CITY OF HICKORY - T HANGAR

PROJ:24-831 CITY OF HICKORY 3101 9TH AVENUE DR. NW HICKORY, NC 28601



		SHEET INDEX			
SHEET SORT					
OVERRIDE	NUMBER	NAME	ORIG ISSUE	REV#	DATE
	GA0.00	COVER SHEET	2024.02.28		
01 (GA0.) PROJECT		COVER SHEET	2024.02.20		
<u> </u>	GC1.01	CODE COMPLIANCE PLAN- LEVEL 01	2024.02.28		
	GC1.00	CODE COMPLIANCE SUMMARY	2024.02.28		
.01 (GC0.) CODE CC	MPLIANCE: 2		·	'	,
		SHEET INDEX			
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SHEET SORT OVERRIDE	NUMBER	NAME	ORIG ISSUE	REV#	DATE
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	VFE101	EXISTING CONDITIONS	2024.02.28		
	CDN101	DEMOLITION PLAN	2024.02.28		
	CSN101	SITE PLAN	2024.02.28		
	CGN101	GRADING AND DRAINAGE PLAN	2024.02.28		
	CGN501	GRADING AND DRAINAGE DETAILS	2024.02.28		
	CCN101	PRE-CONSTRUCTION EROSION CONTROL PLAN	2024.02.28		
	CCN102	POST-CONSTRUCTION EROSION CONTROL PLAN	2024.02.28		
	CCN501	EROSION CONTROL DETAILS	2024.02.28		
	CCN502	EROSION CONTROL DETAILS	2024.02.28		
	CCN503	EROSION CONTROL NOTES	2024.02.28		
	CUN101	UTILITY PLANS	2024.02.28		
	CUN501	UTILITY DETAILS	2024.02.28		
	SPC101	PROJECT SPECIFICATIONS	2024.02.28		
	SPC102	PROJECT SPECIFICATIONS	2024.02.28		
	SPC102	PROJECT SPECIFICATIONS PROJECT SPECIFICATIONS	2024.02.28		
	SPC104	PROJECT SPECIFICATIONS	2024.02.28		
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IVIL: 16	OI O 104		2024.02.20		
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SHEET SORT		SHEET INDEX		REV#	DATE
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SHEET SORT		SHEET INDEX		REV#	DATE
SHEET SORT	NUMBER	SHEET INDEX NAME	ORIG ISSUE	REV#	DATE
SHEET SORT OVERRIDE RCHITECTURAL PLA	NUMBER AE1.01 NS: 1 AC1.01	SHEET INDEX NAME FLOOR PLAN & ELEVATIONS REFLECTED CEILING PLAN, INTERIOR FINISH PLAN & SCHEDULES	ORIG ISSUE	REV#	DATE
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ORIGINAL ISSUE DATE: 2024.02.28

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SHEET:

GA0.00

JURISDICTION: CONTACT: DESIGNER CIVIL ELECTRICAL CES FIRE ALARM EMAIL: PLUMBING EMAIL: MECHANICAL EMAIL: SPRINKLER-STANDPIPE EMAIL: • STRUCTURAL RETAING WALLS >5' HIGH EMAIL: CODE CONSULTANT **2018 NC BUILDING CODE:** SHELL/CORE CONSTRUCTED (DATE): -RENOVATED (DATE): RISK CATEGORY (TABLE 1604.5) **BASIC BUILDING DATA CONSTRUCTION TYPE:** (CHECK ALL THAT APPLY) SPRINKLERS: FIRE DISTRICT: NO YES PRIMARY OCCUPANCY CLASSIFICATION(S): **ASSEMBLY** BUSINESS **EDUCATIONAL** FACTORY: **INSTITUTIONAL:** MERCANTILE S-1 MODERATE UTILITY & MISCELLANEOUS: N/A **INCIDENTAL USES (TABLE 509):** REFRIGERANT MACHINE ROOM HYDROGEN FUEL GAS ROOMS, NOT CLASSIFIED AS GROUP H **INCINERATOR ROOMS** IN GROUP E OCCUPANCIES, LABORITORIES AND VOCATIONAL SHOPS NOT CLASSIFIED AS GROUP H IN AMBULATORY CARE FACILITIES, LABORATORIES NOT CLASSIFIED AS GROUP H LAUNDRY ROOMS OVER 100 SQUARE FEET IN GROUP I-2, COMMERCIAL KITCHENS

NAME OF PROJECT: **CITY OF HICKORY** ADDRESS: P.O. BOX 398 ZIP CODE: OWNER/AUTHORIZED AGENT: RODNEY MILLER PHONE #:(828) 323-7412 E-MAIL: RMILLER@HICKORYNC.GOV PRIVATE STATE OWNED BY: CITY/ COUNTY COUNTY CATAWBA STATE CODE ENFORCEMENT CITY HICKORY L. KENNETH McDANIEL II, AIA LICENSE# TELEPHONE# ARCHITECTURAL MICHAEL GRAVES L. KENNETH McDANIEL II 9291 (336) 725-1371 EMAIL: KMCDANIEL@MICHAELGRAVES.COM CLAYTON ENGINEERING & WILL CLAYTON P-1463 (828) 455-3456 EMAIL: WCLAYTON@CLAYTON-ENGINEERING.NET CHRIS STROUPE EMAIL: CHRIS@CESENG.COM **AARON BOPP** EMAIL: ABBOPP@SKAENG.COM (910) 282-7351 PIERCE LUSHINSKY EMAIL: PIERCE@PBFPE.COM NEW BUILDING ADDITION RENOVATION 1ST TIME INTERIOR COMPLETION CONTACT THE LOCAL INSPECTION JURISDICTION FOR POSSIBLE ADDITIONAL PROCEDURES AND REQUIREMENTS PHASED CONSTRUCTION - SHELL/CORE CONTACT THE LOCAL INSPECTION JURISDICTION FOR POSSIBLE ADDITIONAL PROCEDURES AND REQUIREMENTS 2018 NC EXISTING BUILDING CODE: EXISTING: PRESCRIPTIVE REPAIR CHAPTER 14 ALTERATION: LEVEL I LEVEL II LEVEL III CHANGE OF USE HISTORIC PROPERTY CURRENT OCCUPANCY(S) (CH. 3): PROPOSED OCCUPANCY(S) (CH. 3): -PROPOSED: I II III IV ☐ I-A ☐ III-A ☐ IV ☐ V-A I-B II-B III-B ■ NO PARTIAL YES NFPA 13 NFPA 13R NFPA 13D CLASS I I II III WET DRY

FLOOD HAZARD AREA: NO YES SPECIAL INSPECTIONS REQUIRED: NO YES -(CONTACT THE LOCAL INSPECTION JURISDICTION FOR POSSIBLE ADDITIONAL PROCEDURES AND REQUIREMENTS

GROSS BUILDING AREA TABLE					
FLOOR	existing (SQ ft)	NEW (SQ FT)	SUB-TOTAL		
	-	-	-		
	-	-	-		
	-	-	-		
	-	-	-		
	-	-	-		
LEVEL 1	-	18,313	18,313		
TOTAL	-	18,313	18,313		

ALLOWABLE AREA

□ A-1 □ A-2 □ A-3 □ A-4 □ A-5 F-1 MODERATE F-2 LOW HAZARDOUS: H-1 DETONATE H-2 DEFLAGRATE H-3 COMBUST H-4 HEALTH H-5 HPM ☐ I-1 CONDITION ☐ 1 ☐ 2 ☐ I-2 CONDITION ☐ 1 ☐ 2 \square I-3 CONDITION \square 1 \square 2 \square 3 \square 4 \square 5 \square I-4 R-1 R-2 R-3 R-4 S-2 LOW HIGH-PILED □ PARKING GARAGE
□ OPEN
□ ENCLOSED
□ REPAIR GARAGE ACCESSORY OCCUPANCY CLASSIFICATION(S):

