/ min/ft² (240 liters/second/m²) (maximum)

5. Seams
   a. Get approval on the seams from the Engineer before use on a Project.
   b. Use fabric that is sewn with thread of the same chemical requirements as the fabric, or use fabric bound with cement or heat. Either have the fabric bound or sewn at the point of manufacture or at a location approved by the Engineer.
   c. Seam Uses: You may use one seam in edge drain and underdrain applications.

You may bond or sew fabric together to form sections at least 6 ft (1.8 m) wide for use under rip rap or behind retaining walls.

6. Fabric Use
   a. Use woven fabrics beneath rip rap when dropping stone from 3 ft (1 m) or less.
   b. You may use woven fabrics that meet the flow rate for edge drains.
   c. Use non-woven fabrics to line edge drains, underdrains, or behind retaining walls, where specified.
   d. Do not use non-woven fabrics for filter beneath rip rap.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test according to the following:

Test	Method
Puncture resistance	ASTM D 4833
Tensile strength, elongation, grab strength	ASTM D 4632
Bursting strength	ASTM D 3786
Percent open area	GDT 88
Flow rate	GDT 87

1. See QPL 28 for acceptable woven and non-woven fabrics that meet the requirements of this Specification. See QPL 47 for acceptable Geocomposite wall drains.
2. The Department will reject any fabrics that meet this Specification but fail to perform in actual use.

D. Materials Care and Warranty

Wrap fabric in burlap or similar heavy duty protection during shipment and storage to protect it from mud, dirt, dust, and debris.

881.2.06 Pavement Reinforcement Fabric

A. Requirements

Type I and Type II Pavement Reinforcement Fabric

1. Use pavement reinforcement fabric that has the following properties:
   - Is non-woven, heat-resistant material composed of polypropylene or polyester fibers
   - Can be saturated with asphalt cement
   - Can be placed smooth with mechanical devices and be without wrinkles
   - Can withstand the heat of asphaltic concrete mixes during paving operations
   - Can withstand normal field handling and construction operations without damage

   For a list of sources, see QPL 40.

   - Meets the following physical requirements. The bid item or Plans will indicate which type of fabric is required for a Project.

	Type I	Type II
Tensile strength, minimum	90 lbs (400 N)	125 lbs (555 N)

Elongation at break	40% min., 100% max.	40% min., 100% max.
Asphalt retention, minimum	0.18 gal/yd² (0.8 L/m²)	0.28 gal/yd² (1.3 L/m²)

2. Submit a certificate from the manufacturer that shows the physical properties of the material used and how it meets this Specification. Submit the certificate according to Subsection 106.05, "Materials Certification."
3. Demonstrate to the Department that fabric meeting the physical properties requirements of this Specification has been used successfully in installations with similar environmental and Project conditions.

High Strength Pavement Reinforcement Fabric

1. Use pavement reinforcement fabric that has the following properties:
   - Is a flexible, water-resistant, high-density asphaltic membrane laminated between two layers of high strength, heat resistant polypropylene or polyester fabric.
   - Can be placed smooth with mechanical devices and be without wrinkles.
   - Can withstand the heat of asphaltic concrete mixes during paving operations.
   - Can withstand normal field handling and construction operations without damage.
   - May have a self-adhesive backing adhered to a film release liner.

   For a list of sources, see QPL 40.

   - Meets the following physical requirements. The bid item or Plans will indicate which type of fabric is required for a Project.

Width, minimum	18 in (450 mm)
Tensile strength, minimum	1,800 lbs/in^2 (12 MPa)
Elongation	20% to 50%
Softening Point (Asphaltic membrane), minimum	190 ^{0}F (87 ^{0}C)
Caliper	0.135 inch (3.43 mm) 95% retained after loading
Pliability (Cold Flex) 2" (50 mm) X 5" (125 mm) specimen, condition specimen at 0 ^{0}F (-18 ^{0}C)for 1 hour, 180^0 bend on 2" (50 mm) mandrel	No Separation

2. Submit a certificate from the manufacturer that shows the physical properties of the material used and how it meets this Specification. Submit the certificate according to Subsection 106.05, "Materials Certification."
3. Demonstrate to the Department that fabric meeting the physical properties requirements of this Specification has been used successfully in installations with similar environmental and Project conditions.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Type I and Type II Pavement Reinforcement Fabric

Test according to the following:

Test	Method
Tensile strength	ASTM D 4632 Grab
Elongation	ASTM D 4632 Grab
Asphalt retention	GDT 95

High Strength Pavement Reinforcement Fabric

Test according to the following:

Test	Method
Tensile strength	ASTM D 412
Elongation	ASTM D 412
Softening Point	ASTM D 36
Caliper	ASTM D 1777
Pliability (Cold Flex)	ASTM D 146

D. Materials Warranty

General Provisions 101 through 150.

