Breezewood Avenue Sidewalk Improvements

FAYETTEVILLE NC
AMERICA'S CAN DO CITY

APPENDIX A

Drawings

PROJECT CONTACTS CITY OF FAYETTEVILLE	
Engineering	Byron Reeves, PE, CFM Assistant Public Services Director - Engineering 433 Hay Street, Fayetteville, NC 28301 (910) 433-1301 byronreeves@fayettevillenc.gov
Construction Management	Jeff Riddle, PLS Construction Manager 339 Alexander Street, Fayetteville, NC 28301 (910) 433-1661 jeffreyriddle@fayettevillenc.gov
Traffic Services	Brian McGill, PE, PTOE Assistant Public Services Director for Traffic Services 339 Alexander Street, Fayetteville, NC 28301 (910) 433-1170 brianmcgill@fayettevillenc.gov

811

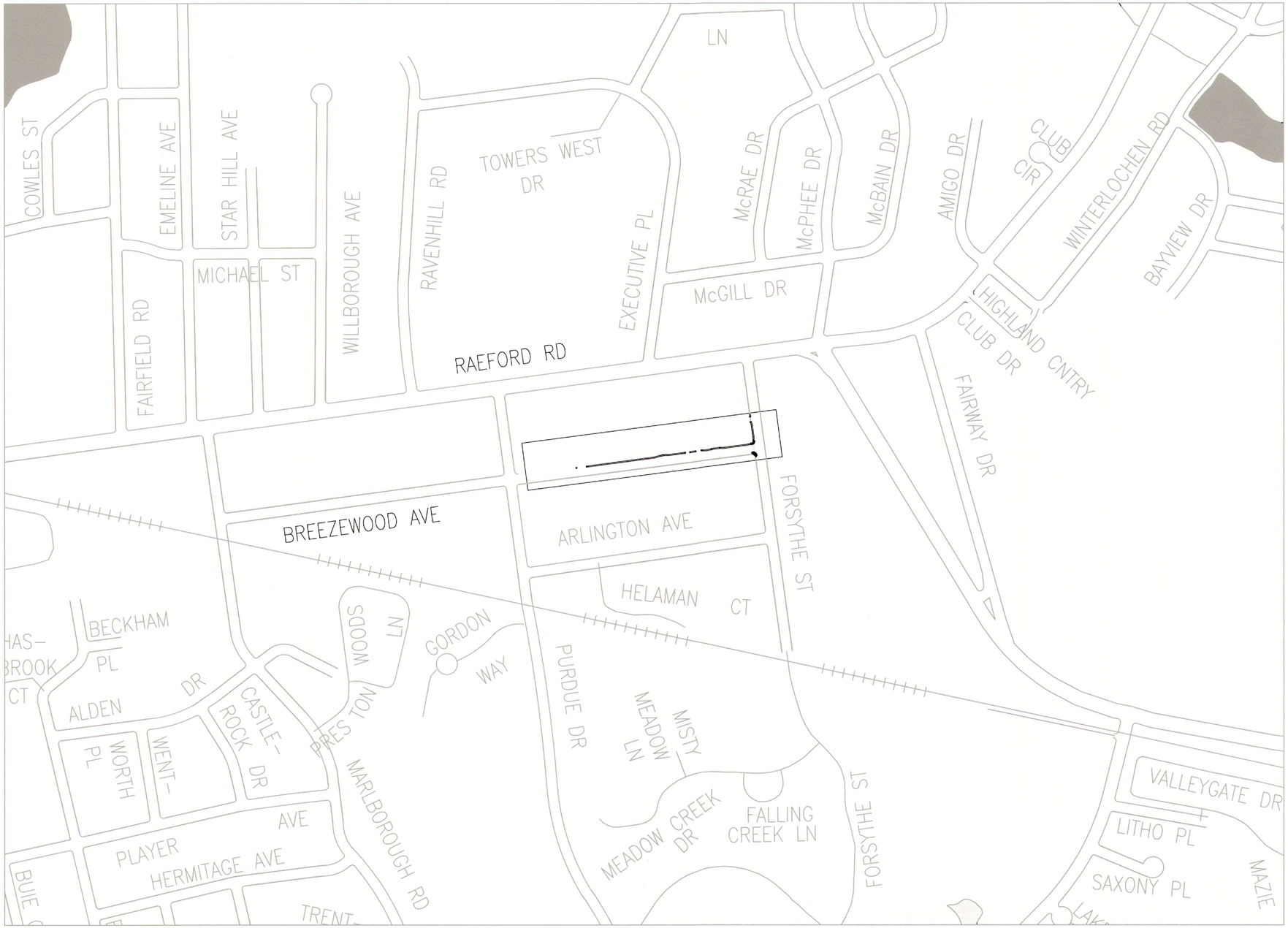
Know what's **below.**
Call before you dig.

FAYETTEVILLE NC
PUBLIC SERVICES

BREEZEWOOD AVENUE SIDEWALK

PROJECT SCOPE

**THIS PROJECT CONSISTS OF:
THE INSTALLATION OF ±820 LINEAR FEET
OF SIDEWALK ALONG THE NORTH SIDE
OF BREEZEWOOD AVENUE FROM
PURDUE DRIVE TO FORSYTHE STREET**



250 0 250 500
1 INCH = 250 FT

INDEX

SHEET	SHEET DESCRIPTION
1	COVER SHEET
2	LEGEND
3	GENERAL NOTES
4	PLAN (STA: 0+00 - 9+80)
5	CROSS SECTIONS
6	DETAILS
7	DETAILS

BREEZEWOOD AVENUE SIDEWALK

SHEET NUMBER 1 of 7
PLAN TYPE: COVER

FAYETTEVILLE NC
AMERICA'S CAN DO CITY
ENGINEERING DIVISION
PUBLIC SERVICES DEPARTMENT
433 HAY STREET, FAYETTEVILLE, NC 28301

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 57101 CHRISTOPHER S. PIGHET
9-22-25

REVISIONS		
REV. #	DESCRIPTION	REV.BY DATE

DRAWN : C.PIGHET
CHECK : V.SMALL
APPROVED : J.TALIAN
DESIGN : C.PIGHET
SCALE : 1"=20'
DATE : 07/08/2026

ABBREVIATIONS

AL - AREA LIGHT
ASPH - ASPHALT
B/C - BACK OF CURB
BM - BENCHMARK
BFP - BACK FLOW PREVENTER
BLRD - BOLLARD
CB - CATCH BASIN
CP - CABLEVISION PEDESTAL
C&G - CURB AND GUTTER
C/L - CHAIN LINK
CMP - CORRUGATED METAL PIPE
CO - CLEANOUT
CONC - CONCRETE
CONST - CONSTRUCTION
CP - CONTROL POINT
CTR - CENTER
DB - DEED BOOK
DEPT - DEPARTMENT
DI - DROP INLET
DIP - DUCTILE IRON PIPE
DWA - DRIVEWAY ASPHALT
DWB - DRIVEWAY BRICK
DWC - DRIVEWAY CONCRETE
DWD - DRIVEWAY DIRT
DWG - DRIWEWAY GRAVEL
E - EAST/EASTING
EIP - EXISTING IRON PIPE
EIR - EXISTING IRON REBAR
EOP - EDGE OF PAVEMENT
ERB - EXISTING REBAR
ESMT - EASEMENT
EV - ELECTRICAL VAULT
F/C - FACE OF CURB
FES - FLARED END SECTION
FH - FIRE HYDRANT
FOB - FIBER OPTIC BURIED
FOM - FIBER OPTIC MARKER
FP - FLAG POLE
GV - GAS VALVE
GW - GUY WIRE
HDPE - HIGH DENSITY POLYETHYLENE
INV - INVERT
JB - JUNCTION BOX
LF - LINEAR FOOT
LOD - LIMITS OF DISTURBANCE
LP - LIGHT POLE
MAX - MAXIMUM
MB - MAILBOX
MHEL - MANHOLE ELECTRIC
MHSD - MANHOLE STORM DRAIN
MHSS - MANHOLE SANITARY SEWER
MHTP - MANHOLE TELEPHONE
N - NORTH/NORTHING
O.C. - ON CENTER
OHE - OVERHEAD ELECTRICAL
PC - POINT OF CURVATURE
PG - PAGE
PI - POINT OF INTERSECTION
PP - POWER POLE
PR - PROPOSED
PVC - POLYVINYL CHLORIDE
PVMT - PAVEMENT
RCP - REINFORCED CONCRETE PIPE
R/W - RIGHT OF WAY
S- SOUTH
SC - SAWCUT
SD - STORM DRAIN
SIR - SET IRON REBAR
SS - SANITARY SEWER
STA - STATION
SWA - SIDEWALK ASPHALT
SWB - SIDEWALK BRICK
SWC - SIDEWALK CONCRETE
SY - SQUARE YARD
TC - TRASH CAN
TD - TRUNCATED DOME
TCE - TEMPORARY CONSTRUCTION EASEMENT
TCP - TERRA COTTA PIPE
TP - TELEPHONE PEDESTAL
TSB - TRAFFIC SIGNAL BOX
TYP - TYPICAL
U.O.N. - UNLESS OTHERWISE NOTED
UP - UTILITY POLE
W - WEST
WM - WATER METER
WV - WATER VAULT
X SECTION - CROSS SECTIONS

LEGEND

PROPOSED CONCRETE
PROPOSED CONCRETE CURB AND GUTTER
PROPOSED RIGHT-OF-WAY (R/W)
PROPOSED FENCE
PROPOSED UNDERGROUND GAS (GAS)
PROPOSED UNDERGROUND WATER (W)
PROPOSED SANITARY SEWER (SS)
PROPOSED STORM DRAIN (SD)
PROPOSED TEMPORARY CONSTRUCTION EASEMENT (TCE)
PROPOSED EASEMENT (PE)
SILT FENCE - LIMITS OF DISTURBANCE (SF)
PROPOSED SWALE (<)
PROPOSED TRUNCATED DOMES
PROPOSED SANITARY SEWER MAN HOLE
PROPOSED STORM SEWER MAN HOLE
PROPOSED ELECTRICAL MAN HOLE
PROPOSED TELEPHONE MAN HOLE
PROPOSED CATCH BASIN
PROPOSED DROP INLET
PROPOSED ELECTRICAL VAULT
PROPOSED WATER VAULT
PROPOSED WATER METER
PROPOSED SANITARY SEWER CLEAN OUT
PROPOSED POWER POLE
PROPOSED LIGHT POLE
PROPOSED FIRE HYDRANT
PROPOSED GATE WATER VALVE
PROPOSED GAS VALVE
PROPOSED TREE
PROPOSED SHRUB
PROPOSED INLET PROTECTION
PROPOSED FLAIRED END SECTION
PROPOSED HEADWALL

WETLANDS
EXISTING CONCRETE/SIDEWALK
EXISTING CONCRETE CURB AND GUTTER
EXISTING RIGHT-OF-WAY (R/W)
EXISTING FENCE
EXISTING UNDERGROUND GAS (GAS)
EXISTING UNDERGROUND WATER (W)
EXISTING SANITARY SEWER (SS)
EXISTING STORM SEWER (SD)
EXISTING FIBER OPTIC BURIED (FOB)
EXISTING UNDERGROUND ELECTRIC (UGE)
EXISTING OVERHEAD ELECTRIC (OHE)
EXISTING TELEPHONE CABLE (TEL)
EXISTING CABLEVISION (CTV)
EXISTING TRAIN TRACKS
EXISTING EASEMENT (EE)
EXISTING SWALE (<)
EXISTING SANITARY SEWER MAN HOLE
EXISTING STORM SEWER MAN HOLE
EXISTING ELECTRICAL MAN HOLE
EXISTING TELEPHONE MAN HOLE
EXISTING CATCH BASIN
EXISTING DROP INLET
EXISTING ELECTRICAL VAULT
EXISTING WATER VAULT
EXISTING WATER METER
EXISTING WELL
EXISTING SANITARY SEWER CLEAN OUT
EXISTING POWER POLE
EXISTING LIGHT POLE
EXISTING FIRE HYDRANT
EXISTING WATER VALVE
EXISTING GAS VALVE
EXISTING TRAFFIC SIGNAL BOX (TSB)
EXISTING FIBER OPTIC BOX (FOB)
EXISTING FIBER OPTIC MARKER (FOM)

EXISTING CONCRETE MONUMENT
EXISTING SURVEY CONTROL MARKER
EXISTING PROPERTY CORNER (EIR/ERB/SIR/EIP)
EXISTING MAILBOX
EXISTING TREE
EXISTING SHRUB
EXISTING FLAIRED END SECTION
EXISTING HEADWALL
EXISTING TELEPHONE PEDESTAL
EXISTING BACK FLOW PREVENTER

BREEZEWOOD AVENUE SIDEWALK

SHEET NUMBER 2 of 7
PLAN TYPE: LEGEND

FAYETTEVILLE
AMERICA'S CAN DO CITY
ENGINEERING DIVISION
ENGINEERING, SURVEYING AND PLANNING
433 HAY STREET, FAYETTEVILLE, NC 28301

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 57101 CHRISTOPHER PIGHET
9-22-26
DATE

REVISIONS

REV. #	DESCRIPTION	REV.BY	DATE

DRAWN : C.PIGHET
CHECK : V.SMALL
APPROVED : J.TALIAN
DESIGN : C.PIGHET
SCALE : 1"=20'
DATE : 07/08/2026

GENERAL NOTES:

ACCESS TO SITES SHALL BE BY PUBLIC RIGHT-OF-WAYS AND UTILITY EASEMENTS. OTHER ACCESS LOCATIONS REQUIRED SHALL BE SECURED BY THE CONTRACTOR AT NO ADDITIONAL EXPENSE TO THE OWNER. SUPPLEMENTAL EROSION CONTROL MEASURES SHALL BE REQUIRED TO INCLUDE CONSTRUCTION ENTRANCES, SILT FENCING, RESTORATION, ETC.

THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE THE CONSTRUCTION STAGING AREA AT HIS EXPENSE. A TEMPORARY USE PERMIT IS REQUIRED FOR THE STAGING AREA (ZONING 433-1705).

THE CONTRACTOR IS EXPECTED AND REQUIRED TO COOPERATE WITH THE PROPERTY OWNERS AFFECTED BY THE WORK. PRIVATE AGREEMENTS WITH PROPERTY OWNERS MUST BE IN WRITING ON A FORM APPROVED BY THE ENGINEER AND A COPY SHALL BE PROVIDED TO THE ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION ACTIVITIES AFFECTED BY SAID AGREEMENT. THE AGREEMENT MUST SPECIFY THAT THE CITY AND THE ENGINEER SHALL BE HELD HARMLESS AGAINST ALL CLAIMS ARISING FROM THE AGREEMENT. THE OWNER DISCOURAGES PRIVATE AGREEMENTS. BEFORE FINAL ACCEPTANCE, A RELEASE FROM EACH PROPERTY OWNER THAT THE CONTRACTOR MADE AN AGREEMENT WITH SHALL BE REQUIRED. THE PROPERTY OWNER'S RELEASE IS A CONDITION OF FINAL ACCEPTANCE.

CONTRACTOR SHALL MAINTAIN A NEAT AND CLEAN JOB-SITE TO INCLUDE STAGING/STORAGE AREAS AS FOLLOWS:

- PERFORM DUST CONTROL BY WATERING DAILY OR AS DIRECTED BY THE ENGINEER.
- SWEEP STREETS A MINIMUM OF ONCE WEEKLY (FRIDAY) OR AS DIRECTED BY THE ENGINEER.
- BLADE, LEVEL AND RE-COMPACT ALL EXPOSED TRENCHES WEEKLY (OR AS DIRECTED BY THE ENGINEER) TO PRODUCE A SMOOTH "RIDE".
- PERFORM DAILY CLEAN-UP OF ALL DIRT, DEBRIS AND SCRAP MATERIALS.
- REMOVE EXCESS EQUIPMENT, MATERIALS, TOOLS, ETC. NOT NEEDED.

CONTRACTOR SHALL PROVIDE MEASURES DURING CONSTRUCTION TO SECURE THE SITE AND EXCAVATION FROM THE GENERAL PUBLIC AND COMPLY WITH ALL OSHA REGULATIONS. JOB SITE SAFETY IS THE EXCLUSIVE AND SOLE RESPONSIBILITY OF THE CONTRACTOR. OPEN EXCAVATION LEFT UNATTENDED OR OVER NIGHT IS NOT ACCEPTABLE AND SHALL BE FILLED IMMEDIATELY.

CONTRACTOR SHALL REPAIR OR REPLACE DRIVES DISTURBED BY CONSTRUCTION TO EXISTING OR BETTER CONDITIONS. NO SEPARATE PAYMENT UNLESS OTHERWISE INDICATED.

CONTRACTOR SHALL PROVIDE TEMPORARY FENCING WHERE FENCES ARE REMOVED FOR CONSTRUCTION. CONTRACTOR SHALL COORDINATE REMOVAL OF EXISTING FENCE AND INSTALLATION OF TEMPORARY FENCE WITH PROPERTY OWNER PRIOR TO CONSTRUCTION. REMOVAL OF TEMPORARY FENCE AND INSTALLATION OF PERMANENT FENCE MUST ALSO BE COORDINATED WITH PROPERTY OWNER. ALL REMOVAL, TEMPORARY, AND REPLACEMENT FENCING SHALL BE CONSIDERED INCIDENTAL TO THE CITY INSTALLATION AND NO SEPARATE PAYMENT SHALL BE MADE. CONTRACTOR SHALL REINSTALL ALL SHEDS, FENCES, ETC. TO AS GOOD OR BETTER THAN EXISTING CONDITIONS UNLESS OTHERWISE INDICATED. (NO SEPARATE PAYMENT).

CONTRACTOR SHALL REPLACE ALL DISTURBED MAILBOXES, SIGNS, ETC. DISTURBED DURING CONSTRUCTION WITHIN 24 HOURS OF DISTURBANCE. PERMANENT ROAD SIGNAGE DISTURBED SHALL BE REPLACED IMMEDIATELY AND IF NECESSARY ROADWAY SIGNS SHALL BE TEMPORARILY INSTALLED IN A LOCATION CONSISTENT WITH THE NCMUTCD TO PROVIDE CONTINUOUS TRAFFIC AWARENESS OF ROADWAY CONDITIONS. (NO SEPARATE PAYMENT).

CONTRACTOR SHALL PROVIDE SECURITY FENCING, SECURITY GUARD, AND ANY AND ALL OTHER MEASURES CONTRACTOR DEEMS NECESSARY TO PROTECT EQUIPMENT AND MATERIALS STORED ON THE PROJECT. (NO SEPARATE PAYMENT).

WHERE CONTRACTOR CEASES WORK OPERATION FOR A 72 HOUR PERIOD OR LONGER, SUCH AS HOLIDAYS, ETC., THE FOLLOWING SHALL BE ACCOMPLISHED PRIOR TO THE WORK STOPPAGE.

- CONTRACTOR WILL STORE ALL EQUIPMENT IN THE CONTRACTOR STAGING AREA OR OFF SITE.
- THE CONTRACTOR SHALL SWEEP ALL STREETS, PERFORM GENERAL CLEANUP AND SHALL PERFORM MAINTENANCE ON ALL EXPOSED PATCHES.

CONTRACTOR SHALL SCHEDULE WORK AND MATERIAL DELIVERIES SO THAT STORED MATERIAL QUANTITIES ON THE JOB SITE SHALL BE MINIMIZED.

CONTRACTOR SHALL STORE ALL MATERIALS IN THE CONTRACTOR STAGING AREA 72 HOURS PRIOR TO INCORPORATING INTO THE WORK TO REDUCE OBSTRUCTIONS TO TRAFFIC AND INCONVENIENCE TO RESIDENTS.

GENERAL NOTES FOR RESIDENT RELATIONS (MANDATORY):

THE CONTRACTOR IS REQUIRED TO DEVELOP GOOD RELATIONS WITH THE RESIDENTS WHICH INCLUDE THE FOLLOWING MANDATORY MINIMUM REQUREMENTS:

- NO SPEEDING WITH EQUIPMENT AND/OR VEHICLES (25 MPH MAX.)
- DO NOT BLOCK DRIVEWAYS AT ANY TIME
- DO NOT LITTER AT ANY TIME
- DO NOT USE RESIDENT'S WATER WITHOUT THEIR PERMISSION (SIGNED AGREEMENT REQUIRED)
- ALL PLUMBING CODE REQUIREMENTS FOR BACK FLOW PREVENTION WILL BE ADHERED TO
- RESPOND TO RESIDENT'S COMPLAINTS WITHIN 24 HOURS
- DO NOT USE ABUSIVE LANGUAGE, PROFANITY OR CAT-CALLING
- WEAR PROPER PROTECTIVE CLOTHING (HARD HATS, PROPER SHOES, SHIRTS, ETC.) AT ALL TIMES.
- MAINTAIN PROPER SAFETY MEASURES, PARTICULARLY ALONG OPEN TRENCHES, PLACING CONES ON RAISED MANHOLES AND BACK FILLING OPEN TRENCHES IF CONSTRUCTION IS STOPPED AND THE OPEN TRENCH IS NOT MANNED.
- PERSONNEL MUST WEAR CITY APPROVED SAFETY VEST AT ALL TIMES WHILE WORKING IN THE CITY AND/OR NCDOT RIGHT-OF-WAY
- ALL TRAFFIC CONTROL FLAG PERSONS AND AT LEAST ONE PERSON ON EACH WORK CREW MUST BE FLUENT IN THE ENGLISH LANGUAGE

IF THE CONTRACTOR AND/OR SUBCONTRACTORS CANNOT ADQUATELY PERFORM AND/OR COMPLY WITH THESE REQUIREMENTS, THE INDIVIDUAL, SUBCONTRACTOR, OR EMPLOYEES MAY BE DIRECTED TO LEAVE THE PROJECT PERMANENTLY. INCONSIDERATE, NON-COOPERATIVE ATTITUDES AND ACTIONS WILL NOT BE TOLERATED.

UTILITIES:

UTILITIES ARE ILLUSTRATED FOR INFORMATION PURPOSES ONLY. THE CITY OR ENGINEER WILL NOT BE HELD RESPONSIBLE FOR THE ACCURACY OF UTILITY LOCATIONS, SIZES, DEPTHS, OR FOR COMPLETENESS OF UTILITY INFORMATION SHOWN.

PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY AND MEET WITH ALL UTILITY OWNERS. THE CONTRACTOR SHALL PROTECT ALL UTILITIES FROM DAMAGE CAUSED BY HIS OPERATIONS OR THOSE OF HIS AGENTS. THE CONTRACTOR SHALL HOLD THE CITY HARMLESS FOR ANY THIRD-PARTY INCONVENIENCE CREATED BY WORK OF HIS OWN FORCES OR THAT OF HIS AGENTS. ANY DAMAGES INCURRED SHALL BE THE CONTRACTORS FINANCIAL RESPONSIBILITY.

ADJUSTMENTS/RELOCATIONS WILL BE PERFORMED BY THE VARIOUS UTILITY OWNERS. THE CONTRACTOR SHALL COORDINATE WORK WITH UTILITY OWNERS SO AS NOT TO ADVERSELY AFFECT THE PROJECT SCHEDULE. THE CITY WILL NOT BE HELD RESPONSIBLE FOR ANY DELAYS OR DISRUPTIONS TO THE WORK SCHEDULE OF OTHER UTILITY OWNERS.

- FOR UTILITY LOCATES CALL NORTH CAROLINA ONE-CALL @ 811.
- FOR LOCATES OF UTILITIES NOT MEMBERS OF NORTH CAROLINA ONE-CALL CONTACT PROJECT MANAGER OR UTILITY COORDINATOR.

THE CONTRACTOR SHALL ADJUST ALL WATER VALVES, WATER METER BOXES AND WATER VAULTS TO FINISHED GRADE. WATER METERS, MANHOLES, AND CLEANOUTS LOCATED IN SIDEWALKS OR CONCRETE DRIVEWAYS SHALL BE INSTALLED IN ACCORDANCE WITH PWC REQUIREMENTS. NO ABOVE GROUND UTILITY BOXES, POWER POLE, OR OTHER STRUCTURES ARE TO BE LOCATED WITHIN THE SIDEWALK AREA. THE SIDEWALK AREA IS TO BE FREE OF OBSTACLES.

PRIOR TO COMMENCEMENT OF ANY WORK WITHIN EASEMENTS OR RIGHT-OF-WAYS, THE CONTRACTOR IS REQUIRED TO NOTIFY CONCERNED UTILITY COMPANIES IN ACCORDANCE TO GS 87-102. CONTRACTOR SHALL VERIFY LOCATION OF EXISTING UTILITIES PRIOR TO BEGINNING CONSTRUCTION. NO SEPARATE PAYMENT. EXISTING UTILITIES SHOWN ARE TAKEN FROM MAPS FURNISHED BY VARIOUS UTILITY COMPANIES AND HAVE NOT BEEN PHYSICALLY LOCATED (i.e. GAS, FIBER OPTIC, ETC.).

THE CONTRACTOR SHALL DIG UP EACH UTILITY WHICH MAY CONFLICT WITH CONSTRUCTION 14 DAYS IN ADVANCE TO VERIFY LOCATIONS (HORIZONTALLY AND VERTICALLY) TO ALLOW THE ENGINEER AN OPPORTUNITY TO ADJUST THE DESIGN TO AVOID CONFLICTS (NO SEPARATE PAYMENT).

STORM DRAINAGE REPAIRS BY CONTRACTOR DUE TO CONSTRUCTION DAMAGE AND JOINTS EXPOSED DURING CONSTRUCTION SHALL BE INSPECTED BY THE OWNER PRIOR TO BACKFILLING.

MAIL BOXES:

THE CONTRACTOR SHALL RELOCATE ALL MAIL BOXES AS REQUIRED BY SECTION 107-12 OF THE NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES. COORDINATE THIS WORK WITH THE U.S. POSTAL SERVICE.

TREES, SHRUBS, AND HEDGES:

ALL TREES THAT ARE TO REMAIN ARE TO BE PROTECTED WITH TREE PROTECTION BARRIERS ACCEPTABLE TO THE CITY ARBORIST OR LANDSCAPE ARCHITECT. CONTRACTOR SHALL OBTAIN APPROVAL FROM THE CITY ARBORIST OR LANDSCAPE ARCHITECT PRIOR TO ROOT PRUNING. WHEN ROOT PRUNING IS ABSOLUTELY NECESSARY, CUT ROOTS CLEANLY USING A DISC TRENCHER OR OTHER APPROVED METHOD.

CONTRACTOR SHALL OBTAIN APPROVAL FROM THE CITY PRIOR TO REMOVING ANY TREES. ALL TREES LOCATED WITHIN THE LOT THAT ARE TO REMAIN AFTER CONSTRUCTION SHALL BE INSPECTED BY THE CITY TO VERIFY THEY ARE SUITABLE TO REMAIN.

GRADING:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL BORROW MATERIAL REQUIRED TO CONSTRUCT PROJECT AS SHOWN ON THE CONTRACT DOCUMENTS.

ALL EXCAVATED MATERIALS THAT ARE NOT REQUIRED OR ARE UNSUITABLE FOR THE PROJECT SHALL BE CONSIDERED WASTE AND SHALL BE HAULED OFF SITE AND DISPOSED IN A SAFE AND LEGAL MANNER AT THE CONTRACTOR'S EXPENSE.

EROSION CONTROL:

CONTRACTOR SHALL NOT DISTURB ANY AREAS OUTSIDE OF THE DESIGNATED EASEMENT AREAS.

THE CONTRACTOR SHALL MAINTAIN EROSION CONTROL DEVICES IN ACCORDANCE WIH THE APPROPRIATE CITY AND STATE EROSION AND SEDIMENT CONTROL ORDINANCES. THE CONTRACTOR SHALL PREVENT STANDING WATER DUE TO CONSTRUCTION.

SAWCUTS:

THE CONTRACTOR SHALL SAWCUT EXISTING ASPHALT AND/OR CONCRETE SURFACES PRIOR TO REMOVAL UNLESS OTHERWISE DIRECTED BY THE ENGINEER. SAW CUT WIDTH SHALL BE 1 FOOT MINIMUM FOR THE EXISTING EDGE OF PAVEMENT. SAWCUT PAVEMENT SHALL BE REPLACED AS WELL AS ADDITIONAL PAVEMENT REQUIRED TO TIE-IN TO FACE OF PROPOSED CURB OR GUTTER.

STORM DRAINAGE STRUCTURE, PIPE & GRADING NOTES:

PIPE INVERT ELEVATIONS HAVE PRECEDENCE OVER SLOPES. HOWEVER, SLOPES SHALL NOT BE DECREASED FROM THOSE SHOWN ON PLAN WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

ALL STORM DRAINAGE PIPE TO BE CLASS III REINFORCED CONCRETE UNLESS OTHERWISE NOTED. PIPE LENGTHS INDICATED ON PLAN ARE APPROXIMATE ONLY.

NO SOIL DISTURBANCE OR COMPACTION, CONSTRUCTION MATERIALS, TRAFFIC, TRENCHING, OR OTHER LAND DISTURBING ACTIVITY SHALL BE PERMITTED BEYOND LIMITS OF GRADING WITHOUT PRIOR APPROVAL FROM THE OWNER AND CITY ENGINEERING DEPT.

THE CONTRACTOR SHALL IMMEDIATELY REPORT TO THE CITY OF FAYETTEVILLE ANY DISCREPANCIES FOUND BETWEEN ACTUAL CONDITION AND CONSTRUCTION DOCUMENTS AND SHALL WAIT FOR INSTRUCTION FROM THE CITY INSPECTOR PRIOR TO PROCEEDING.

MANHOLE RIM ELEVATIONS SHOWN ON THE PLANS ARE APPROXIMATE. NEW MANHOLE RING AND COVERS SHALL BE INSTALLED FLUSH WITH THE SURROUNDING GRADE SO AS TO AVOID DAMAGE TO MOTOR VEHICLES DURING CONSTRUCTION. THEY ARE TO BE ADJUSTED TO MATCH THE SURROUNDING PROPOSED GRADE PRIOR TO PLACING THE NEW SURFACE COURSE.

THE CONTRACTOR SHALL DESIGN, FURNISH, AND INSTALL ANY TRENCH STABILIZATION NECESSARY TO MAINTAIN EXCAVATION FOR PIPE AND DRAINAGE STRUCTURE INSTALLATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLATION AND REMOVAL OF ANY TRENCH STABILIZATION. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR ANY DAMAGE TO ADJACENT STRUCTURES RESULTING FROM THE INSTALLATION, REMOVAL OR ABSENCE OF TRENCH STABILIZATION.

GRADES, ELEVATIONS AND LOCATIONS SHOWN ARE APPROXIMATE, AS DIRECTED BY THE ENGINEER. THEY MAY BE ADJUSTED TO ACCOMMODATE UNFORESEEN CONDITIONS. ALL PROPOSED GRADES ARE FINISH GRADES.

THE CONTRACTOR SHALL BACKFILL OPEN EXCAVATIONS AT THE END OF EACH WORKING DAY. AT DRAINAGE STRUCTURE LOCATIONS, THE EXCAVATION SHALL BE COVERED WITH METAL PLATES WHEN PRACTICAL OR COMPLETEY ENCLOSED WITH SAFETY NETTING.

STOCKPILING NOTE:

ANY ONSITE STOCKPILING IS TO BE COORDINATED AND APPROVED BY A CITY INSPECTOR. THE STOCKPILE WILL BE PROVIDED WITH GROUND COVER WITHIN 15 WORKING DAYS OF PROJECT COMPLETION.

EXCESS SUITABLE SOIL EXCAVATED DURING CONSTRUCTION SHALL BE STOCKPILED FOR USE ON THE PROJECT OR DISPOSED OF OFF-SITE AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL NOT BE ALLOWED TO STOCKPILE MATERIALS OR EXCESS MATERIALS IN THE STREET RIGHT-OF-WAYS AT ANY TIME UNLESS APPROVED BY THE ENGINEER. THE CONTRACTOR SHALL PROVIDE A SUFFICIENT AND SUITABLE STOCKPILE AREA AND LOCATION AT THE CONTRACTOR'S EXPENSE.

ORDER OF PRECEDENCE GENERAL NOTES/TECHNICAL SPECIFICATIONS/PHOTOS:

THE NOTES CONTAINED HEREIN ARE INTENDED TO SUPPLEMENT THE TECHNICAL SPECIFICATIONS AND PROVIDE EASY REFERENCE FOR THE CONTRACTOR. IN NO CASE SHALL THESE NOTES VOID ANY PART, SECTION OR REQUIREMENT OUTLINED IN THE TECHNICAL SPECIFICATIONS CONTAINED IN THE CONTRACT DOCUMENTS. IF CONFLICTS OCCUR BETWEEN THE TECHNICAL SPECIFICATIONS AND THE NOTES CONTAINED HEREIN, THE TECHNICAL SPECIFICATIONS SHALL SUPERSEDE.

NCDOT ENCROACHMENT SPECIAL PROVISIONS:

CONTRACTOR TO NOTIFY COUNTY MAINTENANCE ENGINEER, (910) 364-0602, A MINIMUM OF THREE (3) DAYS BEFORE CONSTRUCTION IS TO BEGIN.

AN EXECUTED COPY OF THE ENCROACHMENT AGREEMENT SHALL BE PRESENT AT THE CONSTRUCTION SITE AT ALL TIMES DURING CONSTRUCTION. THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RESERVES THE RIGHT TO STOP ALL WORK UNLESS EVIDENCE OF APPROVAL CAN BE SHOWN.

SEE THE ENCROACHMENT AGREEMENT FOR A FULL LIST OF SPECIAL PROVISIONS.

TRAFFIC CONTROL

CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL PLANS FOR WORK ZONE TRAFFIC CONTROL TO CITY TRAFFIC SERVICES DEPARTMENT (910-433-1660) FOR CITY STREETS AND DIVISION 6, DISTRICT 2 (910-364-0601) FOR NCDOT STREETS. CONTRACTOR SHALL NOT PLACE ANY TRAFFIC CONTROL DEVICES WITHOUT HAVING APPROVAL FROM APPLICABLE TRANSPORTATION DEPARTMENT EITHER NCDOT OR THE CITY OF FAYETTEVILLE.

CONTRACTOR SHALL INSURE ACCESS TO ALL PROPERTIES BY PROPERTY OWNERS AT ALL TIMES.

CONTRACTOR SHALL NOTIFY CITY ENGINEERING OFFICE ONE WEEK IN ADVANCE OF ANY ROAD CLOSING AND COORDINATE ALL ROAD CLOSINGS/UTILITY INTERRUPTIONS WITH PROPERTY OWNERS AFFECTED 48 HOURS PRIOR TO CLOSING/INTERRUPTING SERVICES.

MINIMUM ONE WAY TRAFFIC SHALL BE MAINTAINED AT ALL TIMES UNLESS ROAD CLOSURE IS APPROVED BY CITY OF FAYETTEVILLE TRAFFIC SERVICES DEPARTMENT IN WRITING, 5 DAYS IN ADVANCE OF ROAD CLOSURE. AN APPROVED DETOUR PLAN PREPARED BY THE CONTRACTOR SHALL BE REQUIRED AND THE MEASURES INSTALLED PRIOR TO CLOSURE.

CONTRACTOR SHALL COORDINATE/NOTIFY TRAFFIC SERVICES DAILY (BEFORE 2:00 P.M.) AS TO WHICH STREETS WILL BE UNDER CONSTRUCTION IMPEDING TRAFFIC FLOW THE FOLLOWING DAY.

THE CONTRACTOR SHALL NOT IMPEDE TRAFFIC AT ANY TIME UNTIL THE APPROVED TRAFFIC CONTROL DEVICES ARE IN PLACE.

ALL TRAFFIC CONTROL MEASURES, DEVICES, INSTALLATION, METHODS, SEQUENCING AND PLANS SHALL BE IN STRICT ACCORDANCE WITH MUTCD, NCDOT, AND CITY OF FAYETTEVILLE TRAFFIC SERVICES.

BREEZEWOOD AVENUE SIDEWALK

PLAN TYPE: GEN. NOTES

SHEET NUMBER 3 of 7

FAYETTEVILLE NC
AMERICA'S CAN DO CITY
ENGINEERING DIVISION
PUBLIC SERVICES DEPARTMENT
433 HAY STREET FAYETTEVILLE, NC 28301

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 57101 BRANDON S. MCINNIS
8-22-26

REVISIONS

REV. #	DESCRIPTION	REV.BY	DATE

DRAWN : C.PIGHET
CHECK : V.SMALL
APPROVED : J.TALIAN
DESIGN : C.PIGHET
SCALE : 1"=20'
DATE : 07/08/2025

SOD INSTRUCTION:

- FROM STA 1+50 TO STA 4+95, SOD 2.5 FT BEHIND PROPOSED SIDEWALK. SEE EC-7 AND SD-12.
- FROM STA 4+76 TO STA 6+03, SOD UTILITY STRIP. SEE EC-7 AND SD-12.

CLEARING AND GRUBBING:

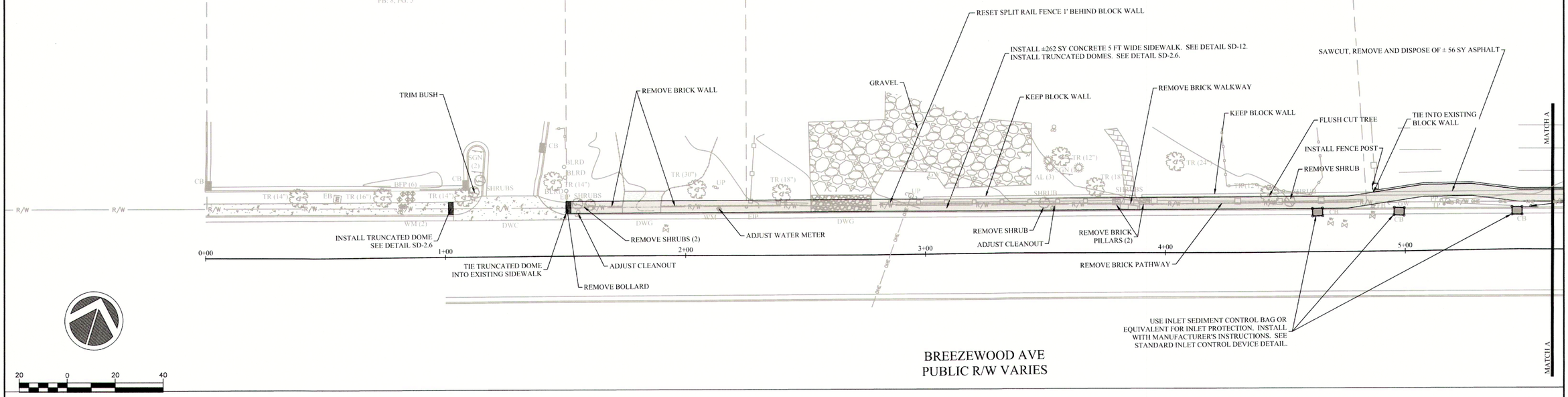
- ALL TREES WITHIN 3.0' PROPOSED SIDEWALK PATH IS CONSIDERED CLEARING AND GRUBBING.

0427-21-9272
2800 BREEZEWOOD AVE
ROSCOE PROPERTIES LLC
DB: 7999, PG: 152
PB: 8, PG: 5

0427-31-0282
2772 BREEZEWOOD AVE
BRESWITZ PROPERTIES LLC
DB: 4294, PG: 417
PB: 8, PG: 5

0427-31-2254
2770 BREEZEWOOD AVE
WOOTEN RENTALS LLC
DB: 7266, PG: 64
PB: 8, PG: 5

0427-31-3430
2629 RAEFORD RD
WOOTEN RENTALS LLC
DB: 7266, PG: 64
PB: 8, PG: 5



BREEZEWOOD AVE
PUBLIC R/W VARIES

20 0 20 40
1 INCH = 20 FT

SOD INSTRUCTION:

- FROM STA 6+50 TO STA 7+55, SOD UTILITY STRIP AND 2.5 FT BEHIND PROPOSED SIDEWALK AND RAMP. SEE EC-7 AND SD-12.
- FROM STA 7+90 TO STA 9+61, SOD UTILITY STRIP AND 3.0 FT BEHIND PROPOSED SIDEWALK AND RAMP ON NORTH SIDE OF BREEZEWOOD AVENUE AND FORSYTHE STREET. SEE EC-7 AND SD-12.
- FROM STA 9+40 TO STA 9+56, SOD 3.0 FT BEHIND PROPOSED SIDEWALK AND RAMP ON SOUTH SIDE OF BREEZEWOOD AVENUE. SEE EC-7 AND SD-12.

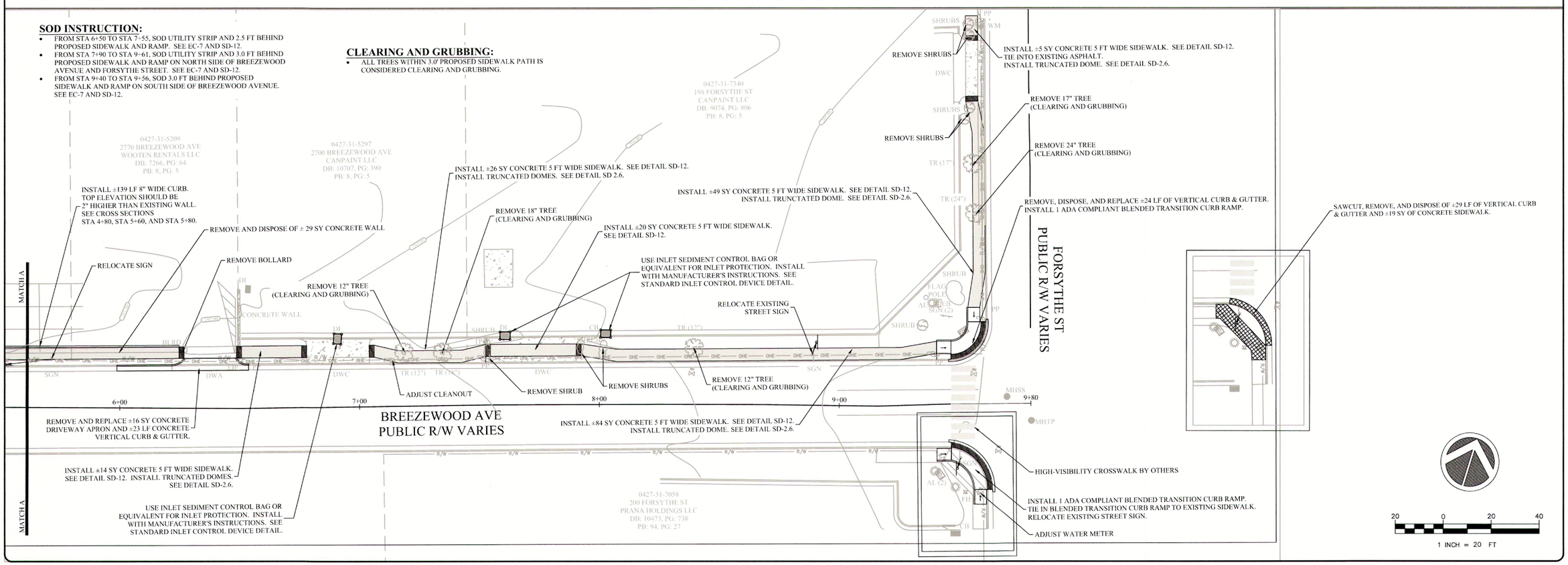
CLEARING AND GRUBBING:

- ALL TREES WITHIN 3.0' PROPOSED SIDEWALK PATH IS CONSIDERED CLEARING AND GRUBBING.