FURNACE ROOM WHERE ANY PIECE OF EQUIP. IS OVER 400,000 BTU PER HOUR INPUT

ROOMS WITH BOILERS WHERE THE LARGEST PIECE OF EQUIPMENT IS OVER 15 PSI AND 10 HORSEPOWER

PAINT SHOPS, NOT CLASSIFIED AS GROUP H, LOCATED IN OCCUPANCIES OTHER THAN GROUP F

IN GROUP I-2 OCCUPANCIES, LABORATORIES NOT CLASSIFIED AS GROUP H

IN GROUP I-2, LAUNDRY ROOMS OVER 100 SQUARE FEET

IN GROUP I-2, LAUNDRIES EQUAL TO OR LESS THAN 100 SQUARE FEET

IN GROUP I-2, ROOMS OR SPACES THAT CONTAIN FUEL-FIRED HEATING EQUIPMENT

GROUP I-3 CELLS AND GROUP I-2 PATIENT ROOMS EQUIPPED WITH PADDED SURFACES IN GROUP I-2, PHYSICAL PLANT MAINTENANCE SHOPS

IN AMBULATORY CARE FACILITIES OR GROUP I-2 OCCUPANCIES, WASTE AND LINEN COLLECTION ROOMS

WITH CONTAINERS THAT HAVE AGGREGATE VOLUME OF 10 CUBIC FEET OR GREATER IN OTHER THAN AMBULATORY CARE FACILITIES OR GROUP I-2 OCCUPANCIES, WASTE AND LINEN

COLLECTION ROOMS OVER 100 SQUARE FEET IN AMBULATORY CARE FACILITIES OR GROUP I-2 OCCUPANCIES, STORAGE ROOMS GREATER THAN 100

SQUARE FEET STATIONARY STORAGE BATTERY SYSTEMS HAVING A LIQUID ELECTROLYTE CAPACITY OF MORE THAN 50 GALLONS FOR FLOODED LEAD-ACID, NICKEL CADMIUM OR VRLA, OR MORE THAN 1,000 POUNDS FOR LITHIUM-ION AND LITHIUM METAL POLYMER USED FOR FACILITY STANDBY POWER, EMERGENCY POWER OR

FUEL STORAGE ROOMS IN PUBLIC SCHOOLS AND BOILER ROOMS IN PUBLIC SCHOOLS

STORAGE ROOMS UNDERNEATH GRANDSTANDS OR BLEACHER SEATS CONTAINING COMBUSTIBLE OR FLAMMABLE MATERIALS

_ 402 _ 403 _ 404 _ 405 _ 406 _ 407 _ 408 _ 409

 410
 411
 ■ 412
 413
 414
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 416
 417
 418
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 420
 421

422 423 424 425 426 427 428 429 430 **SPECIAL PROVISIONS:** ___ 510.2 ___ 510.3 ___ 510.4 ___ 510.5 ___ 510.6 ___ 510.7 ___ 510.8 ___ 509.9

MIXED OCCUPANCY: NO YES SEPARATION: - HR. EXCEPTION: -NON-SEPARATED USE (508.3)

THE REQUIRED TYPE OF CONSTRUCTION FOR THE BUILDING SHALL BE DETERMINED BY APPLYING THE HEIGHT AND AREA LIMITATIONS FOR EACH OF THE APPLICABLE OCCUPANCIES TO THE ENTIRE BUILDING. THE MOST RESTRICTIVE TYPE OF CONSTRUCTION, SO DETERMINED, SHALL APPLY TO THE ENTIRE BUILDING.

SEPARATED USE (508.4)

STORIES) (506.2).

WITHIN PROJECT MANUAL.

SEE BELOW FOR AREA CALCULATIONS FOR EACH STORY, THE AREA OF THE OCCUPANCY SHALL BE SUCH THAT THE SUM OF THE RATIOS OF THE ACTUAL FLOOR AREA OF EACH USE DIVIDED BY THE ALLOWABLE FLOOR AREA FOR EACH USE SHALL NOT EXCEED 1.

ACTUAL AREA OF OCCUPANCY A ACTUAL AREA OF OCCUPANCY B ALLOWABLE AREA OF OCCUPANCY A ALLOWABLE AREA OF OCCUPANCY B

1. FRONTAGE AREA INCREASES FROM SECTION 506.3 ARE COMPUTED THUS: A. PERIMETER WHICH FRONTS A PUBLIC WAY OR OPEN SPACE HAVING 20 FEET MINIMUM WIDTH = B. TOTAL BUILDING PERIMETER = C. RATIO (F/P) =D. W = MINIMUM WIDTH OF PUBLIC WAY = _

E. PERCENT OF FRONTAGE INCREASE $I_f = 100 [F/P - 0.25] \times W/30 = 0.000$ 2. UNLIMITED AREA APPLICABLE UNDER CONDITIONS OF SECTION 507. 3. MAXIMUM BUILDING AREA = TOTAL NUMBER OF STORIES IN THE BUILDING x D (MAX 3

4. THE MAXIMUM AREA OF OPEN PARKING GARAGES MUST COMPLY WITH TABLE 406.5.4. 5. FRONTAGE INCREASE IS BASED ON THE UNSPRINKLERED AREA VALUE IN TABLE 506.2. NOTE*: FOR CODE ANALYSIS AND CALCULATIONS, SEE CODE NARRATIVE FOUND

ALLOWABLE HEIGHT

	ALLOWABLE	SHOWN ON PLANS	CODE REFERENCI
BUILDING HEIGHT IN FEET (TABLE 504.3)2	55'	20'-0"	504.3
BUILDING HEIGHT IN STORIES (TABLE 504.4)3	2	1	504.4
PROVIDE CODE REFERENCE IF THE "SHOWN ON PLA	.NS" QUANTITY IS	S NOT BASED ON TABLE 5	504.3 OR 504.4.

² THE MAXIMUM HEIGHT OF AIR TRAFFIC CONTROL TOWERS MUST COMPLY WITH TABLE 412.3.1. ³ THE MAXIMUM HEIGHT OF OPEN PARKING GARAGES MUST COMPLY WITH TABLE 406.5.4.

FIRE PROTECTION REQUIREMENTS

	FIRE	F	RATING		DESIGN #		SHEET
BUILDING ELEMENT	SEPARATION DISTANCE (FEET)	req'd	PROVIDED (WITH * REDUCTION)	DETAIL # AND SHEET #	for rated assembly	SHEET # FOR RATED PENETRATION	FOR RATEI JOINT
STRUCTURAL FRAME, INCLUDING COLS, GIRDERS, TRUSSES	>30 FT	O HR	N/A	N/A	N/A	N/A	N/A
BEARING WALLS	-	-	-	-	-	-	-
EXTERIOR	-	-	-	-	-	-	-
NORTH	>30 FT	O HR	N/A	N/A	N/A	N/A	N/A
EAST	>30 FT	O HR	N/A	N/A	N/A	N/A	N/A
WEST	>30 FT	O HR	N/A	N/A	N/A	N/A	N/A
SOUTH	>30 FT	O HR	N/A	N/A	N/A	N/A	N/A
INTERIOR	N/A	O HR	N/A	N/A	N/A	N/A	N/A
NONBEARING WALLS & PARTITIONS EXTERIOR WALLS	-	-	-	-	-	-	_
NORTH	>30 FT	O HR	N/A	N/A	N/A	N/A	N/A
EAST	>30 FT	O HR	N/A	N/A	N/A	N/A	N/A
WEST	>30 FT	O HR	N/A	N/A	N/A	N/A	N/A
SOUTH	>30 FT	O HR	N/A	N/A	N/A	N/A	N/A
INTERIOR WALLS	N/A	O HR	N/A	N/A	N/A	N/A	N/A
FLOOR CONSTRUCTIC INCLUDING SUPPO BEAMS & JOISTS	ORT	O HR	N/A	N/A	N/A	N/A	N/A
FLOOR CEILING ASSE		O HR	N/A	N/A	N/A	N/A	N/A
COLUMNS SUPPORTIN		O HR	N/A	N/A	N/A	N/A	N/A
ROOF CONSTRUCTION INCLUDING SUPPORT BEAMS & JOISTS		O HR	O HR	N/A	N/A	N/A	N/A
ROOF CEILING ASSEM	MBLY	O HR	O HR	N/A	N/A	N/A	N/A
COLUMNS SUPPORTIN	NG ROOF	O HR	O HR	N/A	N/A	N/A	N/A
SHAFT ENCLOSURES -	EXIT	O HR	O HR	N/A	N/A	N/A	N/A
SHAFT ENCLOSURES -	OTHER	O HR	N/A	N/A	N/A	N/A	N/A
CORRIDOR SEPARATION	NC	O HR	N/A	N/A	N/A	N/A	N/A
OCCUPANCY/ FIRE B.	ARRIER SEP.	2 HR	N/A	A1-01	U.L. U415	N/A	N/A
PARTY/FIRE WALL SEP	ARATION	O HR	N/A	N/A	N/A	-	-
SMOKE BARRIER SEPA	RATION	O HR	N/A	N/A	N/A	N/A	N/A
SMOKE PARTITION		O HR	N/A	N/A	N/A	N/A	N/A
TENANT/DWELLING UI SLEEPING UNIT SEPAR	ATION	N/A	N/A	N/A	N/A	N/A	N/A
INCIDENTAL USE SEPA	RATION	N/A	N/A	N/A	N/A	N/A	N/A