881.2.07 Silt Fence Filter Fabric

A. Requirements

1. Use approved silt fence from QPL 36.
   a. Type "A" and "B" Fences: Use either woven or nonwoven filter fabric for Type "A" and "B" fences. If using woven fabric, the fabric may have slit tape yarns in one direction (warp or fill) only.
   b. Type "C" Fences: Use non-calendered woven fabric constructed with monofilament yarns only.

NOTE: Approved fabrics must consistently exceed the minimum requirements of this Specification as verified by the Office of Materials and Research. If a fabric is removed from the Qualified Products List, do not use it in the work until the Department has reestablished the product's acceptability.

2. Ensure that silt fence filter fabrics have the following characteristics:
   - Has strong rot-proof synthetic fibers formed into either a woven or non-woven fabric
   - Has no treatment or coating that might significantly alter its physical properties after installation
   - Contains stabilizers and/or inhibitors to make the filaments resistant to deterioration resulting from exposure to sunlight or heat
   - Makes a pervious sheet of synthetic fibers oriented into a stable network so that the fibers retain their relative position with respect to each other under normal handling, installation, and service conditions
   - Has finished fabric edges to prevent the outer yarn from pulling away from the fabric
   - Has no defects or flaws that would significantly affect its physical and/or filtering properties
   - Meets the following physical or dimensional requirements:

Type Fence	A	B	C

Minimum tensile strength, pounds (newtons) (1)	Warp – 120 (530) Fill – 100 (445)	Warp – 120 (530) Fill – 100 (445)	Warp– 260 (1155) Fill – 180 (800)
Elongation (% Max.)	40	40	40
Apparent opening size (max. sieve size)	No. 30 (600 um)	No. 30 (600 um)	No. 30 (600 um)
Flow rate, gal/ min./ft² (L/min./m²)	25 (1015)	25 (1015)	70 (2850)
Ultraviolet stability (2)	80	80	80
Bursting strength, psi (kPa)	175 (1200)	175 (1200)	175 (1200)
Minimum fabric width	36 in (900 mm)	22 in (550 mm)	36 in (900 mm)
1. Minimum roll average of five specimens. 2. Percent of required initial minimum tensile strength.			

B. Fabrication

The fabric may be manufactured with pockets for posts, hems with cord, or with posts pre-attached using staples or button head nails.

Ensure that the fabric has the manufacturer's mark, either with an approved color mark yarn in the fabric or the manufacturer's name and product trade name labeled on the fabric at a minimum of 100 ft (30 m) intervals.

C. Acceptance

Test according to the following:

Test	Method
Tensile strength	ASTM D 4632
Elongation	ASTM D 4632
Apparent opening size	ASTM D 4751
Flow Rate	GDT 87
Ultraviolet stability	ASTM D 4632 (after 300 hours weathering according to ASTM D 4355)
Bursting strength	ASTM D 3786, Diaphragm Bursting Strength Tester

D. Materials Care and Warranty

Wrap fabric in a heavy-duty protective covering during shipment and storage to protect it from mud, dirt, dust and debris.

Do not expose fabric to temperatures greater than 140 °F (60 °C).

881.2.08 Filter Fabric for Embankment Stabilization

See Special Provision.

JOINT AND CRACK SEALANT

PART 1 - GENERAL

1.1 SUMMARY

1. Furnish all materials, labor, tools, equipment and services necessary for the preparation of the substrate and the application of a joint and crack sealant as indicated by the drawings and specifications.

2. This section specifies components of a concrete repair and protection system that shall be provided by a single manufacturer.