0427-31-5209
2770 BREEZEWOOD AVE
WOOTEN RENTALS LLC
DB: 7266, PG: 64
PB: 8, PG: 5

0427-31-5297
2700 BREEZEWOOD AVE
CANPAINT LLC
DB: 10707, PG: 390
PB: 8, PG: 5

0427-31-7340
198 FORSYTHE ST
CANPAINT LLC
DB: 9074, PG: 806
PB: 8, PG: 5



BREEZEWOOD AVE
PUBLIC R/W VARIES

20 0 20 40
1 INCH = 20 FT

BREEZEWOOD AVENUE SIDEWALK

PLAN TYPE: PLAN

SHEET NUMBER 4 of 7

FAYETTEVILLE
AMERICA'S CAN DO CITY

ENGINEERING DIVISION
PUBLIC SERVICES DEPARTMENT
433 HAY STREET FAYETTEVILLE, NC 28301

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 57101 JAMES T. TALIAN

9-22-25

REV. #	REVISIONS DESCRIPTION	REV.BY DATE

DESIGN : C.PIGHET	SCALE : 1"=20'	DATE : 07/08/2026
DRAWN : C.PIGHET	CHECK : V.SMALL	APPROVED : J.TALIAN

10 0 10 20
1 INCH = 10 FT

BREEZEWOOD AVENUE
SIDEWALK

PLAN TYPE: X SECTIONS

SHEET NUMBER 5 of 7

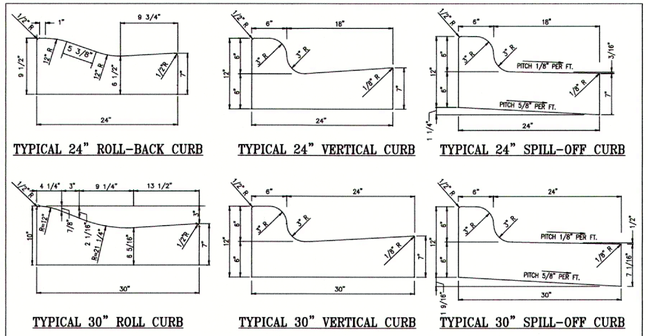
FAYETTEVILLE
AMERICA'S CAN DO CITY

ENGINEERING DIVISION
PUBLIC SERVICES DEPARTMENT
433 HAY STREET FAYETTEVILLE, NC 28301

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 57101 JAMES T. ITALIAN
9-22-26

REV.#	DESCRIPTION	REV.BY	DATE
	REVISIONS		

DRAWN : C.PIGHET	CHECK : V.SMALL	APPROVED : J.ITALIAN
DESIGN : C.PIGHET	SCALE : 1"=20'	DATE : 07/08/2026

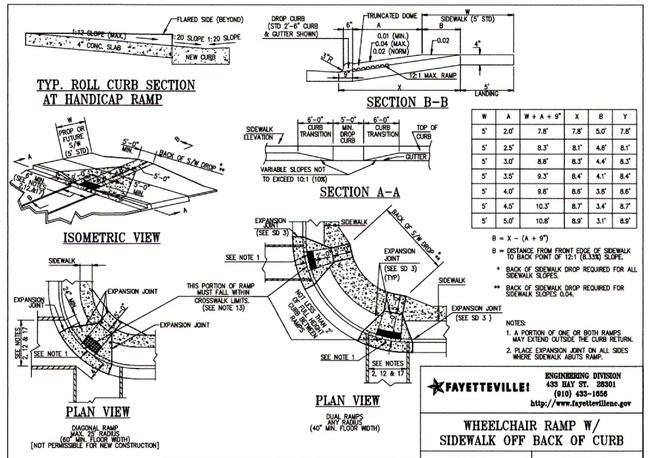


NOTES
1. ALL CURBS CONSTRUCTED OF 2500 PSI CONCRETE.
2. PLACE GROOVE JOINTS 1" DEEP AT 12'-6" INTERVALS BETWEEN EXPANSION JOINTS.
3. CURB SHALL BE DEPRESSED AT INTERSECTIONS TO PROVIDE FOR FUTURE ACCESSIBLE RAMPS.
4. TOP 6" OF SUBGRADE BENEATH THE CURB AND GUTTER SHALL BE COMPACTED TO 100% STANDARD PROCTOR DENSITY.
5. ADOPTED FROM NCDOT STANDARD NO. 846.01

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24" AND 30" CURB DETAILS

Not to Scale | Review Date: JULY 2024 | SD-1



W	A	W + A + 9"	X	B	Y
5'	2.0'	7.8'	7.8'	5.0'	7.8'
5'	2.5'	8.3'	8.1'	4.8'	8.1'
5'	3.0'	8.8'	8.3'	4.4'	8.3'
5'	3.5'	9.3'	8.4'	4.1'	8.4'
5'	4.0'	9.8'	8.6'	3.8'	8.6'
5'	4.5'	10.3'	8.7'	3.4'	8.7'
5'	5.0'	10.8'	8.9'	3.1'	8.9'

B = X - (A + 9")
B = DISTANCE FROM FRONT EDGE OF SIDEWALK TO BACK POINT OF 12:1 (8.33%) SLOPE.
* BACK OF SIDEWALK DROP REQUIRED FOR ALL SIDEWALK SLOPES.
** BACK OF SIDEWALK DROP REQUIRED FOR SIDEWALK SLOPES 0.04.

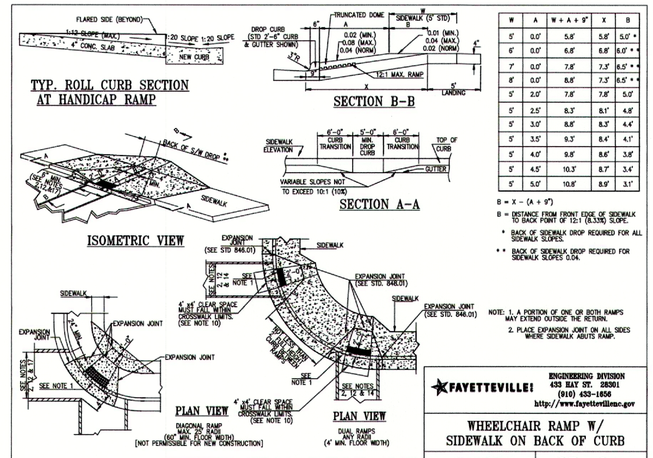
NOTES:
1. A PORTION OF ONE OR BOTH RAMPS MAY EXTEND OUTSIDE THE CURB RETURN.
2. PLACE EXPANSION JOINT ON ALL SIDES WHERE SIDEWALK ABUTS RAMP.

SEE SHEET SD-2.8 FOR WHEELCHAIR RAMP NOTES.

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WHEELCHAIR RAMP W/ SIDEWALK OFF BACK OF CURB

Not to Scale | Review Date: JULY 2024 | SD-2



W	A	W + A + 9"	X	B
5'	0.0'	5.8'	5.8'	5.0' *
6'	0.0'	6.8'	6.8'	6.0' *
7'	0.0'	7.8'	7.3'	6.5' * *
8'	0.0'	8.8'	7.3'	6.5' * *
5'	2.0'	7.8'	7.8'	5.0'
5'	2.5'	8.3'	8.1'	4.8'
5'	3.0'	8.8'	8.3'	4.4'
5'	3.5'	9.3'	8.4'	4.1'
5'	4.0'	9.8'	8.6'	3.8'
5'	4.5'	10.3'	8.7'	3.4'
5'	5.0'	10.8'	8.9'	3.1'

B = X - (A + 9")
B = DISTANCE FROM FRONT EDGE OF SIDEWALK TO BACK POINT OF 12:1 (8.33%) SLOPE.
* BACK OF SIDEWALK DROP REQUIRED FOR ALL SIDEWALK SLOPES.
** BACK OF SIDEWALK DROP REQUIRED FOR SIDEWALK SLOPES 0.04.

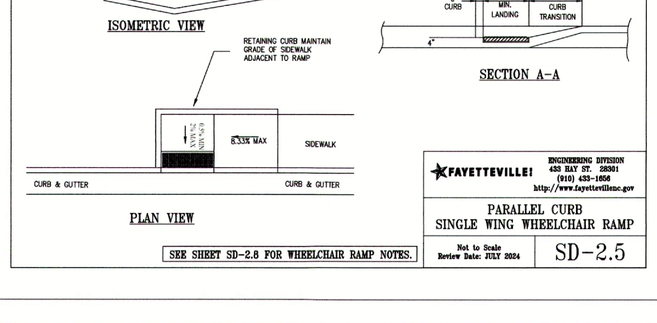
NOTE: 1. A PORTION OF ONE OR BOTH RAMPS MAY EXTEND OUTSIDE THE RETURN.
2. PLACE EXPANSION JOINT ON ALL SIDES WHERE SIDEWALK ABUTS RAMP.

SEE SHEET SD-2.8 FOR WHEELCHAIR RAMP NOTES.

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WHEELCHAIR RAMP W/ SIDEWALK ON BACK OF CURB

Not to Scale | Review Date: JULY 2024 | SD-2.1

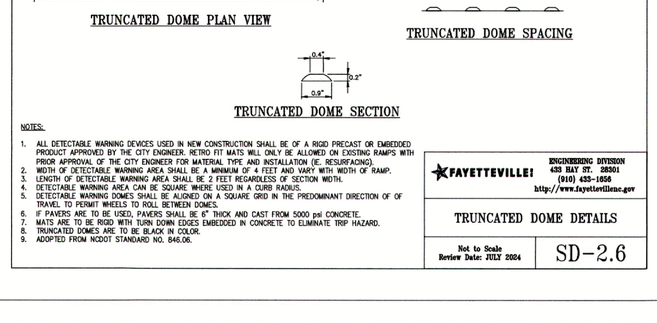


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DETAIL OF MID-BLOCK PARALLEL CURB WHEELCHAIR RAMP

Not to Scale | Review Date: JULY 2024 | SD-2.2

SEE SHEET SD-2.8 FOR WHEELCHAIR RAMP NOTES.



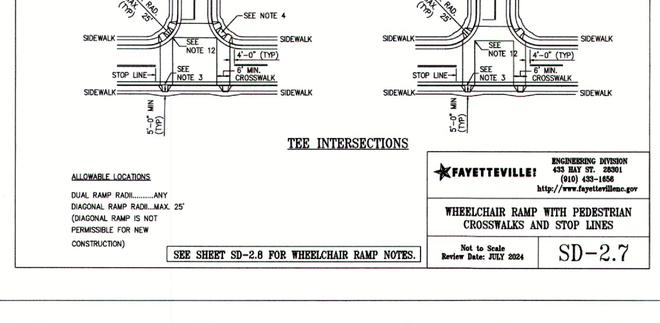
NOTE: WHEN DUAL PARALLEL RAMPS ARE BEING PLACED, A 4' LANDING SHALL BE INSTALLED BETWEEN THE TWO RAMPS.

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DETAIL OF PARALLEL CURB WHEELCHAIR RAMP

Not to Scale | Review Date: JULY 2024 | SD-2.3

SEE SHEET SD-2.8 FOR WHEELCHAIR RAMP NOTES.



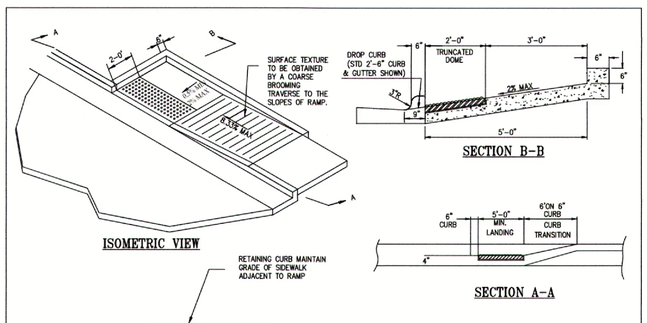
NOTE:
IF THE DISTANCE BETWEEN THE ROADWAY AND THE RAMP IS LESS THAN 5', THEN TRUNCATED DOMES SHALL BE INSTALLED AS SHOWN IN PLAN VIEW 'A'. WHEN THE DISTANCE IS GREATER THAN 5', TRUNCATED DOMES SHALL BE INSTALLED AS SHOWN IN PLAN VIEW 'B'.

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DIRECTIONAL CURB RAMP

Not to Scale | Review Date: JULY 2024 | SD-2.4

SEE SHEET SD-2.8 FOR WHEELCHAIR RAMP NOTES.

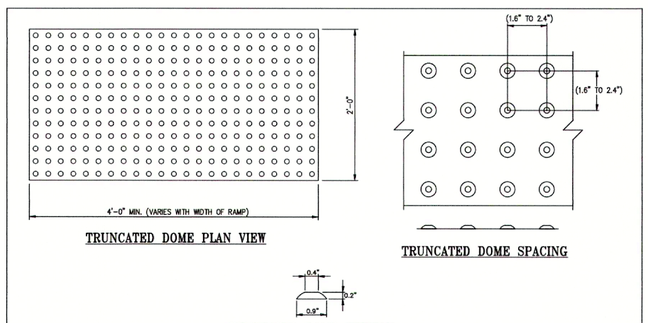


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PARALLEL CURB SINGLE WING WHEELCHAIR RAMP

Not to Scale | Review Date: JULY 2024 | SD-2.5

SEE SHEET SD-2.8 FOR WHEELCHAIR RAMP NOTES.

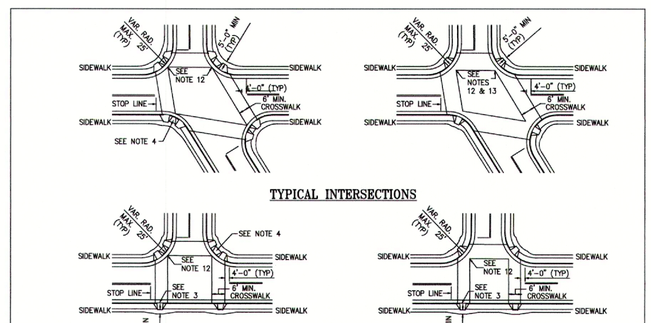


NOTES:
1. ALL DETECTABLE WARNING DEVICES USED IN NEW CONSTRUCTION SHALL BE OF A RIGID PRECAST OR EMBEDDED PRODUCT APPROVED BY THE CITY ENGINEER. RETRO FIT MATS WILL ONLY BE ALLOWED ON EXISTING RAMPS WITH PRIOR APPROVAL OF THE CITY ENGINEER FOR MATERIAL TYPE AND INSTALLATION (IE. RESURFACING).
2. WIDTH OF DETECTABLE WARNING AREA SHALL BE A MINIMUM OF 4 FEET AND VARY WITH WIDTH OF RAMP.
3. LENGTH OF DETECTABLE WARNING AREA SHALL BE 2 FEET REGARDLESS OF SECTION WIDTH.
4. DETECTABLE WARNING AREA CAN BE SQUARE WHERE USED IN A CURB RADIUS.
5. DETECTABLE WARNING DOMES SHALL BE ALIGNED ON A SQUARE GRID IN THE PREDOMINANT DIRECTION OF OF TRAVEL TO PERMIT WHEELS TO ROLL BETWEEN DOMES.
6. IF PAVERS ARE TO BE USED, PAVERS SHALL BE 6" THICK AND CAST FROM 5000 psi CONCRETE.
7. MATS ARE TO BE RIGID WITH TURN DOWN EDGES EMBEDDED IN CONCRETE TO ELIMINATE TRIP HAZARD.
8. TRUNCATED DOMES ARE TO BE BLACK IN COLOR.
9. ADOPTED FROM NCDOT STANDARD NO. 846.06.

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TRUNCATED DOME DETAILS

Not to Scale | Review Date: JULY 2024 | SD-2.6



ALLOWABLE LOCATIONS

DUAL RAMP RADII....ANY
DIAGONAL RAMP RADII...MAX. 25'
(DIAGONAL RAMP IS NOT PERMISSIBLE FOR NEW CONSTRUCTION)

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WHEELCHAIR RAMP WITH PEDESTRIAN CROSSWALKS AND STOP LINES

Not to Scale | Review Date: JULY 2024 | SD-2.7

SEE SHEET SD-2.8 FOR WHEELCHAIR RAMP NOTES.

BREEZEWOOD AVENUE SIDEWALK

PLAN TYPE: DETAILS

SHEET NUMBER: 6 of 7

FAYETTEVILLE
AMERICA'S CAN DO CITY
ENGINEERING DIVISION
PUBLIC SERVICES DEPARTMENT
433 HAY STREET, FAYETTEVILLE, NC 28301

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 57101 ENGINEERING SERVICES
9-22-26

REV. #	DESCRIPTION	REV BY	DATE
	REVISIONS		

DESIGN : C.PICHET
DRAWN : C.PICHET
CHECK : V.SMALL
APPROVED : J.TALIAN
SCALE : 1"=20'
DATE : 07/08/2026

1. DETECTABLE WARNING SURFACE SHALL CONTRAST VISIBLY WITH ADJOINING SURFACE, EITHER LIGHT-ON-DARK OF DARK-ON-LIGHT SEQUENCE COVERING THE ENTIRE RAMP.
2. CROSSWALK WIDTHS AND CONFIGURATION VARY BUT MUST CONFORM TO TRAFFIC DESIGN STANDARDS.
3. NORTH CAROLINA GENERAL STATUTE 136-44.14 REQUIRES THAT ALL STREET CURBS BEING CONSTRUCTED OR RECONSTRUCTED FOR MAINTENANCE PROCEDURES, TRAFFIC OPERATIONS, REPAIRS, CORRECTION OF UTILITIES OR ALTERED FOR ANY REASON AFTER SEPTEMBER 1, 1973 SHALL PROVIDE WHEELCHAIR RAMPS FOR THE PHYSICALLY DISABLED AT ALL INTERSECTIONS WHERE BOTH CURB AND GUTTER AND SIDEWALKS ARE PROVIDED AND AT OTHER POINTS OF PEDESTRIAN FLOW.

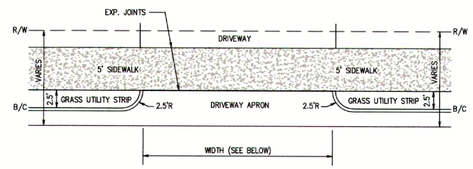
   IN ADDITION, SECTION 228 OF THE 1973 FEDERAL AID HIGHWAY SAFETY ACT REQUIRES PROVISION OF CURB RAMPS ON ANY CURB CONSTRUCTION AFTER JULY 1, 1976 WHETHER A SIDEWALK IS PROPOSED INITIALLY OR IS PLANNED FOR A FUTURE DATE.

   THE AMERICANS WITH DISABILITIES ACT (ADA) OF 1990 EXTENDS TO INDIVIDUALS WITH DISABILITIES. COMPREHENSIVE CIVIL RIGHTS PROTECTIONS SIMILAR TO THOSE PROVIDED TO PERSONS ON THE BASIS OF RACE, SEX, NATIONAL ORIGIN AND RELIGION UNDER THE CIVIL RIGHTS ACT OF 1964. THESE CURB RAMPS HAVE BEEN DESIGNED TO COMPLY WITH THE CURRENT ADA STANDARDS.
4. PROVIDE WHEELCHAIR RAMPS AT LOCATIONS AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. LOCATE WHEELCHAIR RAMPS AS DIRECTED BY THE ENGINEER WHERE EXISTING LIGHT POLES, FIRE HYDRANTS, DROP INLETS, ETC. AFFECT PLACEMENT. WHERE TWO RAMPS ARE INSTALLED NOT LESS THAN 2 FEET OF FULL HEIGHT CURB SHALL BE PLACED BETWEEN THE RAMPS. PLACE DUAL RAMPS AS NEAR PERPENDICULAR TO THE TRAVEL LANE BEING CROSSED AS POSSIBLE.
5. PAY FOR ALL VARIABLE DEPTH CONCRETE USED FOR CONSTRUCTION OF WHEELCHAIR RAMPS AS CONCRETE WHEELCHAIR RAMPS AS DESCRIBED ON PROJECT SPECIFICATIONS.
6. PAY FOR ALL DEPRESSED CURBS AT WHEELCHAIR RAMPS AS THE TYPE CURB AND GUTTER USED ADJACENT TO DEPRESSED CURB. (LN. FT.)
7. SUCH PRICES AND PAYMENTS WILL BE CONSIDERED FULL COMPENSATION FOR ALL MATERIALS, LABOR, EQUIPMENT, TOOLS AND INCIDENTALS NECESSARY TO SATISFACTORILY COMPLETE THE WORK.
8. DO NOT EXCEED 0.08 (1:12) SLOPE ON THE WHEELCHAIR RAMP IN RELATIONSHIP TO THE GRADE OF THE STREET.
9. CONSTRUCT WHEELCHAIR RAMPS 48" (ADA STANDARD) OR GREATER FOR DUAL RAMPS.
10. USE CLASS "B" CONCRETE WITH A SIDEWALK FINISH IN ORDER TO OBTAIN A ROUGH NON-SKID TYPE SURFACE.
11. PLACE A 1/2" EXPANSION JOINT WHERE THE CONCRETE WHEELCHAIR RAMP JOINS THE CURB AND AS SHOWN ON SD-2.
12. PLACE THE INSIDE PEDESTRIAN CROSSWALK LINES NO CLOSER IN THE INTERSECTION BY BISECTING THE INTERSECTION RADII, WITH ALLOWANCE OF A 4' CLEAR ZONE IN THE VEHICULAR TRAVELWAY WHEN ONE RAMP IS INSTALLED. (SEE NOTE 17)
13. COORDINATE THE CURB CUT AND THE PEDESTRIAN CROSSWALK LINES SO THE FLOOR OF THE WHEELCHAIR RAMP WILL FALL WITHIN THE PEDESTRIAN CROSSWALK LINES. PLACE DIAGONAL RAMPS WITH FLARED SIDES SO 24" OF FULL HEIGHT CURB FALLS WITHIN THE CROSSWALK MARKINGS ON EACH SIDE OF THE FLARES.
14. CONSTRUCT THE PEDESTRIAN CROSSWALK A MINIMUM OF 6 FEET. A CROSSWALK WIDTH OF 10 FEET OR GREATER IS DESIRABLE.
15. USE STOP LINES, NORMALLY PERPENDICULAR TO THE LANE LINES, WHERE IT IS IMPORTANT TO INDICATE THE POINT BEHIND WHICH VEHICLES ARE REQUIRED TO STOP IN COMPLIANCE WITH A TRAFFIC SIGNAL. STOP SIGN OR OTHER LEGAL REQUIREMENT. AN UNUSUAL APPROACH SKEW MAY REQUIRE THE PLACEMENT OF THE STOP LINE TO BE PARALLEL TO THE INTERSECTING ROADWAY.
16. TERMINATE PARKING A MINIMUM OF 20 FEET BACK OF PEDESTRIAN CROSSWALK.
17. PLACE ALL PAVEMENT MARKINGS IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) PUBLISHED BY THE FEDERAL HIGHWAY ADMINISTRATION AND THE NORTH CAROLINA SUPPLEMENT TO THE MUTCD.
18. ADOPTED FROM NCDOT STANDARD NO. 846.06

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WHEELCHAIR RAMP NOTES

Not to Scale Review Date: JULY 2024 | SD-2.8



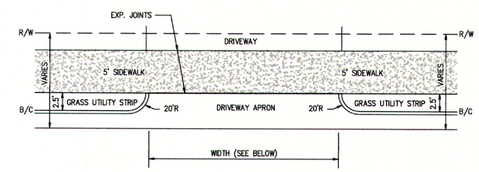
DRIVEWAY APRON
12'(MIN) WIDTH
24'(MAX) WIDTH (DOUBLE)
4" THICK(MIN) CONCRETE

NOTE: DISTANCE FROM B/C TO R/W VARIES ON DIFFERENT STREETS.

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TYPICAL RESIDENTIAL DRIVEWAY APRON

Not to Scale Review Date: JULY 2024 | SD-9



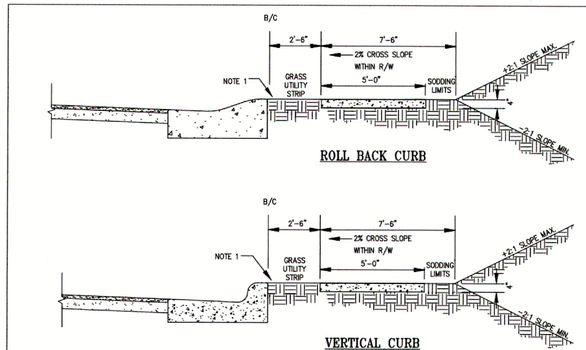
DRIVEWAY APRON
20'(MIN) WIDTH
36'(MAX) WIDTH (DOUBLE)
6" THICK(MIN) CONCRETE

NOTE: DISTANCE FROM B/C TO R/W VARIES ON DIFFERENT STREETS.

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TYPICAL COMMERCIAL DRIVEWAY APRON

Not to Scale Review Date: JULY 2024 | SD-9.1



ROLL BACK CURB

VERTICAL CURB

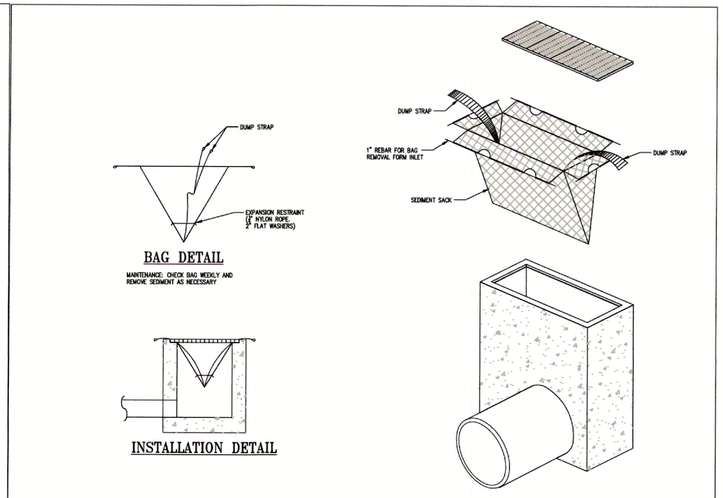
NOTES:

1. VERTICAL CURB - GRASS UTILITY STRIP MAY BE REMOVED UPON APPROVAL OF THE CITY ENGINEER. IF NO GRASS UTILITY STRIP, INSTALL 1/2" EXPANSION JOINT MATERIAL BETWEEN BACK OF CURB AND SIDEWALK.
2. PLACE CONTRACTION JOINTS AT 5' INTERVALS, EXCEPT THAT A 30' SPACING MAY BE USED WHEN A MACHINE IS USED OR WHEN SATISFACTORY SUPPORT FOR THE FACE FORM CAN BE OBTAINED WITHOUT THE USE OF TEMPLATES AT 10' INTERVALS.
3. SEE DETAIL SD-9 TYPICAL RESIDENTIAL DRIVEWAY APRON AND DETAIL SD-9.1 TYPICAL COMMERCIAL DRIVEWAY APRON.
4. SODDING LIMITS INCLUDE THE GRASS UTILITY STRIP BETWEEN THE BACK OF CURB AND THE SIDEWALK AS WELL AS 2'6" BEYOND THE SIDEWALK.
5. SEE TECHNICAL SPECIFICATION SECTION 00455, PART 3, SUB-SECTION 3.02, SUB-PART F.

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TYPICAL SIDEWALK SECTION & SODDING LIMITS

Not to Scale Review Date: JULY 2024 | SD-12



EFFECTIVE: 01/05/17

STANDARD INLET SEDIMENT CONTROL DEVICE

DETAIL SHEET 1 OF 1

BREEZEWOOD AVENUE SIDEWALK

PLAN TYPE: DETAILS

SHEET NUMBER 7 of 7

FAYETTEVILLE AMERICA'S CAN DO CITY

ENGINEERING DIVISION
DEVELOPMENT SERVICES DEPARTMENT
433 HAY STREET, FAYETTEVILLE, NC 28301

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 57101 JAMES M. ITALIAN

12-22-25

REVISIONS		
REV. #	DESCRIPTION	REV.BY DATE

DRAWN : C.PIGHET
CHECK : V.SMALL
APPROVED : J.ITALIAN
DESIGN : C.PIGHET
SCALE : 1"=20'
DATE : 07/08/2026

Breezewood Avenue Sidewalk Improvements

FAYETTEVILLE NC
AMERICA'S CAN DO CITY

APPENDIX B

City of Fayetteville Technical Specifications

FAYETTEVILLE NC

PUBLIC SERVICES



TECHNICAL SPECIFICATIONS

JULY 2026

Engineering Division
433 Hay Street
Fayetteville, NC 28301-5537

(910) 433-1656
www.fayettevillenc.gov

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SECTION 00127

UNIT PRICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Delineation of measurement and payment criteria applicable to Work performed under Contract by the unit price payment method.

1.02 FIELD MEASUREMENT

A. Take measurements and compute quantities for submittal of the monthly pay request unless specified otherwise in the measurement paragraphs as indicated in this Section.

1.03 CHANGE IN QUANTITIES

A. Increase in the quantity of a bid item up to 100% may be authorized by the Engineer above what is indicated in the Bid Form, after 100% increase the contract unit price will be negotiated only by a Change Order as required by the Contract Documents. Revised contract unit prices pertaining to quantity increases will be applicable only to that portion of the overrun in excess to the percentages stated above.

B. A final adjusting Change Order may be made for adjustment of the actual quantities installed prior to submittal of the final pay request.

1.04 GENERAL BID ITEMS

A. Items with a "(X)" in the title of the bid items represents the size or depth as indicated on the Bid Form.

B. Method of measurement for the individual Bid Items shall be as specified in each section.

C. Payment for each item shall be in accordance with the Contract Unit Price times the number of units installed in accordance with the Contract Documents.

D. Work for each bid item shall include, but not be limited to, the work listed in each execution section of the bid item and the labor, materials, equipment, and services required and reasonably implied by the Contract Documents for a complete installation.

E. Administrative cost including, but not limited to, video and photographic records, coordination of construction activities (including but not limited to updating master construction schedule, providing weekly tasks schedule, coordination with owner, engineer, utility providers, permitting agencies, property owners, etc.), as-built documentation, and office administration for the Project construction shall be included in the individual unit price items. If a Contractor elects to use a trailer, it is at no cost to the Owner.

F. Unit prices will be listed in each section unless otherwise specified.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION 00127

SECTION 00132

PROJECT MANAGEMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This Section specifies administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:
   1. Project Management.
   2. Coordination.
   3. Administrative and supervisory personnel.
   4. General installation provisions.
   5. Cleaning and protection.

1.02 GENERAL COORDINATION REQUIREMENTS

A. Responsibilities of Contractor:
   1. Coordinate construction activities for the Project to assure efficient and proper installation of each part of the Work.
   2. Where availability of space is limited, coordinate installation of components to assure maximum accessibility for maintenance. Make adequate provisions to accommodate components scheduled for later installation.
   3. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings. A copy of all memoranda shall be submitted to the Engineer.

1.03 ADMINISTRATIVE

A. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
   1. Preparation of schedules.
   2. Installation and removal of temporary facilities.
   3. Delivery and processing of submittals.
   4. Progress meetings.
   5. Installation meetings.
   6. Project Close-out activities.
   7. Payment Applications.

B. Project Meetings: A Pre-construction conference shall be held prior to the beginning of the Work. Construction progress meetings shall be held monthly. Project close-out conference shall be held during the final phases of the Work. The Engineer (Or Designee) may schedule additional meetings. The location of meetings is to be determined by the Engineer. The Contractor's project superintendent shall attend meetings. Suppliers and subcontractors will be notified to attend meetings as appropriate or as required by the Engineer. The Contractor shall schedule pre-installation conferences as required in the individual specification sections and shall notify the Engineer of project meetings scheduled by the Contractor. The Engineer will schedule and administer meetings throughout the progress of the Work, except for meetings held by the Contractor for normal coordination of the Work. The meeting agenda shall include, but not be limited to, the following: Project Administration, Submittals,

Construction Schedules and Methods, Safety and Health Regulations, Project Coordination, Payment Application, Change Orders, and Site Inspections. Engineer will prepare an agenda with copies to participants, preside at meetings, prepare minutes, and distribute to participants for meetings scheduled by the Engineer.

C. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

D. Salvage materials and equipment involved in the performance of, but not actually incorporated in, the Work. Refer to other sections for disposition of salvaged materials that are designated as Owner's property.

1.04 CLOSE-OUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected and is complete in accordance with Contract Documents and ready for Engineer's inspection.

B. Provide submittals to Engineer that are required by governing or other authorities.

C. Submit a set of Record Documents indicating changes during construction as required in Section, Submittal Procedures.

D. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and final amount due.

E. Submit the following with final Application for Payment: (As Applicable)
1. Release of Claims
2. Consent of Surety for Final Payment
3. Final Certified Payroll Information
4. 1 Year Labor Warranty
5. Sales Tax Use Form (with invoices)

F. Submit warranties as required by individual equipment specifications.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION 00132

SECTION 00133

ALLOWANCES

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes administrative and procedural requirements governing allowances.

B. Selected materials and equipment are specified in the Contract Documents by allowances. In some cases, these allowances include installation. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is evaluated. If necessary, additional requirements will be issued by Change Order.

C. Types of allowance include the following:

1.02 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise the Owner of the date when the final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the work.

B. At the Owner's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the work.

C. Purchase products and systems selected by the Owner from the designated supplier.

1.03 SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

B. Submit invoices or delivery slips to show the actual quantities of materials delivered to the site for use in fulfillment of each allowance.

1.04 CONTINGENCY ALLOWANCES

A. Use the allowance(s) only as directed for the Owner's purposes.

B. Change Orders authorizing use of funds from the allowance(s) will include Contractor's related cost and maximum fifteen (15) percent combined overhead and profit. (7.5% overhead plus 7.5% profit).

1.05 UNUSED MATERIALS

A. Return unused materials to the manufacturer or supplier for credit to the Owner, after installation has been completed and accepted.

B. When requested by the Owner, prepare unused material for storage where it is not economically practical to return the material for credit. When directed by the Owner, deliver unused material to the Owner's storage space. Otherwise, disposal of unused material is the Contractor's responsibility.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine products covered by an allowance promptly upon delivery for damage or defects.

3.02 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

END OF SECTION 00133

SECTION 00150

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary Utilities: Electricity, lighting, telephone service, water, and sanitary facilities.

B. Work on public right-of-way.

C. Traffic control.

D. Temporary Controls: Barriers, enclosures and fencing, water control, dust control, erosion and sediment control, and protection of the work.

E. Construction Facilities: Access roads, parking, project cleaning, project signage, and field offices.

F. Removal of Utilities, Facilities, and Controls

1.02 TEMPORARY UTILITIES

A. Electricity
   1. Provide and pay for required power service for construction from Utility source.

B. Lighting
   1. Provide and maintain lighting for construction operations as required by Contractor.
   2. Provide and maintain lighting to exterior staging and storage areas after dark for security purposes as required by Contractor.

C. Telephone Service
   1. Provide, maintain, and pay for telephone service to field office as required by Contractor.

D. Water
   1. Provide, maintain, and pay for suitable quality water, including any necessary service(s) required for construction operations. Exercise measures to conserve water during construction.

E. Sanitary Facilities
   1. Provide and maintain required facilities and enclosures as necessary to comply with the laws and ordinances of the authority having jurisdiction and the State of North Carolina.
   2. General Contractor shall provide the above sanitary facilities for all contractors, sub-contractors, Owner, and Engineer at the Project Site.

1.03 WORK ON PUBLIC RIGHTS-OF-WAY

A. Work on this Project is along rights-of-way under jurisdiction of the following offices:
   1. NCDOT Division 6, District 2, District Engineer
   2. City of Fayetteville

B. Work shall comply with requirements of the Encroachment Agreement(s) and Driveway Permit as attached to Project Supplementary Conditions.

C. Post necessary bonds as required.

D. Prior to start of Work notify the Office of the NCDOT as indicated in the encroachment agreement and driveway permit. Also notify the Owner.

E. Work shall conform to the requirements and be subject to the approval of the above agency (ies).

F. Contractor shall be responsible to the Owner for the cost of all DOT inspections that are billed to the Owner by the NCDOT as indicated in the Special Provisions of the Encroachment Agreement.

G. Submit letter to the above District Engineer(s) when work is complete as required by the Encroachment Agreement.

H. Submit letter of approval for completed Work from the above agency(ies) with Final Payment Request.

I. Clean right-of-way as work progresses and daily.

J. Power broom existing pavement as work progresses.

K. Work shall be in accordance with the latest edition of the *N.C. Division of Highways, "Policies and Procedures for Accommodating Utilities on Highway Right-of -Way" and City of Fayetteville standards*.

L. Consult with the above agency(ies) in establishing public thoroughfares to be used for haul routes and site access. Truck route permit and bond may be required.

M. Confine construction traffic to designated haul routes.

N. Provide traffic control along haul routes to regulate traffic and to minimize interference with public.

O. Provide and maintain access to fire hydrants, free of obstructions.

1.04 TRAFFIC CONTROL

A. On public and private road right-of-way provide traffic control devices when construction encroaches within the right-of-way. Devices shall include, but not be limited to, cones, drums, flares, warning signs, temporary pavement marking, warning lights, and flagman.

B. Traffic control devices shall provide the following:
   1. Protection of motorists, pedestrians, and workers from accident hazards.
   2. Advance public information of proposed work sites.
   3. Establishment of an orderly and safe flow of traffic and to minimize traffic congestion.
   4. Provision of access for emergency vehicles.

C. Traffic control devices shall be used in accordance with the latest edition of the *NCDOT Standard Drawings and "Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD)*."

D. Provide personnel trained and certified in traffic control, as required by NCDOT and City of Fayetteville.

1.05 TEMPORARY CONTROLS

A. General
   1. Temporary controls shall be the responsibility of each Contractor for their respective work unless noted otherwise.

B. Barriers
   1. Provide barriers to prevent unauthorized entry to construction areas for the safety of the public, the protection of the work, and to protect existing facilities and adjacent properties from damage from construction operations.

2. Provide barricades required by agency in 1.03A of this section for public rights-of-way and for public access to existing buildings.
3. Provide protection for plant life designated to remain. Replace damaged plant life.
4. Protect vehicular traffic, stored materials, site, and structures from damage.

C. Water Control
1. Grade site to drain. Provide, operate, and maintain pumping equipment to maintain excavations free of water.
2. Protect site from running water.

D. Dust Control
1. Execute Work by methods designed to minimize raising dust from construction operations.
2. Provide positive means to prevent airborne dust from dispersing into atmosphere.

E. Erosion and Sediment Control
1. Provide Erosion and Sediment Control as indicated on the approved Drawings and Specifications and as required by NCDEQ.

F. Protection of Installed Work
1. Protect installed Work and provide special protection where specified in individual specification Sections.
2. Provide temporary and removable protection for installed Products. Control activity in immediate work area to minimize damage.
3. Prohibit traffic from landscaped areas.

1.06 CONSTRUCTION FACILITIES

A. General
1. Construction facilities shall be the responsibility of each Contractor for their respective work unless noted otherwise.

B. Access Roads
1. Contractor shall construct and maintain temporary drives as necessary to access public thoroughfares and existing drives to serve the construction area.
2. Provide means of removing mud from vehicle wheels before entering streets.

C. Parking
1. When site space is not adequate, arrange for temporary off-site surface parking areas to accommodate construction personnel.
2. Do not allow vehicle parking in existing right-of-way or to block existing drives.
3. Do not allow vehicle parking on private property without prior approval.

D. Progress Cleaning
1. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
2. Remove waste materials, debris, and rubbish from site periodically and dispose off site.

1.07 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary above grade or buried utilities, equipment, facilities, and materials, prior to Final Inspection.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore existing facilities used during construction to original condition. Newly installed permanent facilities shall be restored to specified condition if used during construction.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION 00150

SECTION 00170

EXECUTION REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Examination

B. Cutting and patching

C. General installation provisions

D. Cleaning and protection

E. Final inspection and tests

1.02 EXAMINATION

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

B. Verify that 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 specifications sections.

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

1.03 CUTTING AND PATCHING

A. General
   1. Do not cut or alter the work of other contractors without written approval of the Engineer.
   2. Work removed shall be replaced or repaired by the Contractor who removed or damaged the work, and a craftsman, skilled in the trade that the particular replacement requires, shall do the work. (i.e.: A mason, not an electrician, shall replace masonry removed by the Electrical Contractor.)
   3. Conduct removal operations in a manner that will eliminate hazards to persons and property and prevent the release of dust and rubbish into the air. Existing work, which is to remain and is damaged by contract operations shall be replaced with new materials at no additional cost to the Owner.
   4. For replacement of work removed, comply with specifications for type of work to be done.

B. Inspection
   1. Inspect existing conditions of work including elements subject to movement or damage during cutting and patching and excavating and backfilling.
   2. After uncovering work, inspect conditions affecting installation of new products.

C. Preparation prior to cutting.
   1. Provide shoring, bracing, and support as required to maintain structural integrity of project.
   2. Provide protection for other portions of project.
   3. Provide protection from elements.

D. Performance
    1. Execute fitting and adjustment of products to provide finished installation to comply with specified tolerances, finishes.
    2. Execute cutting and demolition by clear sawcut methods, perpendicular to prevent damage to other work and provide proper surfaces to receive installation of repairs and new work.
    3. Execute excavating and backfilling as specified in Section, Trenching for Utilities.
    4. Restore work, which has been cut or removed; install new products to provide completed work in accordance with requirements of contract documents.
    5. Refinish surfaces as necessary to provide an even finish.