PERCENTAGE OF WALL OPENING CALCULATION FIRE SEPARATION DISTANCE **ACTUAL SHOWN** AREA (%) ON PLANS (%) feet) from property lines | prote

LIFE SAFETY SYSTEM REQUIREMENTS: EMERGENCY LIGHTING: NO YES NO YES **EXIT SIGNS:** NO YES FIRE ALARM: NO YES PARTIAL SMOKE DETECTION SYSTEMS:

CARBON MONOXIDE DETECTION: NO YES

LIFE SAFETY PLAN REQUIREMENTS:

LIFE SAFETY PLAN SHEET #: GC1.01

FIRE AND/OR SMOKE RATED WALL LOCATIONS (CHAPTER 7)

ASSUMED AND REAL PROPERTY LINE LOCATIONS (IF NOT ON SITE PLAN)

exterior wall opening area with respect to distance to assumed property lines (705.8) OCCUPANCY USE FOR EACH AREA AS IT RELATES TO OCCUPANT LOAD CALCULATION (TABLE 1004.1.2)

OCCUPANT LOADS FOR EACH AREA EXIT ACCESS TRAVEL DISTANCES (1017)

COMMON PATH OF TRAVEL DISTANCES (1006.2.1 & 1006.3.2(1))

DEAD END LENGTHS (1020.4)

CLEAR EXIT WIDTHS FOR EACH EXIT DOOR

MAXIMUM CALCULATED OCCUPANT LOAD CAPACITY EACH EXIT DOOR CAN ACCOMMODATE BASED ON

EGRESS WIDTH (1005.3) ACTUAL OCCUPANT LOAD FOR EACH EXIT DOOR

A SEPARATE SCHEMATIC PLAN INDICATING WHERE FIRE RATED FLOOR/CEILING AND/OR ROOF STRUCTURE IS PROVIDED FOR PURPOSES OF OCCUPANCY SEPARATION

LOCATION OF DOORS WITH PANIC HARDWARE (1010.1.10) LOCATION OF DOORS WITH DELAYED EGRESS LOCKS AND THE AMOUNT OF DELAY (1010.1.9.7)

LOCATION OF DOORS WITH ELECTROMAGNETIC EGRESS LOCKS (1010.1.9.9)

LOCATION OF DOORS EQUIPPED WITH HOLD-OPEN DEVICES LOCATION OF EMERGENCY ESCAPE WINDOWS (1030)

THE SQUARE FOOTAGE OF EACH FIRE AREA (202)

THE SQUARE FOOTAGE OF EACH SMOKE COMPARTMENT FOR OCCUPANCY CLASSIFICATION I-2 (407.5) NOTE ANY CODE EXCEPTIONS OR TABLE NOTES THAT MAY HAVE BEEN UTILIZED REGARDING THE ITEMS ABOVE

ACCESSIBLE DWELLING UNIT

			(SECTION	N 1107)			
TOTAL UNITS	ACCESSIBLE UNITS REQUIRED	ACCESSIBLE UNITS PROVIDED	UNITS	TYPE A UNITS PROVIDED	TYPE B UNITS REQUIRED	TYPE B UNITS PROVIDED	TOTAL ACCESSIBLE UNITS PROVIDED
-	·		-	-	-		-

ACCESSIBLE PARKING

SEE CIVIL SHEETS TOTAL # OF # OF ACCESSIBLE SPACES ARKING SPACES PROVIDED LOT OR PARKING CESS | 8' ACCESS | ACCESSIBLE AREA AISLE PROVIDED REQ'D PROVIDED

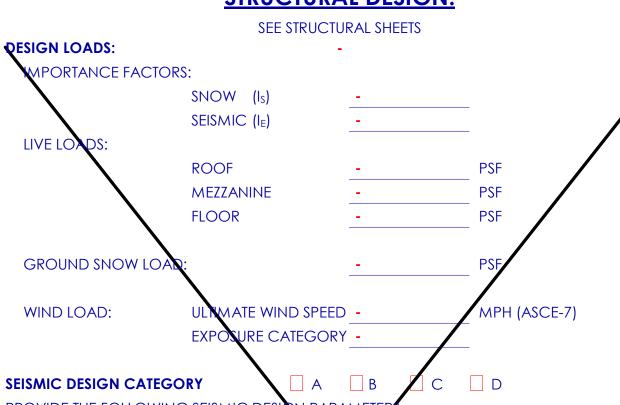
PLUMBING FIXTURE REQUIREMENTS

						(TABLE 2	2902.1)				
Γ											DRINK	ING
			W	ATERCLO	SETS		L	AVATORI	ES	SHWRS	FOUNT	TAINS
		USE	MALE	FEMALE	UNISEX	URINALS	MALE	FEMALE	UNISEX	/ TUBS	REGULAR	ACCESS
	щ	EXIST'G	-	-	-	-	-	-	-	-	-	-
	AC	NEW	N/A	N/A	-	-	-	-	-	-	-	-
	SP	REQ'D	SEE	NOTE*	-	-	-	-	-	-	-	_

NOTE* BUILDING IS UN-OCCUPIED AND NOT HEATED **SPECIAL APPROVALS:**

SPECIAL APPROVAL: (LOCAL JURISDICTION, DEPARTMENT OF INSURANCE, OSC, DPI, DHHS, ETC., DESCRIBE BELOW)

STRUCTURAL DESIGN:



PROVIDE THE FOLLOWING SEISMIC DESIGN PARAMETE RISK CATEGORY (TABLE 1604.5) SPECTRAL RESPONSE ACCELERATION %g S_1 -SITE CLASSIFICATION (ASCE 7) B C D D E F DATA SOURCE: PRESUMPTIVE HISTORICAL DATA BASIC STRUCTURAL SYSTEM (CHECK (BEARING WALL DUAL W/ SRECIAL MOMENT FRAME BUILDING FRAMI DUAL W/ INTERMEDIATE R/C OR SPECIAL STEEL INVERTED PEND MOMENT FRAM ANALYSIS PROCEDURE: SIMPLIFIED EQUIVALENT LATERAL FORCE DYNAMIC

ARCHITECTURAL, MECHANICAL, COMPONENTS ANCHORED? LATERAL DESIGN CONTROL: EARTHQUAKE WIND

SOIL BEARING CAPACITIES: OVIDE COPY OF TEST REPORT) PRESUMPTIVE BEARING CAPACITY E, TYPE, AND CAPACITY

ENERGY SUMMARY

ENERGY REQUIREMENTS

THE FOLLOWING DATA SHALL BE CONSIDERED MINIMUM AND ANY SPECIAL ATTRIBUTE REQUIRED TO MEET THE ENERGY CODE SHALL ALSO BE PROVIDED. EACH DESIGNER SHALL FURNISH THE REQUIRED PORTIONS OF THE PROJECT INFORMATION FOR THE PLAN DATA SHEET. IF PERFORMANCE METHOD, STATE THE ANNUAL ENERGY COST FOR THE STANDARD REFERENCE DESIGN VS ANNUAL ENERGY COST FOR THE PROPOSED DESIGN.

EXISTING BUILDING ENVELOPE COMPLIES WITH CODE: UNO YES (REMAINDER OF SECTION

IS NOT APPLICABLE) EXEMPT BUILDING: YES NO PROVIDE CODE OR STATUTORY REFERENCE: SECTION C101.2.

CLIMATE ZONE:

METHOD OF COMPLIANCE: ENERGY CODE: PRESCRIPTIVE PRESCRIPTIVE PERFORMANCE (IF "OTHER" SPECIFY SOURCE HERE)

THERMAL ENVELOPE (PRESCRIPTIVE METHOD ONLY) DUPLICATE SECTIONS BELOW FOR EACH ADDITIONAL ASSEMBLY REQUIRED

ROOF/CEILING ASSEMBLY: (EACH ASSEMBLY)

DESCRIPTION OF ASSEMBLY:

OF THE EXTERIOR WALLS DOUBLE AS HANGAR DOORS.