1.2 SUBMITTALS

1. Submittals for any proposed material substitutions shall include written verification that the proposed substitute meets or exceeds all the performance criteria specified in this section. If the proposed substitute does not meet or exceed all the performance criteria specified in this section, submit the respective performance criteria of the proposed substitute, project references demonstrating a proven record of performance, compatibility documentation with entire concrete repair and protection system, and the cost savings to the owner.

2. Submit warranty upon acceptance of work.

1.3 QUALITY ASSURANCE

1. The contractor shall be experienced in concrete repair and protection. This shall be demonstrated by providing five successful concrete repair and protection project references.

2. The manufacturer shall be experienced in concrete repair and protection. This shall be demonstrated by providing proof of producing concrete repair and protection products for a minimum of ten years. Manufacturers that do not comply with the ISO 9001 quality standard in the development, manufacturing, and sale of their products shall not be acceptable.

3. The contractor shall schedule a site meeting with a representative of the product prior to commencement of work.

4. Deliver products in original, unopened containers with the manufacturer's name, labels, product identification, and batch numbers. Store and condition the product in full compliance with the manufacturer's recommendations.

5. The contractor shall supply a complete warranty for workmanship for one year commencing with the date of acceptance of work. The manufacturer shall supply a complete warranty for materials for five years commencing with the date of acceptance of work.

PART 2 - PRODUCTS

2.1 SEALANTS TO BE APPLIED TO JOINTS AND CRACKS

1. The product shall be a two-component, non-sag for vertical and self-leveling for horizontal, polyurethane-based, elastomeric sealant.

2. Any primers, as required, recommended by the manufacturer of the specified product, approved by the engineer.

3. Backer Rod: Closed-cell, dense, polyethylene, extruded rod.

4. Specified product: Sikaflex 2c NS/SL, as manufactured by Sika Corporation, Lyndhurst, New Jersey. The specified product has been selected to establish a minimum standard of quality that will be accepted. The listing of the product is not intended to limit competition, but to establish the standard of quality. Proposed substitutions may be submitted, and shall conform to the standard of quality, as established in these specifications.

2.2 PERFORMANCE CRITERIA

1. Pot life: 3-4 hours.

2. Initial cure (tack-free time): 6-8 hours.

3. Final cure: 3 days, maximum.

4. Tensile Strength (ASTM D-412) at 14 days: > 125 psi.

5. Shore A Hardness (ASTM D-2240): 35 - 45.

6. Movement capability: + or - 50% of average joint width.

7. Adhesion in peel to concrete (TT-S-00227E): > 20 lb.

8. Tear strength (ASTM D-624): > 75 lb./in.

9. The product must be able to perform in total water immersion.

10. The product must be ANSI/NSF Standard 61 approved for potable water contact.

11. Service range: -40ºF to 170ºF.

PART 3 - EXECUTION

3.1 PREPARATION

1. Joint and crack walls must be sound, clean, dry, frost-free, and free of oil and grease. Remove all traces of the old sealant, dust, laitance, grease, oils, curing compounds, and foreign matter by mechanical means. Blow joint free of dust using a compressed air line equipped with an oil trap.

3.2 APPLICATION

1. Do not apply material if it is raining or snowing or if such conditions appear to be imminent. Minimum application temperature is 40ºF (5ºC) and rising.

2. Prime all substrates as required based upon the recommendations of the manufacturer of the specified product, when field testing indicates need, and when the joints will be subject to immersion after cure, as approved by the Engineer.

3. Install bond breaker tape or backer rod to prevent bond at base of joint or crack and to set depth of sealant between 3/8 to 1/2 inch. Minimum width of joint or crack is 1/4 inch, and maximum width is 2 inches. A 2:1 width to depth ratio is the best design.

4. Place nozzle of sealant gun into bottom of the joint or crack and fill completely. Keep the tip of the nozzle in the sealant and continue with a steady flow of sealant preceding the nozzle to avoid air entrapment. Avoid overlapping of sealant to eliminate entrapment of air. Tool as necessary to properly fill the joint or crack.

5. Adhere to all procedures, limitations and cautions for the product in the manufacturer's current printed literature.

3.3 CLEANING

1. Leave finished work and work area in a neat, clean condition without evidence of spillovers onto adjacent areas.