1.04 GENERAL INSTALLATION PROVISIONS

A. Require Installer of each major component to inspect conditions under which work is to be performed. Clean substrate surfaces prior to applying next material or substance. Do not proceed until unsatisfactory conditions have been corrected.

B. Comply with manufacturer's recommendations to the extent that they are more explicit or stringent than requirements contained in Contract Documents.

C. Provide attachment and connection devices and methods necessary for securing work. Secure work true to line and level. Allow for expansion and building movement.

D. Provide uniform joint widths in exposed work. Arrange joints in exposed work to obtain the best visual effect. Refer questionable choices to the Engineer for final decision.

E. Check dimensions before starting each installation.

F. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.

G. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.

H. Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the application indicated. Refer questionable mounting height decisions to the Engineer for final decision.

1.05 CLEANING AND PROTECTION

A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration.

B. Clean and maintain completed construction as frequently as necessary through the construction period. Adjust and lubricate components as required to ensure proper operation.

C. Limiting Exposures: Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, or dangerous exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
    1. Excessive static or dynamic loading.
    2. Excessive internal or external pressures.
    3. Excessively high or low temperatures.
    4. Thermal shock.
    5. Air contamination or pollution.

6. Water or ice.
7. Abrasion.
8. Heavy traffic.
9. Misalignment.
10. Improper shipping or handling.
11. Theft.
12. Vandalism.

D. Clean Project prior to final inspection. Project clean up shall include, but not be limited to, the following:
1. Clean glass.
2. Clean surfaces exposed to view as recommended by manufacturer.
3. Remove temporary labels.
4. Vacuum carpeted areas.
5. Clean fixtures to a sanitary condition.
6. Repaint damaged paint surfaces.
7. Clean debris from roofs, gutters, down spouts, and drainage systems.
8. Sweep paved areas.
9. Rake clean landscaped surfaces.
10. Remove waste and surplus materials.
11. Remove temporary construction facilities.

1.06 FINAL INSPECTION

A. Complete punch list items within contract time to avoid liquidated damages.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION 00170

SECTION 00400

MOBILIZATION

PART 1 GENERAL

1.01 DESCRIPTION

A. This work consists of preparatory work and operations to mobilize personnel, materials, and equipment to the project site.

1.02 MEASUREMENT AND PAYMENT

A. *Mobilization* will be paid as contract lump sum price.

B. Partial payments for *Mobilization* will be made with the first and second partial pay estimates paid on the contract and will be made at the rate of 50% lump sum price on each of these partial pay estimates, provided the amount bid for *Mobilization* does not exceed 5% of the total amount bid for the contract. Where the amount bid for *Mobilization* Exceeds 5% of the total amount bid for the contract, 2.5% of the total amount bid will be paid on each of the first two partial pay estimates. That portion exceeding 5% will be paid on the last partial pay estimate.

C. As an exception to the above where the work covered by the contract is limited exclusively to the resurfacing of an existing pavement, payment of the entire lump sum price for *Mobilization* will be made with the first partial pay estimate paid on the contract, provided the amount bid does not exceed 5% of the total amount bid on the contract. Where the amount bid for *Mobilization* exceeds 5% of the total amount bid for the contract, 5% of the total amount bid will be paid on the first partial pay estimate. That portion exceeding 5% will be paid on the last partial pay estimate.

D. Such price and payment includes, but is not limited to, the movement of personnel, equipment, supplies and incidentals to the project site, for the establishment of offices, buildings and other facilities necessary for work on the project; the removal and disbandment of those personnel, equipment, supplies, incidentals or other facilities that were established for the prosecution of work on the project; and for all other work and operations that shall be performed for costs incurred before beginning work on the various items on the project site.

E. For projects that have delayed notice to proceed date of 90 calendar days or more after contract execution, the first mobilization payment may be for the verified actual cost of paid bond premiums. This payment will only be made upon request by the contractor with supporting documentation including invoice and proof of payment. This payment will be limited to 1% of the amount bid for the contract and the subsequent mobilization payment will be reduced by and equal amount to follow the payment schedule as shown above. In no case will more than 5% of the amount bid for the contract be paid before the last partial pay estimate.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

PAY ITEM:	**PAY UNIT:**
Mobilization	LS

END OF SECTION 00170

SECTION 00401

EROSION CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The work consists of providing all labor, material, equipment, and services required to conduct erosion control as described herein and indicated on drawings in accordance with the requirements of the North Carolina Sedimentation Pollution Control Act of 1973 and the rules and regulations promulgated pursuant to the provisions of said act. In the event of changing field conditions, erosion control devices shall be changed with the approval of the Engineer.

B. Determination of Measurement: Measurement shall not be made for Erosion Control under circumstances when Erosion Control line item in the contract is listed as Lump Sum as all items required for erosion control are then incidental to the lump sum line item. In specific circumstances, erosion control items may be itemized at the discretion of the Engineer or their designee. In these instances, the specific erosion control item will be paid using the common measurement for the individual material discernable in the products section below.

C. Basis for Payment: Payment for Erosion Control shall be made over the life of the project. Initially, 40% of the lump sum for erosion control shall be paid on the first payment application, then 5% on each subsequent payment application until the final payment application, where the remaining balance will be paid.

PART 2 PRODUCTS

2.01 MATERIALS

A. Products specified in this section are for establishing the type, design and quality required. Products of equal type, design and quality produced by other manufacturers will be considered.

B. Geotextiles:

1. The fabric shall consist of strong rot-proof synthetic fibers formed into a woven fabric or a nonwoven needle punched fabric meeting all applicable requirements of this section. The fabric shall be free from any treatment or coating which might significantly alter in physical properties before or after installation. The fabric fibers shall contain stabilizers and/or inhibitors to make the filaments resistant to deterioration resulting from ultraviolet or heat exposures. The fabric shall be a pervious sheet of synthetic fibers oriented into a stable network so that the fibers retain their relative position with respect to each other. The edge of the fabric shall be finished to prevent the outer fibers from pulling away from the fabric. The fabric shall be free of defects or flaws which significantly affect its physical and/or filtering properties. Sheets of fabric may be sewn or bonded together with a fungus resistant material. No deviation from any physical requirements will be permitted due to the presence of the seam.

2. During all periods of shipment and storage, the fabric shall be wrapped in a heavy-duty protective covering to protect the fabric from direct sunlight, mud, dust, dirt, and debris. The fabric shall not be exposed to temperatures greater than 140°.

3. When anchor pins are required, they shall be fabricated of steel and installed per manufacturer's recommendation unless otherwise specified by the Engineer.

4. Surfaces to receive filter fabric shall be graded to the lines and grades shown on the plans, unless otherwise directed by the Engineer. The surface shall be free of obstructions, debris, and pockets of soft or low-density material. The fabric shall be laid smooth and free from tension, stress, folds, wrinkles, or creases. Horizontal overlaps shall be a minimum of 18" with the upper fabric overlapping the lower. Vertical overlaps shall be a minimum of 18" with the upstream fabric overlapping the downstream. The Engineer reserves the authority to reject any material that is felt to not meet the necessary requirements.

5. All geotextiles submitted to the City for approval must meet minimum qualification requirements of *North Carolina Department of Transportation Standard Specifications for Roads and Structures*.

C. Erosion Control Stone

1. Use field stone or rough unhewn quarry stone for plain rip rap. Use stone that is sound, tough, dense, resistant to the action of air and water and suitable in all other respects for the purpose intended. Where broken concrete from demolished structures or pavement is available, it may be used in place of stone provided that such use meets with the approval of the Engineer. However, the use of broken concrete that contains reinforcing steel will not be permitted.

2. All riprap lining shall be in accordance with the North Carolina Department of Transportation (NCDOT) – Standard Specifications for Roads and Structures, current edition, and any revisions. 1042-2 for Class A riprap. The stones should vary in size from 2” to 6”.

3. Stone or broken concrete for rip rap shall meet the requirements outlined in Chart A in the Acceptance section of this technical specification for the class and size distribution..

All stone place for the purposes of Erosion Control Stone shall have a layer of geotextile placed beneath it. Geotextile layers shall have an overlapping edge of no less the 18 inches or be installed accordance to the manufacturer’s specifications, whichever is greater.

D. Erosion Control Matting:

Matting for erosion control shall be excelsior matting or straw matting. Furnish a material certification certifying that the matting meets this article. Other acceptable material manufactured especially for erosion control may be used when approved by the Engineer in writing before being used. Matting for erosion control shall not be dyed, bleached or otherwise treated in a manner that will result in toxicity to vegetation.

1. Excelsior Matting

   Excelsior matting shall consist of a machine produced mat of curled wood excelsior at least 47" in width and weigh 0.975 lb/sy with a tolerance of ± 10%. At least 80% of the individual excelsior fibers shall be 6" or more in length. Evenly distribute the excelsior fibers over the entire area of the blanket. Cover one side of the excelsior matting with an extruded plastic mesh. The mesh size for the plastic mesh shall be no more than 1" x 1".

2. Straw Matting

   Straw matting shall consist of a machine produced mat of 100% grain straw. The straw matting shall have a width of at least 48" and no more than 90" and weighing at least 0.50 lb/sy and no more than 0.75 lb/sy. Evenly distribute the straw over the entire area of the blanket. Cover one side of the blanket with photodegradable

netting with a maximum mesh (netting) size of 0.75" x 0.75" sewn together with a degradable thread. The grain straw shall contain no weed seeds. Package each roll separately.

3. Wire Staples

Staples shall be machine made of No. 11 gauge new steel wire formed into a U-shape. The size when formed shall be not less than 6" in length with a throat of not less than 1" in width.

2.02 ACCEPTANCE

A. Geotextile:

1. The Contractor shall furnish a Type I Certified Mill Test Report, Type 2 Typical Certified Mill Test Report, or Type 4 Certified Test Report for the fabric in accordance with Article 106-3 of the NCDOT Standard Specifications for Roads and Structures, current edition, and any revisions. Additionally, the material shall be subject to inspection, test, or rejection by the Engineer at any time.

2. Fabric will be rejected if more than 72 hours has elapsed between the time the protective wrapping has been removed, and the fabric is covered up during installation except where the fabric is used for temporary silt fence.

3. Chart A:

PROPERTY	TEST PROCEDURE	VALUE
Grab Tensile	ASTM D-4632	300 lbs.
Grab Elongation	ASTM D-4632	15%
Mullen Burst	ASTM 3786	600 lbs.
Puncture	ASTM D-4633	120 lbs.
Trapezoidal Tear	ASTM D-4633	120 lbs.
AOS	ASTM D-4751	30/70 US Sieve

B. Erosion Control Stone:

1. Chart B:

ACCEPTANCE CRITERIA FOR RIP RAP AND STONE FOR EROSION CONTROL			
	Required Stone Sizes in inches		
Class	Minimum	Midrange	Maximum
A	2	4	6
B	5	8	12
1	5	10	17
2	9	14	23

No more than 5.0% of the material furnished can be less than the minimum size specified nor no more than 10.0% of the material can exceed the maximum size specified.

PART 3 EXECUTION

3.01 INSTALLATION

A. Work: Shall include labor, equipment, tools, saw cutting, legal disposal, and all other incidentals necessary to complete the work.

B. Install Erosion Control Devices:
   1. Install erosion control devices, which shall be in place and operational prior to other land disturbing activity.
   2. After installing erosion control devices as indicated on the Drawings, verify that reasonable measures have been taken to prevent the sedimentation of nearby watercourses, existing and new facilities, and adjacent property.
   3. Should Contractor believe that additional measures are necessary to adequately prevent erosion, immediately notify Engineer. If rain is predicted before the Engineer can be notified, take measures as necessary to prevent siltation of nearby water courses.
   4. After installing erosion control devices, request an inspection by the local agency having jurisdiction and the Engineer.
   5. Incorporate permanent erosion control work into the project at the earliest practicable time. Coordinate temporary erosion control measures with permanent erosion control measures and other work on the project to assure effective and continuous erosion control throughout the construction and post construction period.
   6. Maintain erosion control devices during construction until the disturbed areas are stabilized and the agency having jurisdiction, and the Engineer have approved the removal of the erosion control devices.

C. Geotextiles:
   1. Geotextiles shall be placed as shown on the plans and in strict accordance with manufacturer's written instructions. To be acceptable for use, all geotextiles must be certified by the manufacturer to meet the specified requirements (minimum roll average) and shall be packaged and labeled according to ASTM procedures. Geotextiles are to be installed with the common installation method related the specific type of erosion control products being installed.

D. Borrow and Disposal Areas:
   1. Obtain and pay for erosion control permit for borrow and disposal areas as required by Engineer and the local agency having jurisdiction. (NC Department Environmental Quality)
   2. Install and maintain erosion control devices in accordance with Contractor's approved plan.

E. Silt Fences:
   1. Provide posts and metal fence fabric as detailed on the drawings and cover with filter cloth as indicated to furnish an effective filtering medium to separate soil sediment from the storm water runoff. The filter cloth shall be permanently attached to the fence to prevent displacement, and the bottom of the filter cloth shall be buried to prevent under-washing in heavy rainstorms.

F. Gravel Filters:
   1. Gravel filters as detailed on the drawings, consisting of piles of #57 stone shall be placed around permanent and temporary drainage structures to allow storm water to flow into natural drainage channels while separating soil sediment from the storm water runoff.

G. Rock Inlet Sediment Traps:
   1. Provide posts, staples, hardware cloth and stone of type and class as detailed on the drawings. Structural stone, per class specified, shall be placed around the outside

perimeter of the inlet structure with approximately 2:1 side slope and plate the upstream side with #57 stone.

H. Rock Pipe Inlet Sediment Traps:

I. Provide stone of type and class detailed on the drawings. Surround structure with a sediment storage area built to 3600 cubic feet per disturbed acre. Dam must be a minimum of 18 inches high. Temporary Swales and Ditches:
   1. Temporary swales and ditches shall be graded to the profiles and sections indicated and, in the locations, directed. Slope all swales and ditches to drain to the basins and/or filters as indicated.

J. Erosion Control Matting:
   1. See Section in products above

K. Erosion Control Stone:
   1. The riprap shall be placed and graded as specified in the NCDOT – Standard Specifications for Roads and Structures, current edition and any revisions, Section 876 and other applicable sections. The stone shall be placed on the slopes as indicated on the plans, or as the Engineer directs. The stone shall be graded so that the smaller stones are uniformly distributed throughout the mass. The Contractor may place the stone by mechanical methods, augmented by hand placing, provided that when completed, the riprap shall be at a depth of at least that which is shown on the plans.
   2. The stone lining shall be placed upon the filter fabric and smooth graded to a depth as shown on plans in such a way as to not damage the underlining fabric liner. Any damage to the fabric liner shall necessitate the removal and replacement of the damaged area.
   3. The finished slope should be free of pockets of small stone or clusters of large stones. Hand placing may be necessary to achieve the proper distribution. The finished grade of the riprap should blend with the surrounding area. No over fall or protrusion of riprap should be apparent.

L. Seeding:
   1. Refer to Section 00480.

M. Maintenance
   1. The Contractor shall be responsible for periodic reviews of the conditions of the erosion control measures and shall remove all soil sediment and debris as it accumulates in and around the sediment collection structures.
   2. The Contractor shall make all necessary repairs to the erosion control measures to insure their proper operation and function throughout the duration of the project.

N. Self-Inspection and Monitoring:
   1. Provide self-inspection and reporting as required by the Sedimentation Pollution Control Act for the duration of the project. These inspections will be performed to ensure that the approved sedimentation and erosion control measures on the Drawings are installed, maintained, and working adequately.
      1. The inspections need to be conducted after each phase of the project and continue until permanent ground cover is established.
      2. The self-inspection forms and information regarding this program are provided On NCDEQ Website. HOME > ABOUT > DIVISIONS > ENERGY, MINERAL, AND LAND RESOURCES > EROSION AND SEDIMENT CONTROL > E&SC DOWNLOADS AND FORMS
      3. Documentation of inspections shall be recorded on a single copy of the approved erosion and sedimentation control drawings. These Drawings and inspection reports shall be made available at the project site.

2. Provide weekly self-monitoring in accordance with the NPDES Stormwater permit for all construction activities

O. Removal of Temporary Erosion Control Measures:
   1. Remove erosion control devices upon the approval of the permanent stabilization of the site by the agency having jurisdiction of the area (NCDEQ) and the Engineer. Dress sediment deposits remaining in place after the erosion control devices are removed to conform to the existing grade, prepared and seeded. Include cost of removal and cleanup in the cost of the installation of the device. All grassed areas disturbed as a result of this removal shall be re-grassed as called for in Section 00480.

Pay Item	**Pay Unit**
Erosion Control	LS
High Hazard Temporary Silt Fence	LF
Standard Temporary Silt Fence	LF
Rip Rap	TN
Geotextile Fabric	SY

END OF SECTION 00401

SECTION 00405

CLEARING, GRUBBING, AND SELECTED TREE REMOVAL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Furnishing of all labor, equipment, and materials in performing all operations in connection with clearing and grubbing, selected tree removal, and legal disposal thereof.

1.02 MEASUREMENT AND BASIS FOR PAYMENT

A. Clearing and Grubbing
   1. The area to be paid for shall be the area in acres, measured horizontally of the areas designated on the plans or directed by the Engineer to be cleared and/or grubbed. Measurement shall be made to the nearest square foot. No measurement or allowance will be made for removing isolated trees within an area designated by the Engineer to be cleared and/or grubbed, nor for cutting and removal of grain, grass, weeds, or other plants. Clearing and grubbing shall include all selective tree removal unless otherwise specified by the Contract. The combined item of clearing and grubbing shall also include the removal and satisfactory disposal of fences, steps, walls, chimneys, slabs, building foundations, basements, signs and other rubble and debris unless otherwise specified by the Engineer.
   2. Alternate Lump Sum: If the bid form indicates lump sum for clearing and grubbing no measurement is required. All Clearing and Grubbing within the Limits of Disturbance (LOD) shall be included in Lump Sum payment.

B. Selective Tree Removal
   1. By the number of various sizes of selected trees removed. Diameters will be measured at a height of 4'-6" above the ground.
   2. Selected trees shall NOT be paid for within an area designated as clearing and grubbing.
   3. Basis for Payment: Payment shall be for each selected tree removed as indicated in the sizing chart below. Selected trees shall NOT be paid for within an area designated as clearing and grubbing. Trees measuring less than 4” in diameter shall be considered saplings. Payment for saplings is paid for under clearing and grubbing and shall not be paid as selective tree removal.

PAY ITEM SIZE	ACTUAL TREE DIAMETER
6"	4" up to 8"
10"	8" up to 12"
15"	12" up to 18"
18"+	Above 18"

PART 2 PRODUCTS

2.01 MATERIALS NOT USED

PART 3 EXECUTION

3.01 INSTALLATION

A. Protection: Locate and protect property corners and survey control stakes prior to start of clearing operations. Contractor shall protect underground utilities in the area.

B. Clearing: Clearing shall consist of the felling and cutting up of trees, the trimming of trees, and the satisfactory disposal of trees and other vegetation together with down timber, snags, brush, and rubbish occurring within the areas to be cleared. Trees and other vegetation, except such individual trees, groups of trees, and vegetation as may be indicated on the drawings or designated by the Engineer to be left standing, and all stumps, roots, and brush in areas to be cleared shall be cut off flush with or slightly below the original ground surface. Trees and stumps that are to be grubbed under the same contract may be cut to any height up to three feet. When it is necessary to remove limbs and branches from trees which are to be left standing, the cut shall be neatly made close to the bole of the tree or to main branches. Individual trees, groups of trees, and other vegetation to be left standing shall be thoroughly protected from damage incident to construction operations by the erection of barriers or by other approved means. Clearing operations shall be conducted to prevent damage by falling trees to trees to be left standing, existing structures and installations, and to those under construction, and to provide safety of employees and others.

C. No trees, brush, stumps, or other refuse from clearing shall be places or left on adjacent property. Trees unavoidably falling outside the specified limits shall be immediately removed and disposed of.

D. For cut or scarred surfaces, damaged area should be trimmed with a sharp blade to remove shredded or loose outer layer(s) and left to heal on its own. No paint or dressing is required.

E. Grubbing: All stumps, roots, logs, or other timber more than three inches in diameter, matted roots, and other debris shall be excavated and removed to a depth not less than three feet below any subgrade, shoulder, or slope. All depressions excavated for or by the removal of stumps and roots, shall be refilled with suitable material thoroughly compacted.

F. Selective Tree Removal: Selected trees to be removed shall consist of trees six inches or more in diameter either shown on the plans or as designated by the Engineer. All roots, or other timber more than three inches in diameter, and matted roots shall be excavated and removed to a depth not less than three feet below any subgrade, shoulder, or slope.

G. Disposal: All timber, logs, stumps, roots, brush, rotten wood, and other debris from the clearing and grubbing operations shall be disposed of legally by the Contractor.

H. Erosion Control: Erosion control devices shall be installed and operational prior to other land disturbing activity. Install erosion control devices in accordance with Project Manual and Drawings and Erosion Control Permit.

I. Access Roads: Clear for access roads. Limit clearing and grubbing for access roads to width necessary or as shown on plans.

Pay Item	**Pay Unit**
Clearing and Grubbing	LS or AC
Selective Tree Removal (Tree size”)	EA

END OF SECTION 00405

SECTION 00410

PROOFROLLING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This item shall consist of furnishing and operating heavy pneumatic tired compaction equipment or fully loaded tandem dump truck for compacting the roadbed and testing the roadbed for stability and uniformity of compaction.

B. The requirement for proofrolling may not be eliminated or modified without the approval of the Engineer.

PART 2 PRODUCT

2.01 EQUIPMENT

A. The Engineer shall check to see that the equipment conforms to the requirements of this article. A tandem dump truck legally fully loaded to not less than 28 tons with soil or stone may be used to proofroll.

B. If requested, weight tickets signed by a licensed public weighmaster may be used to determine the weight of the dump truck and product used for proof rolling.

C. Requests by the Contractor to substitute other types of equipment shall be forwarded to the Engineer for approval or disapproval.

PART 3 EXECUTION

3.01 EXECUTION

A. Proofrolling is to be done when the roadbed is within plus or minus 0.5 feet of finished grade and the roadbed shall be rolled for a width of 2 feet outside the proposed edges of pavement including shoulder pavement.

B. A coverage is considered to be complete when the entire area to be proofrolled has been in contact with the pneumatic tires of the roller or loaded dump truck. One complete coverage shall be made with additional coverage as required when failure is suspected. Areas which have failed and been repaired shall be given a complete coverage after repair has been completed.

C. Equipment shall be operated at a speed between 225 ft/min and 300 ft/min.(2.6 mph-3.4 mph)

D. The Contractor may operate the proofrolling equipment at times other than when directed by the Engineer. Such use is at the Contractor's option and is not to be considered as work performed under this section and will not be considered for payment.

E. The Contractor shall not be permitted to drive the loaded dump truck over existing structures or curbing. The Contractor shall use rubber tired or other types of tractive equipment for operation on the roadbed. The Contractor shall protect all structural facilities within the project area, such as, but not limited to, bridges, box culverts, pipe culverts and utilities. Damage resulting from proofrolling equipment shall be repaired by contractor at no cost to the City.

3.02 QUALITY CONTROL

A. The Engineer shall follow (walking is preferable) a short distance behind the proofroller observing the action of the roadbed produced immediately behind the tires of the roller. When the roadbed material compresses and remains compressed, the roadbed is satisfactory. When the roadbed material compresses and then rebounds to any appreciable extent, further testing and investigation shall be made. Horizontal slippage or crust breakage is not considered as failure. Any slippage or breakage shall be repaired.

B. The Engineer shall take immediate steps to determine the cause of any failure observed. Failures are usually due to the necessity for underdrains, unsuitable materials, or excessively wet materials. These conditions may be found to be as much as 6 feet below the roadbed surface. Assistance in determining corrective action required when needed, may be obtained from the Engineer.

C. Should it be determined that the failure is due to negligence or weather, the City Engineer shall so inform the Contractor, verbally and in writing and shall document all work (including equipment, personnel, and time) necessary for correction of the area.

END OF SECTION 00410

SECTION 00412

INCIDENTAL STONE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. DESCRIPTION

1. Perform the work covered by this section including but not limited to, furnishing, hauling, placing and shaping a graded stone material for use in driveways, temporary maintenance of traffic, adjacent to mailboxes, beneath traffic island, median covers and at any other locations, other than use as a part of any base course on which pavement is to be placed; shaping; tamping when required; maintaining the base; and disposing of any surplus stockpiled material.

2. This section specifically does not include bedding stone for pipes and other structures.

B. MEASUREMENT AND PAYMENT

1. Incidental Stone Base will be measured and paid at the contract unit price per ton that has been stockpiled or incorporated into the completed and accepted work. This quantity will be measured as provided for in this section. Incidental Stone base which has been stockpiled will not be measured more than one time. The Incidental stone will be measured by being weighed in trucks on certified platform scales or other certified weighing devices. No deductions will be made for any moisture contained in the stone at the time of weighing.

2. Determination of Measurement: Measurement shall be per ton of each type placed as approved by the Engineer prior to placement. Contractor shall furnish a “certified scale ticket” with each load of stone to the Engineer within 24 hours in order to be considered for payment.

3. Basis for Payment: Payment shall be on a contract unit price per ton. Incidental stone that is stockpiled or not placed will not be considered for payment. No separate payment shall be made for incidental stone placed in mainline or service lateral trenches unless approved by the Engineer.

PART 2 PRODUCTS

2.02 MATERIALS

A. Use stone gravel or recycled concrete for the graded stone material which is well graded from the 1-1/2 inches through the No. 200 sieve. The liquid limit of the recycled concrete is raised 5 points to no more than 35.

PART 3 EXECUTION

3.01 INSTALLATION

A. WORK

1. Work: Labor, tools, materials, equipment, furnishing, placing, supplementing stone required for maintenance, grading/leveling stone, hauling, wetting, blading, compacting, removing and disposal of incidental stone immediately prior to asphalt pavement patch.

2. Contractor shall remove a minimum of two inches of soil or aggregate base course, place and compact stone in order for this item to be applicable.

B. GRADATION SAMPLING, TESTING AND ACCEPTANCE

1. Acceptance of the graded stone material will be made by visual inspection and approval by the Engineer as being satisfactory for the purpose intended before it use. No sampling for testing of the graded stone material will be performed.

C. PLACING AND SHAPING STONE

1. Spread the stone material uniformly over the area required and then shape and dress to the satisfaction of the Engineer.

2. Uniformly spread, grade to the required depth and firmly tamp the stone material beneath traffic island and median covers. If the Contractor desires, the surface of the stone material me be covered with a sufficient amount of fine material to facilitate grading and shaping.

D. MAINTENANCE

1. Maintain the stone material until final acceptance of the project by reshaping and by the addition of incidental stone base material when directed by the Engineer.

Pay Item	**Pay Unit**
Incidental Stone Base	TN

END OF SECTION 00412

SECTION 00420

AGGREGATE BASE COURSE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The Work consists of providing all labor, material, equipment, and services required for all work as described herein and indicated on drawings.

B. Determination of Measurement: Measurement shall be by certified scale ticket with each load of material. Tickets must be provided within 24 hours.

C. Basis for Payment: Contractor will be paid on a contract unit price per ton of stone that is placed.

D. Remove and Replace Gravel Driveways with Aggregate Base Course (no overages allowed)

1. Determination of Measurement: Measurement shall be in square yards as measured in the field.
2. Basis for Payment: Payment shall be on a contract unit price bid per square yard completed and accepted. Existing gravel and/or soil driveway shall be replaced with six (6) inch thick stone, compacted Aggregate Base Course (ABC) or whichever matches existing type stone.

1.02 REFERENCES

A. The *North Carolina Department of Transportation Standard Specifications for Roads and Structures,* latest edition and revisions, Section 520, will govern the work under these specifications except as they are modified hereinafter.

1.03 SCHEDULING

A. No aggregate base course will be laid until the sub-grade is approved for grade and density by the Engineer.

PART 2 PRODUCTS

2.01 SOURCE QUALITY CONTROL AND TESTS

A. Gradation testing may be required by Engineer if visible segregation in material is noted.

B. Sand cone test shall be utilized for density testing. Density testing shall be performed at a minimum of one test per road or every 1,000 feet for roads less than 27 feet in width and every 500 feet for roads greater than 27 feet in width.

PART 3 EXECUTION

3.01 Proofrolling is required for roadway subbase and base courses.

Pay Item	**Pay Unit**
Aggregate Base Course	TN
Removal Existing Gravel Drive	SY

END OF SECTION 00420

SECTION 00425

EXCAVATION/BACKFILLING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roadway: This item shall consist of the removal and satisfactory disposal of all materials excavated within the area of the street to be paved, the removal and replacement of unsuitable sub-grade material with satisfactory material, the formation, compacting, and shaping of all embankments to the lines and grades established by the Engineer, excavation from borrow areas of suitable materials to be hauled in and used as fill or back-fill, when sufficient quantities of suitable material are not available from the roadway, all in accordance with this section of the specification, and subject to the terms and conditions of the contract. The classification of all material excavated shall be either "Unclassified Excavation" or "Undercut Excavation."

B. Storm Sewer: The Contractor shall provide labor, equipment, and material to perform required excavating, backfilling, and compacting for storm sewer utilities and related structures to the depths shown on the plans or as directed by the Engineer.

C. Determination of Measurement: The number of cubic yards of Unclassified Excavation measured in original position by cross sectioning and computed by the average end area method. When it is not feasible to cross section the volume of excavation which is to be replaced with borrow back-fill, the loads of material hauled in shall be counted. Undercut Excavation will be measured by the volume (cubic yards) of unsuitable material excavated, authorized by the Engineer. Excavation to greater depths and/or widths, unauthorized, shall be refilled with select backfill material used for backfilling and compacted at no additional cost to the City. The width of the trench shall not exceed the width required to properly tamp backfill material around pipe or to adequately shore trench but shall be limited to pipe diameter plus two feet or pipe diameter plus ½ pipe diameter, whichever is greater.

D. Basis for Payment: Contractor will be paid on a contract unit price per cubic yard for unclassified/undercut excavation, which price and payment shall be full compensation for the excavation and hauling; formation and compaction of embankments; removal and disposal of surplus drain pipes, existing walls, steps and surplus materials within the right-of-way, removal and disposal of all roots, stumps, logs, and other debris excavated from drainage ditches; for all sloping and trimming of the ditches, preparation and completion of the sub-grade and shoulders, ditches, slopes, and furnishing of all labor, equipment, tools, and incidentals necessary to complete the work

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.01 INSTALLATION

A. Work: Complete removal and disposal of unstable soil including, but not limited to, excavating, loading, hauling, properly disposing of excavated material, and providing select

borrow material for backfill. Providing select borrow material for backfilling shall include, but not be limited to, material, loading, hauling, placing and compacting.

B. Construction Methods: The Contractor shall proceed with excavation and disposal of material at such locations and in such sequence as the Engineer may approve.

1. All excess excavated material from a project shall be disposed of by the Contractor at his expense unless ordered to another project by the Engineer. The Contractor's obligation to remove and dispose of excess materials shall in no manner convey to him any right of property in any material taken from any excavation.
2. Recesses shall be excavated to receive the bells of the pipe.
3. When the foundation materials are of poor supporting value, the pipe foundation shall be reinforced by one of the following methods:
    a. By replacing the unsuitable material in a minimum depth of six inches, or as directed by the Engineer with sand, sand-clay, gravel, or crushed stone and thoroughly tamped.
    b. By constructing supporting cradles of concrete under each joint.
4. Excavation below grade shall be backfilled at the Contractor's expense, as directed by the Engineer, and thoroughly tamped. When select borrow material is required by the Engineer, it shall be paid for as Select Borrow.
5. The ground adjacent to all excavation shall be graded to prevent surface water running in. The Contractor shall, at his expense, remove by pumping or other means approved by the Engineer any water accumulated in the trench.
6. All banks or trenches shall conform to City and OSHA safety standards (whichever more stringent). The Contractor shall, at his expense, do all bracing, sheeting, and shoring necessary to perform and protect all excavations, as required for safety, and as directed by the Engineer or when the Contractor deems it necessary.
7. The excavation for manholes and catch basins shall be of sufficient width and depth to permit ready construction.

C. Sub-Grade: The sub-grade shall be graded and regulated either by hand labor, the use of one-man motor graders or other approved methods. The sub-grade of the area to be paved shall be in a true plane parallel with and to the grade line established by the Engineer. Should soft or yielding places develop in the sub-grade, the unsuitable material shall be removed and replaced with suitable material and thoroughly compacted. Care shall be taken to ensure that all utility excavations have been thoroughly backfilled and compacted. Any settlement evident after base has been placed shall be corrected at the Contractor's expense. No soil, sand-clay or other base material shall be placed on the sub-grade until the sub-grade has been checked and approved by the Engineer. A variation of more than one-half inch (½") shall be cause for rejection of the sub-grade. Compaction testing for subgrade and for base is 100% compaction.

D. Unclassified Excavation: All excavation of every description and of whatever substance including rock and rock-like material encountered shall be to the lines and grades indicated or otherwise as specified. The classification of all material excavated shall be "Unclassified Excavation." The work shall consist of the excavation, placement, compaction or satisfactory disposal of all materials encountered within the limits of the work, necessary for the construction of the roads, parking lots, building pads, and utilities. Suitable material excavated shall be transported to and placed in fill areas within the work limits. Excavation and filling shall be performed in a manner and sequence that will provide drainage at all times. All excess unsuitable excavated material from the project shall be legally disposed of by the Contractor at his expense.

1. Removal of Old Pipe, Walls, Steps, Curb, Gutter, Sidewalk and Pavement: All old pipe, walls, steps, curb, gutter, sidewalks, and pavement shall be removed (including saw cutting) as directed by the Engineer, and legally disposed of by the Contractor. All items referenced above shall be considered incidental to unclassified excavation.

E. Undercut Excavation: All undercut excavation consists of the excavation, placement, and compaction and/or satisfactory disposal of materials removed from a location below finished grade roadway cross section.

F. Drainage Ditches: Drainage ditches shall be excavated in accordance with the plans, sections, and grades, and at the time directed by the Engineer. No deviation from alignment, grade, or section will be allowed except by the Engineer.

1. The Contractor shall, in general, be required to excavate all drainage ditches in proper sequence or at the time directed by the Engineer. All roots, stumps, and objectionable matter in the sides and bottom of the ditch shall be cut to conform to the slope, grade, and shape of the section. The Contractor shall dispose of the excavated material as directed by the Engineer and no excavated material or spill from a drainage ditch shall be deposited or left within three feet of the edge of the ditch, but shall be scattered back and not left piled up in a ridge along the ditch, unless otherwise shown on the plans or directed by the Engineer in writing.

G. Private Driveways: The Contractor shall keep private driveways open and unobstructed as far as practicable and shall regrade same from curb to property line when directed by the Engineer.

Pay Item	**Pay Unit**
Excavation and Backfilling	CY
Unclassified Excavation	CY
Undercut Excavation	CY

END OF SECTION 00425

SECTION 00426

SOIL MATERIALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. SOIL TYPE BASE COURSE
   1. Excavating, loading, hauling, spreading, and compacting, etc. as required for placement of soil base course.

B. SELECT BORROW
   1. Shall include material loading, hauling, placing, and compacting, equipment, labor, supplying suitable subsoil material and any other incidentals required for installation.

C. TOPSOIL
   1. Shall include removal of unusable topsoil including rocks and debris, excavation, grading, loading, hauling, equipment, labor, compaction, supplying suitable topsoil material and any other incidentals required for installation.

D. Conditioning Existing Base:
   1. Scarifying, shaping, and compacting the existing base to conform to the required lines, grades, depths, and typical sections established by the plans or modified by the Engineer is incidental to Soil Materials.

1.02 MEASUREMENT AND BASIS FOR PAYMENT

A. SOIL MATERIALS SPECIFIED AS SOIL TYPE BASE COURSE, SELECT BORROW, OR TOPSOIL
   1. Determination of Measurement: Measurement shall be based on truck quantity minus 25% from certified scale ticket for each load of material. Certified scale tickets must be provided within 24 hours.
   2. Basis for Payment: Soil Materials will be paid on a contract price per cubic yard.

1.03 REFERENCES

A. AASHTO T180 - Moisture-Density Relations of Soils Using a 10-lb (4.54 kg) Rammer and an 18-in. (457 mm) Drop.

B. ASTM D698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5 lb (2.49 Kg) Rammer and 12-inch (304.8 mm) Drop.

C. ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.

D. ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 Kg) Rammer and 18-inch (457 mm) Drop.

E. ASTM D2487 - Classification of Soils for Engineering Purposes. (Uniform Soil Classification System)

F. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth). OTHER TESTING ALLOWED

G. ASTM D3017 - Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

1.04 SUBMITTALS

A. Materials Source: Submit name of imported materials source.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with the *North Carolina Department of Transportation Standard Specifications for Roads and Structures,* latest edition and revisions. Maintain one copy on site.

PART 2 PRODUCTS

2.01 SOIL TYPE BASE COURSE MATERIALS

A. Soil type base course shall be either Type A, B, or C.
   1. The base course material shall be free from vegetative matter and lumps or balls of clay.

B. Samples will be tested for gradation in accordance with AASHTO T-88. The liquid limit test will be in accordance with AASHTO T-89 and the plasticity index will be tested in accordance with AASHTO T-90.

C. Gradation testing shall be performed a minimum of one test per road or every 2,000 feet for roads less than 27 feet in width and every 1,000 feet for roads greater than 27 feet in width.

D. Sand cone test shall be utilized for density testing. Density testing shall be performed a minimum of one test per road or every 1,000 feet for roads less than 27 feet in width and every 500 feet for roads greater than 27 feet in width.

Requirements	Limits Type A	Limits Type B	Limits Type C
Passing 2” Sieve		100%	
Passing 1” Sieve	100%	70% - 100%	
Passing ½" Sieve		55% - 100%	
Passing No. 4 Sieve		35% - 100%	
Passing No. 10 Sieve	65% - 100%	25% - 65%	100%
Passing No. 40 Sieve		15% - 45%	
Passing No. 200 Sieve		5 – 25%	

2.02 SELECT BORROW

A. Select Borrow:
   1. A structurally cohesive and uniform, high quality earthen material excavated from an approved source or borrow pit. Material classified as select borrow must be free of debris/unapproved fill materials and meet engineering standards as defined specifically by the Engineer or their designee. Typical materials include sand clay or sandy clay loam materials referenced in the USDA Soil Triangle.
   2. Select materials from *North Carolina Department of Transportation Standard Specifications for Roads and Structures,* may be used with approval from Engineer or their designee.

2.03 TOPSOIL MATERIALS

A. Topsoil Type S3: Conforming to the *North Carolina Department of Transportation Standard Specifications for Roads and Structures,* latest edition and revisions.

B. Topsoil Type S4:
   1. Excavated and reused material.
   2. Graded.
   3. Free of roots, rocks larger than ½ inch, subsoil, debris, large weeds, and foreign matter.

C. Topsoil Type S5:
   1. Imported borrow.
   2. Friable loam.
   3. Free of roots, rocks larger than ½ inch, subsoil, debris, large weeds, and foreign matter.
   4. Acidity range pH of 5.5 to 7.5.
   5. Containing a minimum of 4 percent and a maximum of 25 percent inorganic matter.

PART 3 EXECUTION

3.01 INSTALLATION

A. SOIL REMOVAL
   1. Excavate subsoil and topsoil from areas designated.
   2. Remove lumped soil, boulders, and rock.
   3. Stockpile excavated material on approved site and remove excess material, not being used, from site.
   4. Remove excavated material from site when no onsite, stockpile area is approved.

B. STOCKPILING/STOCKPILE CLEANUP
   1. Stockpile materials on approved site.
   2. Stockpile in sufficient quantities to meet Project schedule and requirements.
   3. Separate differing materials with dividers or stockpile apart to prevent intermixing of soil types or contamination.
   4. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.
   5. Remove stockpile, leave area in a clean and neat condition, with permanent ground cover. Grade site surface to prevent free standing surface water.
   6. If a borrow area is indicated, leave area in a clean and neat condition, with permanent ground cover. Grade site surface to prevent free standing surface water.

C. Soil type base course shall be placed on a sub-grade that has been cut to the required depth as shown on the plans. Sub-grade should be checked by the inspector or Engineer before any base course can be placed.

D. The base shall be finally shaped to conform to the lines, grades, and typical sections shown on the plans. Care shall be taken to prevent the formation of slippage planes in the surface. All soft or unstable areas shall be thoroughly dried, re-mixed, or reworked and replace

Pay Item	**Pay Unit**
Soil Material (Type Sx)	CY
Soil Type Base Course	CY
Select Borrow	CY
Topsoil	CY

END OF SECTION 00426

SECTION 00440

MILLING BITUMINOUS PAVEMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Summary Of Work: The work covered by this section consists of milling bituminous pavement at locations, depths, widths, and typical sections indicated in the plans and special provisions or as directed by the Engineer. Removing, transporting, and disposing of the milled material and cleaning the milled pavement surface is incidental.

B. Determination of Measurement: The quantity of milled bituminous pavement and incidental milling to be paid for will be the actual number of square yards of pavement surface which has been milled to depth indicated on drawings in accordance with the requirements of the contract. In measuring this quantity, the length and the width shall each be measured along the pavement surface in the field.

C. Basis of Payment: The quantity of milled bituminous pavement will be paid for at the contract unit price per square yard for "Milling Bituminous Pavement" or "Incidental Milling" as the case may be.

PART 2 PRODUCTS

2.01 EQUIPMENT

A. Equipment shall include a self-propelled unit capable of removing the existing bituminous pavement to the depths, widths, and typical sections shown in the plan, special provisions or as directed by the Engineer. The equipment shall have been designed and built exclusively for pavement milling operations and shall have sufficient power, traction, and stability to accurately maintain depth of cut and slope. The milling machine shall be equipped with a grade control system which will automatically control the longitudinal profile and cross slope of the milled surface by the use of one or more skid sensors moving along the pavement surface. The machine shall be capable of leaving a uniform surface suitable for handling traffic without excessive damage to the underlying pavement structure. The milling machine and other loading equipment shall be capable of loading milled material to be used in other parts of the work without excessive segregation. The milling machine must be on tracks, not wheels.

B. Additional equipment necessary to satisfactorily remove the pavement in the area of manholes, water valves, curb and gutter, and other obstructions shall be provided.

C. The milling equipment shall be equipped with a means of effectively limiting the amount of dust escaping from the removal operation in accordance with local, State and Federal air pollution control laws and regulations.