STANDING SEAM METAL ROOF, PROVIDED BY THE PEMB MANUFACTURER

EXTERIOR WALLS (EACH ASSEMBLY) DESCRIPTION OF ASSEMBLY:

BASIS OF DESIGN: EXTERIOR METAL PANEL SKIN WITH PEMB STRUCTURE, BY THE PEMB MANUFACTURER. PORTIONS

MECHANICAL DESIGN MECHANICAL SUMMARY

MECHANICAL SYSTEMS, SERVICE SYSTEMS, AND EQUIPMENT:

THERMAL ZONE: WINTER DRY BULB SUMMER DRY BULB **INTERIOR DESIGN CONDITIONS:**

WINTER DRY BULB SUMMER DRY BULB RELATIVE HUMIDITY

BUILDING HEATING LOAD: **BUILDING COOLING LOAD:** MECHANICAL SPACE CONDITIONING SYSTEM:

DESCRIPTION OF UNI HEATING EFFICIEN COOLING EFFI

SIZE CATEGO BOILER TEGORY. IF OVERSIZED STATE REASON.

ZE CATEGORY. IF OVERSIZED STATE REASON. **EQUIPMENT EFFICIENCIES:**

ELECTRICAL DESIGN

SEE ELECTRICAL SHEETS **ELECTRICAL SUMMARY**

METHOD OF COMPLIANCE: ENERGY CODE: PRESCRIPTIVE METHOD OF COMPLIANCE: ASHRAE 90.1: PRESCRIPTIVE

LIGHTING SCHEDULE (EXCH FIXTURE TYPE): LAMP TYPE REQUIRED IN FIXTURE NUMBER OF LAMPS IN PATURE: BALLAST TYPE USED IN THE FIXTURE:

NUMBER OF BALLASTS IN FIXTUR TOTAL WATTAGE PER FIXTURE: TOTAL INTERIOR WATTAGE SPECIFIED (WHOLE BUILDING OR SPACE BY S

TOTAL EXTERIOR WATTAGE SPECIFIED VS. ALLOWS ADDITIONAL EFFICIENCY PACKAGE OPTIONS (WHEN USING THE 2018 NCECC; NOT REQUIRED FOR ASHRAE 90. C406.2 MORE EFFICIENT HVAC EQUIPMENT PERFORMAN C406.3 REDUCED LIGHTING POWER DENSITY

C406.4 ENHANCED DIGITAL LIGHTING CONTROLS 06.5 ON-SITE RENEWABLE ENERGY

C406.6 DEDICATED OUTDOOR AIR SYSTEM

C406.7 REDUCED ENERGY USE SERVICE WATER HEATING

REGISTRATION NO

MICHAEL

Walter Robbs Architects, a Michael

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CODE CONSULTANT:

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Consultant Engineering Service 1111 S. Marshall Street, Suite 250

Performance Based Fire Protection

Clayton Engineering and Design

Winston-Salem, NC 27103



L. KENNETH MCDANIEL II

Δ DATE DESCRIPTION

SHEET NAME:

CODE COMPLIANCE SUMMARY

ORIG SUBMISSION: **CURRENT:**

SHEET:

FOR ALL COMMERCIAL PROJECTS

UNINTERRUPTABLE POWER SUPPLIES

CODE COMPLIANCE PLAN- LEVEL 01

February 14, 2022 * Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification

Horizontal Section System C - 2 Hr. 24 in. or 600 mm O.C. Horizontal Section System D - 2 Hr.

Design No. **U415**

Nonbearing Wall Ratings — 1, 2, 3 or 4 Hr

(such as Canada), respectively.

System A - 1 Hr.

Horizontal Section

System B - 2 Hr.

24 in. or 600 mm O.C.

24 in. or 600 mm 0.C. --

24 in. or 600 mm 0.C.

Horizontal Section System F - 2 Hr. 24 in. or 600 mm 0.C. with short leg toward finished side of wall. Runners attached to structural supports with steel fasteners located not greater than 2 in. from ends and not greater than 24 in. OC. "E" - shaped studs (Item 2A) may be used as side runners in place of "J" - shaped runners.

2. Steel Studs — "C-H" - shaped studs, min 2-1/2 in. deep (min 4 in. deep when System C is used), fabricated from min 25 MSG (min 20 MSG when Items 2D, 4A, 4B, 4C, 4D or 7 is used) galv steel. Cut to lengths 3/8 to 1/2 in. less than floor-to-ceiling height and spaced 24 in. or 600 mm OC (max 16 in. OC when Items 4A, 4B, 4C, or 4D are used).

2A. Steel Studs — (Not Shown) — "E" - shaped studs installed back to back in place of "C-H" - shaped studs (Item 2) "E" - shaped studs secured together with steel screws spaced a maximum 12 in. OC. Fabricated from min 25 MSG (min 20 MSG when Item 2D, 4A, 4B or 7 is used) galv steel, min 2-1/2 in. deep (min 4 in. deep when System C is used), with one leg 1 in. long and two legs 3/4 in. long. Shorter legs 1 in. apart to engage gypsum liner panels. Cut to lengths 3/8 to 1/2 in. less than floor to ceiling heights.

2B. Furring Channels — (Optional, Not Shown) — For use with single or double layer systems. Resilient furring channels fabricated from min 25MSG corrosion protected steel, installed horizontally, and spaced vertically a max 24 in. OC. Flange portion of channel attached to each intersecting "C-H" or "E" stud on side of stud opposite the 1 in. liner panels with 1/2 in. long Type S or S-12 panhead steel screws. When furring channels are used, wallboard to be installed vertically only. . Not to be used with Type FRX-G gypsum board, lead backed gypsum boards (Items 4A-4D), or cementitious backer units (Item 7).

2C. Furring Channels — For use with System I - "Hat" - shaped, 25 MSG galv steel furring channels attached directly over the inner layers of wallboard to each stud with 2 in. long Type S pan head steel screws. Screws alternate from top flange to bottom flange at each stud intersection. Furring channels spaced vertically max 24 in. OC.

2D. Steel Framing Members* — (Optional, Not Shown) — For use with single or double layer systems. Furring channels and Steel Framing Members as described below. Not to be used with Type FRX-G gypsum board, lead backed gypsum boards (Items 4A-4D), or a. Furring Channels — Formed of No. 25 MSG galv steel. 2-9/16 in. or 2-23/32 in. wide by 7/8 in. deep, spaced max. 24 in. OC perpendicular to studs. Channels secured to studs as described in Item b. Gypsum board installed vertically only and attached to

b. Steel Framing Members* — Used to attach furring channels (Item 2Da) to studs (Item 2 or 2A). Clips spaced max. 24 in. OC., and secured to studs with No. 8 x 1-1/2 in. minimum self-drilling, S-12 steel screw through the center grommet. Furring channels are friction fitted into clips. RSIC-1 clip for use with 2-9/16 in. wide furring channels. RSIC-1 (2.75) clip for use with 2-23/32 in. wide furring

2E. Steel Framing Members* — (Optional, Not Shown) — Furring channels and Steel Framing Members as described below. . Not to be used with Type FRX-G gypsum board, lead backed gypsum boards (Items 4A-4D), or cementitious backer units (Item 7). a. Furring Channels — Formed of No. 25 MSG galv steel. Spaced 24 in. OC perpendicular to studs. Channels secured to studs as described in Item b. Ends of adjoining channels overlapped 6 in. and tied together with double strand of No. 18 AWG galvanized steel

wire. Gypsum board attached to furring channels as described in Item 4. b. Steel Framing Members* — Used to attach furring channels (Item 2Ea) to studs. Clips spaced 24 in. OC., and secured to studs with 2 in. coarse drywall screw with 1 in. diam washer through the center hole. Furring channels are friction fitted into clips.

STUDCO BUILDING SYSTEMS — RESILMOUNT Sound Isolation Clips - Type A237R 2F. Steel Framing Members* — (Optional, Not Shown) — For use with single or double layer systems. Furring channels and Steel Framing Members as described below. Not to be used with Type FRX-G gypsum board, lead backed gypsum boards (Items 4A-4D), or cementitious backer units (Item 7). a. Furring Channels — Formed of No. 25 MSG galv steel. 2-3/8 in. wide by 7/8 in. deep, spaced max. 24 in. OC perpendicular to studs.

Channels secured to studs as described in Item b. Gypsum board installed vertically only and attached to furring channels as described

b. Steel Framing Members* — Used to attach furring channels (Item 2Da) to studs (Item 2 or 2A). Clips spaced max. 24 in. OC. GENIECLIPS secured to studs with No. 8 x 1-1/2 in. minimum self-drilling, S-12 steel screw through the center grommet. Furring channels are friction fitted into clips.

PLITEQ INC — Type GENIECLIP

furring channels as described in Item 4.