PART 3 EXECUTION

3.01 INSTALLATION

A. Work: Shall include milling and re-milling the pavement, cleaning the milled surface, loading, hauling, stockpiling the milled material for use in recycled bituminous mixtures and disposal of any excess milled materials. Any equipment necessary to remove asphalt in the

areas of manholes, water valves, curb and gutter and any other obstructions shall be part of milling contract price.

B. Tolerance: Removal of the existing pavement shall be to the depth required by the plans or project special provisions. The Engineer may vary the depth of milling by not more than one inch.

C. The existing pavement shall be milled in a manner which will leave the remaining pavement surface in a uniform longitudinal profile and cross section at the locations and in accordance with typical sections shown in the plans. Where indicated in the plans or project special provisions, removal shall be to a specified depth and shall produce a specified cross slope. The Contractor shall mill intersections and other irregular areas as indicated in the plans, project special provisions, or as directed by the Engineer.

D. The Contractor may elect to make multiple cuts to achieve the required depth of cut or cross slope required by the plans.

E. The longitudinal profile of the milled surface shall be established by a mobile string line on the side of the cut nearest the centerline of the road or as directed by the Engineer. The cross slope of the milled surface shall be established by an automatic cross slope control mechanism or by a second skid sensing device located on the opposite edge of the cut. The Engineer may waive the requirement for automatic grade and cross slope controls where conditions warrant.

F. The milling equipment shall be operated in such a manner as to prevent damage to the underlying pavement structure, utilities, drainage facilities, curb and gutter, paved surfaced outside the milled area, and reasonably smooth and free of excessive scarification marks, gouges, ridges, continuous grooves, or other damage as determined by the Engineer. Any leveling or patching required as a result of negligence by the Contractor shall be repaired with hot bituminous plant mix at no cost to the City of Fayetteville and in a manner acceptable to the Engineer. The Contractor shall coordinate the adjustment of manholes, meter boxes and valve boxes with the milling operation.

G. Milling limits will be determined by Engineer before operation begins.

H. The milled material shall become the property of the Contractor. All milled material shall be legally disposed of by the Contractor in areas provided by him which are outside the right-of-way, except where the milled material is used in the work. Milled material must be removed and disposed of on the same day.

I. Inspector must be present during milling.

J. The Engineer may require re-milling of any area exhibiting defects such as lamination or other defects. If the defects are determined to be the result of the Contractor's negligence, then measurement of the re-milling, as specified in Unit Prices, will not be made. If, however, the Engineer directs the re-milling of an area which is not due to the Contractor's negligence, measurement of the re-milled area will be made under provisions of Unit Prices.

K. The milled pavement surface shall be thoroughly cleaned of all loose aggregate particles, dust and other objectionable material by the use of power brooms, power blowers, power vacuums or other means. Disposal or wasting of oversized pavement or loose aggregate material will not be permitted within the right-of-way.

L. The pavement removal operations shall be conducted to effectively minimize the amount of dust being emitted. The operations shall be planned and conducted so that it is safe for persons and property adjacent to the work including the traveling public.

Pay Item	**Pay Unit**
Milling Bituminous Pavement	SY

END OF SECTION 00440

SECTION 00445

PAVEMENT JOINT SEALER

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The work covered by this section consists of the furnishing and placement of joint sealer material in accordance with these specifications.

B. Determination of Measurement: Measure total number of pounds of joint sealer placed on the roadway.

C. Basis for Payment: Payment will be on a contract unit price per pound of joint sealer placed.

PART 2 PRODUCTS

2.01 MATERIALS

A. Joint sealer shall be hot poured rubber asphalt conforming to AASHTO M 173, except:
   1. Flow test at 140 degrees F shall not exceed 1.0 CM.
   2. Bond test shall be performed at minus 20 degrees F.

B. Ductility shall be not less than 40 CM when tested in accordance with ASTM D113

C. The joint sealer shall be free of all foreign material. When melted it shall be free of lumps. The composition of the material shall be a mixture of virgin rubber, synthetic rubber, or a combination of both, with asphalt, plasticizers, and tackifiers. Under no circumstances shall ground cured rubber scrap be used in place of virgin or reclaimed rubber.

PART 3 EXECUTION

3.01 INSTALLATION

A. Work: Material, equipment, labor, clean up and all associated appurtenances for installation of pavement joint sealer.

B. Construction Methods: All existing pavement cracks in excess of 1/8 inch but not more than 1 ½ inches will be cleaned using a hot compressed air lance. The cracks shall be sealed with hot poured rubber asphalt meeting the requirements with these specifications.

C. The joint sealer shall be allowed to dry tack free prior to placing traffic on a sealed area of roadway. Apply DeTack (brand name) or equivalent to remove tackiness. Material shall be placed using the wand followed by a "V- shaped" asphalt squeegee. This method will allow uniform filing of the cracks and reduce excess material due to over-banding.

D. The Contractor shall provide all traffic control in accordance with the Manual on Uniform Traffic Control Devices.

Pay Item	**Pay Unit**
Pavement Joint Sealer	Lb.

END OF SECTION 00445

SECTION 00450

PLANT MIX BITUMINOUS CONCRETE SURFACE COURSE
AND
BITUMINOUS CONCRETE BASE COURSE
(TYPE B 25.0 C; TYPE I 19.0 C; TYPE S 9.5 B; TYPE S 9.5 C)

PART 1 GENERAL

1.01 SECTION INCLUDES

A. PROPOSED PAVEMENT

1. DETERMINATION AND BASIS FOR PAYMENT

a. Determination of Measurement: Measurement shall be per ton of each type placed. Certified weighmaster tickets shall be provided by contractor. Must be provided within 24 hours

b. Basis for Payment: Payment on a contract price per ton.

B. REMOVE EXISTING PAVEMENT

1. DETERMINATION AND BASIS FOR PAYMENT

a. Determination of Measurement: By the square yard of existing pavement removed. The existing pavement shall be measured by the Engineer prior to its removal

b. Basis for Payment: Payment will be on a contract unit price per square yard for removal and proper disposal of existing pavement.

C. REMOVE AND REPLACE ASPHALT DRIVEWAYS (no overages allowed)

1. DETERMINATION OF MEASURMENT AND BASIS FOR PAYMENT

a. Determination of Measurement: Measurement shall be to the nearest one-tenth square yards. The designated number of square yards to be removed shall be on the plan or as directed by the Engineer.

b. Basis for Payment: Payment shall be on a contract unit price bid per square yard completed and accepted with a minimum thickness of two (2) inches or matching existing asphalt thickness, whichever is greater.

1.02 REFERENCES

A. The *North Carolina Department of Transportation Standard Specifications for Roads and Structures,* latest edition and revisions, will govern the work under these specifications except as they are modified hereinafter.

B. Quality Management System for Asphalt Pavements: The Contractor shall produce and construct asphalt mixtures and pavements in accordance with a quality management system as described in Section 609 of the *North Carolina Department of Transportation Standard Specifications for Roads and Structures,* latest edition and revisions. The Contractor shall submit only NCDOT approved mix design which must be approved by the Engineer prior to delivery. Perform all quality control activities in accordance with NCDOT "Hot Mix Asphalt Quality Management System (HMA/QMS)" Manual.

1.03 ENVIRONMENTAL REQUIREMENTS

A. Weather Limitations:

1. Bituminous mixtures shall not be produced or placed during rainy weather, when the sub-grade or base course is frozen, nor when the moisture on the surface to be paved would prevent proper bond.

B. Temperature

1. Bituminous material shall not be placed when the air temperature, measured in the shade away from artificial heat at the location of the paving operations, is less than the following temperatures:

Allowable Ambient Temperatures		
Material Type	Minimum Air Temperature	Minimum Road Surface Temperature
ACBC, Types B 25.0C, B 37.5 C, PADC, ACIC, Types I 19.0C	35-degree F (2 degree C)	35-degree F (2 degree C)
ACSC, Types S 4.75A, SF 9.5B, ACSC, Types S 9.5C	40-degree F (5 degree C)	40-degree F (5 degree C)
Final layer of surface mixes containing recycled asphalt shingles (RAS)	50-degree F (10 degree C)	50-degree F (10 degree C)

2. An exception to the above, when in any day's operations the placement of a layer of bituminous base course material or binder material 2" or greater in thickness has started, it may continue until the temperature drops to 32 degrees Fahrenheit (F).

C. Seasonal

1. Surface course material, which is to be the final layer of pavement, and Open-graded asphalt friction courses (OGAFC) shall not be placed between December 15 and March 16 unless otherwise approved by the Engineer.

PART 2 PRODUCTS

2.01 MATERIALS

A. Bituminous Plants Production: All bituminous plants shall meet specification 610 of the *North Carolina Department of Transportation Standard Specifications for Roads and Structures,* latest edition and revisions. All bituminous plants shall have a current and up to date certification of the asphalt plant on file with the City of Fayetteville

B. All bituminous base courses and surface course mixes that are to be use within the rights-of-way of the City of Fayetteville shall be NCDOT approved and have all job mix formulas on file with the City of Fayetteville. No other bituminous mixes will be acceptable. Must submit mix design for the project.

C. All binder shall meet the appropriate requirements of Section 610 of the *North Carolina Department of Transportation Standard Specifications for Roads and Structures,* latest edition and revisions.

PART 3 EXECUTION

3.01 PROPOSED PAVEMENT

A. The work covered by this section consists of the production, delivery, placement and compaction of all types of bituminous plant mixed bases and surface courses.

B. Construction Requirement: The production, spreading, finishing, weather limitation, joints, compaction, density and surface requirements shall be in accordance with the *North Carolina Department of Transportation Standard Specifications for Roads and Structures,* latest edition and revisions.

C. Transportation of Bituminous Mixture: The mixture shall be transported from the mixing plant to the point of use in vehicles which have tight, clean, smooth metal beds that have been sprayed with a lime solution, a soap and oil solution, or other approved material, to prevent the mixture from adhering to the beds. Fuel oil is not permitted for this purpose. Truck beds shall be drained prior to loading. Each load of mixture shall be fully covered with a canvas or other suitable material. All covers shall be so constructed and secured as to prevent the entrance of moisture and the rapid loss of temperature. A 3/8-inch diameter hole shall be provided on each side of the vehicle body near the

center of the body and 6 inches above the bed of the vehicle for the purpose of inserting a thermometer.

D. The temperature of the mixture immediately prior to discharge from the hauling vehicle shall be within a tolerance of plus 15 degrees F to minus 25 degrees F of the specified job mix temperature.

TABLE 610-1 MIXING TEMPERATURE AT THE ASPHALT PLANT	
Binder Grade	JMF Temperature
PG 64-22	300°F
PG 70-22	315°F
PG 76-22	335°F

E. Staff: The contractor is required to have a certified Roadway Technician with each paving operation at all times. This person is responsible for monitoring all roadway paving operations and directly supervising all quality control processes and activities. Provide a certified nuclear gauge operator when nuclear density control is being used. Provide the City of Fayetteville with an organizational chart, including names, telephone numbers, and current certification numbers of all personnel responsible for the quality control program while asphalt paving work is in progress.

F. Utilize the 30-foot minimum length mobile grade system to control longitudinal profile when placing the initial lanes and all adjacent lanes of all courses, including resurfacing, leveling courses, and asphalt in-lays, unless otherwise approved by the Engineer. Where public traffic is being maintained, apply only as much tack coat as can be covered during the same day's operation. In addition, the Engineer may limit the application of tack coat in advance of the paving operation depending on traffic conditions, project location, proximity to business or residential areas, or other reasons. In the event that tack coat material is not covered in the same day's operation; the Engineer may require the application of suitable granular material or other means to provide a safe traffic condition at no additional cost to the City of Fayetteville. The contractor will be responsible for any clean-up of the materials that was placed at no cost to the City of Fayetteville.

G. Contractor will furnish with each load of asphalt a scale ticket by a certified weigh master showing the amount of asphalt on the truck. Contractor will be paid on a unit price per ton of asphalt that is actually placed and rolled to a finish asphalt surface or base course.

H. The Engineer may prohibit or restrict the use of vibratory rollers where damage to the pavement being placed, the underlying pavement structure, drainage structures, utilities, or other facilities is likely to occur or is evident.

I. The final surface course material shall be compacted using two steel-wheel rollers and a pneumatic tired roller. For any paving operations, two rollers required on site.
    1. Initial rolling shall be achieved using an 8-to-10-ton steel wheel roller.
    2. Intermediate rolling shall be achieved using a pneumatic tired roller.
    3. Final rolling shall be achieved using an additional steel wheel roller.

J. Surface Smoothness:
    1. Base Course – 1/4" in 10 feet.
    2. Surface Course – 1/8" between any two contact points, 10-foot straight edge.

3.02 SPECIAL CONSIDERATION

A. Traffic Loops: Contractor shall install loops before final layer, no later than five (5) days from when milled or as approved by the Engineer.

3.03 REMOVE EXISTING PAVEMENT

1. The work covered by this section shall include labor, equipment, tools, saw cutting, legal disposal, and all other incidentals necessary to complete the work.

3.04 REMOVE AND REPLACE ASPHAULT DRIVEWAYS

1. Work: Saw cutting and removal of the existing driveway, removing and disposing of excess or unsuitable materials off-site, furnishing, hauling, fine grading the sub-grade, compaction, placing all materials, forms and all equipment, tools, labor, and incidentals necessary to complete the work. Replacement of the drive shall be to existing or better condition.

Pay Item	**Pay Unit**
Plant Mix Bituminous Concrete	TN
Removal Existing Asphalt	SY
Remove and Replace Asphalt Driveway	EA

END OF SECTION 00450

SECTION 00451

PERMANENT PAVEMENT PATCH

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The work covered by this section consists of furnishing and applying Permanent Pavement Patch in accordance with the *North Carolina Department of Transportation Standard Specifications for Roads and Structures*, latest edition and revisions, hereinafter referred to as the NCDOT Specifications, except where modified in this specification.

B. Determination of Measurement:

1. For Annexation projects, permanent pavement patch length shall be measured in the field, and width shall be determined using the following chart. Any pavement removed or damaged beyond the width limits specified below shall be replaced by the Contractor at his own cost unless directed otherwise by the Engineer. No overages allowed.

Maximum Payment Widths for Annexation Pavement Trench Patch

Utility Type	Conditions	Patch Width Payment
Storm Drainage	≤ 24” pipe	6’
Storm Drainage	30” – 42” pipe	8’
Storm Drainage	48” – 54” pipe	10’
Storm Drainage	≥ 54” pipe	12’
Sanitary Sewer	≤ 10’ depth to invert of pipe	10’
Sanitary Sewer	>10’ depth to invert of pipe	12’
Sewer Laterals		6’
Water Mains		4’
Water Services		4’

2. For all other projects Quantity shall be to the nearest one-tenth square yards as measured in the field.

C. Basis of Payment: Permanent Pavement Patch will be paid for at the contract unit price per square yard.

PART 2 EXECUTION

2.01 INSTALLATION

A. Labor, materials, tools, and equipment necessary to complete the work which shall include saw cutting (NO WHEEL CUTTING ALLOWED) pavement to straight uniform widths

parallel and perpendicular to the road with no jagged edges, removal and disposal of asphalt offsite, removal and disposal of temporary patch material, re-compaction, removing and disposing of excess soil base course, re-compaction of pavement sub-grade, placement and compaction of ten inches of ABC, maintaining ABC as necessary to maintain stone at pavement grade until removal of upper two inches of stone for paving, adjusting castings as required, tack coat, placing and compacting asphalt material, cleanup and all other incidental work as shown on the details.

B. All work shall be performed with the appropriate traffic control standards and in accordance with the latest edition of MUTCD and City Standards.

C. At any areas of settlement contractor shall be required to remove installed patch, re-compact base and sub-base, dispose of unsuitable material off-site, and re-patch at no expense to the Owner.

D. Prior to paving, vertical transitions shall be made to accommodate road travel at no additional cost to the Owner.

E. Contractor shall repair any pavement markings, signal loops and any other traffic device damaged during work.

F. Incidental Repairs

1. Gravel or Soil Driveways: Existing gravel and/or soil driveway shall be replaced with six-inch-thick stone; compacted Aggregate Base Course (ABC) or whichever matches existing type stone. Replacement of the drive shall be to existing or better condition. Installation of Aggregate Base Course shall comply with Section 00420.

2. Concrete Driveways and Sidewalks: After completion of the excavation, etc., any trench or opening in any street or sidewalk shall be properly backfilled following City standards for compaction. The material used in replacing the surface course shall be of the same type and thickness and equal in quality to that which was removed. Excavatable flowable fill in accordance with the City's specifications may be used instead of backfilling from the invert to the base layer elevation at the discretion of the Engineer. Installation Concrete shall comply with Section 00455.

G. City Ordinance Chapter 24, Article 11: Any street that is degraded 25% or greater between intersection shall be overlayed with a minimum of 1 inch of asphalt for the entire length between the intersecting streets. Percentage of degradation will be determined prior to excavation including existing and new degradation. A temporary patch flush with the existing asphalt elevation is to be used for one year to allow settlement prior to final asphalt layer. The contractor may elect to pay in-lieu-of overlay in accordance with the City's fee schedule. For additional requirements on excavation in the right of way, refer to City Ordinance Chapter 24, Article 11.

PART 3 PRODUCTS

3.01 PERMANENT PAVEMENT MATCH MATERIALS

A. Materials shall comply with Sections 00420 and 00450

Pay Item	Pay Unit
Permanent Pavement Patch	SY

END OF SECTION 00451

SECTION 00452

EMULSIFIED ASPHALT SLURRY SEAL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The work covered by this section consists of furnishing and applying and emulsified asphalt slurry seal in accordance with the *North Carolina Department of Transportation Standard Specifications for Roads and Structures*, latest edition and revisions, hereinafter referred to as the NCDOT Specifications, and these Special Provisions.

B. Determination of Measurement: Measurement shall be in square yards installed as measured in the field.

C. Basis of Payment: The quantity of emulsified slurry seal will be paid for at the contract unit price per square yard.

1.02 REFERENCES

A. The NCDOT Specifications will govern in its the work under these specifications except as they are modified hereinafter.

PART 2 PRODUCTS

2.01 MATERIALS

A. Asphalt Emulsion: The emulsified asphalt shall conform to the requirements of Section 1020 of the NCDOT Specifications.

B. Quick Setting Emulsion: Quick setting emulsion shall be used and the following requirements shall apply:

1. The emulsion shall meet the requirements of Cationic Type CRS-1H of ASTM D 2397. Each change in formulation requires a test as referenced in NCDOT Specifications indicated above.

C. Fine Aggregate: Fine aggregate shall be polish resistant natural or manufactured sand, slag, or a combination thereof. The quality of fine aggregate shall conform to the requirements of Section 1014 of the NCDOT Specifications.

D. Mineral Filler: Mineral filler shall conform to the requirements of Section 1012.1 the NCDOT Specifications.

E. Water: Water used in the mix shall conform to the requirements of Section 1024.4 of the NCDOT Specifications.

F. Mix Requirements: The Contractor shall submit to City of Fayetteville a mix design and results of the wear loss by the Wet Track Abrasion Test (WTAT) as prepared by an approved testing laboratory. The WTAT will be performed in accordance with ADSTM D 3910. The wear loss by the WTAT shall not be greater than 100 grams per square foot. The wear loss shall apply to the asphalt content limits designated on the job mix formula.

1. The Contractor shall place a test strip for approval by the Engineer prior to beginning the work. Once the consistency of the mix has been approved by the Engineer, the total water content shall be maintained within 3 percent of the approved blend during the course of operation.

2. The gradation of the mix produced shall conform to the job mix range. The residual asphalt content by dry weight of aggregate shall not vary more than 1.5 percent from the approved mix design.

JOB MIX RANGE	
TYPE SIEVE SIZE	C PERCENT PASSING
3/8”	100
# 4	90-100
# 8	70-90
# 16	32-54
# 30	23-38
# 50	16-29
# 100	9-20
# 200	5-15

G. Sampling Requirements: Samples for gradation will be taken from aggregate stockpiles designated by the Contractor for use. Samples for asphalt content and total water content shall be taken from the completed mixture. Samples of aggregate, filler, and emulsion for WTAT will be taken from the job site. The frequency of sampling and testing will be established by the Engineer.

2.02 EQUIPMENT

A. General: All equipment and tools used in the performance of this work shall be furnished and maintained in satisfactory working condition. The mixing and spreading equipment shall be combined in a single mobile operating unit. A burlap drag approximately 19 inches wide shall be attached to the back of the unit for the purpose of smoothing the slurry seal.
   1. The mobile unit shall be equipped with an approved feeder which will accurately meter or otherwise introduce a predetermined amount of material into the mixer simultaneously with the aggregate. The feeder shall be used whenever mineral fill is added to the mix.
   2. The mobile unit shall be equipped with a water pressure system and fog spray bar capable of completely fogging the surface to which slurry seal is to be applied.
   3. The mobile unit shall be capable of an operative speed of at least 60 ft/min and have sufficient storage capacity to mix and apply a minimum of 5 tons of slurry.

B. Mixer: The mixer shall be a continuous flow type mixer and shall be capable of delivering water and a predetermined proportion of aggregate and asphalt emulsion to a revolving multi-blade mixer tank. The mixer shall discharge the thoroughly mixed product on a continuous basis. The blades of the mixing unit shall be capable of thoroughly blending all ingredients.

C. Spreader: The spreader shall be equipped with a flexible type squeegee positioned in contact with the pavement surface. The spreader shall be designed to apply a uniform spread with a minimum loss of slurry.

D. Auxiliary Equipment: Hand squeegees, shovels, and other hand equipment shall be provided as necessary to perform work in areas which are inaccessible to the unit.

PART 3 EXECUTION

3.01 INSTALLATION

A. Work: Shall include cleaning, loading, hauling, equipment, labor, compaction, material and any other incidentals required for installation.

B. The Contractor shall notify the Engineer at least five (5) working days prior to beginning work. The Contractor shall give the Engineer sufficient notice of all operations for any sampling, inspections or acceptance testing required.

C. Preparation of Surface: the surface upon which slurry seal is to be applied shall be thoroughly cleaned of all loose material, vegetation, silt spots, and other objectionable materials immediately preceding application by either brooming or the use of compressed air.

D. Application: Aggregate shall be wetted immediately prior to mixing with the emulsion. The Engineer may direct that the surface of the pavements be fogged with water (approximately 0.05 gallon per square yard) immediately preceding the pass of the spreader. The slurry mixture shall be of a consistency such that it "rolls" in the spreader box in a continuous mass. Slurry that segregates in the spreader box, so that flowing of liquids (water and emulsion) is evident, is not acceptable and shall not be applied. The liquid portion of slurry mixture shall not flow from either the spreader box or the applied slurry. Evidence of such flow shall be sufficient cause for rejection of the applied material. The slurry shall be placed on the road in full lane widths up to and including 12 feet. A mechanical device such as an auger shall be used to distribute the slurry mix in the spreader box.
   1. Excess buildup of slurry on longitudinal and transverse joints shall be corrected.
   2. Treated areas shall not be opened to traffic until such time as the slurry seal has cured to the extent that it will no longer be damaged by traffic. The applied slurry mixture shall be uniform in texture and shall not flush under traffic. Any areas not considered satisfactory by the Engineer shall be corrected by the Contractor at no additional cost to the City of Fayetteville. Nothing contained herein is intended to relieve the Contractor from sharing in the responsibility and performance of the treatments, should a failure occur prior to acceptance of the contract.
   3. Slurry Seal surface shall not be applied on surfaces containing ponding water and the minimum surface temperature shall be 50 degrees F.
   4. The Engineer may require the surface area to which the slurry has been applied by hand to be rolled using a pneumatic-tire roller. The roller shall be operated at an approximate tire pressure of 50 pounds per square inch and the paved area shall be subjected to a minimum of two coverages.
   5. Should oversize aggregate be encountered in the stockpile, the Contractor shall immediately cease operations and remove the oversize aggregate by screening.

E. Thickness of Application: The average minimum thickness of application shall not be less than 5/16" for Type C unless otherwise specified.

Pay Item	**Pay Unit**
Emulsified Asphalt Slurry Seal	SY

END OF SECTION 00452

SECTION 00455

CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This work shall consist of Portland cement concrete combination curb and gutter, sidewalk, sidewalk flumes, blended transitions, and driveway constructed on a prepared sub-grade, in one course, in conformity with the lines, grade and typical cross section shown on the plans and in accordance with these specifications.

B. MEASUREMENT AND BASIS FOR PAYMENTCONCRETE CURB AND GUTTER

a) Determination of Measurement: The quantity to be paid for in this section shall be the actual number of linear feet of combination curb and gutter measured in place, completed and accepted. This measurement of curb and gutter shall be along the top of the curb.

b) Basis for Payment: Payment shall be on a contract unit price per linear foot.

C. REMOVE AND REPLACE CONCRETE CURB AND GUTTER

a) Determination of Measurement: Measurement shall be per linear foot. Measurement of the curb and gutter shall be along the top of the curb excluding catch basin openings.

b) Basis for Payment: Payment shall be on a contract unit price per linear foot.

D. CONCRETE SIDEWALK (thickness")

a) Determination of Measurement: The quantity shall be measured in square yards of concrete sidewalk in place, completed and accepted.

b) Basis for Payment: Payment shall be on a contract unit price per square yard. The amount of grade work required to obtain the proper sub-grade from the finished grade of the sidewalk will be included as part of the per square yard price for concrete sidewalk.

E. REMOVE EXISTING SIDEWALK

a) Determination of Measurement: By the square yard of the existing sidewalk removed. The existing walks shall be measured by the Engineer prior to its removal.

b) Basis for Payment: Payment will be on a contract unit price per square yard for removal and proper disposal of existing sidewalks.

F. REMOVE AND REPLACE CONCRETE SIDEWALK

a) Determination of Measurement: Measurement shall be in square yards of installed sidewalk measured in the field.

b) Basis for Payment: Payment shall be on a contract unit price bid per square yard installed.

G. CURB RAMP

a) Determination of Measurement: per each by the number installed (per type).

b) Basis of Payment: Payment will be for the contract unit price for curb ramps installed.

H. REMOVE AND REPLACE CONCRETE DRIVEWAYS

a) Determination of Measurement: Measurement shall be to the nearest one-tenth square yards. The designated number of square yards to be removed shall be on the plan or as directed by the Engineer.

b) Basis for Payment: Payment shall be on a contract unit price bid per square yard per specified thickness.

I. CONCRETE DRIVEWAY APRON (X")
   a) Determination of Measurement: By square yard per thickness specified by the Engineer. Measurement from back of curb to edge of apron.
   b) Basis of Payment: Payment shall be per square yard installed.

J. CONCRETE SIDEWALK FLUMES
   a) Determination of Measurement: Measurement shall the number of flumes constructed.
   b) Basis of Payment: Payment of Concrete Sidewalk Flume shall be paid per each for the number of constructed flumes measured.

K. BLENDED TRANSITION
   a) Determination of Measurement: Blended Transitions shall be measured in the field by number of blended transitions constructed.
   b) Basis of Payment: Payment of Blended Transitions shall be paid per each for the number of constructed blended transitions measured.

PART 2 PRODUCTS

2.01 MATERIALS

A. Cement: The cement used in this item shall be a standard brand of Portland cement or high-early-strength Portland cement conforming to the requirements of AASHTO Specifications. Different brands of cement, or the same brand from different mills, shall not be mixed nor shall they be used alternately in any one continuous pouring between transverse joints.

B. Concrete Joint Sealer: See NCDOT Section 1028 Joint Materials

C. Concrete: The concrete shall be an approved NCDOT certified mix.

2.02 SOURCE QUALITY CONTROL

A. Testing: The Engineer shall engage and pay an approved independent testing agency to conduct the routine testing of material for compliance in accordance with ACI 301.

B. Test reports shall be furnished to the Engineer at the earliest possible date following the testing.

C. If cylinder test results indicate that the concrete has not or will not reach the required 28day compressive strength, the Engineer shall have the right to require any additional testing as necessary to determine the actual in-place strength of the concrete. Such additional testing will be at the Contractor's expense.

D. The Engineer shall have the right to require the removal and subsequent replacement of any concrete not meeting the minimum 28-day compressive strength. Such removal and replacement shall be at the Contractor's expense.

2.03 DESIGN REQUIREMENTS

A. Proportioning of Concrete: The concrete shall be mixed in proportions approved by the Engineer. The concrete shall develop at 28 days a minimum compressive strength of 2,500 pounds per square inch (Class B). The consistency range in slump of the concrete shall be two to four inches.

B. Air Entrainment of Concrete: All exposed concrete shall have 6 percent (+ or - 1.5 percent) entrained air as discussed in ASTM C 494. Measurement shall be with a roll-meter in accordance with ASTM C173 or a pressure meter in accordance with ASTM C 231. Use of other testing procedures will be considered if requested in writing.
   a) The concrete from a central plant shall be delivered by a mobile agitator type mixer and deposited at the consistency specified without segregation. The time lapsing from mixing to placing the concrete shall be in accordance with NCDOT requirements.
   b) Concrete shall be mixed only in such quantities as are required for immediate use and all such material shall be used while fresh and before initial set has taken place. Any concrete in which set has begun shall not be used in the work. Re-tempering of concrete will not be allowed.

C. Finished grade of the sidewalk shall be based on the top of curb elevation.

2.04 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather and Night: Concreting shall be done when weather conditions are favorable unless otherwise directed by the Engineer. Concrete operations shall be discontinued when the temperature of 40° Fahrenheit is reached on a falling thermometer. No concreting shall be attempted when local weather bureaus indicate temperatures below freezing within the ensuing 24 hours unless proper precautions are made to protect concrete by covering with straw and plastic or other thermal insulation satisfactory to the Engineer. The Contractor shall be responsible for the quality and strength of the concrete laid during cold weather and any concrete damaged by frost action or freezing shall be removed and replaced as directed by the Engineer at the Contractor's expense.
   a) No more concrete shall be laid than can be properly finished and covered during daylight, unless adequate artificial light satisfactory to the Engineer is provided.

PART 3 EXECUTION

3.01 WORK

A. Concrete: The work Shall include furnishing, hauling, and placing all materials, fine grading of sub-grade, installation and removal of forms, compacting subgrade, truncated dome, soil amendments, backfilling behind curb with topsoil, all equipment, tools, curing and labor and incidentals necessary to complete the work.
B. Removal of Existing Sidewalk: The work of the removal of existing sidewalk shall include labor, equipment, tools, saw cutting, legal disposal, and all other incidentals necessary to complete the work.
C. Removal of existing Concrete Curb: The work of the removal and disposal of existing concrete curb shall include furnishing, hauling, fine grading sub grade, compacting sub grade, seeding, backfilling behind curb with topsoil, adding soil amendments, placing all materials, and all equipment, materials, tools, labor, and incidentals necessary to complete the work
D. Remove and Replace Concrete Driveway: The work of the removal and replacement of concrete driveways shall include saw cutting and removal of the existing driveway, removing and disposing of excess or unsuitable materials off-site, furnishing, hauling, fine grading the sub-grade, compaction, expansion joint materials, curing and placing all materials, forms and all equipment, tools, labor, and incidentals necessary to complete the work. Replacement of the drive shall be to existing or better condition.
E. Remove and Replace Concrete Sidewalk: The work of the removal and replacement of concrete sidewalk shall include saw cutting and removal to the nearest joint, proper disposal of the existing concrete sidewalk and unsuitable materials, compaction, furnishing, hauling,

and placing all materials, fine grading the sub-grade, installation of necessary expansion joints, installation and removal of forms, concrete placement, curing and all equipment, tools, labor, and incidentals necessary to complete the work.

3.02 PREPARATION

A. Erosion Control measures shall be installed in accordance to the project plans and section 00401.

B. Traffic Control measures shall be installed in accordance to the project plans and section 00491..

3.03 INSTALLATION

A. Sub-grade: The sub-grade shall be excavated to the required depth below the finished surface in accordance with the plans and lines and grades established by the Engineer. All soft and yielding material or other unsuitable material shall be removed and replaced with approved material and compacted thoroughly. If the sub-grade is in a filled section, the entire area shall be compacted to an unyielding surface.

B. Forms: Forms shall be set true to the lines and grades established by the Engineer. Sections less than 5 feet will not be accepted. Forms shall be held rigidly in position and shall be of sufficient strength to resist springing out of line when the concrete is placed. Forms shall be metal of the necessary dimensions to construct the combined curb and gutter, sidewalk or driveway shown on the drawings or specified. Wood forms may be used only where conditions make the use of metal forms impractical, and then only when approved by the Engineer. Forms for straight curb and gutter or radius curb and gutter having a radius of 350 feet or over shall be of steel of an approved type. Bent steel forms or steel forms with top or bottom flanges out of square sides or forms without pin lugs shall not be used and shall be removed from the construction site. Flexible steel forms shall be used on all radius curb having less than a 350-foot radius.

C. Prior to placing of concrete, the sub-grade shall be moistened, and the contact side of the forms shall be coated with a heavy oil. After the placing of the concrete within the forms, the sides of the forms shall be spaded with a flat spade of approved type. All voids that may appear after forms have been removed, shall be wetted thoroughly and plastered. An excess of voids will be cause for rejection. A slip form concrete machine may be used only on a trial basis and must meet the approval of the Engineer

D. Placing of Concrete (Curb and Gutter): The curb and gutter shall be constructed in place in uniform sections 10 feet in length. The joints between sections shall be formed by steel templates 3/16 inches in thickness. Templates shall conform strictly to the curb and gutter section. All joints shall be at right angles to straight curb and in radius line in radius curb. Any broken edges or joints may be cause for rejection. Templates must be pulled halfway out before concrete is set in order that concrete may run under the template. After concrete is set and while the forms are still in place, the templates are to be completely removed. When a curbing machine is used, the Contractor should use all precautions to prevent curb from settling when first starting, especially when grade is critical (below 1 percent). Contractor shall check grade on new poured curb before concrete has set so that correction can be made to the flow line of the curb.

   a) Expansion joints of approved material for curb and gutter shall be provided every 90 feet or as directed by the Engineer. Joint material shall be not less than ½ inch in thickness, cut true to section, and shall be placed against the steel template forming the joint. Care shall be taken not to disturb the position of the expansion joint filler material during the removal of the templates.

E. Placing of Concrete (Driveways, Sidewalks, Curb Ramps, Blended Transitions, Flumes and Trails): Thickness shall be minimum of 4 inches for residential driveway aprons and 6 inches for commercial driveway aprons. Expansion joints of approved material shall be provided every 50 feet and contraction joints every 5 feet or as directed by the Engineer. Joint material shall be not less than ½ inch in thickness, cut true to section, and shall be placed against the template forming the joint. Care shall be taken not to disturb the position of the expansion joint filler materials during the removal of the templates. Seal expansion joints where sidewalk and curb ramps are placed adjacent to concrete curb and/or gutter. **Seal all joints to include expansion and contraction joints**.

F. Placing of Concrete Sidewalk flumes
   a) Concrete Sidewalk flumes shall be installed per DR-22.
   b) Metal Treadplates shall be installed by instruction on DR-22. Treadplate materials shall be submitted to the Engineer or designee for approval prior to installation. Treadplates shall be installed so that the back of the plate is behind the handrail installed adjacent or extends 6" beyond the sidewalk. The front of the tread plate shall be installed so that it is flush with the face of the curb, even when installed with utility strip.
   c) Handrails for Flumes shall be measured and paid independently. Refer to Section 02832 for handrail specification.

G. Placing of Concrete Curb Ramps, Blended Transitions and Truncated domes
   a) Curb Ramps shall comply with the installation of sidewalk in this section. Each Ramp type is broken down in SD-2 through SD-2.9. Curb Ramps and Blended Transitions shall be installed to meet technical requirements in Chapter 3 of the Public Right of Way Accessibility Guidelines
      a. The type of curb ramp called for in the plans shall be constructed unless alternate ramp is approved by the Engineer or designee.
      b. All Ramps or Blended Transitions shall be installed 4 inches thick unless otherwise specified by the Engineer or designee.
      c. Truncated Domes for all Curb Ramps or Blended Transitions shall be installed per SD-2.6.
         1) Truncated domes are a detectable warning device that shall be installed anywhere there is an absence of vertical separation from the traffic surface.
         2) Installation should also comply with R305 of the Public Right of Way Accessibility Guidelines.

H. Finishing: All concrete within forms shall be brought to true section by the use of an approved straight edge and shall be tamped with straight edge to bring mortar to the surface, after which it shall be floated smooth by means of wood floats. No steel floats will be permitted. After true surface of section has been obtained, and after initial set has taken place, the entire surface shall be broom finished with a dampened broom. Broom finished in direction of flow, all joints and all exposed edges shall be rounded off with approved jointing and edging tools.

I. Curing: Immediately after finishing operations have been completed, the entire surface of the concrete shall be sprayed with white curing compound (type 11 white pigment). The use of liquid retarding agents shall conform to standards specified by current AASHTO or ASTM specifications.

J. Removal of Forms: Forms shall not be removed from freshly placed concrete until it has set for at least 24 hours. They shall be carefully removed and in such a manner as to prevent damage to the edges of the concrete. Honeycombed areas shall be promptly filled with mortar composed of one part cement and two parts sand.

K. Prior to the acceptance of the work, unsightly objects such as stones, stumps, limbs, roots, concrete, etc., shall be removed from the site and disposed of to the satisfaction of the

Engineer. Work shall not be considered complete until all cleaning up has been done and the site is of a neat appearance

3.04 FIELD QUALITY CONTROL

A. The Engineer shall have the authority to require the Contractor to remove and replace any curb and gutter, sidewalk, or driveway which has been placed at grade elevations other than those shown on the plans and/or cut sheet. The finished grade of sidewalk is based on the top of curb. Such curbing, sidewalk, or driveway shall be removed and replaced at the Contractor's expense.

B. Curbing, sidewalk, or driveway found to be holding "ponding" water will be removed and replaced at the Contractor's expense.

3.05 PROTECTION OF FINISHED WORK

A. Protection of Concrete: After 24 hours the forms may be removed. Immediately after the forms have been removed and all honeycombed areas repaired, the back of the curb shall be backfilled to prevent under-wash. Traffic shall be excluded from crossing the concrete for a period of approximately 7 days by erection and maintenance of suitable barricades. Contractor shall be responsible for any damage resulting from traffic within the 7-day period and he shall remove and replace any concrete damaged as directed by the Engineer.

Pay Item	**PAY UNIT**
Vertical Concrete Curb and Gutter (width”)	LF
Roll Back Concrete Curb and Gutter (width”)	LF
Concrete Sidewalk (thickness”)	SY
Curb Ramp (SD #)	EA
Concrete Driveway Apron (thickness”)	SY
Concrete Sidewalk Flume	EA
Blended Transition	EA
Removal Existing Concrete	SY
Removal Existing Curb	LF

END OF SECTION 00455

SECTION 00465

VERTICAL ADJUSTMENT OF EXISTING UTLITIES
PORTLAND CEMENT CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The work covered by this section consists of vertical adjustment of existing utilities, to include manhole covers, valve boxes, etc.
B. Determination of Measurement: Measurement shall be for each utility.
C. Basis of Payment: The quantity of utilities adjusted will be paid for at the contract unit price per each adjustment made.

PART 2 PRODUCTS

2.01 Masonry product shall comply with section 04000.

PART 3 EXECUTION

3.01 MANHOLE ADJUSTMENTS

A. Work shall include cleaning, equipment, labor, material, leveling, adjustments and any other incidentals required for installation.

B. Excavate all material from around casting to a width of 12 inches and to a depth of at least 2 inches below existing brickwork, existing structure or valve box. Remove and dispose of all loose material.

C. Raising: The height of any casting adjustment shall be determined by the use of a string line. The string line is to be pulled across casting and for at least 10 feet on each side of casting parallel to curb. Hold string at height of adjustment. Example: 1 inch above existing pavement for resurfacing and/or 2 inches above sand/clay or stone base. Then another string is pulled perpendicular across casting from edge of pavement at curb to center line of street. The string shall be set at same adjustment height. Every effort shall be taken to ensure that the surface course and casting shall provide as smooth a ride as possible.
   1. When setting casting higher than existing, all bricks are to be placed in a "spoke" pattern and laid in a bed of clean fresh mortar. The Contractor is to ensure all brick are set firm to eliminate movement of casting.

D. Lowering: When setting casting lower than existing, all brick and concrete are to be cut away, leaving a smooth surface. A cap of clean fresh mortar shall be applied to surface as a setting bed for casting.
   1. The casting is then placed back on brick and care shall be taken to ensure that it is set on a bed of clean fresh mortar to eliminate movement. Mortar shall meet requirements of North Carolina Department of Transportation Standard Specifications for Roads and Structures current edition and any revisions Section 1040-9 for mortar and Section 1040-7 for mortar sand.

E. The excavated area shall be backfilled with Class B concrete to within 1 to 1-1/2 inches of finished grade. Concrete shall comply with NCDOT mix design. Casting is to be cleaned of any concrete spillage. Asphalt shall not be used to back-fill around casting.

F. All adjustments shall then be protected for at least 24 hours before the placement of any surfacing material. A finish surface tolerance shall not vary more than 1/4 inch in any direction.

G. After casting has been adjusted to grade, all excess debris and mortar shall be removed from manhole or valve box.

3.02 STANDARD UTILITY ADJUSMTENT

A. Utility box adjustments shall be measured and paid per each.

B. Adjustments shall be made so the utility will be flush with the proposed finished surface

C. All excavating, coordination with utility companies, tools, equipment, labor, and materials shall be included in each Standard Utility Adjustment.

D. All adjustments shall then be protected for at least 24 hours before the placement of any surfacing material. A finish surface tolerance shall not vary more than 1/4 inch in any direction.

E. After casting has been adjusted to grade, all excess debris and mortar shall be removed from manhole or valve box.

Pay Item	**Pay Unit**
Manhole Adjustment	EA
Standard Utility Adjustment	EA

END OF SECTION 00465

SECTION 00471

NEW MANHOLE COVERS AND VALVE BOXES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The work covered by this section consists of new manhole cover and valve box installations.
B. Measurement: Measurement shall be the count of number of manhole covers and/or valve boxes installed.
C. Basis of Payment: Payment shall be per unit contract price for each manhole cover and/or valve box installed.

PART 2 PRODUCTS

2.01 MATERIALS

A. Manhole covers and valve boxes shall be constructed in accordance with the *North Carolina Department of Transportation Standard Specifications for Roads and Structures,* latest edition and revisions.

PART 3 EXECUTION

3.01 INSTALLATION

A. Work: Excavating, backfilling, stone subbase, concrete sections as required for the depth, top adjusting rings, steps, ring and cover, invert and joint sealer.

B. Excavate all material from around casting to width of 18 inches and to a depth of at least 2 inches. Remove and dispose of all loose material.

C. The height of casting adjustment shall be determined by the use of a string line. The string line is to be pulled across casting and for at least 10 feet on each side of casting parallel to curb. Hold string at height of adjustment. Example: 1 inch above existing pavement for resurfacing and/or 2 inches above sand/clay or stone base. Then string is pulled perpendicular across casting from edge of pavement at curb to centerline of street. The string shall be set at same adjustment height. Every effort shall be taken to ensure that the surface course and casting shall provide as smooth a ride as possible.

D. When setting new casting higher than existing, all bricks are to be placed in a "spoke" pattern and laid in a bed of clean fresh mortar. The Contractor is to ensure all brick are set firm to eliminate movement of casting.

E. When setting new casting lower than existing, all brick and concrete are to be cut away, leaving a smooth surface. A cap of clean fresh mortar shall be applied to surface as a setting bed for casting.

F. The casting is then placed back on brick and care shall be taken to ensure that it is set on a bed of clean fresh mortar to eliminate movement. Mortar shall meet requirements of NC DOT Standard Specifications current edition and any revisions, Section 1040-9 for mortar and Section 1014-1 for mortar sand.

G. The exposed brick work and face of the existing asphalt shall be cleaned. The excavated area shall be backfilled with Class B concrete to within 1 to 1-1/2 inches of finished grade. Concrete shall comply with NCDOT mix design. Casting is to be cleaned of any concrete spillage.

H. All adjustments shall then be protected for at least 24 hours before the placement of any surfacing material. A finish surface tolerance shall not vary more than 1/4 inch in any direction.

I. After casting has been adjusted to grade, all excess debris and concrete shall be removed from manhole cover or valve box.

Pay Item	**Pay Unit**
New Manhole Cover	EA
New Valve Boxes	EA

END OF SECTION 00471

SECTION 00472

MANHOLE ADJUSTMENT RINGS

PART 1 GENERAL

1.01 SUMMARY

A. The work covered in this section includes furnishing and installing adjustment rings for manholes requiring a rise of one inch or greater. Adjusting rings less than one inch are not acceptable.

B. Badly damaged or worn castings shall be replaced with new castings provided by OWNER at no cost to the contractor. Contractor is responsible for exchanging castings at the OWNER'S facility.

PART 2 PRODUCTS

2.01 MATERIALS

A. Riser rings shall consist of domestic A-36 steel 3/4-inch thickness steel inner ring, and domestic A-36 1/2-inch thickness steel outer ring. The riser system shall be anchored to the manhole frame to prevent any movement from traffic loads and shall be pre-approved by the Engineer. The adjustment device shall be fabricated from stainless steel, have a positive lock and be in line with the lower bearing bar. It shall be capable of adjustment plus or minus 3/8 inches from nominal.

B. The manhole adjustment ring shall fit within the existing casting without interference and the manhole lid shall have bearing on all of the surface of the inner ring to prevent locking. The lid shall be able to be removed without binding.

C. The inner and outer ring shall be securely welded to prevent any differential movement between the inner and outer rings under traffic loads and shall be fabricated to plus or minus 1/16-inch concentricity. The outer riser ring shall have an inside diameter no greater than 3/16 inch larger than the outside diameter of the manhole lid.

D. All material shall be bituminous asphalt coated.

E. All welding shall be in accordance with AWS D1.5 by certified welders.

PART 3 EXECUTION

3.01 MEASUREMENT

A. Each manhole to receive adjusting rings shall be inspected and properly measured, with the measurements following all manufacturers' guidelines. Measurement for the height of adjustment shall be made only after any asphalt-leveling course has been placed. The contractor will be required to provide personnel to individually measure each structure in the presence of the OWNER. The measurements will include top and bottom lid diameters, lid thickness, as well as the required rise.

B. The adjustment of manholes and valve boxes shall not be attempted until after the placement of the base course and any leveling course, and prior to placement of the overlay. Any debris that has fallen into the manholes or water valves during the adjustment process shall be removed before cleanup is complete.

C. Adjustment rings for rise less than one inch shall be unacceptable.

D. Special attention shall be given to structures needing replacement rings due to wear or other factors which may not be suitable for adjustment rings. Adjustment rings shall not be placed on any existing casting which has been deemed unacceptable by the OWNER.

E. Manhole adjustments shall be completed within 10 days prior to final surface overlay on each individual street.

3.02 INSTALLATION

A. The adjusting ring shall be adjusted to the outside diameter of the manhole lid before placement can proceed. The outer ring shall have an inside diameter of no greater than 3/16 inch larger than the outside diameter of the lid. The area on the existing casting where the ring will seat shall be thoroughly cleaned using a steel wire brush. The ring can then be placed making sure there is full bearing of the lower section to the existing casting. The set screws can be tightened to assure no movement due to traffic.

B. Frames and covers shall be set to proposed grade and sloped to match slope and crown of road within 0.25 inches of the final surface.

C. The contractor shall provide personnel to assist the OWNER in inspecting the adjustment. The height of adjustment shall be checked by the following procedure:
   1. Pull string line parallel to the curbing across the casting for at least 10 feet on either side of the casting.
   2. Hold string at a height of 1 inch above the required adjustment and subtract 1 inch from the measurements.
   3. Measurements shall be made from the top of lid (and ring) to the string line.
   4. The height shall then be checked with the same string line pulled perpendicular to the curbing.
   5. The final adjustment height shall not vary more than 1/4 inch from the thickness of the over lay, in either direction.

D. The contractor shall open the manhole for inspection of how the lid fits and a field check to assure the ring is secure.

E. Any unacceptable adjustments shall be repaired by the Contractor or replaced with a concrete adjustment, with no additional expense to the OWNER.

Pay Item	**Pay Unit**
Manhole Adjustment Rings	EA

END OF SECTION 00472

SECTION 00474

TRENCHING STABILIZATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The Contractor shall design, furnish, and install any trench stabilization necessary to maintain excavations for pipe and drainage structure installation. The Contractor shall be responsible for installation and removal of any trench stabilization. The Contractor shall also be responsible for any damage to adjacent structures resulting from the installation, removal, or absence of trench stabilization. Payment for all labor, equipment, and materials involved in this specification will be considered incidental to the cost of construction.

B. It is the responsibility of the contractor to comply with all current safety regulations issued by all regulatory agencies.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION 00474

SECTION 00475

STORM SEWER

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This item shall consist of storm sewer pipes and structures of the classes, sizes, and dimensions designated, furnished and installed at such places as are designated in accordance with the lines and grades given and in conformity to these specifications. This item shall also include furnishing and construction of such joints and connections to other pipes, catch basins, manholes, endwalls, trench stabilization, etc., as may be required to complete the work as shown on the plans.

B. Determination of Measurement:
   1. (X) inch Storm Sewer: Measure pipe inside wall to inside wall of structures and from pipe end to longest point of opposing pipe end. Depth of pipe will not affect measurement.
   2. Storm Sewer Structure: Structures shall be measured by count of structures installed.

C. Basis for Payment:
   1. Payment for Storm Sewer: shall be on a contract unit price per linear foot of storm sewer that is installed.
   2. Payment for Storm Sewer Structures shall be per each installed in the field.

PART 2 PRODUCTS

2.01 MATERIALS

A. Pipes: All pipes shall be of the type and class indicated on the plans.

   1. Reinforced concrete pipe shall conform to A.S.T.M. Specifications C-76, Class III, and 15" through 36" diameter shall be of modified or improved tongue and groove type. No plain or straight wall grooves shall be used.

   2. Corrugated galvanized metal pipe shall conform to latest AASHTO Specifications. All metal pipe culverts used shall be fully coated inside and outside with an asphalt cement to a minimum thickness of 0.05 of an inch when measured on the crest of the percent soluble in carbon disulfide. The pipe shall be coated with the bituminous material in a manner so that a smooth pavement will be formed in the invert (inside bottom of pipe when installed), filling the corrugation for at least 25 percent of the periphery of the pipe. The pavement shall have a minimum thickness of 0.125 of an inch then measured on the crests of the corrugations.

   3. Castings: All casting shall be of the type and duty shown on the plans and shall be approved by the Engineer prior to installation. Castings shall be made of gray iron, ASTM A-48 – class 30, or ductile iron, ASTM A536, grade 65-45-12. Castings shall be free from imperfections not true to pattern. Casting tolerances shall be plus or minus 1/16 inch per foot of dimension. Top shall set neatly in frame, with edges machined for even bearing and proper fit to prevent rattling and flush with the edge of frame. All covers and gratings shall seat firmly without rocking. The Contractor shall replace all faulty castings installed by him at his expense.

4. Mortar*:* Mortar used in brick masonry and joints shall be composed of one-part Portland cement and hydrated lime, (not more that 10 percent of lime, based on the volume of cement, shall be used) and two-parts sand. Portland cement and hydrated lime shall meet the requirements of the latest A.S.T.M. specifications. The sand shall be composed of clean, well graded aggregate. The mortar shall be mixed in a tight mortar box or in an approved mechanical mixer. Mortar shall be used within *45* minutes after mixing.
5. Bedding material shall be #57 washed stone. Stone depth shall be 6" below the pipe (or as specified by the Engineer) and full width of trench.
6. Tracer wire may be installed on non-metallic pipe. Tracer wire shall be #12 AWG solid-copper wire with green insulation.

B. General work items:
1. Adjust Existing Manhole Cover with Portland Cement Concrete: Refer to specification section 00472.
2. Adjust Existing Valve Box with Portland Cement Concrete: Refer to specification section 00465.
3. New Manhole Cover with Portland Cement Concrete: Refer to specification section 00471.
4. New Valve Box with Portland Cement Concrete: Refer to specification section 00471.

C. Storm Sewer Structures items:
5. (X) inch Concrete Flared-End Section: Excavation, backfilling, and compacting for flared-end section.
6. Catch Basin: Excavation, backfilling and compacting, stone bedding, concrete base, brick work as required for the depth, grate, frame, invert, steps, and weep holes.
7. Double Catch Basin: Excavation, backfilling and compacting, stone bedding, concrete base, brick work as required for the depth, grate, frame, invert, steps and weep holes.
8. Open Throat Catch Basin: Excavation, backfilling and compacting, stone bedding, concrete base, brick work as required for the depth, invert, steps, weep holes, and precast top.
9. Drop Inlet: Excavation, backfilling and compacting, stone bedding, concrete base, brick work as required for the depth, grate, frame, invert steps and weep holes.
10. Junction Box: Excavation, backfilling and compacting, concrete base, brick work as required for the depth, grate and frame.
11. Concrete Pipe Collar: Excavation, forms, backfilling, compacting, concrete, and hauling.
12. Precast Concrete Box: Excavation, materials, pipe boots, grout, backfilling, compaction, grading.
13. New catch basin frame and grate: Remove and properly dispose of existing grate, frame, and hood. Provide new grate, frame, and hood adjusting to grade of new curb and gutter elevations.

PART 3 EXECUTION

3.01 INSTALLATION

A. Work: Shall include, but not be limited to (unless specifically noted otherwise on the Bid Form and this specification Section), the following:
1. Excavating, shoring and bracing where required, dewatering as required, installing, backfilling (including Class I material as specified for the pipe bedding, haunching, and initial backfill).
2. Installation of warning / identification / traceable tape over utilities.

3. Temporary support and protection of existing underground facilities.
4. Pipe, concrete blocking and encasement, connection to existing piping, and fittings.
5. Flushing and treatment, as required.
6. Adjust existing and new manhole and valve boxes to finished surface elevations, if applicable.
7. Grade disturbed areas to original surface profile prior to seeding.
8. Pipe bedding.
9. Joint materials.
10. Clean up.

B. The trench shall be shaped true to line and grade, and bedding surface for the pipe shall provide a firm foundation. Grooves shall be cut in the trench for bells so that each joint of pipe shall be bedded for its full length.

C. Concrete pipe culverts shall be carefully seated with bells or grooves upgrade and ends fully closed. Joints of concrete pipe shall be thoroughly wet before making the mortar joint. CONSEAL can be used instead of mortar to seal joints.

D. Modified Tongue and Groove Concrete Pipes: Before succeeding sections of pipe are laid, the lower portions of the bell or groove of the pipe shall be filled on the inside with cement mortar of sufficient thickness to bring the inner surface of the abutting pipes flush and even. After the pipe is laid, the remainder of the joint shall be solidly filled with mortar and sufficient additional mortar to form a bead or ring around the outside of the joint. The inside of the joint shall be wiped and finished smooth. Pipe which is not true to plan alignment or profile, or which shows any settlement after laying shall be taken up and reinstalled without extra compensation.

E. Manholes, Inlets, Junction Boxes, Catch Basins, Etc.: Excavation shall be made to the required depth. The foundation on which the brick masonry is to be laid shall be approved by the Engineer prior to the laying of bricks. The bricks shall be laid so that they will be thoroughly bonded into the mortar by means of the *"shove joint"* method; buttered or plastered joints will not be permitted. The headers and stretchers shall be so arranged as to bond the mass. Brick work shall be of alternate headers and stretchers with consecutive courses breaking joints. All mortar joints shall be completely filled with mortar. No spalls or bats shall be used except for shaping around irregular openings or when unavoidable to finish out a corner. Competent bricklayers shall be employed on the work and all details of construction shall be in accordance with approved practice and to the satisfaction of the Engineer.

1. Steps shall be in accordance with ASTM C478 and made of ½-inch grade 60 steel encapsulated by co-polymer polypropylene and have serrated tread and tall end lugs. Steps as shown on the plans shall be placed in all manholes, catch basins and inlets when they are greater than 42" in depth. The steps shall be set in the masonry as the work is built up, thoroughly bonded and accurately spaced and aligned. Place steps on narrow side of structure.

2. Existing manholes, catch basins and inlets shall be adjusted by the Contractor when designated by the Engineer. The work will be considered an adjustment where the manhole, catch basin or inlet in question is extended or lowered three feet or less in elevation, or where a catch basin can be adjusted to line without tearing out and rebuilding an entire wall. More work than this will not be considered an adjustment but shall be classified as reconstruction.

3. Inverts in appurtenances shall be shaped to form smooth and regular surfaces free from sharp or jagged edges. They shall be sloped adequately to prevent sedimentation.

4. The casting shall be set in full mortar beds. All castings when set shall conform to the finished grade as established by the Engineer. Any castings not conforming shall be adjusted to the correct grade without extra compensation.

5. Concrete pipe collars may be used for repairing storm drainpipes. Concrete collars may not be installed within 16' of any structure. Damage within 16' of structures shall be replaced with new pipe. See detail for more information on installation.

Pay Item	**Pay Unit**
Storm Sewer Pipe (X")	LF
Storm Sewer Structures (by Type)	EA

END OF SECTION 00475

SECTION 00476

PRECAST DRAINAGE STRUCTURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The work covered by this section includes round and rectangular pre-cast concrete drainage structures including inlet structure components, sub-grade structure components, grates, covers and accessories.
B. Determination of Measurement: By the number installed per type.
C. Basis of Payment: Payment will be for the contract unit price per end-wall/ headwall/flared end section per type installed.

1.02 REFERENCES

A. Pre-stressed Concrete Institute: Manual for Quality Control for Plants and Production of Pre-cast and Pre-stressed Concrete Products.

B. National Pre-cast Concrete Association: Quality Control Manual for Pre-cast Concrete Plants.

C. American Society for Testing and Materials:
1. ASTM C478: Standard Specification for Precast Reinforced Concrete Manhole Sections.
2. ASTM C890: Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Pre-cast Concrete Water and Wastewater Structures.
3. ASTM C891: Standard Practice for Installation of Underground Pre-cast Concrete Utility Structures.
4. ASTM C913: Standard Specification for Pre-cast Concrete Water and Wastewater Structures.

D. American Association of State Highway and Transportation Officials Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets (AASHTO M198).

E. American Concrete Institute: Building Code Requirements for Reinforced Concrete (ACI 318).

F. Occupational Safety and Health Administration: Standard 1926.704, Requirements for Pre-cast Concrete.

1.03 SUBMITTALS

A. The following information must be submitted to the project Engineer:
1. Schedule of the drainage structure components to be provided on the project including the following:
a. Sheet number where the structure plan and profile are shown.
b. Line number when applicable.
c. Drainage structure number or station number.
d. Invert elevation of the influent and effluent lines as shown on the plans.
e. Inlet structure flow-line elevation as shown on the plans.
f. Total height required from top of base slab to top of structure.
g. Total height of the individual and assembled drainage structure components.
h. Top and bottom elevation of the drainage structure as calculated.
i. Manufacturer's part or catalog number and number required of each component.
j. Each pipe size, type and hole size and its distance from top of base slab.

k. Pipe location in degrees clockwise from step centerline on round structures.
l. Pipe location on rectangular structures by wall and intersecting angle relative to wall.
m. Minimum round inside diameter or rectangular inside dimensions required.

B. Detail of each pre-cast concrete component to be provided, sealed by the registered Professional Engineer including the following:
1. Manufacturer's part number or catalog number.
2. Inside diameter or dimensions and lay length.
3. Wall thickness and base or top thickness where applicable.
4. Handling weight and lift hole or insert or loop description and location.
5. Wire size, spacing and area provided per vertical foot (when applicable).
6. Reinforcing bar size and spacing or location.
7. Design loads for all rectangular components and round top slab components.
8. Step locations on round structures.
9. Concrete design strength and manufacturer's mix number.
10. Height, width, slope and annular space of the tongue and groove for products requiring tongue and groove joints.

C. Step detail and material specifications.

D. Joint material detail, material specifications and calculations showing that the joint material cross section is greater than the joint's annular space times its height.

E. Lifting device and hole detail including design loads.

F. At the request of the Engineer or owner, submit the following:
1. Structural analysis and design calculations for precast rectangular components and round top slab components, performed in accordance with applicable codes and standards, showing that allowable stresses will not be exceeded. All calculations must be sealed by a Registered Professional Engineer.
2. Calculations or test results verifying that the lifting device components and holes are designed in accordance with OSHA Standard 1926.704.
3. Concrete 28-day compression strength results for every day production of Pre-cast Components for the project was performed, showing the required strength according to the guidelines established in ACI 318.
4. Reinforcing and cement mill reports for materials used in the manufacture of Pre-cast Components for this project.
5. The above test reports for similar Pre-cast Components recently produced, submitted prior to production of Pre-cast Components for this project.

1.04 QUALIFICATIONS

A. The pre-cast manufacturer shall comply with the following requirement:
1. The Precast Manufacturer shall be a NCDOT approved manufacturer of precast concrete structures and have a minimum of 5 years of experience in manufacturing the required components.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Maintain materials and surrounding air temperature to a minimum 40 degrees F prior to, during, and 48 hours after completion of masonry, grouting or concreting work.

PART 2 PRODUCTS

2.01 MATERIALS

A. Concrete shall conform to ASTM C478, C858 and as follows:

1. Compressive strength: 4000 psi minimum at 28 days.
2. Air Content: 6% ± 1.5%.
3. Cementitious Materials: Minimum of 564 pounds per cylinder yard.
4. Course Aggregates: ASTM C33, bound, crushed, angular granitic stone only.
5. Fine Aggregates: ASTM C33 free from organic impurities.
6. Chemical Admixtures: ASTM C494 calcium chloride or admixtures containing calcium chloride shall not be used.
7. Air Entraining Admixtures: ASTM C260.

B. Reinforcing steel shall be ASTM A615 Grade 60 deformed bar, ASTM A82 wire or ASTM A185 welded wire fabric.

C. Lift Loops shall be ASTM A416 steel strand. Lifting loops made from deformed bars shall not be allowed.

D. Flexible joint sealants shall be butyl rubber based conforming to Federal Specification SS-S-210A, AASHTO M-198, Type B - Butyl Rubber and as follows: maximum of 1 percent volatile matter and suitable for application temperatures between 10 and 100 degrees F.

E. Epoxy gels shall be a 2component, solvent free, moisture insensitive, high modulus, high strength, structural epoxy paste adhesive meeting ASTM C881, Type I and II, Grade 3, Class B and C, Epoxy Resin Adhesive.

F. No waffle boxes allowed in city right of way or easement as noted in Standard Detail DR-20.

2.02 COMPONENTS

A. Pre-cast Components shall be designed and manufactured as described in this paragraph and in the following paragraphs for the specific components.
1. Lifting Inserts, Holes and Devices shall comply with OSHA Standard 1926.704. Lift holes and inserts shall be sized for a precision fit with the lift devices. Lifting devices shall be provided by the Pre-cast Manufacturer.
2. Joints shall be sealed internally between the tongue and groove and additionally around the external perimeter of the joint as follows:
   a. External Seals shall consist of a polyethylene backed flat butyl rubber sheet no less than 1/16 inch thick and 6 inches wide applied to the outside perimeter of the joint.
   b. Internal Seals shall consist of a plastic or paper-backed butyl rubber rope no less than 14 feet long and having a cross-sectional area no less than the annular space times the height of the joint
   c. At the option of the Contractor, Internal Seals on round joints may consist of an O-Ring Gasket conforming to ASTM C443, installed according to the Pre-cast manufacturer's recommendation.
3. Rings, Covers, Grates, and Frames shall be Class 30 gray cast iron and shall be designed for 16,000-pound wheel loads when located in roadways.
4. Pre-cast Base Sections shall be cast monolithically without construction joints or with approved galvanized or PVC water-stop cast in the cold joint between the base slab and the walls. The minimum size of the base section shall be as specified in the schedules.
5. Wall and inside slab finishes resulting from casting against forms standard for the industry shall be acceptable. Form ties through the wall are not allowed. Exterior slab surfaces below grade shall have a float finish. Small surface holes, normal color variations, normal form joint marks, and minor depressions, chips and spalls will be tolerated. Dimensional tolerances shall be as set forth in the appropriate References. Exposed Drainage Structure Top Components shall have a form finish or a light broom finish on their exposed surfaces. Fins, voids, chips, or fractures over 3/8 inch in diameter shall be filled with thin cement paste and finished to a color and texture

reasonably consistent with that of formed finish. Rings and covers cast in exposed tops shall be free from cement paste build up.

6. Provisions for pipe entrances in the structures shall be cast or cored openings.
    a. Pipe openings in round structures shall remain 6 inches clear of other pipe openings.
    b. Pipe openings in rectangular structures shall not extend into the corners and may extend across a joint only when structural analysis shows stresses to be within the allowable.
7. Components shall be designed in accordance with ACI, ASTM C890 and following loads:
    a. Horizontal Load on Walls: An earth load of 80 psf per foot of burial depth plus a live lateral surcharge due to HS20 traffic loads of 80 psf.
    b. Vertical Load on Below Grade Adapter Slabs and Tops: An earth load of 120 psf per foot of overburden plus a live HS20 traffic load.
    c. Vertical Load on Exposed Inlet tops: A live 300 psf load.
    d. Vertical Load on Cast Iron Covers and Grates Supported Around Perimeter: A live HS20 load.

B. Round Sub-grade Components shall be designed and manufactured in conformance with ASTM C478 and as follows:
1. Riser Sections shall have a minimum lay length of 16 inches.
2. Pre-cast Concentric and Eccentric Cone Sections shall have an inside diameter at the top of 24 inches. The width of the top ledge shall be no less than the wall thickness required for the cone section.
3. Pre-cast Transition Cone or Top Sections may be used to provide an eccentric transition from 60 inch and larger structures to 48-inch diameter risers, cones, and adaptor slabs. Transition tops shall only be used in areas not subject to vehicle traffic with no more than 20 feet of cover.
4. Provide Steps in Bases, Risers, Cones, Transition Cones, and Transition Top sections aligned vertically on 16-inch centers when 42” deep or greater. Secure steps to the wall with a compression fit in cast or drilled holes or cast in place. Steps shall not be vibrated or driven into freshly cast concrete or grouted in place. The steps shall be Copolymer Polypropylene Plastic reinforced with a ½ inch diameter grade 60 bar and have serrated tread and tall end lugs. Pullout strength shall be a minimum of 2,000 pounds when tested according to ASTM C497.
5. Joints of Bases, Risers and Cones shall be manufactured to the joint surface design and tolerance requirements of ASTM C361.

C. Rectangular Sub-grade Components shall be no less than 22 inches wide, 34 inches long, designed and manufactured in conformance with ASTM C913 and as follows:
1. Riser sections shall not be allowed on boxes smaller than 4 feet long by 4 feet wide.
2. Pre-cast Transition Top Sections may be used to provide an eccentric transition from 4 foot by 4 foot and larger storm drain structures to 48-inch diameter risers, cones and adapter slabs. The maximum amount of fill over the transition top section shall be 20 feet.
3. Joints between precast components shall be keyways or tongue and groove. Joints to accept cast iron frames shall be flat and no less than 5" wide.

D. (Access Manhole) Inlet Components shall have cast iron rings and covers shall be as shown in the details with an opening diameter of 22 inches. Adapter slabs and cones shall have a minimum opening diameter of 24 inches. Precast grade rings conforming to ASTM C478, with a minimum lay length of 4 inches and totaling no more than 12 inches in height shall be used to adjust rings and covers to finished grade.

2.03 CONFIGURATION

A. Construct (Access Manhole) Structures to the elevations shown on the plans and as follows:
   1. A 24-inch diameter Cast Iron Ring and Cover
   2. A Concentric or Eccentric Cone or an Adapter Slab and a Round or Rectangular Subgrade Structure sized according to the schedule.

B. Drainage Structures greater than 8 feet deep shall be no less than 48 inches in diameter or 48 inches wide by 48 inches long.

PART 3 EXECUTION

3.01 WORK

A. Work shall include the block, brick, concrete, reinforcing steel, materials, excavation, bedding, grading and all other incidentals in order to build end-wall.

B. Work shall include the materials, excavation, bedding, grading and all other incidentals needed to construct headwall/flared end section.

C. The Contractor shall build inverts in all drainage structures in accordance with the *North Carolina Department of Transportation Standard Specifications for Roads and Structures,* latest edition and revisions. The additional work and materials required to install inverts will not be measured for payment as this work will be considered incidental to the construction of Drainage Structures.

3.02 EXAMINATION

A. Inspect Precast components prior to unloading from the delivery truck.

3.03 PREPARATION

A. Product Delivery, Storage and Handling: Coordinate delivery with the manufacturer, handle and store the Precast Components in accordance with ASTM C891 and the manufacturer's recommendations using methods that will prevent damage to the components and the joint surfaces.

3.04 PLACING PRECAST CONCRETE SECTIONS

A. Excavate to the required depth and remove materials that are unstable or unsuitable for a good foundation. Prepare a level, compacted foundation extending 6" beyond the precast base and follow ASTM C891 excavation standards.

B. Set base plumb and level, aligning pipe opening with pipe invert.

C. Thoroughly clean joint tongue and grooves to remove dirt and other foreign materials that may prevent sealing. Unroll the Butyl Sealant rope directly against bottom groove. Leave protective wrapper attached until sealant is entirely unrolled against groove. Do not stretch. Overlap from side to side, not top to bottom.

D. Set risers and tops, aligning internal wall surfaces, so that proper alignment is achieved, taking particular care to clean, prepare and seal joints.

E. When recommended by the manufacturer, fill the void between horizontal joint surfaces with a sand cement grout around the outside perimeter as risers are set.

F. After joining precast sections, apply the butyl sealant sheet around the outside perimeter of the joints below grade.

G. Secure Pipe Connectors to Pipe according to the Connector Manufacturer Instructions. When pipe stub outs are installed, provide restraint from longitudinal movement before backfilling.

H. Lift Holes leaving less than 2" of wall thickness shall be plugged from the outside using a sand cement mortar and then covered with butyl sealant sheet. Lift Holes penetrating the wall shall be additionally sealed with an interior application of an epoxy gel 1/8" thick extending 2" beyond the penetration.

I. Perform the final finishing to the Structure interior by filling all chips or fractures greater than 1/2" in length, width or depth and depressions more than 1/2" deep in inverts with a sand cement mortar. Clean the interior of the Structure, removing all dirt, spills or other foreign matter.

3.05 SCHEDULES

A. Round Storm Drain Structures.

1. Provide round sub-grade structures with minimum inside diameters in inches based on the pipe's outside diameter and the angle formed with the adjacent entering pipe as shown in the table below:

Largest	Mnimum Degrees Between Pipe Entering Structure										
Pipe OD	180	165	150	135	120	105	90	75	60	45	30
15	48	48	48	48	48	48	48	48	48	72	96
21	48	48	48	48	48	48	48	60	60	84	120
27	48	48	48	48	48	48	60	60	72	96	N/A
33	48	48	48	48	48	60	60	72	84	120	N/A
39	48	48	48	60	60	60	72	84	96	N/A	N/A
45	60	60	60	60	72	72	84	96	108	N/A	N/A
51	72	72	72	72	72	84	84	108	120	N/A	N/A
57	72	72	72	72	84	84	96	108	N/A	N/A	N/A
63	84	84	84	84	84	96	108	120	N/A	N/A	N/A
69	84	84	84	84	96	108	120	N/A	N/A	N/A	N/A
75	96	96	96	96	96	108	120	N/A	N/A	N/A	N/A
81	96	96	96	96	108	120	N/A	N/A	N/A	N/A	N/A

2. Structures with smaller inside diameters may be supplied when pipes are of different diameters and calculations or shop drawings show that a minimum of 6 inches clearance will be maintained between pipe openings.
3. The minimum lay length of the base section shall be no less than the diameter of the pipe opening for pipe OD up to 87 inches.

B. Rectangular Storm Drain Structures

1. Provide rectangular sub-grade structures with minimum inside wall widths based on the entering pipe's outside diameter and the angle formed with the penetrated wall as shown in the chart below:

Largest	Minimum Degrees Between Pipe and Wall						
Pipe OD	90	80	70	60	50	40	30
15	22	22	22	22	22	34	34
21	22	22	22	34	34	34	46
27	34	34	34	34	46	46	58
33	34	34	46	46	46	58	70
39	46	46	46	46	58	70	82
45	46	46	58	58	70	70	94
51	58	58	58	70	70	82	106
57	58	58	70	70	82	94	118
63	70	70	70	82	82	106	130
69	70	70	82	82	94	118	142
75	82	82	82	94	106	118	154
81	82	82	94	94	106	130	166
87	94	94	94	106	118	142	178

2. Structures with narrower walls may be supplied when pipes are different diameters than shown and calculations of shop drawings show that the pipe will not penetrate the corners of the structure.

Pay Item	**Pay Unit**
Precast Drainage Structures - Type	EA

END OF SECTION 00476

SECTION 00485

FLOWABLE FILL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The work covered by this specification consists of furnishing and placing flowable fill. Flowable fill is a controlled low strength material consisting of Portland cement, fly ash, fine aggregate, and water. It is suitable for filling underground storage tanks and pipe culverts and for back-filling culverts, bridges (where culverts or pipes are installed under a bridge), retaining walls, and roadway trenches.

B. Determination of Measurement: Measure by the cubic yard measured in the field of flowable fill installed.

C. Basis for Payment: Payment shall be on a contract unit price per cubic yard that is installed.

1.02 DELIVERY, HANDLING, AND STORAGE

A. Mixing and Delivery: The Contractor shall comply with the applicable portions of Section 00455.

B. Temperature Requirements: The temperature requirements of Section 00455 shall apply.

1.03 DESIGN REQUIREMENTS

A. Composition and Design: The Contractor shall submit to the Engineer the proposed mix design(s) on M&T Form 312 at least 35 days prior to use. Mix proportions shall be determined by a testing laboratory which has been approved by NCDOT and shall be based on laboratory trial batches meeting the following requirements:

BATCH ITEM	**FILL TO BE EXCAVATED**	**FILL TO REMAIN IN PLACE**
Compressive Strength @ 28 Days Approximate Quantities Per C.Y.	80-150 PSI Max	500 PSI Min.
Cement	40-100 Lbs. Min.	150 Lbs. Min.
Fly Ash	250-600 Lbs. Min.	300 Lbs. Min.
Fine Aggregate	2000-2500 Lbs. SSD (Saturated Surface Dry)	2650 Lbs. SSD (Saturated Surface Dry)
Water	60 Gallons	60 Gallons

B. To achieve desired placement consistency, flowability may be adjusted by varying the water content approximately + or - 5 gallons per cubic yard without quantitative changes in other materials. This decision can only be made by the project Engineer or their designee. Less flowable mixes are desirable when it is necessary to put traffic back on a roadway quickly (i.e., within 8 to 10 hours) or when less buoyant fill is needed to backfill pipes that could float out of position. Pipes that could float shall be anchored or placement shall be in stages to prevent the pipe from floating.

PART 2 PRODUCTS

2.01 MATERIALS

A. All materials, including the materials listed below, shall meet the requirements of the *North Carolina Department of Transportation Standard Specifications for Roads and Structures,* latest edition and revisions.

1. Fine Aggregate
2. Portland Cement
3. Type IP Blended Cement
4. Fly Ash
5. Type IS Blended Cement
6. Water
7. Chemical Admixtures
8. Flowable Fill

B. Steel plates shall be Grade A36 steel and of a size to cover openings completely and shall be of suitable thickness to support all traffic that may pass over the plate. Steel plates shall be solid with only small holes on the sides to aid in lifting and moving the plates.

PART 3 EXECUTION

3.01 INSTALLATION

A. Work: Material, placement, steel plating, backfilling, tools, equipment, etc.

B. Placing: Flowable fill shall be discharged directly from the truck into the space to be filled, or by other methods approved by the Engineer. The mix may be placed full depth or in lifts as site conditions dictate. In roadway trenches, the flowable fill shall be brought level with the bottom of the pavement and then paved over. Between filling and paving operations, steel plates may be placed over the trench to accommodate traffic.

C. The Contractor shall state on NCDOT M&T Form 312 the intended use of the flowable fill. The Form shall be accompanied by a listing of compressive strength of at least three 4" x 8" cylinders at the age of 7 and 28 days. The Engineer will advise the Contractor in writing of the acceptability of the mix design.

D. The Contractor may use flowable fill as an option to conventional fill and backfill methods with the approval of the Engineer.

Pay Item	**Pay Unit**
Flowable Fill	CY

END OF SECTION 00485

SECTION 00497

TRAFFIC CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The work covered by this section consists of furnishing, erecting, maintaining, relocating and removing traffic control devices for maintenance of traffic during construction operations.

B. Determination of Measurement: Measurement shall not be made for this item.

C. Basis of Payment: Traffic control shall be billed and compensated as a lump sum item based on the following percentage schedule:

50%	First Payment
25%	Completion of 50% of project
15%	Completion of 75% of project
10%	Final Payment

1.02 REFERENCES

A. All work performed is to be in accordance with:

1. The *North Carolina Department of Transportation Standard Specifications for Roads and Structures*, latest edition and revisions.
2. The *North Carolina Department of Transportation Highway Design Branch Roadway Standard Drawings*, latest edition and revisions.
3. The Manual on Uniform Traffic Control Devices (MUTCD).
4. The North Carolina Supplement to the MUTCD.
5. Any project plans or sketches.
6. Any project special provisions.

1.03 SUBMITTAL

A. If the traffic control plan is not included as a part of the project plans, the individual project traffic control plan must be submitted to the City Traffic Engineer within two weeks of being declared the lowest responsible bidder. The City Traffic Engineer will approve or revise and approve the traffic control plan within 5 working days of submittal.

PART 2 PRODUCTS

2.01 MATERIALS

A. The Contractor shall use interim pavement marking paint as described in the *North Carolina Department of Transportation Standard Specifications for Roads and Structures*, latest edition and revisions.

B. Traffic cones may be used when approved by the City Traffic Engineer. When cones are used, they shall be either double stacked or have special heavy bottoms such that they will not be blown over by traffic.

C. All traffic control devices furnished by the Contractor shall remain the property of the Contractor, unless otherwise required by the Special Provisions.

PART 3 EXECUTION

3.01 PREPARATION

A. Street Closure
   1. Intended street closures must be requested, in writing to the City of Fayetteville Traffic Engineer, a minimum of five (5) working days prior to the desired closure date. The request shall state the street name, the from and to locations, and the length of closure time of the individual street to be closed.
   2. The request must also be accompanied by a traffic control plan, showing the detour information of through traffic. This plan must be in accordance with the current edition of the MUTCD.
   3. After approval, in writing, the Contractor bears full responsibility for the closure to include installation, maintenance and removal of all traffic control devices, as well as all implied liability.

B. No work shall start until all the traffic control devices required for the particular work activity have been installed, inspected, and approved by the Traffic Engineer or his representative.

3.02 TEMPORARY ROAD CLOSURE

A. Conditions represented are for work that requires closings during daytime hours only.

B. This application is intended for a planned temporary closing not to exceed 15-20 minutes.

C. The flaggers shall stop the first vehicle from a safe position, then move to the centerline to stop approaching traffic.

D. A portable message sign may be used in addition to the initial warning sign.

E. NOTE: The spacing between signs has a recommended standard of 200' but can be modified by the City Inspector according to the location of the workspace.

3.03 LANE CLOSURE ON MINOR STREET

A. The traffic control procedure is appropriate only for low volume, low speed facilities, such as local residential streets.

B. Traffic can regulate itself when volumes are low and the length of the workspace is short, thus enabling drivers to readily see the roadway beyond.

C. Flashing warning lights and/or flags may be used to call attention to the advance warning signs.

D. The spacing between signs has a recommended standard of 200' but can be modified by the City Inspector according to the location of the workspace.

3.04 SIDEWALK CLOSURES

A. Additional advance warning may be necessary.

B. Other devices may be needed to control traffic on the streets. Use lane closure signing as required.

3.05 INSTALLATION

A. The furnishing, erecting, maintaining, relocating and removing of traffic control devices will be in accordance with the current edition of *The Manual on Uniform Traffic Control Devices* for streets and highways.

B. All traffic control devices must be in place before beginning work each day, removed during intervals when work is not ongoing and removed at the end of the workday.

C. The Contractor shall not obstruct or impede any of the traffic on adjacent streets while installing traffic control or doing construction work.

D. The Contractor shall not close a lane to through traffic at night and during periods of construction inactivity, unless otherwise approved by the Engineer.

E. The Engineer may restrict the Contractor from placing lane closures during certain hours, holidays, or special events because traffic may be unusually heavy. All lane closure types, hours of installation and lengths, will be controlled by and required to be approved by the Engineer.

F. When working within the travelway, the Contractor shall use a standard lane closure or a moving operation caravan utilizing a shadow vehicle and truck mounted impact attenuator, as approved by the City Traffic Engineer. A moving operation caravan shall only be used if the marker operation maintains a minimum speed of 3 MPH at all times with no stops that would narrow or close a lane of travel.

G. The use of police and/or trained flaggers to control traffic through the work site will be provided by the Contractor as required. The Contractor will be responsible for obtaining trained personnel to direct traffic and contacting local authorities for use of police for traffic control where applicable.

H. Time limitation for placement and replacement on pavement markings and markers completed by contractors on newly resurfaced areas:
   1. Marking By Contractor
      a. Divided and Multi-Lane Facilities
         1) For all Interstate highways and access ramps, place all markings including symbols and legends, by the end of each workday's operation.
         2) For all divided and multi-lane facilities, place all center line and lane line markings and railroad and school symbols and stop bars by the end of each workday's operation. Place all edge lines, gore lines, and other symbols within 3 calendar days after they have been obliterated by the resurfacing operation.
         3) A multi-lane facility is defined as any roadway having more than two lanes to include a two-lane, two-way with two-way center left turn lane.
      b. Two-Lane, Two-Way Facilities
         1) For all two-lane, two-way facilities, place all centerline markings, railroad and school symbols within 5 calendar days after they have been obliterated by the resurfacing operation. Place all edge lines and other symbols within 15 calendar days after they have been obliterated by resurfacing operations.
      c. All Facilities
         1) Place two applications of paint on newly resurfaced asphalt which will remain in place over three (3) months. Place the second application of paint upon ample drying time of the first, as determined by the Engineer.
         2) Install permanent markers within sixty (60) calendar days after completing the resurfacing.

Pay Item	**Pay Unit**
Traffic Control	LS

END OF SECTION 00491

SECTION 00495

THERMOPLASTIC PAVEMENT MARKINGS
(Alkyd/Maleic)

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This section consists of the furnishing and placement of Alkyd/Maleic Thermoplastic Reflective Markings in the form of lines and symbols as shown on the pavement marking plans. These markings shall be installed at the locations shown on the pavement marking plans or where directed by the City Traffic Engineer. Installation shall be performed in accordance with the lines, symbols, and dimensions shown on the pavement marking plans or as directed by the City Traffic Engineer. The Contractor shall furnish all materials, services, labor, and equipment necessary for the required pavement preparation and pavement marking installation. The Contractor shall provide sufficient personnel experienced in handling and applying the thermoplastic pavement marking materials to assure that the work is done properly.

1. The work shall meet the requirements of this section and the *North Carolina Department of Transportation Standard Specifications for Roads and Structures*, current revision, and any attached standard pavement marking typical drawings and/or project plans.

B. This special provision covers machine applied hot Alkyd/Maleic Thermoplastic Pavement Marking Material with both incorporated glass beads and drop-on glass beads. The material shall be plainly visible to the motorist both day and night. Nighttime visibility shall be enhanced by retroreflection induced by standard automobile headlights.

1.02 THERMOPLASTIC PAVEMENT MARKING LINES

A. Determination of Measurement: The quantity of thermoplastic pavement marking lines to be paid for will be the actual number of linear feet of thermoplastic pavement marking lines which have been satisfactorily placed. The quantity of solid lines will be the summation of the linear feet of solid line measured end to end of the line. The quantity of skip or intermittent lines will be the summation of the linear feet derived by multiplying the nominal length of the marking lines by the number of marking lines in place.

B. Basis for Payment: The quantity of thermoplastic pavement marking lines measured will be paid for at the contract unit price per linear foot for thermoplastic pavement marking lines.

1.03 REMOVAL OF PAVEMENT MARKING LINES

A. Determination of Measurement: Will be measured and paid as the actual number of linear feet of pavement marking lines satisfactorily removed and accepted by the Engineer. The quantity of solid lines will be the summation f the linear feet of solid line measured end-to-end of the line. The quantity of skip or broken lines will be the summation of the linear feet derived by multiplying the nominal length of lines by the number of marking lines satisfactorily removed.

B. Basis for Payment: The quantity of pavement marking lines removed will be paid for at the contract unit price for each linear foot. No payments will be made for the removal of removable pavement marking tape.

1.04 THERMOLASTIC PAVEMENT MARKING SYMBOLS

A. Determination of Measurement: The quantity of thermoplastic pavement marking symbols to be paid for will be the actual number of thermoplastic pavement marking symbols satisfactorily placed.