2G. Steel Framing Members* — (Optional, Not Shown) — Furring channels and Steel Framing Members as described below. Not to be used with Type FRX-G gypsum board, lead backed gypsum boards (Items 4A-4D), or cementitious backer units (Item 7). a. Furring Channels — Formed of No. 25 MSG galv steel. Spaced 24 in. OC perpendicular to studs. Channels secured to studs as described in Item 2Gb. Ends of adjoining channels overlapped 6 in. and tied together with double strand of No. 18 AWG galvanized

b. Steel Framing Members* — Used to attach furring channels (Item 2Ga) to studs. Clips spaced 24 in. OC., and secured to studs with No. 8 x 2-1/2 in. coarse drywall screw through the center hole. Furring channels are friction fitted into clips. REGUPOL AMERICA — Type SonusClip

steel wire. Gypsum board attached to furring channels as described in Item 4.

2H. Steel Framing Members* — (Optional, Not Shown) — Resilient channels and Steel Framing Members as described below. Not to be used with Type FRX-G gypsum board, lead backed gypsum boards (Items 4A-4D), or cementitious backer units (Item 7). a. Resilient Channels — Formed of No. 25 MSG galv steel, spaced 24 in. OC, and perpendicular to studs. Channels secured to studs as described in Item b. Ends of adjoining channels overlapped 6 in. and secured in place with two No. 8 15 x 1/2 in. Phillips Modified Truss

screws spaced 2-1/2 in. from the center of the overlap. Gypsum board attached to resilient channels as described in Item 4.

b. Steel Framing Members* — Used to attach resilient channels (Item 2Ha) to studs. Clips spaced 48 in. OC., and secured to studs with No. 8 x 2-1/2 in. coarse drywall screw through the center hole. Resilient channels are secured to clips with one No. 10 x 1/2 in. pan-head self-drilling screw. **KEENE BUILDING PRODUCTS CO INC** — Type RC+ Assurance Clip

21. Steel Framing Members* — (Optional, Not Shown) — For use with single or double layer systems. Furring channels and Steel Framing Members as described below. Not to be used with Type FRX-G gypsum board, lead backed gypsum boards (Items 4A-4D), or cementitious backer units (Item 7). a. Furring Channels — Formed of No. 25 MSG galv steel. 2-23/32 in. wide by 7/8 in. deep, spaced max. 24 in. OC perpendicular to studs. Channels secured to studs as described in Item b. Gypsum board installed vertically only and attached to furring channels as

b. Steel Framing Members* — Used to attach furring channels (Item 2Ia) to studs (Item 2 or 2A). Clips spaced max. 24 in. OC., and secured to studs with No. 8 x 1-1/2 in. minimum self-drilling, S-12 steel screw through the center grommet. Furring channels are CLARKDIETRICH BUILDING SYSTEMS — Type ClarkDietrich Sound Clip

3. Gypsum Board* — Gypsum liner panels, nom 1 in. thick, 24 in. or 600 mm (for metric spacing) wide. Panels cut 1 in. less in length than floor to ceiling height. Vertical edges inserted in "H" portion of "C-H" studs or the gap between the two 3/4 in. legs of the "E" studs. Free edge of end panels attached to long leg of vertical "J" - runners with 1-5/8 in. long Type S steel screws spaced not greater than 12 in, OC. When wall height exceeds liner panel length, liner panel may be butted to extend to the full height of the wal Horizontal joints need not be backed by steel framing. In System I, butt joints in liner panels are staggered min 36 in. Butt joints backed with 6 in. by 22 in. strips of 3/4 in. thick gypsum wallboard (Item 4). Wallboard strips centered over butt joints and secured to liner panels with six 1-1/2 in. long Type G steel screws, three screws along the 22 in. dimension at the top and bottom of the strips.

UNITED STATES GYPSUM CO — Type SLX

USG BORAL DRYWALL SFZ LLC — Type SLX

USG MEXICO S A DE C V — Type SLX

backed by steel framing.

4. Gypsum Board* -System A — 1 Hr Gypsum panels, with beveled, square or tapered edges, nom 5/8 in. thick, 48 in. or 1200 mm wide, applied vertically or horizontally, attached to studs with 1 in. long Type S steel screws spaced 12 in. when installed vertically or 8 in OC when installed horizontally. Horizontal joints need not be

LIFE SAFETY LEGEND

- HUNG FIRE EXTINGUISHER - MEETING EXTRA HAZARD RATING OF 4A, 80-BC, AND FAA REGULATIONS (SHALL MEET NFPA 10), VERIFY FINAL LOCATION WITH LOCAL FIRE MARSHALL, PROVIDE AN ALLOWANCE OF \$2,000 FOR FIRE EXTINGUISHERS. KNOX BOX

MOST REMOTE POINT # — OCCUPANTS SERVED (EGRESS) OCCUPANTS REQUIRED (EGRESS) FIRE RATING OF DOOR

——DOOR NUMBER PATH OF TRAVEL CGC INC — Types AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, ULIX, ULX, USGX, WRC, WRX

THE SIAM GYPSUM INDUSTRY (SONGKHLA) CO — Types C and SCX UNITED STATES GYPSUM CO — Types AR, C, FRX-G, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SGX, SHX, ULIX, ULX, WRC, WRX, USGX.

USG BORAL DRYWALL SFZ LLC — Types C, SCX, SGX, USGX

USG MEXICO S A DE C V — Types AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, ULX, USGX, WRC, WRX

System B — 2 Hr Gypsum panels, with beveled, square or tapered edges, nom 1/2 in. or 5/8 in. thick, 48 in. or 1200 mm wide, applied vertically or horizontally in

two layers. Inner or base layer attached to studs with 1 in. long Type S steel screws spaced 24 in. OC when installed vertically or 16 in. OC when installed horizontally. Outer or face layer attached to studs with 1-5/8 in. long Type S steel screws spaced 12 in. OC when installed vertically and staggered 12 in. from base layer screws or 8 in. OC when installed horizontally and staggered 8 in. from base layer screws. Horizontal joints between inner and outer layers staggered a min of 12 in. Horizontal joints need not be backed by steel framing. Vertical joints centered over studs

CGC INC — 1/2 in. Type C, IP-X2, IPC-AR or WRC; 5/8 in. Types AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, ULX, USGX, WRC, WRX THE SIAM GYPSUM INDUSTRY (SONGKHLA) CO — Types C and SCX

UNITED STATES GYPSUM CO — 1/2 in. Types C, IP-X2, IPC-AR, or WRC; 5/8 in. Types AR, C, FRX-G, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SGX, SHX, ULIX, ULX, USGX, WRC, WRX.

USG MEXICO S A DE C V — 1/2 in. Types C, IP-X2, IPC-AR or WRC; 5/8 in. Types AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, ULX, USGX, WRC,

System C — 2 Hr Gypsum panels, with beveled, square or tapered edges, nom 3/4 in. thick, 48 in. or 1200 mm wide, applied vertically or horizontally, secured with 1-1/4 in. long Type S steel screws spaced 8 in. OC along vertical edges and 12 in. OC in the field when installed vertically or 8 in. OC along the vertical edges and in the field when installed horizontally. Horizontal joints need not be backed by steel framing. Screws along side joints offset 4 in. Requires min 4 in. deep framing per Items 1, 2 and 3. Requires min 3 in. thick mineral wool batts per Item 6. CGC INC — Types IP-X3 or ULTRACODE

UNITED STATES GYPSUM CO - Types IP-X3 or ULTRACODE

USG BORAL DRYWALL SFZ LLC — 1/2 in. Type C; 5/8 in. Types C, SCX, SGX, USGX

 ${\bf USG~BORAL~DRYWALL~SFZ~LLC} - {\bf Type~ULTRACODE}$

USG MEXICO S A DE C V - Types IP-X3 or ULTRACODE

System D — 2 Hr Gypsum panels, with beveled, square or tapered edges, nom 5/8 in. thick, 48 in. or 1200 mm wide, applied vertically or horizontally, attached directly to studs with 1 in. long Type S steel screws spaced 24 in. when installed vertically or 16 in. OC when installed horizontally. Horizontal joints need not be backed by steel framing. Requires face layer of 1/2 or 5/8 in. thick cementitious backer units per Item 7 and min 1-1/2 in. thick mineral.

wool batts per Item 6. CGC INC — Types AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, ULX, USGX, WRC, WRX

THE SIAM GYPSUM INDUSTRY (SONGKHLA) CO — Types C and SCX

UNITED STATES GYPSUM CO — Types AR, C, FRX-G, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SGX, SHX, ULIX, ULX, USGX, WRC, WRX.