B. Basis for Payment: The quantity of thermoplastic pavement marking symbols measured will be paid for at the contract unit price per each for thermoplastic pavement marking symbols.

1.05 REMOVAL OF PAVEMENT MARKING SYMBOLS AND CHARACTERS

A. Determination of Measurement: Will be measured and paid as the actual number of pavement marking symbols and characters satisfactorily removed and accepted by the Engineer.

B. Basis for Payment: The quantity of pavement marking symbols and characters removed will be paid for at the contract unit price.

1.06 QUALIFICATIONS

A. All Alkyd/Maleic thermoplastic reflective pavement marking products shall be pre-qualified by the City of Fayetteville Traffic Services Division. The process of pre-qualification shall be handled through the Traffic Services Division.

1.07 DELIVERY, STORAGE, AND HANDLING

A. All thermoplastic and glass bead material shall be delivered to the project in containers filled by the manufacturer. Each material container shall be clearly and adequately marked to indicate the material, the date of manufacture, the process, batch or lot number, and the manufacturer's name and location.

B. Dry mixed thermoplastic material shall be shipped in leak proof moisture proof containers.

C. The thermoplastic pavement marking material shall be in block or granular form packaged in either suitable corrugated containers or thermal degradable plastic bags to which it will not adhere during shipment or storage. The packages shall weigh approximately 23 kg (50 pounds). The corrugated containers shall consist of blocks approximately 14 inches x 28 inches x 2 1/4-inch size. Each container shall designate the color, manufacturer's name, batch number and date of manufacture. The label shall warn the user that the material shall be heated in the range of 204° to 227°C (400° to 440° Fahrenheit [F]) during application.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Thermoplastic pavement markings shall not be applied on new asphalt surfaces unless the ambient air temperature is 50° F and rising and the temperature of the pavement is 50° F.

B. Thermoplastic pavement markings shall not be placed when the pavement surface shows visible evidence of containing moisture.

1.09 WARRANTY

A. Thermoplastic Pavement Marking Observation Period

1. The Contractor shall warrant the thermoplastic pavement markings in accordance with the Contract.
2. During the warranty period the thermoplastic pavement marking material furnished and installed under this contract shall be warranted against failure due to blistering, excessive cracking, bleeding, staining, discoloration, oil content of the pavement materials, smearing, or spreading under heat, deterioration due to contact with oil, grease deposits, diesel fuel or gasoline drippings, chipping, spalling, poor adhesion to the pavement materials, loss of reflectivity, damage from traffic, and wear.
3. The Contractor, at no expense to the City of Fayetteville shall replace any pavement markings that will not perform satisfactorily under traffic during the warranty period due to defective materials and/or workmanship in manufacture and/or application. (Failure to comply with any portion of this specification shall be considered as unsatisfactory performance of the thermoplastic pavement marking material.)
4. Marking replacement shall be performed in accordance with the requirements specified herein for the initial application, including but not limited to surface cleaning, pavement marking removal, seasonal and weather limitations, etc.

5. Traffic shall be operating on the facility during the warranty period.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. The material manufacturer has the option of formulating the Thermoplastic Material according to his own specifications, however, the Contractor shall provide to the City Traffic Engineer a certificate of certification that the thermoplastic meets *North Carolina Department of Transportation Standard Specification for Roads and Structures*, current edition and any revision, Division 10, Section 1087.

PART 3 EXECUTION

3.01 WORK

A. Work: Layout, materials, testing, tools, traffic control necessary to install markings, pre-marking, or interim lines/markings, equipment, labor and all other requirements necessary to complete the work.

3.02 PREPARATION

A. To ensure maximum possible adhesion, the pavement surface upon which the thermoplastic markings are to be placed shall be properly cleaned and free of oil, mud, dust, dirt, grass, loose gravel, and other deleterious material, prior to the application of the thermoplastic pavement markings. Cleaning shall be performed on all surfaces which are to receive new thermoplastic pavement markings. The area to be cleaned shall be a minimum of 2 inches wider than the thermoplastic pavement markings to be placed, such that, an additional 1 inch of cleaned area is on each side of the thermoplastic pavement markings after they are applied.

B. Where cleaning of objectionable material is obscuring existing pavement markings of a lane occupied by public traffic, the residue including but not limited to dust, shall be removed immediately from the surface being treated. Such removal shall be by methods approved by the City Traffic Engineer.

C. On Portland Cement Concrete surfaces, a liquid epoxy resin primer-sealer or equivalent shall be applied to the area where new thermoplastic pavement markings are to be placed unless otherwise recommended by the manufacturer or Engineer. The primer-sealer shall be that recommended by the manufacturer of the thermoplastic material and shall be approved by the City Traffic Engineer. The material shall form a continuous film which shall dry rapidly, and which shall adhere to the pavement surface, thermoplastic material. The primer-sealer shall not discolor nor cause any noticeable change in the appearance of the thermoplastic pavement markings and/or the pavement outside the edge of the finished pavement markings. A sample of the primer-sealer shall be submitted to the City Traffic Engineer and shall be approved by the City Traffic Engineer prior to application.

D. No direct payment shall be made for this surface preparation (pavement cleaning and application of primer-sealer) as such work shall be considered incidental to the work being paid for by the various thermoplastic pavement marking items in this contract.

3.03 PREMARKING

A. Where no existing markings are in place, the existing markings are not visible, and/or the existing markings are to be removed, the Contractor shall be required to pre-mark each installation of thermoplastic pavement marking materials prior to application. The pre-marking shall be of a manner that will be helpful to the Contractor and the Engineer in placing the thermoplastic pavement markings as directed in the plans. The actual placement of the thermoplastic pavement marking materials shall not be performed until the pre-marking has been inspected and approved by the Engineer.

B. No direct payment shall be made for this pre-marking as such work shall be considered incidental to the work being paid for by the various thermoplastic pavement marking items in the contract.

3.04 METHODS OF APPLICATION

A. The Contractor shall furnish and install by the specified method of application, thermoplastic pavement markings as directed by and in accordance with the pavement markings plans:
   1. Machine applied, hot extruded thermoplastic with glass spheres in the proper ratio to immediately produce a highly reflective marking as described elsewhere in this proposal conventional extrusion equipment or "ribbon gun" extrusion devices.
   2. Machine applied, hot sprayed thermoplastic with glass spheres in the proper ratio to immediately produce a highly reflective marking as described elsewhere in this proposal form. This method shall be approved by the Engineer prior to application.

B. The thermoplastic pavement markings shall be applied to the road surface in a molten state with a homogenous surface application of glass spheres. When applied properly and at the designated uniform thickness and width, the marking shall, upon cooling, be uniformly reflectorized and have the ability to resist deformation caused by traffic throughout its entire length.

C. Application of Thermoplastic Marking Material
   1. The parts of the application and pre-melting equipment shall be thoroughly cleaned of foreign material prior to the introduction of the thermoplastic pavement marking proposed in this specification.
   2. Openings of three to six inches in length shall be provided at intervals of 250 feet in edge-lines placed on the inside of curves and in edge-lines on the low side of tangents as directed by the City Traffic Engineer.
   3. The material shall be heated uniformly throughout and shall have a homogenous dispersant of binder, pigment, and glass beads when applied to the surface of the pavement.
   4. To avoid blistering and poor adhesion, the thermoplastic pavement marking material shall be applied to dry pavements in a molten state at a minimum temperature of 205° C (400° F) for Bituminous Pavements and at a minimum temperature of 218° C (425° F) for Portland Cement Concrete Pavements. The temperature shall be checked every 10 minutes for compliance with the specified application temperature range.
   5. "Drop-on Beads" shall be uniformly applied to the surface of the molten thermoplastic pavement marking material so that the beads are partially embedded. The beads shall be applied at a rate of 7 pounds per 100 square feet of marking. The cross-sectional thickness of the thermoplastic pavement marking material above the surface of the pavement for center lines, skip lines, transverse lines, mini skip lines, legends, and median islands shall be a minimum of 0.120 inches; for edgelines, gorelines, 12-inch crosswalk lines, arrows and diagonals shall be a minimum of 0.90 inches.
   6. The thermoplastic pavement marking materials, when formed into traffic symbols and lines, shall have a uniformly thick and smooth surfaced cross-section throughout its entire length.
   7. All pavement marking widths, shall not vary by more than ½ inch.

8. Pavement marking lines shall be straight or of uniform curvature and shall conform with the tangents, curves, and transitions as specified in the plans and/or directed by the City Traffic Engineer. Longitudinal lines shall be offset a minimum of 2 inches from longitudinal construction joints of pavements. Longitudinal lane lines of multilane roads shall be offset 2 inches toward the median.
9. The finished lines shall have well defined edges and be free of horizontal fluctuations. The lateral deviation of the finished lines shall not exceed ½ inch from the proposed location alignment, as specified in the plans and/or directed by the City Traffic Engineer, at any point. Any greater deviations shall be sufficient cause for requiring the Contractor to remove and correct such pavement markings at no additional expense to the City of Fayetteville.
10. All pavement marking lines shall be applied with one pass of the pavement marking equipment, except the "X" of the railroad crossing symbol, 24-inch stop bars and 24-inch transverse bands, where two passes of the equipment will be permitted.
11. The stem portion of the straight arrows is to be applied in a single pass and the stem portion of turn arrows is to be applied in a maximum of two passes of the application equipment. Arrow heads may be applied by multiple passes of the application equipment, not to exceed three passes.
12. All pavement marking lines and symbols installed by multiple passes of the application equipment shall exhibit no gaps separating the application passes.
13. The various letters and symbols shall conform to the size and shape outline in the most recent edition of the Manual on Uniform Traffic Control Devices for Street and Highways, and *North Carolina Department of Transportation Standard Specification for Roads and Structures,* current edition and any revision, and as shown on the pavement marking plans.
14. The thermoplastic pavement marking material, when formed into traffic symbols and stripes, shall be readily renewable by placing a thin overlay of compatible new material directly over the old material.
15. The Contractor shall protect the pavement markings until they are track free by placing warning devices as directed by the Engineer.
16. Any molten pavement marking which is crossed by a vehicle shall be reapplied, and any subsequent marking made by the vehicle shall be removed by methods acceptable to the Engineer and at no additional expense to the Owner.
17. The Contractor shall be responsible for removing all pavement marking materials spilled upon the road surface by a method acceptable to the Engineer.

Pay Item	**Pay Unit**
Thermoplastic Pavement Marking Lines	LF
Thermoplastic Pavement Marking Symbols	EA
Removal Existing Pavement Lines	LF
Removal Existing Pavement Symbols	EA

END OF SECTION 00495

SECTION 00496

RAISED REFLECTIVE PAVEMENT MARKERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The work covered by this section consists of furnishing and installing raised reflective pavement markers. Under this contract, the Contractor is to install materials identified by the City of Fayetteville. Any tools and/or installation equipment not specifically shown as being furnished by the City of Fayetteville is the responsibility of the Contractor.

B. All work performed is to be in accordance with:
   1. The *North Carolina Department of Transportation Standard and Specifications for Roads and Structures*, current edition.
   2. *The North Carolina Department of Transportation's Highway Design Branch Roadway Standard Drawings*, current edition.
   3. The Manual on Uniform Traffic Control Devices (MUTCD).
   4. The North Carolina Supplement to the MUTCD.
   5. Any project plans or sketches.
   6. Any project special provisions as attached.
   7. The Engineer.

C. All work will be subject to inspection by the City of Fayetteville Traffic Services Division before final payment is made.

D. Determination of Measurement:
   1. The quantity of raised reflective pavement markers to be paid for will be the actual number of markers which have been satisfactorily installed and accepted. Any reference to quantities is provided as an estimate only and shall not serve to obligate the City to purchase any minimum amount, nor shall such reference serve to furnish any maximum amount which the Contractor is required to furnish.
   2. The quantities shown in the itemized proposal for the project are considered to be approximate only and are given as the basis for comparison of bids. The City of Fayetteville may increase or decrease the quantity of any item or portion of the work as may be deemed necessary or expedient.
   3. An increase or decrease in the quantity of any item will not be regarded as sufficient ground for an increase or decrease in the unit prices, nor in the time allowed for the completion of the work, except as provided for the contract.

E. Basis for Payment: The quantity of raised reflective pavement markers measured will be paid for at the contract unit price per each raised reflective pavement marker installed.

1.02 REFERENCES

A. Refer to Roadway Standard Drawing in pavement marking section of the *North Carolina Department of Transportation Highway Design Branch Roadway Standard Drawings*, current edition for placement of pavement markers.

1.03 QUALIFICATIONS

A. Pre-qualifications: Raised reflective pavement markers are required to be pre-qualified by the City of Fayetteville Traffic Services Division. The process of pre-qualification will be accomplished through the City of Fayetteville Traffic Services Division at (910) 433-1660.

1.04 REGULATORY REQUIREMENTS

A. The Contractor shall comply with all applicable local ordinances and regulations prior to beginning work. He shall obtain all permits and licenses required by state and local agencies having jurisdiction in his area of work.

PART 2 PRODUCTS

2.01 MATERIALS

2.02 All materials for raised reflective pavement markers, shall meet the requirements of the most recent edition of the *North Carolina Department of Transportation Standard and Specifications for Roads and Structures*, current edition.

A. Your quote shall be at the contract unit price each for the following items for all work involved in this project and needs to be submitted on the enclosed bid sheet.
   1. Type 1 - Raised non-snow-plowable crystal/white.
   2. Type 2 - Raised non-snow-plowable yellow/yellow.
   3. Type 3 - Raised non-snow-plowable crystal/red.

B. The work to be performed by the Contractor includes the material, labor, equipment, and traffic control necessary to install these devices.

C. Hot bitumen adhesive shall be used for mounting the pavement markers to the pavement. Other adhesives such as epoxy or cold bituminous adhesive pads will not be acceptable.

D. The pavement marker reflector lens shall be of the glass face type and as illustrated in the most recent edition of *North Carolina Department of Transportation Highway Design Branch Roadway Standard Drawings.*

PART 3 EXECUTION

3.01 INSTALLATION

A. Work: Adhesive, required traffic control devices, equipment and incidentals, cleaning of pavement surface and furnishing and installing raised reflective pavement markers.

B. Construction Methods
   1. Construction methods shall meet the requirements of the *North Carolina Department of Transportation Standard Specifications for Roads and Structures*, current edition and any revisions.
   2. The markers shall be seated on the bituminous adhesive with all edges of the marker lapped by adhesive. Markers shall not be installed on the asphalt seam or joint.
   3. Traffic control will be installed in accordance with the *North Carolina Department of Transportation Standard Specifications for Roads and Structures*, current edition and any revisions.

C. Completion and final acceptance of the project shall be contingent upon successful completion of the observation period. The observation period shall be considered a part of the work required to be completed after the final completion date specified herein (15 days after the date of availability of the work).

D. After the completion of the work, the Contractor shall have the work inspected as required by local inspectors having jurisdiction in the area and receive written approval of his work. The Contractor shall be responsible for maintaining traffic in a safe and efficient manner at all work sites. Local ordinances involving the time of day the Contractor may work are to be observed.

Pay Item **Pay Unit**

Raised Reflective Pavement Markers	EA

END OF SECTION 00496

SECTION 00499

TEMPORARY PAVEMENT MARKINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Work covered in this section consists of furnishing and applying temporary pavement marking tapes.
B. All work performed is to be in accordance with:
   1. The *North Carolina Department of Transportation Standard and Specifications for Roads and Structures*, current edition.
   2. The *North Carolina Department of Transportation's Highway Design Branch Roadway Standard Drawings*, current edition.
   3. The Manual on Uniform Traffic Control Devices (MUTCD).
   4. The North Carolina Supplement to the MUTCD.
   5. Any project plans or sketches.
   6. Any project special provisions as attached.
   7. The Engineer.

1.02 TEMPORARY PAVEMENT MARKING LINES

A. Determination of Measurement: The quantity of temporary pavement marking tape to be paid for lines will be the actual number of linear feet which has been satisfactorily installed and accepted. The quantities shown in the itemized proposal for the project are considered to be approximate only and are given as the basis for comparison of bids. The Engineer may increase or decrease the quantity of any item or portion of the work as may be deemed necessary or expedient. An increase or decrease in the quantity of any item will not be regarded as sufficient ground for an increase or decrease in the unit prices, nor in the time allowed for the completion of the work.
B. Basis for Payment: The quantity of temporary marking tape measured will be paid for at the contract unit price per linear foot installed.

1.03 TEMPORARY PAVEMENT MARKING SYMBOLS

A. Determination of Measurement: The quantity of temporary pavement marking tape to be paid for symbols will be the actual number of symbols which have been satisfactorily installed and accepted by the City Traffic Engineer. The quantities shown in the itemized proposal for the project are considered to be approximate only and are given as the basis for comparison of bids. The Engineer may increase or decrease the quantity of any item or portion of the work as may be deemed necessary or expedient. An increase or decrease in the quantity of any item will not be regarded as sufficient ground for an increase or decrease in the unit prices, nor in the time allowed for the completion of the work.
B. Basis for Payment: The quantity of temporary marking tape measured will be paid for at the contract unit price for each symbol installed.

PART 2 PRODUCTS

2.01 MATERIALS

A. Materials to be used are 3-M Scotch Lane removable tape #5710 (white or yellow) and Black Line mask #145 or approved equal.

B. Materials other than those listed above must be determined to be an approved equal by the City Traffic Engineer prior to use.

PART 3 EXECUTION

3.01 WORK

A. Work: Labor, placement, removal, disposal, materials, equipment and any other necessary incidentals.

3.02 TEMPERATURE

A. Air and pavement temperature must be at least 50 degrees F and rising.

3.03 PREPARATION

A. Road surface shall be cleaned with high pressure air or by sweeping.

B. Mark pavement where tape is to be applied.

3.04 INSTALLATION

A. Temporary pavement marking tapes shall be applied per manufacturer's instructions.

B. Do not overlap material--use butt splices.

3.05 TAMPING

A. Tape must be tamped, a minimum of three (3) passes back and forth, using one of the following methods:
   1. Roller tamper cart with a minimum load of 200 pounds.
   2. Driving a vehicle tire slowly (2-3 MPH) over the tape.

B. Do not twist or turn the tamping device on the tape.

C. Ensure all edges have firmly adhered before opening to traffic.

3.06 REMOVAL

A. For your own safety, wear gloves and eye protection when removing temporary pavement marking tape.

B. Use a chisel-like tool to pry up the edge of the tape.

C. Pull the tape up at a 90-degree angle to the pavement.

D. Burning or grinding is not recommended.

Pay Item	**Pay Unit**
Temporary Pavement Marking Lines	LF
Temporary Pavement Marking Symbols	EA

END OF SECTION 00499

SECTION 02810

IRRIGATION SYSTEM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Work to be done includes furnishing all labor, materials, equipment and services required to complete all irrigation work indicated on the Drawings, as specified herein, or both.

B. Trench excavation, backfilling and bedding materials, together with the testing of the completed installation shall be included in this work.

C. Record Drawing as well as Operating & Maintenance Manual generation, in accordance to these specifications shall also be included in this work.

D. Determination of Measurement: No measurement shall be made for this item.

E. Basis of Payment: Payment will be lump sum for complete installation of the irrigation system as shown.

F. The Contractor shall include in his bid any charges by the Water Department, Utility Company, or other authorities for work done by them and charged to the Contractor.

1.02 ORDINANCES, PERMITS AND FEES

A. The Work under this Section shall comply with all ordinances and regulations of authorities having jurisdiction.

B. The Contractor shall obtain and pay for any and all permits, tests and certifications required for the execution of Work under this Section, including water supply tap fee.

C. Furnish copies of Permits, Certifications and Approval Notices to the Owner's Representative prior to requesting payment.

1.03 QUALITY ASSURANCE

A. Installer: A qualified firm which has experience in work of the type and size required by this Section, and which is acceptable to the Engineer.

B. Applicable requirements of accepted Standards and Codes shall apply to the Work of this Section and shall be so labeled or listed:
   1. American Society for Testing & Materials (ASTM)
   2. National Plumbing Code (NPC)
   3. National Electric Code (NEC)
   4. National Sanitary Foundation (NSF)
   5. American Society of Agricultural Engineers (ASAE)
   6. Underwriters Laboratories, Inc. (UL)
   7. Occupational Safety and Health Regulations (OSHA)

1.04 TESTS

A. Operational Test: After completion of the system, test the operation of entire system and adjust sprinklers as directed by the Engineer. Demonstrate to the Engineer that all irrigated areas are being adequately covered (See Part 3 - Execution).

1.05 SHOP DRAWINGS

A. The Contractor shall provide copies of product specification sheets on all proposed equipment to be installed to the Engineer for approval prior to the start of work, in

accordance with the parameters of Division-1. Work on the irrigation system may not commence until product sheets are submitted and approved. Submittals shall be marked up to show proper nozzles, sizes, flows, etc. Equipment to be included:

1. Sprinkler Heads
2. Valves: Manual and Automatic
3. Controller
4. Valve Boxes
5. Pipe and Fittings
6. Wire and Connectors
7. Quick Coupling Valves
8. Rain Sensor
9. Backflow Preventer/ Enclosure
10. Miscellaneous Materials

B. The Contractor shall maintain complete Record Drawings of the system as the project proceeds. Record Drawings shall specify sprinkler type; pop up height and nozzle for each sprinkler installed. Each valve box location to be referenced by distance from a minimum of two permanent locations. Controller, rain sensor, quick coupling valves, water meters, back flow prevention device and all other equipment shall be indicated on the drawings. All wire routing, wire size and splices shall be indicated. Main line pipe and wire route shall have two distinctly different graphic symbols (line types).

1.06 DELIVERY, STORAGE AND HANDLING

A. Store and handle all materials in compliance with manufacturer instructions and recommendations. Protect from all possible damage. Minimize on-site storage.

1.07 GUARANTEE

A. The Contractor shall obtain in the Owner's name the standard written manufacturer's guarantee of all materials furnished under this Section where such guarantees are offered in the manufacturer's published product data. All these guarantees shall be in addition to, and not in lieu of, other liabilities that the Contractor may have by law.

B. In addition to the manufacturer’s guarantees, the Contractor shall warrant the entire irrigation system, both parts and labor for a period of one year from the date of acceptance by the Owner.

C. As part of the one-year warranty the Contractor shall perform the first year-end winterization and spring start-up for the irrigation system.

1.08 COORDINATION

A. The Contractor shall at all times coordinate his work closely with the Engineer to avoid misunderstandings and to efficiently bring the project to completion. The Engineer shall be notified as to the start of work, progression and completion, as well as any changes to the drawings before the changes are made. The Contractor shall also coordinate his work with that of his sub-contractors.

B. The Contractor shall be held responsible for and shall pay for all damage to other work caused by his work, workmen or sub-contractors. Repairing of such damage shall be done by the Contractor who installed the work, as directed by the Engineer.

1.09 MAINTENANCE AND OPERATING INSTRUCTIONS

A. Contractor shall include in his Bid an allowance for four hours of instruction of Owner and/or Owner's personnel upon completion of check/test/start-up/adjust operations by a competent operator The Engineer shall be notified at least one week in advance of check/test/start-up/adjust operations.

B. Upon completion of work and prior to application for acceptance and final payment, a minimum of three 3-ring, hard cover binders titled MAINTENANCE AND OPERATING INSTRUCTIONS FOR THE "Project Name", shall be submitted to the Engineer's office. After review and approval, the copies will be forwarded to the Owner. Included in the Maintenance and Operating binders shall be:
   1. Table of Contents
   2. Written description of Irrigation System.
   3. System drawings:
      a. One copy of the original irrigation plan;
      b. One copy of the Record Drawing;
      c. One reproducible of the Record Drawing;
      d. One copy of the controller valve system wiring diagram
   4. Listing of Manufacturers.
   5. Manufacturers' data where multiple model, type and size listings are included; clearly and conspicuously indicating those that are pertinent to this installation.
      a. "APPROVED" submittals of all irrigation equipment;
      b. Operation:
      c. Maintenance: including complete troubleshooting charts.
      d. Parts list.
      e. Names, addresses and telephone numbers of recommended repair and service companies. A copy of the suggested "System Operating Schedule" which shall call out the controller program required (zone run time in minutes per day and days per week) in order to provide the desired amount of water to each area under "no-rain" conditions.
   6. Winterization and spring start-up procedures.
   7. Guarantee data.

1.10 PROCEDURE

A. Notify all city departments and/or public utility owners concerned, of the time and location of any work that may affect them. Cooperate and coordinate with them in the protection and/or repairs of any utilities.

B. Provide temporary support, adequate protection and maintenance of all structures, drains, sewers, and other obstructions encountered. Where grade or alignment is obstructed, the obstruction shall be permanently supported, relocated, removed or reconstructed as directed by the Engineer.

PART 2 PRODUCTS

2.01 GENERAL

A. All materials to be incorporated in this system shall be new and without flaws or defects and of quality and performance as specified and meeting the requirements of the system. All material overages at the completion of the installation are the property of the Contractor and shall be removed from the site.

B. No material substitutions from the irrigation products described in these specifications and shown on the drawings shall be made without prior approval and acceptance from the Engineer.

2.02 PVC IRRIGATION PIPE

A. All pipe in sizes 1-1/2 inches and smaller shall be PVC, Class 200, Type 1120, SDR 21, Solvent-Weld PVC, conforming to ASTM No. D2241 as manufactured by Certainteed, Cresline, JM or equal.

2.03 PVC PIPE SLEEVES

A. All pipe sleeves beneath non-soil areas shall be PVC, Class 160 water pipe as manufactured by Certainteed, Cresline, JM or equal. Minimum sleeve size to be 2-inch.

2.04 WIRE CONDUIT

A. Conduit for wiring beneath non-soil areas shall be PVC, SCH-80 conduit, as manufactured by Certainteed, Cresline, JM or equal.

B. Conduit for above ground wiring to rain sensor or controller shall be galvanized, rigid metallic conduit.

2.05 PVC IRRIGATION FITTINGS

A. Fittings for solvent weld PVC pipe, shall be Schedule 40 solvent weld PVC fittings as manufactured by Dura, Lasco, Spears or equal.

B. All PVC threaded connections in and out of valves shall be made using Schedule 80 toe nipples and Schedule 40 couplers or socket fittings. Schedule 40 male threads will not be approved for installation.

C. PVC solvent shall be NSF approved, for Type I and Type II PVC pipe, and Schedule 40 fittings. Cement is to meet ASTM D2564 and F493 for potable water pipes. PVC solvent cement shall be Rectorseal Gold, or equal, and shall be used in conjunction with the appropriate primer.

D. All nipples to be schedule 80 PVC.

2.06 SPRAY SPRINKLERS

A. Full and part circle pop up spray sprinklers shall be pressure regulating, plastic construction with ratcheting riser, removable nozzle and check valve. Nozzle size shall be as indicated on the Drawings and in the legend. Pop-up height shall be 6 inches for turf and ground cover, 12 inches for shrubs and annual beds.

B. Sprinkler shall carry a minimum 3-year exchange warranty against defects. Sprinklers shall be manufactured by Toro model 570Z-PRX, Rain Bird model 1800-SAM-PRS or approved equal.

2.07 ROTARY SPRINKLERS

A. Rotary sprinklers shall be gear-driven, rotary type heads, designed for in-ground installation with integral check valves. Sprinkler shall be capable of covering a 34-40 foot radius and flow range of 1.6-6.8 gpm at 40 pounds per square inch of pressure. Sprinklers shall have a one hundred percent warranty for two years minimum against defects in workmanship.

B. The nozzle assembly shall elevate a minimum of four inches when in operation and retraction shall be achieved by a stainless steel spring. Riser assembly shall be plastic. A nozzle wiper seal shall be included in the sprinkler for continuous operation under the presence of sand and other foreign material.

C. All sprinkler parts shall be removable through the top of the unit through the removal of a heavy-duty threaded cap. The sprinkler shall have a 3/4" iron pipe size (IPS) water connection on the bottom of the sprinkler.

D. Sprinkler shall be as manufactured by Hunter Industries, model I20-ADV-15/35/80 or approved equal.

2.08 ELECTRIC CONTROL VALVES

A. Electric control valves shall be one, one and one half and two-inch remote control, diaphragm type, fiberglass or reinforced nylon body plastic valves with manual flow control,

manual bleed screw and 150 psi pressure rating. Valves shall be globe/angle combination configuration.

B. Valves shall be manufactured by Toro, model 252, Rain Bird, model PGA or approved equal.

2.09 VALVE BOXES

A. Valve boxes for single electric valves, isolation valves and quick coupling valves shall be 10-inch round valve boxes with metal detection and bolt down covers

B. Valve boxes for dual electric valves shall be 12-inch standard valve boxes with metal detection and bolt down covers.

C. Valve box extensions shall be provided as required for proper box depth.

D. Valve boxes shall be manufactured by Ametek or approved equal.

2.10 AUTOMATIC CONTROLLER

A. Controller shall be electronic in construction with capability of up to 10 hour run times per zone in increments of 1 or 10 minutes. Controllers to have minimum two independent programs, auto/off switch and be capable of manual, semi-automatic and automatic operation. Controller shall have water budgeting feature, sensor input terminal, locking, weather resistant plastic cabinet and internal transformer. Terminal strip connection shall be easily accessible. The controller shall be U.L. listed, 120 volt, 60 Hertz, A.C. type.

B. Controller shall be as manufactured by Toro, Custom Command Series, model CC-P-24, Rain Bird, Model ESP-24LX+ or approved equal.

C. Station quantity shall be minimum of 24.

2.11 QUICK COUPLING VALVES

A. The valve body shall be of cast brass construction with a working pressure of 125 psi. The valve seat disc plunger body shall be spring loaded so that the valve is normally closed under all conditions when the key is not inserted.

B. The top of the valve body receiving the key shall be equipped with a single slot and smooth face to allow the key to open and close the valve slowly with a one-half turn. The quick coupling valve shall be equipped with a locking vinyl cover.

C. The valve body construction shall be such that the coupler seal washer may be removed from the top for cleaning or replacement without disassembling any other parts of the valve.

D. Keys shall be single lug with 1-inch male thread and 3/4 inch female thread at the top.

E. Contractor shall provide two keys for quick couplers, two 1 inch x 1 inch swivel hose ells and two cover keys for quick coupling valves.

F. Quick coupling valves, keys and swivels shall be manufactured by Toro models 474-03, 464-01 and 477-02, Rain Bird models 44NP, 44K and SH-2 or approved equal.

2.12 WIRE

A. All valve control wire shall be minimum #14-awg, common #12-awg, single strand, solid copper, 600v, direct burial (UF) and shall meet all state and local codes for this service. Individual wires must be used for each zone valve. Common wire shall be white in color, control wire for spray and rotor zones shall be red in color, and spare wires, installed where indicated on the drawings shall be blue.

B. In ground wire connections shall be UL listed, manufactured by 3M, model DBY-6 splice kits or approved equal. All wire splices shall be made in valve boxes, at controller, or at valves.

C. Wire type and method of installation shall be in accordance with local codes for NEC Class II circuits of 30-volt A.C. or less.

2.13 ISOLATION VALVES

A. Isolation valves 2-1/2 inches and smaller in size shall be gate type, of bronze construction, US Manufacture, 600 WOG with steel cross handle and 200 psi rating. Gate valves to be as manufactured by Nibco, model T-113-irr, or approved equal.

2.14 SWING JOINTS

A. Sprinklers shall be installed on swing pipe assemblies, minimum length 6 inches, maximum 18 inches.

B. Quick coupling valves to be installed on one-inch brass swing joint, minimum 12-inches in length with Leemco model LS-120 stabilizer, or approved equal.

2.15 AUTOMATIC RAIN SENSOR

A. Rain sensor shall be plastic in construction with adjustable interruption point and 1/2-inch IPS threads. Rain sensor shall be manufactured by Hunter Industries, model Mini-Clik-C or approved equal.

2.16 BACKFLOW PREVENTION DEVICE

A. Back flow prevention device shall be as required by the water utility company.

2.17 CRUSHED STONE

A. Crushed stone shall be used under valve boxes and below all sprinklers.

2.18 SAND

A. Sand shall be used for backfilling of trenches; under, around and over PVC lines.

2.19 CONCRETE

A. Cement concrete for concrete base under enclosure shall be 2,500 psi, 1-1/2 inch aggregate.

2.20 BACK FLOW ENCLOSURE

A. The back flow prevention device enclosure shall be of a vandal and weather resistant nature manufactured entirely of marine grade aluminum alloy 5052-H32, with a wall thickness of 1/8 inch.

B. The mounting base shall be manufactured entirely of stainless steel. The main housing shall be of solid sheet construction punched on the sides with a rectangular pattern for viewing back flow prevention device operation. The length of the enclosure shall be expandable to allow for site adjustment. The enclosure shall have a mounting lip on one end and a locking mechanism on the other end. The mounting base shall be submerged into the concrete a minimum of two inches, and position the enclosure two and one half inches above the concrete for drainage purposes.

C. The locking mechanism shall be of the full release type, which allows for complete removal of the enclosure from its mounting base without the use of tools. The handle controlling the locking mechanism shall be concealed within the surface of the enclosure and provide for a padlock.

D. The enclosure shall be 30 inches high, 16 inches wide and 45 inches long. Unit shall be as manufactured by VIT Products, Inc., model SBBC-45AL or approved equal.

PART 3 EXECUTION

3.01 GENERAL

A. Work: Shall include labor, material, equipment, services and any other incidentals required for installation.

B. Examine all contract documents applying to this Section noting any discrepancies and bringing the same to the attention of the Engineer for timely resolution.

C. Make all field measurements necessary for the work noting the relationship of the irrigation work to the other trades. Coordinate with other trades (landscaping and other site work trades). Project shall be laid out essentially as indicated on the Irrigation Plans, making minor adjustments for variations in the planting arrangement. Major changes shall be reviewed with the Engineer prior to proceeding.

D. At all times, protect existing irrigation, landscaping, paving, structures, walls, footings, etc. from damage. Any inadvertent damage to the work of another trade shall be reported at once.

E. The mechanical point of connection for the irrigation system shall be a new tap of the domestic water supply provided by others, as specified.

F. The electrical point of connection for the irrigation system shall be to a 120-volt, 20-amp building electrical circuit provided by others.

G. The Drawings and Specifications must be interpreted and are intended to complement each other. The Contractor shall furnish and install all parts, which may be required by the Drawings and omitted by the Specifications, or vice versa, just as though required by both. Should there appear to be discrepancies or question of intent, the Contractor shall refer the matter to the Engineer for decision, and his interpretation shall be final, conclusive and binding.

H. The work shall be constructed and finished in every respect in a good, workmanlike and substantial manner, to the full intent and meaning of the Drawings and Specifications.

I. All necessary changes to the Drawings to avoid any obstacles shall be made by the Contractor with the approval of the Engineer.

3.02 PIPE AND FITTINGS INSTALLATION

A. Using proper width trencher chain, excavate a straight and true trench.

B. Loam encountered within the limits of trench excavation for irrigation mains and branch lines shall be carefully removed to the lines and depths as shown on the Drawings and stockpiled for subsequent replacement in the upper 6 inches of the trench from which it is excavated. Such removal and replacement of the quantities of loam shall be considered incidental to the irrigation system and no additional compensation will be allowed therefore.

C. Pipe shall be laid on undisturbed trench bottom provided suitable base is available - no rock larger than 1 inch or sharp edges; if not, excavate to 2 inch below pipe invert and provide sand base or #57 washed stone upon which to lay pipe.

D. Back filling shall be accomplished as follows: the first 10-inch of backfill material shall contain no foreign matter and no rock larger than 1 inch in diameter. Carefully place material around pipe and wire and tamp in place. Remainder of backfill shall be laid-up in 6-inch (maximum) lifts and tamped to compaction with mechanical equipment matching adjacent undisturbed area. Frozen material shall not be used for backfill.

E. Make all solvent-weld joints in strict accordance with manufacturer's recommendations, making certain not to apply an excess of primer or solvent, and wiping off excess solvent from each connection. Allow connections to set minimum 24 hours before pulling or

pressure is applied to the system. Provide for expansion and contraction as recommended. Wire shall be laid in same trench as mainline and at pipe invert (see Wire Installation).

F. Mainline pipe shall have minimum 24 inches of cover (excavate to invert as required by pipe size). Lateral pipe shall have minimum 16 inches of cover (excavate to invert as required by pipe size).

G. Cut plastic pipe with handsaw or pipe-cutting tool, removing all burrs at cut ends. All pipe cuts are to be square and true. Bevel cut end as required to conform to Manufacturer's Specifications.

H. Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the trench. At times, when installation of the piping is not in progress, the open end(s) of the pipe shall be closed by a watertight plug or other means. All piping, which cannot temporarily be joined, shall be sealed to make as watertight as possible. This provision shall apply during the lunch hour as well as overnight. Pipe not to be installed that day shall not be laid out. Should water enter the trench during or after installation of the piping, no additional piping may be installed or back filled until all water is removed from the trench. Pipe shall not be installed when water is in the trench, when precipitation is occurring, or when the ambient temperature is at 35ºF or below. PVC pipe shall be snaked in the trench to accommodate for expansion and contraction due to changes in temperature.

I. In installing irrigation pipe the Contractor shall route the pipe as necessary to prevent damage to tree roots. Where trenching must occur near trees, the Contractor shall provide proper root pruning and sealing methods to all roots 1 inch and larger.

J. Throughout the guarantee period it will be the responsibility of the Contractor to refill any trenches that have settled due to incomplete compaction.

K. Pulling of pipe will be allowed provided soil is suitable and specified depth of bury can be maintained.

3.03 ELECTRICAL WIRE CONDUIT INSTALLATION

A. Electrical conduit shall be installed in all non-soil areas, as well as for all above ground wiring to controllers and rain sensor.

3.04 PIPE SLEEVING INSTALLATION

A. Sleeving shall be installed wherever piping is going under a non-soil area, generally where indicated on the Drawings. Minimum cover over all sleeving pipe shall be 24 inches as shown on the detail.

3.05 ISOLATION VALVE INSTALLATION

A. Install isolation valves per detail where indicated on the Drawings. Install all isolation valves on a level #57 washed stone base so that they can be easily opened or closed with the appropriate valve wrench. Install specified valve box over each isolation valve.

3.06 VALVE BOX INSTALLATION

A. Furnish and install a valve access box for each electric valve, quick coupling valve, isolation valve, and wire splice.

B. All valve access boxes shall be installed on a minimum 4-inch #57 washed stone base. Finish elevation of all boxes shall be at grade. All stone to be supplied by the Contractor and installed before valve box. Stone shall not be poured into previously installed valve boxes.

3.07 24 VOLT CONTROL VALVE INSTALLATION

A. Control valves shall be installed on a level #57 washed stone base. Grade of bases shall be consistent throughout the project so that finish grades fall within the limits of work. Valves

shall be set plumb with adjusting handle and all bolts, screws and wiring accessible through the valve box opening.

B. Adjust zone valve operation after installation using flow control device on valve.

3.08 WIRING INSTALLATION

A. Wiring shall be installed along with the main line. Multiple wire bundles shall be cinched together at maximum 12-foot centers using plastic cable cinches and shall be laid beside, and at the same invert as, the irrigation lines. Sufficient slack for expansion and contraction shall be maintained and wiring shall at no point be installed tightly. Provide an additional 8 inches to 12 inches slack at all changes of direction. Wiring in valve boxes shall be a sufficient length to allow the valve solenoid, splice, and all connections to be brought above grade for servicing. This additional slack shall be coiled for neatness in the valve box. Each valve shall have a separate wire back to the controller.

B. All wire shall be laid in trenches and shall be carefully backfilled to avoid any damage to the wire insulation or wire conductors themselves. In areas of unsuitable material, the trench shall have a 2 inches layer of sand or stone dust on the bottom before the wires are laid into the trench and backfilled. The wires shall have a minimum of 12 inches of cover. Wire not to be installed that day shall not be laid out.

C. An expansion curl shall be provided within 6 inches of each wire connection to a solenoid and at least every 100 feet of wire length on runs more than 100 feet in length. Expansion curls can be formed by wrapping five (5) turns of wire around a 1-inch diameter or larger pipe and then withdrawing the pipe.

D. Provide a common ground wire of white color. No white color shall be used for power wire. Control wire shall be red, and spare wiring shall be blue in color.

E. Service wiring in connection with Drawings and local codes for 24-volt service. All in-ground wire connections shall be waterproofed with 3M DBY, or approved equal, splice kits. All splices shall be made in valve boxes (wire runs requiring splices between valve locations shall be provided in splice box--valve box shall be used). Splice locations shall be shown on the Record Drawings.

F. Contractor shall provide a complete wiring diagram showing wire routing for the connections between the controller and valves. See section one for the inclusion of wiring diagram in operation and maintenance manuals.

3.09 CONTROLLER INSTALLATION

A. Contractor to install controller on wall in mechanical room, generally where shown on the drawings. Contractor to wire valves and rain sensor into controller and set proper program.

B. Wire controller to 120-volt electrical supply provided to the controller locations by OTHERS.

C. Keys shall be turned over to Engineer.

3.10 RAIN SENSOR INSTALLATION

A. Install rain sensor on exterior building wall, generally where indicated on the drawings. Coordinate final location of rain sensor with Engineer. Rain sensor shall be in direct contact with the weather and not in contact with the irrigation spray.

B. Install rain sensor wiring within ½ inch conduit where exposed. All above ground wires shall be installed in conduits.

3.11 SPRINKLER INSTALLATION

A. Spray and rotary sprinklers shall be installed flush to grade on swing pipe assemblies, minimum length 6 inches, maximum 18 inches.

B. Adjust sprinkler zone pressure with flow control on valve.

C. Sprinkler installation prohibited inside City of Fayetteville right-of-way.

3.12 QUICK COUPLING VALVE INSTALLATION

A. Provide quick coupling valves where indicated on the Drawings.

B. Quick coupling valves to be mounted on 1-inch brass swing joint with stabilizer as per details.

3.13 BACKFLOW PREVENTION INSTALLATION

A. Install 1-1/2-inch reduced pressure back flow prevention assembly in above grade enclosure as specified.

3.14 BACK FLOW ENCLOSURE INSTALLATION

A. Install enclosure on concrete pad as indicated on the detail, generally where indicated on the drawings. Final location of enclosure shall be coordinated with the Engineer as to best screen the enclosure and deter vandalism. Final location shall also be coordinated with utility department to ensure proper placement of water supply line.

B. Concrete pad for back flow enclosure shall be 53 inches long by 24 inches wide by 8 inches deep.

3.15 CHECK/TEST/START-UP/ADJUST

A. Flushing:
   1. After all piping, valves and sprinkler bodies are in place and connected, but prior to installation of sprinkler internals, flush piping under a full head of water.