USG BORAL DRYWALL SFZ LLC - Types C, SCX, SGX, USGX

USG MEXICO S A DE C V — Types AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, ULX, USGX, WRC, WRX

Gypsum panels, with beveled, square or tapered edges, nom 1/2 in. or 5/8 in. thick, 48 in. or 1200 mm wide, applied vertically or horizontally, attached to studs with 1 in. long Type S steel screws spaced 12 in. OC when installed vertically or 8 in. when installed horizontally. Horizontal joints need not be backed by steel framing. CGC INC — 1/2 in. Types C, IP-X2, IPC-AR; 5/8 in. Types AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, ULX, USGX, WRC, WRX

System E — 2 Hr

UNITED STATES GYPSUM CO — 1/2 in. Types C, IP-X2, IPC-AR; 5/8 in. Types AR, C, FRX-G, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SGX, SHX, ULIX, ULX,

THE SIAM GYPSUM INDUSTRY (SONGKHLA) CO — Types C and SCX $\,$

USG BORAL DRYWALL SFZ LLC — 1/2 in. Type C; 5/8 in. Types C, SCX, SGX, USGX

USG MEXICO S A DE C V — 1/2 in. Types C, IP-X2, IPC-AR; 5/8 in. Types AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, ULX, USGX, WRC, WRX

System F — 2 Hr Gypsum panels, with beveled, square or tapered edges, nom 1/2 in. or 5/8 in. thick, 48 in. or 1200 mm wide, applied vertically in two layers. Inner or base layer attached to resilient furring channels (Item 2B) with 1 in. long Type S steel screws spaced 24 in. Outer or face layer attached to resilient furring channels (Item 2B) with 1-5/8 in. long Type S steel screws spaced 12 in. OC and staggered 12 in. from base layer screws. Joints between inner and outer layers staggered 24 in.

THE SIAM GYPSUM INDUSTRY (SONGKHLA) CO — Types C and SCX

UNITED STATES GYPSUM CO — 1/2 in. Type C, IP-X2, IPC-AR or WRC; 5/8 in. Types AR, C, FRX-G, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SGX, SHX,

CGC INC — 1/2 in. Type C, IP-X2, IPC-AR or WRC; 5/8 in. Types AR, C, FRX-G, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, ULX, USGX, WRC, WRX

USG BORAL DRYWALL SFZ LLC — 1/2 in. Type C; 5/8 in. Types C, SCX

ULIX, ULX, USGX, WRC, WRX.

USG MEXICO S A DE C V — 1/2 in. Types C, IP-X2, IPC-AR or WRC; 5/8 in. Types AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, ULX, USGX, WRC,

Gypsum panels, with beveled, square or tapered edges, nom 5/8 in. thick, 48 in. or 1200 mm wide, applied vertically or horizontally in three layers. Inner or base layer attached to studs with 1 in. long Type S steel screws spaced 24 in. OC when installed vertically or 16 in OC when installed horizontally. Middle layer attached to studs with 1-5/8 in. long Type S steel screws spaced 24 in. when installed vertically or 16 in. OC when installed horizontally. Outer or face layer attached to studs with 2-1/4 in. long Type S steel screws spaced 16 in. when installed vertically or 12 in. OC when installed horizontally. Screws offset 6 in. from layer below. Horizontal joints on adjacent layers staggered a min of 12 in. . Horizontal joints need not be backed by steel framing. Vertical joints centered over studs and staggered 24 in. on adjacent layers. CGC INC — Types C, IP-X2, IPC-AR, ULIX, WRC

THE SIAM GYPSUM INDUSTRY (SONGKHLA) CO — Type C

UNITED STATES GYPSUM CO — Types C, IP-X2, IPC-AR, ULIX, WRC USG BORAL DRYWALL SFZ LLC — Type C

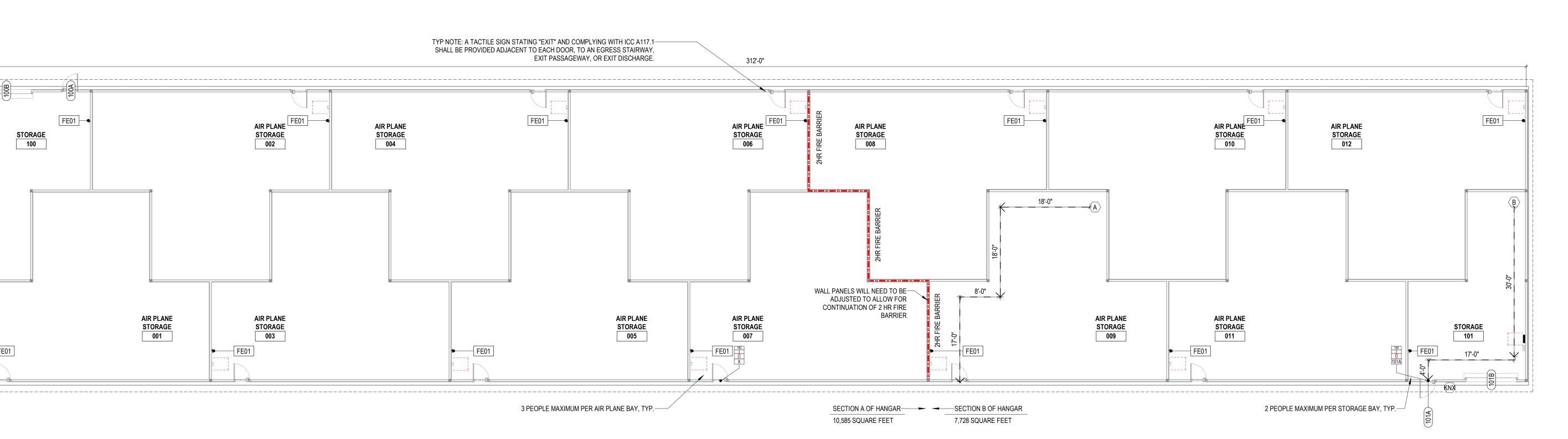
USG MEXICO S A DE C V — Types C, IP-X2, IPC-AR, WRC

COMMON PATH OF TRAVEL - 100'-0" (PER 1006.2.1)

COMMON PATH OF TRAVEL - 61'-0" EGRESS TRAVEL DISTANCE MAXIMUM - 100'-0" | EGRESS TRAVEL DISTANCE MAXIMUM - 100'-0"

EGRESS PATH ANALYSIS STORAGE S1 OCCUPANCY

COMMON PATH OF TRAVEL - 51'-0"



SHEET NAME: CODE COMPLIANCE PLAN-

LEVEL 01

ORIG SUBMISSION: CURRENT:

SHEET: GC1.01

△ DATE DESCRIPTION

MICHAEL

Walter Robbs Architects, a Michael

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ELECTRICAL ENGINEER:

Winston-Salem, NC 27101

CODE CONSULTANT:

Clayton Engineering and Design

SKA Consulting Engineers, Inc

Consultant Engineering Service

Performance Based Fire Protection

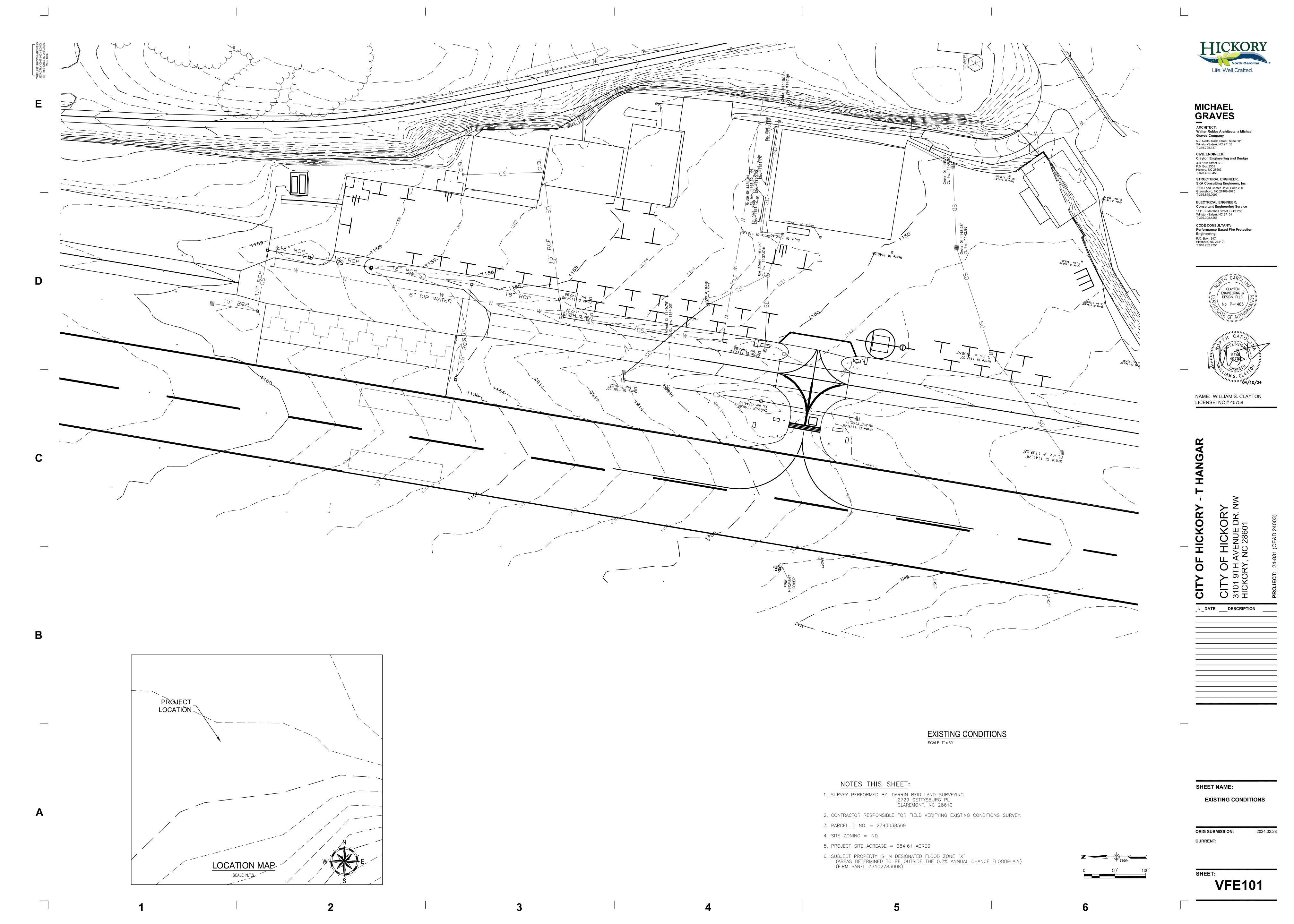
REGISTRATION NO

L. KENNETH MCDANIEL II

1111 S. Marshall Street, Suite 250

7900 Triad Center Drive, Suite 200 Greensboro, NC 27409-9075

Winston-Salem, NC 27103 T 336.725.1371



RUNWAY/TAXIWAY SAFETY AREAS AND ILS CRITICAL AREAS: NO WORK OR HAULING IN AN ACTIVE RUNWAY SAFETY AREA. TAXIWAY

SAFETY AREA. OR INSTRUMENT LANDING SYSTEM (ILS) CRITICAL AREAS IS PERMITTED. NO PERSONNEL/EQUIPMENT PULL BACKS TO CLEAR AN ACTIVE AREAS AREA PERMITTED. LOCAL NOTAMS SHALL BE IN EFFECT FOR ALL ACTIVITIES.

NO STOCKPILES OR MATERIALS MAY PENETRATE THE RUNWAY OBSTACLE FREE ZONE (ROFZ) AS DEFINED IN AC 150/5300-13B PARAGRAPH 3.11 WHILE RUNWAY IS OPEN.

ALL CONSTRUCTION ACTIVITY MUST BE COORDINATED WITH AIRPORT MANAGEMENT PRIOR TO COMMENCEMENT SO PROPER ADVISORIES CAN BE PUBLISHED.

24-HOUR CONTACT:

HICKORY REGIONAL AIRPORT AIRPORT OPERATIONS

PH: (828) 723-7408

HICKORY GROUND FREQUENCY (0700-2100): 121.7 MHZ CTAF FREQUENCY (2101-0659): 128.15 MHZ

CONTRACTOR SHALL PROVIDE 24/7 CONTACT INFORMATION FOR ALL PARTIES IN THE CONSTRUCTION RELATED ACTIVITY. SUCH THAT IN THE EVENT OF AN EMERGENCY THE NECESSARY ACTIONS CAN BE TAKEN TO MAINTAIN THE SAFETY OF ROADWAY AND AIRPORT OPERATIONS, NAVAIDS, AND UTILITY OUTAGES.

PENALTIES FOR NONCOMPLIANCE CONSEQUENCE VIOLATION EXCEEDING CONTRACT TIME \$1,600 PER CALENDAR DAY VIOLATION OF SAFETY PLAN 1ST OCCURRENCE: VERBAL WARNING 2ND OCCURRENCE: WRITTEN WARNING AND \$500 FINE 3RD OCCURRENCE: WRITTEN WARNING AND \$1,000 FINE 4TH OCCURRENCE: PERSON REMOVED FROM PROJECT

BARRICADES SHALL CONFORM TO THE REQUIREMENTS OF FAA ADVISORY CIRCULAR 150/5273-2 (CURRENT EDITION) "OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION". RED SOLAR LIGHT MUST MEET THE LUMINANCE REQUIREMENTS OF THE STATE HIGHWAY

NOTES:

| HAUL/ACCESS

ROUTE

PROPOSED CONTRACTOR

STABILIZED CONSTRUCTION,

ENTRANCE/EXIT

STAGING AREA

LOW PROFILE BARRICADES —

PROJECT LOCATION -

LOW PROFILE BARRICADES —

- LOW PROFILE BARRICADES

SECURITY CHECKPOINT -

AT EXISTING GATE

- NEW TERMINAL BUILDING

- OLD TERMINAL BUILDING

TAXIWAY A

THE CONTRACTOR SHALL PROVIDE A SUFFICIENT NUMBER OF BARRICADES TO COMPLETE THE WORK. THIS ITEM IS INCIDENTAL TO THE PROJECT, INCLUDING MULTIPLE RELOCATIONS OF THE BARRICADES. NO SEPARATE PAYMENT WILL BE MADE. THE BARRICADES SHALL BECOME PROPERTY OF THE OWNER UPON COMPLETION OF THE POJECT.

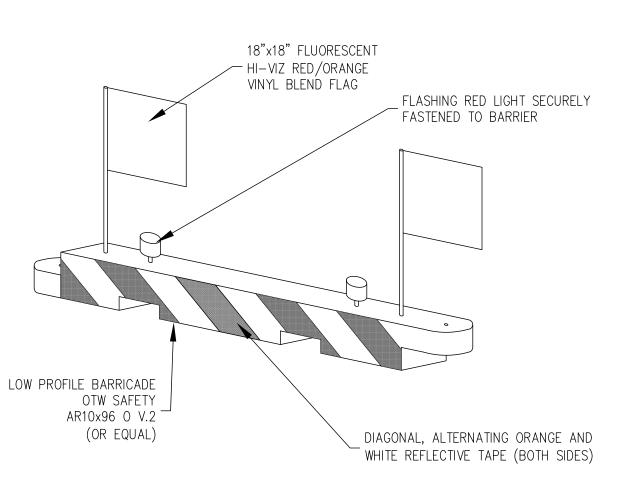
BARRICADES SHALL BE CONSTRUCTED OF MATERIAL THAT IS LOW IN MASS, EASILY COLLAPSIBLE UPON CONTACT WITH AN AIRCRAFT, AND WATER FILLED AND ADEQUATELY SECURED TO WITHSTAND HIGH WINDS AND/OR JET BLAST.

SPACING OF BARRICADES SHALL ENSURE THAT THE DISTANCE BETWEEN LIGHTS IN NO MORE THAN 5 FEET. INSTALLATION OF MULTIPLE LIGHTS ON A SINGLE BARRICADE MAY BE REQUIRED. THE BARRICADES SHALL BE A MINIMUM OF 8' IN LENGTH.

5. THE CONTRACTOR SHALL MAINTAIN AND MAKE FREQUENT INSPECTIONS OF THE BARRICADES THROUGHOUT THE DURATION OF THE PROJECT. PROMPT REPAIRS INCLUDING REPLACEMENT OF FLASHING RED LIGHTS SHALL BE MADE AS NECESSARY.

6. KNOWN MANUFACTURER AND MODEL: OTW SAFETY, AR10x96 O V.2. (OR APPROVED EQUAL)

7. SEE PHASING AND SAFETY NOTES 3 AND 4.



LOW PROFILE BARRICADE DETAIL

N.T.S.

—

GENERAL NOTES: 1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING POSITIVE

DRAINAGE THROUGHOUT THE PROJECT.

2. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR HAVING VISITED THE SITE AND HAVING FAMILIARIZED THEMSELVES WITH EXISTING CONDITIONS PRIOR TO SUBMITTING THEIR BID. ANY DISCREPANCIES BETWEEN EXISTING FIELD CONDITIONS AND WHAT IS SHOWN ON THE PLAN SHEETS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE BID.