B. Testing:
   1. Leakage test: test all lines for leaks under operating pressure. Repair all leaks and re-test.
   2. Coverage test: perform a coverage test in the presence of the Engineer (notify Engineer at least seven (7) days in advance of scheduled coverage test). Engineer will determine if the water coverage is complete and adequate. Readjust heads and/or head locations as necessary or directed to achieve proper coverage.
   3. All testing shall be at the expense of the Contractor.

3.16 CLEANING AND ADJUSTING

A. At the completion of the work, all parts of the installation shall be thoroughly cleaned. All equipment, pipe, valves, and fittings shall be cleaned of grease, metal cuttings and sludge which may have accumulated by the operation of the system for testing.

B. Adjust sprinkler heads, valve boxes, and quick coupling valves to grade as required, so that they will not be damaged by mowing operations.

C. Continue sprinkler coverage adjustment as required by settlement, etc., throughout the guarantee period.

D. Each control zone shall be operated for a minimum of 5 minutes and all heads checked for consistency of delivering water. Adjustments shall be made to sprinklers that are not consistent to the point that they match the manufacturer's standards. All sprinklers, valves, timing devices or other mechanical or electrical components, which fail to meet these

standards, shall be rejected, replaced, and tested until they meet the manufacturer's standards.

3.17 ACCEPTANCE AND OPERATION BY OWNER

A. Upon completion of the work and acceptance by the Owner, the Contractor shall be responsible for the training of the Owner's Representative(s) in the operation of the system. Provide minimum 48 hours written notice in advance of test. The Contractor shall furnish, in addition to the Record Drawings and operational manuals, copies of all available specification sheets and catalog sheets to the Owner's personnel responsible for the operation of the irrigation system. The Contractor shall guarantee all parts and labor for a minimum period of one year from date of acceptance.

3.18 CLEAN UP

A. Upon completion of all installation work, Contractor shall remove all leftover materials and equipment from the site in a safe and legal manner.

3.19 WINTERIZATION

A. Winterization: If construction extends through winter after filling of system contractor shall winterize by completely draining to protect pipe from bursting prior to freezing temperatures. To adequately drain the system the following procedure must be followed:
   1. Air blow-out
      a. Set automatic controller stations to 2-1/2 minutes timing.
      b. Attach hose from portable air compressor to 1-inch air inlet installed on main line at back flow preventer.
      c. Operate compressor at 100 cubic feet per second at 60-80 psi.
   2. Manual drain valves: Open manual drain valves located at low points on the main line to drain main completely after air blow-out has been completed.
   3. Backflow Preventer: Rotate backflow unit at unions and open petcocks and drain. Reverse operation and tighten unions to resume irrigation.

Pay Item	**Pay Unit**
Irrigation System	LS

END OF SECTION 02810

SECTION 02831

CHAIN LINK FENCING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Provide chain link fencing where indicated on the Drawings and specified herein.

B. Work shall include, but not be limited to, the following major items and necessary accessories for a complete and operational system:
   1. Clearing as necessary for installation of fence.
   2. Fence posts, frames, and concrete foundations.
   3. Chain link fabric and barbed wire.
   4. All appurtenances as herein
   5. Gates.

C. Determination of Measurement: Measurement shall be by the linear foot measured from center of post to center of post. No deduction will be made for gates.

D. Basis of Payment: Payment will be per linear foot per type of fence installed.

E. FENCE REMOVAL
   1. Work shall include labor, material, equipment, grading, and any other incidentals required for removal.
   2. Determination of Measurement: Measurement shall be by the linear foot measured from center post to center post. No deduction will be made for gates

Basis for Payment: Payment will be per linear foot per type of fence removed. Gates will be included in the linear foot price.

1.02 SYSTEM DESCRIPTION

F. Fencing Location
   1. Fence Height: As shown on drawings.
   2. Provide posts, bottom intermediate and top rails as indicated. Provide corner and brace assemblies. These items are considered incidental to the installation of fence.
   3. Provide fabric gauges as indicated and install fabric on outside of fence and anchor to framework such that fabric remains in tension after pulling force is released.

1.03 SUBMITTALS

G. Submit the following in accordance with Section, Submittal Procedures:
   1. Catalog Data: Submit manufacturer's standard drawings or catalog cuts for the following. Equipment to be furnished for the Project shall be clearly indicated including all options to be provided.
      a. Individual components of the fencing system.
   2. Shop Drawings: Submit Project specific shop drawings for the following:
      a. Layout drawing showing spacing of posts and location of gate, corner, end, and pull posts.
   3. Manufacturer's Installation Procedures.

PART 2 PRODUCTS

2.01 FABRIC

A. Selvage: Fabric shall be twisted and barbed at both selvages. Both selvages of meshes less than 2 inches shall be knuckled. Bottom tension wire shall be 7 gauge and shall terminate at posts.

B. Galvanized Steel Chain-Link Fence Fabric: Fabricated in one-piece widths for fencing 12 feet and less in height to comply with Chain Link Fence Manufactures Institute (CLFMI) "Product Manual" and with requirements indicated below:
   1. Mesh and Wire Size: 2-inch mesh, 0.148-inch diameter (9 gage).
   2. Coating: ASTM A392, Class 2, galvanized.

2.02 FRAMING

A. Round member sizes are given in actual outside diameter (OD) to the nearest thousandth of inches. Round fence posts are often referred to in ASTM standard specifications by Nominal pipe sizes (NPS) or the equivalent trade sized inches. The following indicates these equivalents all measured in inches:

B. Type I Round Posts: Standard weight (schedule 40) galvanized-steel pipe conforming to ASTM F 1083, according to heavy industrial requirements of ASTM F 1043. Group IA, with minimum yield strength of 25,000 psi, not less than 1.8 oz. of zinc per square foot. Type coating inside and outside according to ASTM F 1234, as determined by ASTM A 90 test method, and weights per foot as follows:

Actual OD Size (in)	NPS Size	Trade	Weight (lb/ft)
1.660	1 1/4	1 5/8	2.27
1.900	1 1/2	2	2.72
2.375	2	2 1/2	3.65
2.875	2 1/2	3	5.79
4.000	3 1/2	4	9.11

Top Rail: Manufacturer's longest lengths (21 feet) with expansion-type coupling, approximately 6 inches long for joining. Provide rail ends of other means for attaching top rail securely to each gate, corner, pull, and end post.

   1. Round Steel: 1.660-inch OD Type.

C. Steel posts for all fabric heights:
   1. Round Line or Intermediate Posts: 2.375-inch OD Type I steel pipe.
   2. Round End, Corner, and Pull Posts: 2.875-inch OD Type I steel pipe.

D. Swing Gate Posts: Furnish post to support single gate leaf, or one leaf of a double-gate installation, according to ASTM F 900, sized as follows.
   1. Steel posts for fabric height of 8 feet or less and gate leaf width:
      a. Up to and including 4 feet: 2.875-inch OD pipe weighing at least 5.79 lb per foot.
      b. Over 4 to 10 feet: 4.000-inch OD pipe weighing at least 9.11 lb per ft.

2.03 FITTINGS AND ACCESSORIES

A. Material: Comply with ASTM F 626. Galvanized iron or steel to suit manufacturer's standards.
   1. Steel and Iron: Unless specified otherwise, hot-dip galvanize steel or cast-iron fence fittings and accessories with at least 1.2 oz. Zinc per sq. ft. as determined by ASTM A 90.

B. Post and Line Caps: Provide weather-tight closure cap for each post. Provide line post caps with loop to receive top rail.

C. Post Brace Assembly: Manufacturer's standard adjustable brace. Use material specified below for brace, and truss to line posts with 3/8-inch-diameter rod and adjustable tightener. Provide manufacturer's standard galvanized-steel, cast iron or cast-aluminum cap for each end.
   1. Round Steel: 1.6600-inch OD Type I steel pipe.

D. Bottom and Center Rail: (Where indicated on drawings). Same material as top rail unless indicated otherwise. Provide manufacturer's standard galvanized-steel, cast-iron or cast-aluminum cap for each end.

E. Tension or Stretcher Bars: Hot-dip galvanized steel with a minimum length 2 inches less than the full height of fabric, a minimum cross section of 3/16 inch by 3/4, and a minimum of 1.2 oz of zinc coating per sq. ft. Provide one bar for each gate and end post, and two for each corner and pull post, except where fabric is integrally woven into the post.

F. Tension and Brace Bands: 3/4 –inch-wide minimum hot-dip galvanized steel with a minimum of 1.2 oz. of Zinc coating per sq. ft.
   1. Tension Bands: 0.074-inch thick (14 gauge) minimum.
   2. Brace Bands: 0.105-inch thick (12 gauge) minimum

G. Tension Wire: 0.177-inch-diameter metallic-coated steel marcelled tension wire conforming to ASTM A 824 with finish to match fabric.
   1. Coating Type II zinc in the following class as determined by ASTM A 90.
      a. Class 2, with a minimum coating weight of 1.20 oz. per sq. ft. of uncoated wire surface.

H. Tie Wire: (9-gauge) aluminum wire alloy ASTM B230 or equal.

I. Barbed Wire
   1. Provide three lines of 4-point pattern barbed wire. Barbed wire shall be double strand 12-1/2 gauge twisted wire with 14-gauge, 4 point round aluminum barbs spaced on approximately 5 inch centers conforming to the requirements of ASTM A121. Extension arms to accommodate barbed wire shall withstand a 250-pound pulldown load from end of arm and have a 3-inch apron around post. The topmost barbed wire shall be approximately 18 inches above the fabric and approximately 18 inches out from fence line. Barbed wire shall be securely fastened in slots by heavy wire pins. Arms having projections to bend down over barbed wire will not be acceptable.

2.04 CONCRETE

A. Concrete: Provide concrete consisting of Portland cement per ASTM C150, aggregates per ASTM C 33, and potable water. Mix materials to obtain concrete with a minimum 28-day compressive strength of 3000 psi. Use at least four sacks of cement per cu. yd., 1-inch maximum size aggregate, 3-inch maximum slump.

B. Package Concrete Mix: Mix dry-packaged normal-weight concrete conforming to ASTM C 387 with clean water to obtain a 2-inch to 3-inch slump.

2.05 GATES

A. General: Fabricate perimeter frames of gates from same material and finish as fence framework. Assemble gate frames by welding. Provide horizontal and vertical members to ensure proper gate operation and attachment of fabric, hardware, and accessories. Space frame members a maximum of 8 feet apart unless otherwise indicated.
   1. Fabric: Same as for fence unless otherwise indicated. Secure fabric at vertical edges with tension bars and bands and to top and bottom of frame with tie wires.
   2. Bracing: Install an adjustable truss rod diagonally on gates six foot wide and greater to prevent sagging.

B. Swing Gates: Comply with ASTM F 900.
   1. Framework: Fabricate using 1.660-inch minimum OD Type I steel pipe or 1-inch-square galvanized steel tubing weighing 1.84 lb per sq. ft.
   2. Gate Hardware: Provide galvanized hardware and accessories for each gate according to the following:
      a. Hinges: Size and material to suit gate size, non-lift-off type, offset to permit 180-degree gate opening. Provide 1-1/2 pair of hinges for each leaf over 6-foot nominal height.
      b. Latch: Forked type or plunger-bar type to permit operation from either side of gate, with padlock eye as an integral part of latch.
      c. Keeper: Provide a keeper for vehicle gates that automatically engages gate leaf and holds it in the open position until manually released.
      d. Gate stops: Provide gate stops for double gates consisting of mushroom-type flush plate with anchors, set in concrete, and designed to engage a center drop rod or plunger bar. Include a locking device and padlock eyes as an integral part of the latch, permitting both gate leaves to be locked with a single padlock.

PART 3 EXECUTION

3.01 INSTALLATION

A. Work: Shall include labor, material, equipment, grading and any other incidentals required for installation. Fence to match existing fence material or as specified by the Engineer.

B. General: Install fence to comply with ASTM F 567. Do not begin installation and erection before final grading is completed, unless otherwise permitted.

C. Excavation: Drill or hand-excavate (using post-hole digger) holes for posts to diameter and spacings indicated, in firm, undisturbed or compacted soil.
   1. If not indicated on Drawings, excavate holes for each post to minimum diameter recommended by fence manufacturer, but not less than four times the largest cross section of post.
   2. Unless otherwise indicated, excavate hole depths approximately 3 inches lower than post bottom, with bottom of posts set not less than 36 inches below finish grade surface.

D. Setting Posts: Center and align posts in holes 3 inches above bottom of excavation. Space a maximum of 10 feet o.c., unless otherwise indicated.
   1. Protect portion of posts above ground from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and hold in position during placement and finishing operations.
      a. Pour concrete footings to a level 2” below finished grade and cover with fresh earth from excavation.

E. Top Rails: Run rail continuously through line post caps, bending to radius for curved runs and at other posts terminating into rail end attached to posts or post caps fabricated to receive rail. Provide expansion couplings as recommended by fencing manufacturer.

F. Center Rails: Install center rails in one piece between posts and flush with post on fabric side, using rail ends and special offset fittings where indicated.

G. Brace Assemblies: Install braces at end and gateposts and at both sides of corner and pull posts. Locate horizontal braces at midheight of fabric. Install so posts are plumb when diagonal rod is under proper tension.

H. Bottom Tension Wire: Install tension wire within 6 inches of bottom of fabric before stretching fabric and tie to each post with not less than same gage and type of wire. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch-diameter (11-gage) hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches o.c.

I. Fabric: Pull fabric taut and tie to post, rails, and tension wires.

J. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gateposts with tension bands spaced not over 15 inches o.c.

K. Tie Wires: Use wire of proper length to secure fabric firmly to posts and rails. Bend ends of wire to minimize hazard to persons or clothing.
   1. Maximum Spacing: Tie fabric to line posts 12 inches o.c. and to rails and braces 24 inches o.c.

L. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side.

M. Netting Ties: Fasten safety netting to tension cable and fence top rail with cable ties at 12” o.c.

N. Barbed Wire: Install three parallel wires on each extension arm on security side of fence, unless otherwise indicated. Pull wires taut.

O. Gates: Install gates plumb, level and secure for full opening without interference. Install ground set items in concrete for anchorage as recommended by the manufacturer.

Pay Item	**Pay Unit**
Fencing	LF
Gates	EA
Removal of Existing Fence	LF

END OF SECTION 02831

SECTION 02832

HANDRAILS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The work shall consist of the installation of horizontal handrail to include joints, posts, and sleeves.
B. Basis of Payment: Payment will be by the linear foot measured from center post to center post of handrail installed.

PART 2 PRODUCTS

2.01 MATERIALS

A. Refer to Standard Detail Number SD-10 for material requirement.

B. Concrete shall meet requirements in section 00455.

PART 3 EXECUTION

3.01 INSTALLATION

A. The work shall include the fabrication, primer, paint, installation, core holes, grout and any other incidentals required for installation of horizontal handrail.
B. Installation of Handrails shall conform to SD-10

Pay Item	**Pay Unit**
Handrails	LF

END OF SECTION 02832

SECTION 02833

MAILBOXES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The work shall consist of the removal and replacement or the removal, preservation, and resetting of all mailboxes disturbed by the construction operations.
B. Measurement and Basis of Payment: Payment shall be per each for the contract unit price for mailboxes installed.

PART 2 PRODUCTS

2.01 MATERIALS

A. Mailbox: Each replaced mailbox shall be a double door mailbox as described in SD-20.

B. Mailboxes shall be submitted to the Engineer or Designee for approval prior to installation.

PART 3 EXECUTION

3.01 RELOCATE OR RESET MAILBOX

A. When reset, the mailboxes and their supports shall be left in as good condition as they were before removal. The Contractor will not be required to furnish new material when resetting a mailbox except as required to repair damage resulting from construction operations

3.02 INSTALLATION (REMOVE AND REPLACE)

A. The work shall include removal of the existing mailbox and installation of a new double door mailbox placed in utility strip or designated location. The street side of the mailbox must be at a minimum of 6” and at a maximum of 8” from the edge of pavement or face of curb. Refer to SD-20.

Pay Item	**Pay Unit**
Remove and Replace Mailbox	EA
Relocate or Reset Mailbox	EA

END OF SECTION 02832

SECTION 02931

SOD

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Work: Sod, pest control, disease control, anchoring, placing, soil amendments, fertilizer, topsoil, grading, raking, sod bed preparation, water, maintenance, sod replacement, protection, damage repair and other incidentals required.

B. Determination of Measurement: Measurement shall be to the nearest square yard.

C. Basis of Payment: Payment will be at the contract unit price per square yard of sod installed.

PART 2 PRODUCTS

2.01 MATERIAL

A. Materials, equipment and products incorporated in the work shall be approved by the Engineer. The Contractor shall submit a list of the proposed materials with samples, if required. Package materials should be delivered in unopened original containers showing weight, analysis and name of manufacturer. Protect material from deterioration.

B. Sod shall contain 95 percent permanent grass; not more than 5 percent weeds and undesirable grasses, good texture and free from obnoxious grasses, roots, stones and foreign materials. Sod shall be uniformly 1 1/2 to 2 inches thick with a well-developed fibrous root mat system in topsoil with clean cut edges. The sod shall be sufficiently dense and cut to the minimum required thickness such that if one corner suspends the sod, the sod will not tear apart. The sod shall be recently mowed to a height of not more than 3 inches prior to harvest. The sod shall be supplied and maintained in a healthy condition as evidenced by the grass being a normal green color in appearance, dense, and free from insects, pests, disease or injury. Sod shall be delivered to the job site within 24 hours after being cut and shall be installed within 24 hours after delivery. Any sod which is torn, broken or too dry will be rejected.

C. Sod shall be sourced locally depending on availability.

PART 3 EXECUTION

3.01 REQUIREMENTS

A. Restoration and sod shall be performed as soon as practical, but the time period between initial disturbance, the utility installation and sod placement shall not exceed 60 days. Any area where work is completed shall be restored within 7 days. Sod is defined as blocks, squares, strips of turf grass and adhering soil used for vegetative planting.

B. Sodding and preparation of the sod bed shall be performed by an experienced landscape subcontractor specializing in this type of operation unless otherwise approved by the Engineer in writing. The Contractor shall adhere to the standards set forth by the American Association of Nurseryman and the Associated Landscape Contractors of America. All personnel shall be appropriately trained with regard to the degree of involvement so to assure the owner of the highest level of workmanship. Sod species suitable in this area are Hybrid Bermuda, Centipede and Zoysia; however, the sod placed for each individual's lawn shall be the same species of sod as existing. Sodding may be performed at any time of the year except frozen sod shall not be placed nor shall sod be placed on frozen ground. The Contractor shall adapt his operations to variations in weather or soil conditions as necessary

for the successful establishment and growth of a vigorous, disease free and weed free sod lawn.

3.02 SOIL BED PREPARATION

A. Before landscape construction is to begin, the site shall be cleaned and disposed of brush, rubbish, stones, gravel and other foreign material within the area to be landscaped. Exposed ground surfaces disturbed during construction activities shall be graded to the original contours allowing for the thickness of the sod or as in the case of an altered contour such as a fill slope, graded as directed by the Engineer to finish grade, or typical cross section. The sod bed shall be excavated to such a depth that after sod placement the top of the sod shall be flush with surrounding grade or contours. Rake areas to be sodded smooth, free from unsightly variations, bumps, ridges or depressions. Do not start work until conditions are satisfactory and do not work during inclement or impending inclement weather.

B. The surface area to receive sod shall contain a minimum of 4 inches of good, fertile, friable, organic natural topsoil loam as a base for laying the sod. Topsoil shall be free of clumps, brush, sticks, weeds, stones, roots, trash or other objectionable material. Contractor shall ensure all topsoil to be free of plants or plant parts of Quackgrass, Johnson grass, nut sedge, poison ivy or other noxious weeds. Soil preparation shall not be performed in frozen or extremely wet conditions. The finished topsoil bed shall be uniform in grade, with a yard like appearance. All changes in grade shall have smooth, rounded peaks and valleys.

C. The soil shall be scarified or otherwise loosened to a depth of not less than 5 inches and all clods shall be broken. The top 4 inches shall be worked into an acceptable smooth, friable and uniformly fine texture sod bed by use of soil pulverizes, drags, harrows or by other methods approved by the Engineer. Commercial grade fertilizer containing 8% Nitrogen, 8% Phosphate, 8% Potassium (Potash) shall be applied at a rate of 20 pounds per 100 square feet. Super-Phosphate at 12 pounds per 1000 square feet. Dolomite limestone (Lime) containing not less than 85% total carbonates shall be applied at a rate of 25 pounds per 1000 square feet, or at a rate recommended for the type of sod being placed. Apply soil amendments within 24 hours after raking topsoil base surface and not more than 48 hours prior to laying sod. Mix thoroughly a minimum depth into the upper 4 inches of topsoil and lightly water to aid in dissipation. Sod placement shall not begin until the soil preparation is inspected and approved by the Engineer. During application of soil amendment fertilizer etc., adequate precautions shall be taken to prevent damage to existing features such as traffic, structures, landscape, trees, vegetation, utilities or any other appurtenances. The Contractor shall be required to repair or clean any damages.

3.03 PLACING SOD

A. The Contractor and his landscape subcontractor shall coordinate the placing of the sod to begin within 24 hours after the topsoil base preparation is completed and accepted by the Engineer. Sod shall be brought to the site as near to the time of placing as possible. Store sod in the shade and keep watered particularly in extreme hot and dry condition to insure vitality and to prevent the dropping off of soil during handling. During wet weather, the sod shall be allowed to dry sufficiently to prevent tearing. Handling shall be done in a manner which will prevent tearing, breaking, drying or other damage. Carefully place sod in rows with the longer side perpendicular to slopes and the ends staggered in each successive row in a brick-like pattern. Butt the ends and sides together tightly and do not overlap or stretch the sod. Do not leave any voids or gaps.

B. Ensure sod that abuts valve box covers, manhole covers and/or utility poles, walks, etc, and is 1/4" below the edge of the structure to allow for positive drainage. Soil shall not dam up

water adjacent to walks, etc. or exhibit ponding. Unavoidable gaps shall be closed with small pieces of torn or broken sod if kept moist and approved by the Engineer. After the sod is laid, irrigate thoroughly to allow water to penetrate a minimum 6 inches into the soil below the sod. Sod shall not be placed when the atmospheric temperature is below 32° F.

C. Tamp and roll completed sod installation with a manual roller or approved equipment to eliminate minor irregularities and to form close contact with the soil bed immediately after placing and watering. The type of rolling and tamping equipment to be used shall be submitted to the Engineer for approval prior to construction. On slopes 3:1 horizontal to vertical or greater, in drainage ditches, or any areas where sod slipping may occur, anchor sod with approved wooden stakes (1/2"x 3/4" x 12") or staples spaced not over 2 feet apart in any direction and/or in sufficient number to prevent slippage or displacement. The anchors shall be driven flush with the surface of the sod. The wide flat side of the stake shall be driven parallel to the slope. Staking shall be done concurrently with sod placement and prior to tamping. Sod shall be laid with the long horizontal edge of the strips parallel to the contour starting at the bottom of the slope. The edge of the sod shall be turned slightly into the ground at the top of a slope and a layer of earth placed over it and compacted so as to conduct the surface water over and onto the top of the sod. Upon completion of the above-described work, the surface of the sodded areas shall coincide with the finished grade and not exceed 1/4" plus or minus variation to adjoining grade or proposed contour. Extreme care shall be taken to prevent the installed sod from being torn or displaced. Where sod is placed adjacent to travel way Contractor shall protect sod from vehicular or other shoulder traffic by roping off temporarily or providing other suitable means of protection until sod has set.

3.04 MAINTENANCE

A. The Contractor shall, at no additional cost to the Owner, make whatever arrangements necessary to ensure an adequate supply of water to meet the needs of this Contract. The Contractor shall supply water of suitable quality and purity to sustain and encourage vigorous plant growth and supply all equipment for proper de1ivery and application to planted areas. Water obtained from PWC fire hydrant shall be metered and properly protected with an approved backflow prevention device. All costs for water use shall be borne by the Contractor. PWC must inspect and approve any connections to their water system to include the proposed water application and storage equipment. The Contractor shall not use private resident's water. The Contractor is solely responsible to provide watering of the sod. The Engineer shall approve the method of application of water. Limit watering to early morning or late afternoon to enable the soil to absorb the maximum amount of water with limited runoff.

B. Maintenance shall begin immediately after sodding operation. Contractor shall provide a written schedule to the Engineer of proposed maintenance methods and scheduled maintenance. The Contractor shall maintain all sodded areas until sod is firmly established and as outlined below. Maintenance will include watering, fertilizer, pest control, soil amendments, disease control, erosion repair, mowing, protecting turf area from traffic (i.e. temporary fences, barriers, signs, etc.) and replacement of any dead or damaged sod.
   1. Watering
      a. Water lawn areas once a day with a minimum 1/2-inch water for the first 3 weeks after area sodded.
      b. After the 3-week period, water twice a week with a 3/4-inch of water each time unless a comparable amount of rainfall has occurred.
      c. Make weekly inspections to determine moisture content of soil and supplement the above watering schedule as needed.
      d. Excessive runoff, puddling, and wilting shall be prevented.

2. Fertilizer and Pest Control
    a. Evenly spread fertilizer composite at a rate of 40 pounds per 5000 square feet or as recommended by the manufacturer. Fertilizer shall not be applied until 2 weeks after initial placement of the sod or prior to the advent of winter
    b. Treat areas of weed and insect infestation as recommended by the treatment manufacturer.
3. Mowing
    a. The Contractor shall do mowing operations, in yards not being mowed by residents until provisional acceptance.
    b. Mowing shall be done only when the grass is dry with a rotary type mower having a blade height set not lower than l 1/2 inches nor higher than 3 inches.
    c. Mowing operations shall be conducted at intervals which ensure grass height does not exceed 4 inches between mowing.
    d. The Contractor shall complete at least one mowing operation before the work will be considered for provisional acceptance.
    e. The Contractor shall protect and not allow access of vehicular traffic into any newly sodded areas and shall repair any damaged turf to original grade. Maintenance shall continue for a period of one year after placement or until provisional acceptance by the Engineer. A written record shall be furnished to the Engineer of the maintenance work performed. At least two weeks shall elapse after chemical control is applied before a request of inspection.

3.05 ACCEPTANCE

A. Fifteen days prior to the end of the one year maintenance period, the Contractor shall make written request to the Engineer for an inspection and provisional acceptance of the sod. Failure to notify the Engineer will not relieve the Contractor of the maintenance provisions required and the Contractor will continue to be responsible for the maintenance of the sod.

B. Replacement of dead sod shall be performed within 7 days after notification by the Engineer and the maintenance period for these areas or individual lawns shall be extended for the 90-day maintenance period. Failure to replace dead sod within the specified 7-day period will result in the Owner having the work performed and deducting the cost from the Contract, however, the Contractor shall be responsible for the maintenance and if necessary replacement of sod.

C. Final acceptance will be given upon satisfactory contract performance exhibited at final inspection and acceptance. Sodded areas are to be fully rooted prior to acceptance. The Engineer shall be the sole judge as to whether or not the lawns are acceptable. Should any deficiencies be disclosed at final inspection, the Contractor shall make the necessary corrections in a timely manner and request re-inspection.

D. After the completion of the project, the Contractor will provide a warranty letter for one year.

3.06 GUARANTEE

A. The Contractor shall guarantee a dense, vigorous stand of turf free of weeds, disease, pests or any dead areas more than one half of a square foot in size for a period of one year from initial placement or replacement whichever is greater. Total dead area shall not exceed 1% of total square footage for each individual resident's lawn.

Pay Item	**Pay Unit**
Sod	SY

END OF SECTION 02931

SECTION 02932

SEEDING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. The work consists of providing all labor, material, equipment, and services required for all work as described herein and indicated on drawings.
   1. Work specified in this section:
      a. Preparation and placement of topsoil. Seeding required within 24 hours after preparation.
      b. Initial maintenance of all planting.

B. Measurement: Per acre seeded as specified in the plan, except when less than 1 acre, then square yard as measured in the field.

C. Basis for Payment: Payment shall be on a contract unit price per acre that is seeded, except when less than one acre then square yards will be used.

PART 2 PRODUCTS

2.01 MATERIALS

A. Substitutions for any materials will not be permitted unless authorized in writing by the City.

B. Topsoil:
   1. Topsoil shall be fertile, friable, natural topsoil typical of topsoil of the locality. The topsoil shall be stripped so that there is no admixture of subsoil and shall be free from clay clumps, stones, roots, or similar substances two inches or more in diameter, debris, or other objects which might be a hindrance to planting operations. The City reserves the right to reject topsoil in which more than 60 percent of the materials passing V.S.S. #100 sieve consist of clay as determined by the Bonyoucous Hydrometer by the dried weights of the materials.

C. Soil Additives:
   1. Manure: Well-rotted, unleached, sterilized stable manure which is free of wood shavings, sawdust, or other undesirable litter and contains no chemical or other ingredients harmful to plants and shall not be less than 9 months old and not more than 2 years.
   2. Peat: Domestic product consisting of partially decomposed vegetable matter of natural occurrence. It shall be brown, clean, and low in content of mineral and wood material, mildly acid, and granulated or shredded.
   3. Lime: Shall be ground limestone (Dolomite) containing not less than 85 percent of total carbonates and shall be ground to such a fineness that 50 percent will pass through a 100-mesh sieve and 90 percent will pass through a 20-mesh sieve. Coarser material will be acceptable, provided the specified rates or application are increased proportionately on the basis of quantities passing through the 100-mesh sieve.
   4. Fertilizer:
      a. In Turf Areas, Ground Covers, and Flowers, fertilizer shall be of a controlled release formula and shall conform to the applicable State Board of Agriculture 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 has become caked or otherwise damaged will not be acceptable.

b. All fertilizer and soil conditioners shall be standard brand agricultural products.

D. Mulch: Use grain straw as mulch at any time of the year. If permission to use material other than grain straw is requested and the use of such material is approved by the Engineer, the season limitations, the methods and rates of application, the type of binding material or other conditions governing the use of such material will be established by the Engineer at the time of approval. Apply mulch within 24 hours of seeding unless otherwise permitted. Spread mulch uniformly by hand or by approved mechanical spreader or blower.

E. Plant Materials: Certificates of inspection shall accompany the invoice for each shipment of seeds as may be required by laws for transportation. Deliver certificates to the City prior to acceptance of the material.

2.02 SOURCE QUALITY CONTROL AND TESTS

A. Testing and Inspection: The City shall be notified of the sources of the materials required, desired to be inspected or tested.

B. Testing:

1. Topsoil: All new loam or stripped topsoil shall be tested and approved for use by the Engineer prior to being spread. Stripped material may be used if approved and shall be stockpiled so as not to interfere with the other work or with other subgrade of fill materials.
2. Testing other than soil testing shall be paid for by the City if the City deems the testing necessary.

C. Inspections:

1. All areas to be planted shall be inspected by the Planting Contractor before starting work. Any defects, such as incorrect grading, etc., shall be reported to the City prior to beginning this work. The commencement of work by the Contractor shall indicate his acceptance of the areas to be planted, and he shall assume full responsibility for the work of this Section.
2. During construction and installation, onsite inspections by the City will be made periodically to ensure proper implementation of design. The City retains the right to accept or reject any material or other incidentals needed to complete the project in whole or part and also may stop all work until all discrepancies are resolved.
3. Any work scheduled beyond normal working hours or on weekends, shall be brought to the attention of the City Inspector for approval. Any work accomplished during these hours and in question will be subject to being done over at the request of the City, at no additional cost to the City.
4. The City will inspect topsoil to be used to determine whether or not it meets the requirements specified.
5. City representative shall be present during the application of post emergent sterilization.
6. After completion of project, Contractor will provide a one year warranty letter.

PART 3 EXECUTION

3.01 SUBMITTALS

A. Construction sequence and time schedule.

B. Soil additives and mulch materials.

C. Fertilizers, sterilants, herbicides.

D. Monthly maintenance record: List all herbicides, insecticides, and disease control chemicals used; list a corrective action or replacement of work performed.

E. Suggested maintenance plan for maintenance by City to include chemical recommendations, amount of watering and all other proper care necessary to assure quality plant growth.

F. All other materials: Manufacturer and the product designation.

3.02 MAINTENANCE

A. The Maintenance Period shall extend for a period of one year dating from final inspection.

B. Maintenance requirements:
   1. Maintenance shall include mowing, watering, weeding, leaf raking, fertilizing, and all other care dictated by the standard of the best horticultural practices. In the event the irrigation system is inoperable or in the absence of such system, it shall be the responsibility of the landscape Contractor to supply sufficient watering from the beginning of planting through the one year warranty period at no additional cost to the City.
   2. Maintain all seeded areas from the time of installation until final acceptance of the entire work.
   3. Keep all seeded areas clean and free of weeds, rubbish, and debris at all times.
   4. Seeded areas shall be protected at all times against trespassing and damage of all kinds for the duration of the maintenance period. If any areas become damaged or injured, they shall be treated or replaced as directed by the City at no additional cost to the City.

C. Final inspection and acceptance:
   1. Prior to request for final inspection, Contractor shall again thoroughly clean all seeded areas.
   2. Final inspection will be made upon request and upon notification that Maintenance Period has ended.
   3. Acceptance will be given upon satisfactory findings in the final inspection or upon satisfactory correction of any deficiencies disclosed by the final inspection.

3.03 COORDINATION

A. Coordinate with installation of irrigation system.

B. Coordinate with all earth work and site work.

3.04 INSTALLATION

A. Work: Shall include the full width of the disturbed area for the cleanup and seeding. Work shall include, but not be limited to, the following:
   1. Removal and proper disposal of debris and excess material.
   2. Grade disturbed areas to original or proposed surface profile.
   3. Cleaning of paved surfaces.
   4. Proper seeding, fertilizing, mulching and other incidentals necessary to properly seed project area.

B. Soil Preparation:
   1. Add any amendments necessary to bring topsoil up to standard specified in section 00426.
   2. All topsoil must be approved by Engineer.
   3. Coordinate with irrigation work, if any, to assure all lines have been installed prior to placement of topsoil or any other preparation for planting areas.
   4. Rough grades for planting areas have been left 8-12 inches below adjacent paving and/or curbing under work of General Contractor. Landscape Contractor should plan to provide soil and labor to backfill curbing and sidewalk and should coordinate the work

with the general Contractor as his work progresses. It shall be the responsibility of the Landscape Contractor to provide the specified grade for planting areas -- City will not be responsible for any excavation needed to acquire desired depth.

5. Debris removal: In all seeding areas, remove and dispose of all wire, rubbish, debris, concrete waste, base rock, or other plant materials which might hinder soil preparation, grading, seeding, or subsequent maintenance. Rake to smooth soil.
6. Scarify existing earthwork: Soil in all on-grade paling areas shall be ripped or cultivated to depth of 10 inches. Water shall be added and ripping or cultivating shall be continued until the entire specified depth is loose and friable. All debris, pavement, concrete, and rocks over 2 inches in diameter shall be removed to the specified depth and shall be removed from the site.
7. Place approved topsoil at grade in seeding areas.
8. Rake soil smooth to finished grade, pitched evenly for drainage. Round all changes in gradient and eliminate all depressions where water will pool.
9. Water areas to settle soil. After drying, correct low spots, irregularities, and reestablish finished grade.

C. Finished Grading: When weeding, soil preparation, and soil conditioning have been completed and soil has been thoroughly water settled, all planting areas shall be smooth graded, ready for placement of plant materials and for seeding and/or sodding.

D. Seeded Lawn Areas:
   1. General:
      a. Once site is prepped with lime and fertilizer, it shall be seeded within a 24 hour period.
      b. Seed all lawn areas not covered by sod or other planting areas within scope of construction.
      c. After the areas have been loosened, conditioned, and finish graded as previously specified, they shall be hand raked to remove all clods, weeds, roots, debris and rocks 1 inch in diameter and larger.
      d. Final grades shall be approved by the City prior to seeding.
      e. After final grading has been accepted, no heavy equipment (except lawn rollers) will be allowed onto planting surfaces. Any damaged areas will be prepared using previous method.
      f. De-thatching shall be done in areas not requiring topsoil and grading work and in areas where existing lawn will be top seeded. Use a motor driven de-thatcher to remove all thatch buildup and loosen all areas to be seeded. Area should be hand raked and all debris promptly removed. All seeding shall take place within 24 hours following dethatching. City shall approve all areas for seeding prior to doing so.
   2. Seed Selection:
      a. Seed quantities and mixtures as specified on drawings.
      b. Provide seed complying with the official seed analysis of North America with respect to purity and germination percentages.
      c. Seed should be newly packaged seed (not greater than one year) and should arrive at the job site in the original container. City retains the right to inspect seed specification tag remaining intact on container.
      d. Do not use any seed that has been dampened, moldy, or suffered any other damage in transit or storage.

3. Seed Schedule

COMMON NAME	MIN SEED PURITY	MIN GERMINATION	MAX WEED SEED
Bermuda	90%		1.00%
Fescue tall, (Ky, 31)	98%		1.00%
Wheat	98%	90%	0.10%
German Millet	98%	90%	0.10%

POUNDS PER ACRE				
	K-31 Fescue	**German Millet**	**Bermuda Hulled**	**Bermuda Unhulled**
March 15 – Sept 15	100	25	25	--
	K-31 Fescue	**Wheat**	**Bermuda Hulled**	**Bermuda Unhulled**
Sept 15 – March 15	100	30		30

4. Once the seed is applied, the area shall be very lightly raked, either by hand or by mechanical means. All road right-of-ways and/or private grounds shall also be reseeded or sodded with the same type of grass previously found. The seed mixture specifications shall be used as a guide and the Contractor is charged with the responsibility of seeding areas with the proper type of grass existing.
5. All seeded areas will be mulched with 4000 pounds per acre of small grain straw spread uniformly. Approximately 1/4 of the ground should be visible to avoid smothering seedlings. Asphalt emulsion may be used to anchor the straw applied at 150 gal/ton of straw. If asphalt emulsion is used, the Contractor shall not deface buildings, curbs or plantings with asphalt materials. The Contractor shall take sufficient precautions to prevent mulch from entering drainage structures through displacement by wind, water or other causes and promptly remove any blockage which may occur.

3.05 CLEANING

A. Any soil or similar material which has been brought into paved areas by hauling operations or otherwise shall be removed promptly, keeping these areas clean at all times.

B. Upon completion of work under this section, all excess stones, debris, and soil resulting from work under this section which have not previously been cleaned up shall be cleaned up and removed from the project site.

C. All pavements shall be broomed and hosed clean.

3.06 CONTRACT CLOSEOUT

A. Final Inspection:
1. Prior to requesting final inspection, Contractor shall have completed all of the work of seeding. All seeding areas shall be cleaned of all rubbish and debris, all adjacent pavement or surfaces shall be clean, and entire work shall be neat and presentable.
2. The final inspection will be made upon request and upon notification that all work installation is completed.
3. Approval will be given upon satisfactory findings in the final inspection or upon satisfactory correction of any deficiencies disclosed by the final inspection.

PAY ITEM:	**PAY UNIT:**
Seeding	AC or SY

END OF SECTION 02951

SECTION 02950

TREES, PLANTS, AND GROUND COVER

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preparation of soil.

B. Topsoil bedding.

C. Relocation of trees, plants and ground cover.

D. Mulch and fertilizer.

E. Maintenance.

F. Tree Pruning.

G. Determination of Measurement: Measurement shall be for each unit.

H. Basis of Payment: Payment will be at the contract unit price per each unit installed.

1.02 REFERENCES

A. ANSI Z60.1 - Nursery Stock.

B. NAA (National Arborist Association) - Pruning Standards for Shade Trees.

1.03 DEFINITIONS

A. Weeds: Any plant life not specified or scheduled.

B. Plants: Living trees, plants, and ground cover specified in this Section, and described in ANSI Z60.1.

1.04 SUBMITTALS - PROJECT CLOSEOUT

A. Maintenance Data: Include cutting and trimming method; types, application frequency, and recommended coverage of fertilizer.

B. Submit list of plant life sources.

1.05 QUALITY ASSURANCE

A. Nursery Qualifications: Company specializing in growing and cultivating the plants with three years' experience.

B. Installer Qualifications: Company registered and specializing in installing and planting the plants with 3 years' experience.

C. Tree Pruner Qualifications: Company specializing in pruning trees with proof of Arborist Certification.

D. Tree Pruning: NAA - Pruning Standards for Shade Trees.

E. Maintenance Services: Performed by installer.

1.06 WARRANTY

A. Provide one year warranty.

B. Warranty: Includes coverage for one continuous growing season; replace dead or unhealthy plants.

C. Replacements: Plants of same size and species as specified, planted in the next growing season, with a new warranty commencing on date of replacement.

1.07 MAINTENANCE SERVICE

A. Maintain plant life for 12 months after Date of Substantial Completion.

B. Maintain plant life immediately after placement until plants are well established and exhibit a vigorous growing condition. Continue maintenance until termination of warranty period.

C. Maintenance to include:
   1. Cultivation and weeding plant beds and tree pits.
   2. Applying herbicides for weed control in accordance with manufacturer's instructions. Remedy damage resulting from use of herbicides.
   3. Remedy damage from use of insecticides.
   4. Irrigating sufficient to saturate root system.
   5. Pruning, including removal of dead or broken branches, and treatment of pruned areas or other wounds.
   6. Disease control.
   7. Maintaining wrapping, guys, turnbuckles, and stakes. Adjust turnbuckles to keep guy wires tight. Repair or replace accessories when required.
   8. Replacement of mulch.

PART 2 PRODUCTS

2.01 TREES, PLANTS, AND GROUND COVER

A. Trees, plants and ground cover: Species and size identifiable in plant schedule, grown in climatic conditions similar to those in locality of the Work.

2.02 SOIL MATERIALS

A. Topsoil: Fertile, agricultural soil, capable of sustaining vigorous plant growth; free of subsoil, clay or impurities, plants, weeds and roots

2.03 SOIL AMENDMENT MATERIALS

A. Fertilizer: Nitrogen 5 percent, phosphoric acid 10 percent, soluble potash 5 percent.

B. Lime: Ground limestone, dolomite type, minimum 95 percent carbonates.

C. Water: Clean, fresh, and free of substances or matter which could inhibit vigorous growth of plants.

2.04 MULCH MATERIALS

A. Mulching Material: Hardwood mulch.

2.05 ACCESSORIES

A. Wrapping Materials: Burlap.

B. Stakes: Softwood lumber w/ pointed end. Mild steel angle, galvanized, pointed end.

C. Cable, Wire, Eye Bolts, and Turnbuckles: Non-corrosive, of sufficient strength to withstand wind pressure and resulting movement of plant life.

D. Plant Protectors: Rubber sleeves over cable to protect plant stems, trunks, and branches.

2.06 REGULATORY REQUIREMENTS

A. Comply with regulatory agencies for fertilizer and herbicide composition.

B. Plant Materials: Certified by state department of agriculture. Described by ANSI Z60.1, free of disease or hazardous insects.

PART 3 EXECUTION

3.01 WORK

A. Preparation of subgrade and topsoil, placing soils, planting, watering and maintenance.

3.02 COORDINATION

A. Install plant life after and coordinate with installation of underground irrigation system piping and watering heads specified in Section 02810.

3.03 EXAMINATION

A. Verify that prepared subsoil is ready to receive work

B. Saturate soil with water to test drainage.

C. Verify that required underground utilities are available, in proper location, and ready for use.

3.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

B. Protect and maintain plant life until planted.

C. Deliver plant life materials immediately prior to placement. Keep plants moist.

3.05 PREPARATION OF SUBSOIL

A. Prepare subsoil to eliminate uneven areas. Maintain profiles and contours. Make changes in grade gradual. Blend slopes into level areas.

B. Remove foreign materials, weeds and undesirable plants and their roots. Remove contaminated subsoil.

C. Scarify subsoil to a depth of 3 inches where plants are to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted subsoil.

D. Dig pits and beds 6 inches larger than plant root system.

3.06 PLACING TOPSOIL

A. Spread topsoil to a minimum depth of 4 inches over area to be planted. Rake smooth.

B. Place topsoil during dry weather and on dry unfrozen sub-grade.

C. Remove vegetable matter and foreign non-organic material from topsoil while spreading.

D. Grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage.

E. Install topsoil into pits and beds intended for plant root balls, to a minimum thickness of 6 inches.

3.07 FERTILIZING

A. Apply fertilizer in accordance with manufacturer's instructions.

B. Apply after initial raking of topsoil.

C. Mix thoroughly into upper 2 inches of topsoil.

D. Lightly water to aid the dissipation of fertilizer.

3.08 PLANTING

A. Place plants for best appearance for review and final orientation by Architect/Engineer.

B. Set plants vertical.

C. Remove non-biodegradable root containers.

D. Set plants in pits or beds, partly filled with potting soil, at a minimum depth as indicated on drawings under each plant. Loosen burlap, ropes, and wires, from the root ball.

E. Place bare root plant materials so roots lie in a natural position. Backfill soil mixture in 6-inch lifts. Maintain plant life in vertical position.

F. Saturate soil with water when the pit or bed is half full of topsoil and again when full.

3.09 PLANT RELOCATION AND RE-PLANTING

A. Relocate plants as directed by Engineer.

B. Re-plant plants in pits or beds, partly filled with prepared topsoil mixture, at a minimum depth as indicated on drawings under each plant. Loosen burlap, ropes, and wires, from the root ball.

C. Place bare root plant materials so roots lie in a natural position. Backfill soil mixture in 6-inch layers. Maintain plant materials in vertical position.

D. Saturate soil with water when the pit or bed is half full of topsoil and again when full.

3.10 FIELD QUALITY CONTROL

A. Field inspection and testing.

B. Plants will be rejected if a ball of earth surrounding roots has been disturbed or damaged prior to or during planting.

3.11 MAINTENANCE

A. Neatly trim plants where necessary.

B. Immediately remove clippings after trimming.

C. Water to prevent soil from drying out.

D. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions.

E. Apply pesticides in accordance with manufacturer’s instructions.

Pay Item	**Pay Unit**
Trees, Plants and Ground Cover	EA
Plant Relocation and Replanting	LS

END OF SECTION 02950

SECTION 04000

MASONRY

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this Section.

1.02 DESCRIPTION OF WORK

A. Mortar

B. Brick masonry

C. Cast Stone

D. Unit pavers

1.03 QUALITY ASSURANCE

A. All produces and execution shall conform to applicable standards and specifications published by the following:

1. The American Society for Testing and Materials (ASTM)
2. American National Standards Institute (ANSI)
3. National Concrete Masonry Institute (NCMA)
4. Structural Clay Products Institute (SPCI)
5. Underwriters Laboratories, Inc. (UL)

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's specifications and other data for each type of masonry unit, accessory, and other manufactured products, including certifications that each type complies with specified requirements. Include instructions for handling, storage installations and protections.

1.05 JOB CONDITIONS

A. Protection of Work: During erection, cover top of walls with heavy waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress.

1.06 COLD WEATHER PROTECTION

A. Remove any ice or snow formed on masonry bed by carefully applying heat until top surface is dry to the touch.

B. Remove all masonry determined to be frozen or damaged by freezing conditions.

C. Perform the following construction procedures while the work is progressing:

1. When air temperature is from 40 degrees F (4 degrees C) to 32 Degrees F (0 degrees C), heat sand or mixing water to produce mortar temperatures between 40 degrees F (4 degrees C) and 120 degrees F (49 degrees C)
2. Do not lay masonry when the temperature of the surrounding air is 32 degrees F (0 degrees C) and falling.

D. Perform the following protections for completed masonry and masonry not being worked on:

1. When the mean daily air temperature is from 40 degrees F (4 degrees C) to 32 degrees F (0 degrees C), protect masonry from rain or snow for at least 24 hours by covering with weather resistive membrane.

2. When mean daily air temperature is from 32 degrees F (0 degrees C) to 25 degrees F (-4 degrees C), completely cover masonry with weather-resistive membrane for at least 24 hours.

3. When mean daily air temperature is from 25 degrees F (-4 degrees C) to 20 degrees C) completely cover masonry with insulating blankets or similar protection for at least 24 hours.

4. When mean daily temperature is 20 degrees F (-7 degrees C) and below, maintain masonry temperature above 32 degrees F (0 degrees C) for 24 hours using enclosures and supplementary heat, electric heating blankets, infrared lamps, or other acceptable methods.

PART 2 PRODUCTS

2.01 MORTAR MATERIALS

A. Portland Cement: ASTM C150, Type I. Provide natural color or white cement as required to produce the required mortar color.

B. Hydrated Lime: ASTM C 207, Type S.

C. Aggregates: ASTM C 144, except for joints less that ¼" use aggregate graded with 100% passing the No. 16 sieve.

D. Mortar Color: Supply mortar color with fast-color, mineral pigments to produce color of mortar selected by architect.

E. Water: Clean, free of deleterious materials which would impair strength or bond.

2.02 CAST STONE

A. Ornamental Ball: Ornamental Ball shall be design PC-3/12, 12" diameter without pier cap, S-15 color, SK finish, as manufactured by Dura Art Stone, Conley Georgia or approved equal.

B. Balustrade: Balustrade shall consist of the following components, all of which manufactured by Dura Art Stone of Georgia:

1. Base Rails shall be BR4, *' sections with appropriate end sections. Provide with dowels for anchoring to bridge deck. Fabricated for equal baluster spacing of approximately 8.4".

2. Baluster shall be RB2, round, spaced approximately 8.4" on center. Provide with dowels for anchoring to base rails and gap rails. Provide half balusters each side of intermediate piers and inside of end piers. Balusters shall be 31" high.

3. Piers: Intermediate piers shall be 12" straight, provincial. End piers shall be 7" end, provincial.

4. Cap Rail shall be CR4, 8' sections with appropriate end sections. Fabricate for equal baluster spacing of approximately 8.4".

5. Keystone for arch shall be fabricated according to dimensions on details. Composition, color, and finish shall match other cast stonework. Cast dowels into keystone for anchoring into brick arch.

6. System Design: Balustrade system shall be designed by the manufacturer. Submit drawings showing complete elevation, spacing of balusters, piers, and details for installation. Color for all components shall be S-15 (silica white), finish shall be SK (sharked smooth).

2.03 UNIT PAVERS

A. Solid concrete interlocking paving stones: ASTM C936-82 paving stones shall be Holland Stone as manufactured by Metromont Materials, Spartanburg, South Carolina or approved equal. Paving stones shall be 2 3/8" x 4" x8" with hidden spacer and meet the following physical requirements:

1. Compression Strength- At the time of delivery to the work site, the average compressive strength shall not be less than 8,000 psi with no individual unit strength less than 7,200 psi with testing procedures in accordance with ASTM Standard C-140.

2. Absorption- The average absorption shall not be greater than five percent (5%) with no individual unit absorption greater than seven percent (7%).

3. Proven Field Performance – Satisfying field performance is indicated with units similar in composition and made with the same manufacturing equipment as those to be supplied to the purchaser, do not exhibit objectionable deterioration after at least one (1) year.

4. All units shall be manufactured with a separate surfaced hardened mix to ensure consistent texture and concentration of color on the wearing surface.

B. Visual Inspection

1. All units shall be sound and free of defects that would interfere with the proper placing of the unit of impair the strength of performance of the construction. Minor cracks incidental to the usual methods of manufacture, or minor chipping resulting from customary methods of handling in shipment and delivery, shall not be deemed grounds for rejection.

C. Sampling and Testing

1. The purchaser or his authorized representative shall be accorded facilities to inspect and sample the units at the place of manufacture from lots ready for delivery.

2. Sample and test units in accordance with ASTM Methods C-140.

D. Rejection

1. In case the shipment fails to conform to the specified requirements, the manufacturer may sort it, and new test units shall be selected at random by the purchaser from the retained lot and tested at the expense of the manufacturer. In case the second set of test unit fails to confirm to the specified requirements, the entire lot shall be rejected.

E. Expense of Tests

1. The expense of inspection and testing shall be borne by the purchaser unless otherwise agreed.

F. Sand Laying Course

1. The sand laying course shall be a well graded, clean washed sharp sand with 100% passing 3/8" sieve size and a maximum of 3% passing a No. 200 sieve size. This is

commonly known as manufactured concrete sand, river sand, granite screenings, or similar. DO NOT USE MASON SAND.

2. Bedding sand to conform to ASTM C-33 – The sand-laying course should be the responsibility of the paving stone installer.

PART 3 EXECUTION

3.01 MORTARED BRICK MASONRY

A. Do not lower the freezing point of mortar by use of admixtures or antifreeze agents.

B. Do not use calcium chloride in mortar by use of admixtures or antifreeze agents.

1. Type M: ¼ part lime per part of Portland cement.

2. Type S: Over ¼ up to ½ part lime per part Portland cement.

C. Thickness: Build masonry construction to the full thickness shown, except, build single-width walls (if any) to the actual thickness of the masonry units, using units of nominal thickness shown or specified.

D. Cut masonry units with motor-driven saw designed to cut masonry with clean, sharp, unchipped edges. Cut units as required to provide pattern shown and to fit adjoining work neatly. Use full units without cutting wherever possible.

E. Do not wet concrete masonry units.

F. Frozen Materials and Work: Do not use frozen materials or materials mixed or coated with ice or frost. For masonry, which is specified to be wetted, comply with BIA recommendations. Do not build on frozen work. Remove and replace masonry work damaged by frost or freezing.

G. Lay-up walls plumb and true and courses level accurately spaced and coordinated with other work.

H. Stopping and Resuming Work: Rack back ½-masonry unit length in each course; do not tooth. Clean exposed surfaces of set masonry, wet units lightly (if specified to be wetted) and removed loose masonry units and mortar prior to laying fresh masonry.

I. Mortar Bedding and Jointing:

1. Use Type M mortar for masonry below grade and in contact with earth, interior and exterior load bearing walls.

2. Use Type S mortar for exterior above grade and in contact with earth, interior and exterior load bearing walls.

3. Measure and batch materials either by volume or weight, such that the required proportions for mortar can be accurately controlled and maintained. Measurement of sand exclusively by shovel will not be permitted.

4. Mix mortars with the maximum amount of water consistent with workability to provide maximum tensile bond strength within the capacity of the mortar.

5. Mix mortar ingredients for a minimum amount of water consistent with workability to provide maximum tensile bond strength within the capacity of the mortar.

6. Mix mortar ingredients of a minimum of 5-minutes in a mechanical batch mixer. Use water clean and free of deleterious materials, which would impair the work. Do not use

mortar, which has begun to set, or if more than 2 ½ hours has elapsed since initial mixing. Re-temper mortar during 2 ½ hour period as required to restore workability.

7. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells; also, bed webs in mortar in starting course on footings and foundation walls and in all courses of piers, columns, and pilasters, and where adjacent to cells, or cavities to be reinforced or to be filled with concrete or grout.

8. Joints: Maintain joint widths shown, except for minor variations required to maintain bond alignment. If not otherwise indicated, lay walls with 3/8" joints. Cut joints flush for masonry walls which are to be concealed or to be covered by other materials.

9. Remove masonry units disturbed after laying, clean and relay in fresh mortar. Do not pound corners at jambs to fit stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar, and reset in fresh mortar.

10. Formwork for Supporting Reinforced Masonry: Construct formwork to fully support reinforced arch for its entire length. Tolerance for formwork shall be 1/8" true to radius, 1/16" true to level. Leave formwork in place for 14 days after erection.

3.02 CAST STONE

A. Cast stone shall be constructed per manufacturer's recommendations. Drawings and recommendations shall be submitted for review prior to beginning of construction. Joints shall be ½", slightly concave, color to match cast stone. Base rails and bridge shall be drilled and dowelled and grouted securely.

3.03 UNIT PAVERS

A. The paving stone installer/contractor must have related experience in the installation of interlocking concrete paving stones.

B. Base Course Preparation

1. A suitable base must be prepared as detailed in other sections of the project specifications.

2. The base course shall be shaped to grade and cross section with an allowable tolerance of 1.4" (5mm).

3. The compacted base thickness is as follows: Patios, sidewalk, pool decks, and other designated areas for pedestrian walkways shall be at least 4" (100mm) on well drained soils. For other areas such as driveways, receiving wheeled traffic loads, a minimum of 6" (150mm) base thickness is required. A minimum of 8" (200mm) base thickness is required on low volume residential street application. Heavier traffic loads shall require a layer of Geotextile fabric or Geogrids as needed. Reference Tables 1 and 2 of National Concrete Masonry Association's TEK 87-A for minimum physical requirements for Soil Separation Geotextile or Base Reinforcement Geogrids.

C. Construction of the Sand Laying Course

1. The finished base course shall be approved before the placement of the sand-laying course.

2. The uncompacted sand-laying course shall be spread evenly over the area to be paved and then screeded to a level that will produce 1" (25mm) thickness when the paving stones have been placed. Normally, it is good practice to have final elevation of paving stones slightly higher than adjacent curb, gutter, other paving, to allow for any minor settling that may occur within the base. Maximum bedding sand thickness shall not exceed 1 ½".

3. Once screeded and leveled to the desired elevation, this sand laying course shall not be disturbed in any way.

D. Laying of Concrete Paving Stones

1. The paving stones shall be laid in the approved pattern as noted or shown on the drawings. Layering pattern shall be Runner bond.

2. The paving stones shall be laid in such a manner that the desired pattern is maintained and the joints between the stones are as tight as possible. Joints between stones shall not exceed 1/8" (3mm).

3. String lines should be used to hold all pattern lines true.

4. The gaps at the ends of the paver surface be filled with standard edge stone or with stones cut to fit. Cutting shall be accomplished to leave clean edge to the traffic surface using a masonry saw. Whenever possible, no cuts should result with a paver less than 1/3 of original dimension.

5. Paving stones shall be vibrated into the sand-laying course using a vibrator capable of 3,000 to 5,000 pounds of compaction force with the surface clean and joints open. At least two passes with the vibrator should be made across the surface.

6. After vibration, clean masonry type sand containing at least 30% of the 1/8" (3mm) particles shall be spread over the paving stones surface, allowed to dry, and vibrated into joints with additional vibrator passes and brushing so as to completely fill joints. Sweep sand to meet ASTM C-144.

7. Surplus materials shall then be swept from the surface or left on surface during construction time in ensure complete filling of joints during initial use. This sand also may provide surface protection from construction debris.

8. Do not vibrate within three feet of unrestrained edge. All work within three feet of the laying face must be fully compacted edge of the laying face and sand with a waterproof coverage. Sweep off excess sand when the job is complete.

9. Upon completion of work covered in the Section, the Contractor shall cleanup all work areas by removing all debris, surplus material, and equipment from the site.

10. Cleaning- all dirt, grime, and fresh oil and grease shall be removed from the concrete paver surface prior to job being complete. Spray or brush cleaner onto paver surface and then rinse away with clean, potable water. Flammable ingredients or acids are not to be used. Use Addiment Dirt and Grim Remover, or Addiment Efflorescence Remover and General Cleaner, or approved equal.

11. Sealers- No sealer shall be applied until after a thorough cleaning of paver surface. Sealer shall be sprayed or rolled onto clean, dry surface, using Addiment Paver Seal - WB, or approved equal.

3.04 REMOVAL

A. The Removal of Masonry shall be measured by the square yard measured in the field unless otherwise specified by the Engineer.

B. The basis for Payment for Removal shall be per square yard for masonry removed.

C. Removal of Masonry shall include any and all work required for the completion of removing masonry in the specified area on the plans. Excavation, grading, saw cutting, and removal and disposal, will be incidental to Masonry – Removal.

PAY ITEM	**PAY UNIT**
MASONRY - PAVERS	SY
MASONRY – RETAINING WALL	LF
MASONRY – Stormwater Structure	EA
MASONRY- Removal	SY

END OF SECTION 04000

Breezewood Avenue Sidewalk Improvements

FAYETTEVILLE NC
AMERICA'S CAN DO CITY

APPENDIX C

City Standard Forms

NOTICE OF AWARD

Date of Issuance:	[Date]	
Owner:	City of Fayetteville, NC	Owner's Project No.:
Engineer:	[Engineer of Record]	Engineer's Project No.:
Project:	[Project Title]	
Contract Name:	Contract for the Construction of [Project]	
Bidder:		
Bidder's Address:		

You are notified that Owner has accepted your Bid dated **[date]** for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

[Describe Work, alternates, or sections of Work awarded]

The Contract Price of the awarded Contract is $**[Contract Price]**. Contract Price is subject to adjustment based on the provisions of the Contract, including but not limited to those governing changes, and Unit Price Work.

[Number of copies sent] unexecuted counterparts of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award, or has been transmitted or made available to Bidder electronically.

☐ Drawings will be delivered separately from the other Contract Documents.

You must comply with the following conditions precedent within **15 days** of the date of receipt of this Notice of Award:

1. Deliver to Owner **[number of copies sent]** counterparts of the Agreement, signed by Bidder (as Contractor).
2. Deliver with the signed Agreement(s) the Contract security (such as required performance and payment bonds) and insurance documentation, as specified in the Instructions to Bidders and in the General Conditions, Articles 2 and 6.
3. Other conditions precedent (if any): **[Describe other conditions that require Successful Bidder's compliance]**

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Within 15 days after you comply with the above conditions, Owner will return to you one fully signed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions and modified by Supplementary Conditions

Owner:	**The City of Fayetteville, North Carolina**
By *(signature)*:	_____
Name *(printed)*:	_____
Title:	_____

Contractor: _____

By *(signature)*: _____

Name
(printed): _____

Title: _____

Copy: Engineer

NOTICE TO PROCEED

Owner:	City of Fayetteville, North Carolina	Owner's Project No.:	
Engineer:		Engineer's Project No.:	
Contractor:		Contractor's Project No.:	
Project:			
Contract Name:			
Effective Date of Contract:			

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on **[date Contract Times are to start]** pursuant to Paragraph 4.01 of the General Conditions.

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work will be done at the Site prior to such date.

In accordance with the Agreement: **[Select one of the following two alternatives, insert dates or number of days, and delete the other alternative.]**

The date by which Substantial Completion must be achieved is **[date for Substantial Completion, from Agreement]**, and the date by which readiness for final payment must be achieved is **[date for readiness, from Agreement]**.

[or]

The number of days to achieve Substantial Completion is **[number of days, from Agreement]** from the date stated above for the commencement of the Contract Times, resulting in a date for Substantial Completion of **[date, calculated from commencement date above]**; and the number of days to achieve readiness for final payment is **[number of days, from Agreement]** from the commencement date of the Contract Times, resulting in a date for readiness for final payment of **[date, calculated from commencement date above]**.

Before starting any Work at the Site, Contractor must comply with the following:

[Note any access limitations, security procedures, or other restrictions]

Owner:	City of Fayetteville, North Carolina
By *(signature)*:	
Name *(printed)*:	
Title:	
Date Issued:	

Contractor: _____

By *(signature)*: _____

Name *(printed)*: _____

Copy: Engineer

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

APPLICATION FOR PAYMENT

Prepared By

EJCDC®
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

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AMERICAN SOCIETY OF CIVIL ENGINEERS

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GUIDELINES FOR THE INTENDED USE OF EJCDC C-620, APPLICATION FOR PAYMENT

1.0 PURPOSE AND INTENDED USE OF THE DOCUMENT

The Application for Payment is used to facilitate periodic progress payments to the Contractor for Work completed and for stored materials and equipment (referred to in this document as "Stored Materials").

For additional information regarding the Application for Payment, see EJCDC® C–700, Standard General Conditions of the Construction Contract (2018), Paragraph 15.01, and EJCDC® C–001, Commentary on the 2018 EJCDC Construction Documents (2018).

2.0 APPLICATION FOR PAYMENT OVERVIEW

This document was prepared in Microsoft Excel due to the number of calculations involved in the preparation of the Application for Payment. The application consists of a Summary worksheet, and 3 supporting worksheets: Lump Sum worksheet, Unit Price worksheet, and Stored Materials worksheet.

2.1 *Summary Worksheet* — calculates the amount to be paid to the Contractor at the end of each Application for Payment period. This calculation imports numbers from the supporting worksheets to determine the value of the Work completed and Stored Materials, calculate retainage, and deduct amounts previously paid to determine the amount the Contractor should be paid for the current application period. Application periods are typically one month; however these periods may be extended when Contractor's efforts do not result in the billable completion of Work or storage of materials and equipment during the payment period.

2.2 *Lump Sum Worksheet* — calculates the total value for completed Work for which compensation is paid on a Lump Sum basis. The schedule of values included in this worksheet reflects a breakdown of lump sum Work items to which Contractor and Engineer have agreed, pursuant to Article 2 of the General Conditions. Costs for Stored Materials associated with lump sum items are included on this worksheet to calculate the total value for completed lump sum Work and associated Stored Materials. This total is exported to the Summary worksheet. Separate totals for Work Completed and for materials currently stored are also exported to the Summary worksheet for use in calculating the amount of retainage to be held for each.

2.3 *Unit Price Worksheet* — calculates the total value for completed Work for which compensation is paid on a Unit Price basis. The schedule of values included in this spreadsheet is typically a tabulation of Unit Price items from the Agreement. Costs for Stored Materials associated with unit price items are included in this worksheet to calculate the total value for completed Unit Price Work and associated Stored Materials. This total is exported to the Summary worksheet. Separate totals for Work Completed and for Materials Currently Stored are also exported to the Summary worksheet for use in calculating the amount of retainage to be held for each.

2.4 *Stored Materials Worksheet* — calculates the total value for materials and equipment that have been purchased and are being stored until they are incorporated into the Work. This worksheet adds materials and equipment to the worksheet as they are brought to the site and stored; such Stored Materials are then deducted from the Stored Materials worksheet total as they are incorporated into the Work, providing a running net value for the materials and equipment remaining in storage. The values of Stored Materials must be manually added to the Lump Sum or Unit Price line items. These do not automatically update when changes are made. The amount of materials remaining in storage is eligible for payment but must be tracked separately from Work completed since different retainage rates may apply to Work completed and Stored Materials.

3.0 Instructions for filling out the Payment Application form

3.1 Project-specific information is to be entered in the top portion (header) of the Summary worksheet. This same information will automatically be copied to the other worksheets to complete the headers on all other worksheets.

3.2 Outside of the header, data can be entered in non-shaded cells when the sheet is protected. Cells shaded light blue contain equations that will automatically transfer data from other cells or make calculations to complete the worksheet. Altering any of these cells can result in errors in the Application for Payment. It is recommended that the worksheets be protected at all times unless alterations are deliberately being made to the Application for Payment form other than to enter data. See Paragraph 4.0 below for information on Protection of Worksheets.

3.3 Enter information regarding each item in the Lump Sum and/or Unit Price worksheets. For Lump Sum projects, each item should represent an item in the schedule of values prepared by the Contractor and approved by the Engineer/Owner, breaking down the Lump Sum amount into measurable components. For Unit Price contracts, use numbers from the Agreement as the schedule of values. Specific information on the data to be entered into each column may be seen by clicking on the header description for that column. Similar comments may be seen for cells in the "Totals" row that indicates how the number is calculated and where this number is exported to another part of the spreadsheet. See the Commentary for additional information.

3.4 The equations in the Summary worksheet use numbers imported from both the Lump Sum and Unit Price worksheets. Projects will typically either use the Lump Sum or the Unit Price worksheet, but some projects may use both. If one of the worksheets is not used, it should be hidden and not deleted. If it is deleted, Users will need to correct the equations in the Summary worksheet by unprotecting the worksheet and editing the equations. To hide a worksheet, right click on the worksheet tab at the bottom of the worksheet and select "Hide." To unhide a worksheet, right click on any worksheet tab and select "Unhide," and then select the worksheet to unhide and click "Okay." This same process may be used to hide these Guidelines for Use.

4.0 Protection of Worksheets

4.1 The cells in this Workbook that create the forms or contain equations have been coded to "lock" the cells that should not be altered. It is recommended that the Workbook be Protected (cells locked) at all times unless it is necessary to add or delete rows. Directions for adding and deleting rows are provided in the next section. Passwords can be used to lock the Protect / Unprotect settings on spreadsheets, however the worksheets in this workbook do not require a password.

4.2 To unprotect a worksheet, click on the "Review" menu tab at the top of Excel, then click "Unprotect Sheet." To protect a worksheet, click on the "Review" menu tab at the top of Excel, then click "Protect Sheet." This will open a dialog box in which the User is allowed to select protection options. It is recommended that only the top two checkboxes for "Select Locked Cells" and "Select Unlocked Cells" be checked. This will reset the protection for the Worksheet.

5.0 Adding and Deleting Rows

5.1 A limited number of blank rows are provided in the Lump Sum, Unit Price, and Stored Material worksheets. Additional rows may be added to these worksheets by the User. The first step in this process is to unprotect the worksheet as previously discussed. After the sheet is unprotected, move with caution to prevent inadvertently deleting any cells that contain equations. To insert a row, right click in the row heading at the left of the spreadsheet and select "Insert." A new row will be inserted at the location where the cursor was placed in the row heading. If more than one new row is desired, left click and drag the cursor to include the desired number of rows, right click in the selected row headings and then select "Insert." It is important that the line immediately above the "Totals" row not be included in the rows selected. Doing so will require that equations in the "Totals" row be adjusted. When rows are inserted, Excel automatically adjusts the equations to include the new rows, unless the row directly above the "Totals" row is also selected.

5.2 After new rows are inserted, it is important to copy a line from one of the original rows so correct formatting and equations are copied into each new row. To do this, select the row to be copied by clicking the cell in Column A and dragging the cursor to the last column in the table. Then select "Copy" from the menu or type CTRL+C to copy the cells. Excel will show that this row has been copied by showing a moving dashed line around the cells that are to be copied. Then select the new rows into which the information is to be copied as before and select Paste from the menu or type CTRL+V.

5.3 To delete an unused row, right click in the row heading on the left of the spreadsheet for the row to be deleted and select "Delete." The selected row will be deleted. If more than one row is to be deleted, left click and drag the cursor to the desired number of rows to be deleted and then right click to open the menu and select "Delete." Unlike the admonition on adding new rows, it is okay to delete the row just above the "Totals" row.

5.4 After rows have been added or deleted, it is important reset the worksheet protection.

6.0 Saving Files

This file is provided as a Microsoft ® Excel Open XML workbook template (.xltx) to prevent this file from being inadvertently changed. When an application for payment is created for a specific project it should be saved as an Excel workbook (.xlxs) file. To do this, select Save As (F12), type in a new file name and select Excel Workbook (.xlxs) from the drop down Save As Type menu.

7.0 License Agreement

This document is subject to the terms and conditions of the License Agreement, 2018 EJCDC® Construction Series Documents. A copy of the License Agreement was furnished at the time of purchase of this document, and is available for review at www.ejcdc.org and the websites of EJCDC's sponsoring organizations.

Contractor's Application for Payment

Owner:		**Owner's Project No.:**	
Engineer:		**Engineer's Project No.:**	
Contractor:		**Contractor's Project No.:**	
Project:			
Contract:			
Application No.:		**Application Date:**	
Application Period:	**From**	**to**	

1. Original Contract Price			$ -
2. Net change by Change Orders			$ -
3. Current Contract Price (Line 1 + Line 2)			$ -
4. Total Work completed and materials stored to date (Sum of Column G Lump Sum Total and Column J Unit Price Total)			$ -
5. Retainage			
a. _____	X	$ - Work Completed	$ -
b. _____	X	$ - Stored Materials	$ -
c. Total Retainage (Line 5.a + Line 5.b)			$ -
6. Amount eligible to date (Line 4 - Line 5.c)			$ -
7. Less previous payments (Line 6 from prior application)			
8. Amount due this application			$ -
9. Balance to finish, including retainage (Line 3 - Line 4)			$ -

Contractor's Certification

The undersigned Contractor certifies, to the best of its knowledge, the following:
(1) All previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with the Work covered by prior Applications for Payment;
(2) Title to all Work, materials and equipment incorporated in said Work, or otherwise listed in or covered by this Application for Payment, will pass to Owner at time of payment free and clear of all liens, security interests, and encumbrances (except such as are covered by a bond acceptable to Owner indemnifying Owner against any such liens, security interest, or encumbrances); and
(3) All the Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

Contractor: _____

Signature: _____ **Date:** _____

Recommended by Engineer		**Approved by Owner**	
By:		**By:**	
Title:		**Title:**	
Date:		**Date:**	
Approved by Funding Agency			
By:		**By:**	
Title:		**Title:**	
Date:		**Date:**	

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Progress Estimate - Unit Price Work

Contractor's Application for Payment

Owner: _____ **Owner's Project No.:** _____
Engineer: _____ **Engineer's Project No.:** _____
Contractor: _____ **Contractor's Project No.:** _____
Project: _____
Contract: _____

Application No.: _____ **Application Period:** From _____ to _____ **Application Date:** _____

A	B	C	D	E	F	G	H	I	J	K	L
		Contract Information				Work Completed					
Bid Item No.	Description	Item Quantity	Units	Unit Price ($)	Value of Bid Item (C X E) ($)	Estimated Quantity Incorporated in the Work	Value of Work Completed to Date (E X G) ($)	Materials Currently Stored (not in G) ($)	Work Completed and Materials Stored to Date (H + I) ($)	% of Value of Item (J / F) (%)	Balance to Finish (F - J) ($)
Original Contract											
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					-		-		-		-
				Original Contract Totals	$ -		$ -	$ -	$ -		$ -

EJCDC C-620 Contractor's Application for Payment
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Progress Estimate - Unit Price Work

Contractor's Application for Payment

Owner: _____ **Owner's Project No.:** _____
Engineer: _____ **Engineer's Project No.:** _____
Contractor: _____ **Contractor's Project No.:** _____
Project: _____
Contract: _____

Application No.: _____ **Application Period:** **From** _____ **to** _____ **Application Date:** _____

A	B	C	D	E	F	G	H	I	J	K	L
		Contract Information				Work Completed					
Bid Item No.	Description	Item Quantity	Units	Unit Price ($)	Value of Bid Item (C X E) ($)	Estimated Quantity Incorporated in the Work	Value of Work Completed to Date (E X G) ($)	Materials Currently Stored (not in G) ($)	Work Completed and Materials Stored to Date (H + I) ($)	% of Value of Item (J / F) (%)	Balance to Finish (F - J) ($)
Change Orders											
					-		-		-		-
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					-		-		-		-
				Change Order Totals	$ -		$ -	$ -	$ -		$ -
Original Contract and Change Orders											
				Project Totals	$ -		$ -	$ -	$ -		$ -

EJCDC C-620 Contractor's Application for Payment
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CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner:	City of Fayetteville, North Carolina	Owner's Project No.:
Engineer:		Engineer's Project No.:
Contractor:		Contractor's Project No.:
Project:		
Contract Name:		

This ☐ Preliminary ☐ Final Certificate of Substantial Completion applies to:

☐ All Work ☐ The following specified portions of the Work:

[Describe the portion of the work for which Certificate of Substantial Completion is issued]

Date of Substantial Completion: **[Enter date, as determined by Engineer]**

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Work or portion thereof designated above is hereby established, subject to the provisions of the Contract pertaining to Substantial Completion. The date of Substantial Completion in the final Certificate of Substantial Completion marks the commencement of the contractual correction period and applicable warranties required by the Contract.

A punch list of items to be completed or corrected is attached to this Certificate. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

Amendments of contractual responsibilities recorded in this Certificate should be the product of mutual agreement of Owner and Contractor; see Paragraph 15.03.D of the General Conditions.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance, and warranties upon Owner's use or occupancy of the Work must be as provided in the Contract, except as amended as follows:

Amendments to Owner's Responsibilities: ☐ None ☐ As follows:

[List amendments to Owner's Responsibilities]

Amendments to Contractor's Responsibilities: ☐ None ☐ As follows:

[List amendments to Contractor's Responsibilities]

The following documents are attached to and made a part of this Certificate:

[List attachments such as punch list; other documents]

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents, nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Engineer

By *(signature)*: _____

Name *(printed)*: _____

Title: _____

NOTICE OF ACCEPTABILITY OF WORK

Owner:	City of Fayetteville, North Carolina	Owner's Project No.:
Engineer:		Engineer's Project No.:
Contractor:		Contractor's Project No.:
Project:		
Contract Name:		
Notice Date:	Effective Date of the Construction Contract:	

The Engineer hereby gives notice to the Owner and Contractor that Engineer recommends final payment to Contractor, and that the Work furnished and performed by Contractor under the Construction Contract is acceptable, expressly subject to the provisions of the Construction Contract's Contract Documents ("Contract Documents") and of the Agreement between Owner and Engineer for Professional Services dated **[date of professional services agreement]** ("Owner-Engineer Agreement"). This Notice of Acceptability of Work (Notice) is made expressly subject to the following terms and conditions to which all who receive and rely on said Notice agree:

1. This Notice has been prepared with the skill and care ordinarily used by members of the engineering profession practicing under similar conditions at the same time and in the same locality.
2. This Notice reflects and is an expression of the Engineer's professional opinion.
3. This Notice has been prepared to the best of Engineer's knowledge, information, and belief as of the Notice Date.
4. This Notice is based entirely on and expressly limited by the scope of services Engineer has been employed by Owner to perform or furnish during construction of the Project (including observation of the Contractor's Work) under the Owner-Engineer Agreement, and applies only to facts that are within Engineer's knowledge or could reasonably have been ascertained by Engineer as a result of carrying out the responsibilities specifically assigned to Engineer under such Owner-Engineer Agreement.
5. This Notice is not a guarantee or warranty of Contractor's performance under the Construction Contract, an acceptance of Work that is not in accordance with the Contract Documents, including but not limited to defective Work discovered after final inspection, nor an assumption of responsibility for any failure of Contractor to furnish and perform the Work thereunder in accordance with the Contract Documents, or to otherwise comply with the Contract Documents or the terms of any special guarantees specified therein.
6. This Notice does not relieve Contractor of any surviving obligations under the Construction Contract, and is subject to Owner's reservations of rights with respect to completion and final payment.

Engineer

By *(signature)*: _____

Name *(printed)*: _____

Title: _____

WORK CHANGE DIRECTIVE NO.: [Number of Work Change Directive]

Owner:	Owner's Project No.:
Engineer:	Engineer's Project No.:
Contractor:	Contractor's Project No.:
Project:	
Contract Name:	
Date Issued:	Effective Date of Work Change Directive:

Contractor is directed to proceed promptly with the following change(s):

Description:

[Description of the change to the Work]

Attachments:

[List documents related to the change to the Work]

Purpose for the Work Change Directive:

[Describe the purpose for the change to the Work]

Directive to proceed promptly with the Work described herein, prior to agreeing to change in Contract Price and Contract Time, is issued due to:

Notes to User—Check one or both of the following

☐ Non-agreement on pricing of proposed change. ☐ Necessity to proceed for schedule or other reasons.

Estimated Change in Contract Price and Contract Times (non-binding, preliminary):

Contract Price: $ _____ **[increase] [decrease] [not yet estimated]**.

Contract Time: _____ days **[increase] [decrease] [not yet estimated]**.

Basis of estimated change in Contract Price:

☐ Lump Sum ☐ Unit Price ☐ Cost of the Work ☐ Other

	Recommended by Engineer	Authorized by Owner
By:	_____	_____
Title:	_____	_____
Date:	_____	_____

CITY OF FAYETTEVILLE
CONTRACT CHANGE ORDER

City of Fayetteville
Purchasing Department
433 Hay Street
Fayetteville, NC 28301
(910) 433-1942/4332
(910) 483-1680 (Fax)

Project Name: Click here to enter text.

Contractor: Click here to enter text.

Address:

Effective Date: Click here to enter text.	**Previous Total:** Click here to enter text.
Contract No.: Click here to enter text.	**Total Change:** Click here to enter text.
Change Order No.: Click here to enter text.	**Revised Total:** Click here to enter text.
Account No.: Click here to enter text.	**Time Change:** Click here to enter text.

This change order is being written to:

Except as provided herein, all terms and conditions of the contract referenced above, as heretofore changed remains unchanged and in full force and effect.

Contractor Acceptance:	**City Acceptance:**
I certify that my bonding company will be notified forth-with that my contract has been changed by the amount of this change order, and that a copy of the approved change order will be mailed upon receipt by me to my surety. **By:**_____ **(Signature/Date)** **Title:**_____ **Date:**_____	**This instrument has been pre-audited in the manner required by the Local Government and Budget Fiscal Control Act.** _____ **Chief Financial Officer (Signature/Date)** _____ **Contracting Officer (Signature/Date)** _____ **Authorized City Representative (Signature/Date)**

FIELD ORDER NO.: [Number of Field Order]

Owner:	Owner's Project No.:
Engineer:	Engineer's Project No.:
Contractor:	Contractor's Project No.:
Project:	
Contract Name:	
Date Issued:	Effective Date of Field Order:

Contractor is hereby directed to promptly perform the Work described in this Field Order, issued in accordance with Paragraph 11.04 of the General Conditions, for minor changes in the Work without changes in Contract Price or Contract Times. If Contractor considers that a change in Contract Price or Contract Times is required, submit a Change Proposal before proceeding with this Work.

Reference:

Specification Section(s):

Drawing(s) / Details (s):

Description:

[Description of the change to the Work]

Attachments:

[List documents supporting change]

Issued by Engineer

By: _____

Title: _____

Date: _____

CITY OF FAYETTEVILLE

SDBE COMPLIANCE PROVISIONS
AFFIDAVIT E

SDBE DOCUMENTATION FOR CONTRACT PAYMENTS

Prime
Contractor:
Address and Phone:_____
Project Name: _____
Pay Application #_____Period: _____

The following is a list of payments to be made to small disadvantaged business contractors on this project for the above-mentioned period.

Firm Name and Address	*SDBE Category	Payment	Owner Use Only

*SDBE categories: Black-African Americans (B), Hispanic-Americans (H), Asian-Americans (A), Native-Americans (I), Women (F), Socially/Economically Disadvantaged (D)

Date:_____ Approved/Certified By:_____
(Name)

_____
(Title)

_____
(Signature)

*****THIS DOCUMENT MUST BE SUBMITTED WITH EACH PAY REQUEST AND FINAL PAYMENT*****

STANDARD FORM FOR PAYMENT REQUESTS

Company Name: Project Name:

Company Address: Project Number:

Company Phone:

Pay Request#

PART A

TOTAL		SCHEDULED	UNIT	SCHEDULED	PREVIOUS	CURRENT
!TEM# VALUE	DESCRIPTION	QUANTITY	PRICE	VALUE	QTY	QTY
1.						
2.						
3.						
4.						
			SUB-TO'I AL		SUB-TOTAL	

PARTB

TOTAL		SCHEDULED	UNIT	SCHEDULED	PREVIOUS	CURRENT
ITEM# VALUE	DESCRIPTION	QUANT!TY	PRICE	VALUE	QTY	QTY
1.						
2.						
3.						
4.						
			SUB-TOTAL		SUB-TOTAL	

TOTAL EARNINGS $

CONTRACT SUMMARY

Original Contract Value	$
Change Orders Approved	$
Current Contract Value	$
Total Earnings	$
Less Retainage	$
Less Previous Payments	$
Due this estimate	$
Balance to finish (+ retainage)	$

Sign and
Attach to Bid

LIST OF SUBCONTRACTORS

The Prime Contractor states that his Bid is based on quantities received from the following Subcontractors for the various categories of work listed which may exceed 5% of the Contract work; the Prime Contractor agrees that if he is the successful Bidder and if the listed Subcontractors are approved by the Owner's Representative, he shall contract with the approved listed Subcontractors for the performance of this work. The total amount of subcontracted work cannot exceed 49% of the Contract Amount.

Subcontractors Name	Type of Work	% of Contract Amount

THIS FORM SHALL BE SUBMITTED WITH PROPOSAL

_____
COMPANY

_____
BIDDER'S SIGNATURE

_____
TITLE

RELEASE OF CLAIMS

Contract/Purchase Order Number:_____

Title: _____

Project Number: _____

To the best of my knowledge and belief, I certify that all items, units, quantities, prices of work and materials and NC Sales taxes shown on the attached final invoice are correct; that all work has been performed and materials supplied in accordance with the terms and conditions of the above stated contract, including any and all change orders, between the City of Fayetteville, and (Contractor)_____. I further certify that all subcontracting obligations have been met. Below is a true and correct statement of the contract amount up to and including the last day of the period covered by the attached final invoice, and that no part of the "total amount clue" has been received.

(a) Total Contract Cost (Including Change Orders)	$_____
(b) Total Amount Previously Paid	$_____
(c) Total Amount Due (Including retainage)	$_____

In consideration of the above stated sum to be paid by the City of Fayetteville for the noted contract, the undersigned contractor does release and discharge the City of Fayetteville, its officers, agents and employees, of and from all liabilities, obligations and claims whatsoever in law and equity arising out of or by virtue of said contract, except specified claims in stated amounts, or in estimated amounts when the amounts are not susceptible of exact statement by the contractor, as follows:

_____

_____

_____

_____

_____

IN WITNESS WHEREOF, this release has been executed this,_____day of,_____ 2023
(Imprint Corporate Seal below this line)

(CONTRACTOR) BY:_____

TITLE:_____

ATTEST:

_____
(Secretary)