3. THE CONTRACTOR AND ALL SUBCONTRACTORS SHALL DESIGNATE A REPRESENTATIVE AND ALTERNATE TO CONTACT ON A 24 HOUR BASIS SHOULD PROBLEMS ARISE.

4. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER WHEN WORKING IN AREAS CONTAINING FAA OR AIRFIELD LIGHTING CABLE OR UNDERGROUND UTILITIES.

5. CONTRACTOR SHALL CLEAN ALL CONSTRUCTION AREAS OF LITTER, LOOSE PAPERS, DEBRIS, ETC. ON A DAILY BASIS, OR AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL KEEP ALL ROADWAYS CLEAR OF DEBRIS, STONES, LITTER, ETC. DURING CONSTRUCTION. ALL PAVEMENTS SHALL BE CLEANED OF CONSTRUCTION DEBRIS AND SPILLAGE IMMEDIATELY. CONTRACTOR SHALL VISUALLY INSPECT PAVEMENTS DURING THE HAULING OPERATIONS. CONTRACTOR IS REQUIRED TO HAVE A PUSH BROOM ON SITE AT ALL TIMES.

6. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL PERMITS, LICENSES, ETC. REQUIRED BY LOCAL, STATE AND FEDERAL AGENCIES. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS IN REGARD TO CONSTRUCTION NOISE AND EROSION CONTROL DURING CONSTRUCTION.

7. THE CONTRACTOR SHALL LOCATE AND PROTECT EXISTING UTILITIES FROM DAMAGE BY EQUIPMENT OR PERSONNEL. THE CONTRACTOR SHALL CONTACT ALL UTILITY AGENCIES FOR FIELD MARKING PRIOR TO BEGINNING CONSTRUCTION. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONDED BY THE UTILITIES. ALL UTILITIES AND FACILITIES ARE NOT NECESSARILY SHOWN. THE CONTRACTOR SHALL ADVISE THE ENGINEER IN WRITING OF ANY EXISTING DAMAGED UTILITIES PRIOR TO BEGINNING CONSTRUCTION.

8. ANY UTILITIES OR FACILITIES DAMAGED DURING THE PROJECT BY THE CONTRACTOR'S MEN OR EQUIPMENT SHALL BE PROMPTLY REPAIRED AT THE CONTRACTOR'S EXPENSE. HAND DIGGING TO PROTECT UTILITIES FROM DAMAGE SHOULD BE ANTICIPATED.

9. ALL DISTURBED AREAS, INCLUDING THE CONTRACTOR'S STAGING AREA, HAUL ROUTES, GRADING LIMITS, ETC. SHALL BE RESTORED TO A SMOOTH LINE AND GRADE WITH POSITIVE DRAINAGE. THE CONTRACTOR SHALL SEED AND MULCH ALL DISTURBED AREAS. THERE WILL NE MEASUREMENT FOR PAYMENT OF SEEDING AND MULCHING REQUIRED OUTSIDE THE GRADING LIMITS, APPROVED STOCKPILE LIMITS, OR APPROVED HAUL LIMITS.

10. CONTRACTOR SHALL REMOVE ALL TEMPORARY SEDIMENT AND EROSION CONTROL DEVICES, INCLUDING BUT NOT LIMITED TO SILT FENCE, CONSTRUCTION ENTRANCES, INLET PROTECTION AND GRAVEL ROADS, ONCE THE SITE HAS BEEN STABILIZED.

11. UPON COMPLETION OF THE PROJECT, THE CONTRACTOR MAKE ALL NECESSARY REPAIRS TO THE HAUL ROUTES AND CONTRACTOR STAGING AREA AS ORDERED BY THE ENGINEER.

SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE.

12. THE OWNER RESERVES THE RIGHT TO CONTRACT AND PERFORM OTHER OR ADDITIONAL WORK ADJACENT TO AND WITHIN THE WORK AREA COVERED BY THIS CONTRACT. WHEN SEPARATE CONTRACTS ARE LET WITHIN THE LIMITS ON ANY ONE PROJECT, EACH CONTRACTOR SHALL CONDUCT THEIR WORK SO AS NOT TO INTERFERE WITH OR HINDER THE PROGRESS OR THE COMPLETION OF THE WORK BEING PERFORMED BY OTHER CONTRACTORS. THE CONTRACTORS SHALL COOPERATE WITH EACH OTHER AS ORDERED BY THE OWNER. ANY ADDITIONAL EFFORT OR WORK REQUIRED FOR SUCH COORDINATION WITH OTHER CONTRACTORS SHALL BE INCIDENTAL TO THE PROJECT AND NO

13. THE CONTRACTOR IS ADVISED THAT AIRCRAFT AND VEHICULAR OPERATIONS ARE CONDUCTED ADJACENT THE THE PROJECT. SPECIAL ATTENTION TO DUST CONTROL WILL BE REQUIRED DURING THE COURSE OF THE PROJECT. THE USE OF WATER AND CALCIUM CHLORIDE SHALL BE ANTICIPATED. THE ENGINEER RESERVES THE RIGHT TO HALT WORK OR HAULING IN NON-CONFORMING AREAS, IF CORRECTIVE ACTIONS ARE NOT PROMPTLY TAKEN BY THE CONTRACTOR TO CONTROL DUST.

14. INSPECTION - FREQUENT INSPECTIONS MAY BE MADE BY THE AIRPORT PUBLIC SAFETY OFFICE DURING CRITICAL PHASES OF THE WORK TO ENSURE THAT THE CONTRACTOR IS FOLLOWING THE RECOMMENDED SAFETY PROCEDURES.

_taxiway a —

RUNWAY 6-24

15. FAA CABLES WILL BE LOCATED AND MARKED BY CONTRACTOR WITH FAA PRESENT PRIOR TO CONSTRUCTION. CONTRACTOR IS TO NOTIFY FAA 30 DAYS IN ADVANCE SO THAT FAA CAN SCHEDULE THE REQUIRED STAFF TO BE PRESENT. ANY CABLES DAMAGED DURING CONSTRUCTION WILL BE REPLACED BY THE CONTRACTOR. CONTRACTOR SHALL PAY ALL COSTS ASSOCIATED WITH THE REPAIR OF DAMAGED CABLES AT NO COST TO THE OWNER.

16. CONTRACTOR SHALL BE RESPONSIBLE FOR THE LOCATION AND IDENTIFICATION OF ALL EXISTING UTILITIES AND PIPELINES IN THE CONSTRUCTION AREA. ANY DAMAGE TO EXISTING UTILITIES OR PIPELINES (IN OR OFF AIRPORT PROPERTY) DAMAGED BY THE CONTRACTOR SHALL BY THE RESPONSIBILITY OF THE CONTRACTOR. CONTRACTOR SHALL REPAIR ALL UTILITY/PIPELINE DAMAGED BY THE CONTRACTOR AT NO ADDITIONAL COST TO OWNER.

17. ANY UNPLANNED, UNAPPROVED OR ACCIDENTAL SHUTDOWN OR INTERRUPTION OF SERVICE TO ANY LIGHTING CIRCUIT OR NAVIGATIONAL AID REQUIRED IMMEDIATE NOTIFICATION OF AIRPORT OPERATIONS AND ENGINEER BY THE CONTRACTOR. ALL NECESSARY REPAIRS WILL BE AT CONTRACTOR'S EXPENSE.

18. CONTRACTOR SHALL PROTECT EXISTING RUNWAY, TAXIWAY, AND APRON LIGHTING SYSTEMS.

19. CONTRACTORS OPERATING CONSTRUCTION VEHICLES AND EQUIPMENT ON THE AIRPORT MUST BE PREPARED TO EXPEDITIOUSLY CONTAIN AND CLEAN-UP SPILLS RESULTING FROM FUEL OR HYDRAULIC FLUID LEAKS. TRANSPORT AND HANDLING OF OTHER HAZARDOUS MATERIALS ON AN AIRPORT REQUIRES SPECIAL PROCEDURES. SEE FAA'S ADVISORY

CIRCULAR 150/5320-15, MANAGEMENT OF AIRPORT INDUSTRIAL WASTE.

20. CONTRACTOR SHALL CALL AIRPORT OPERATIONS (828) 232-7408 IN CASE OF ANY EMERGENCY FOR MEDICAL, FIRE FIGHTING, AND POLICE RESPONSE.

21. NO USE OF OPEN FLAME WELDING OR TORCHES UNLESS FIRE SAFETY PRECAUTIONS ARE PROVIDED AND THE AIRPORT OPERATOR HAS APPROVED THEIR USE. NO USE OF FLARE POTS OR ELECTRICAL BLASTING CAPS AT ANY TIME DURING THIS PROJECT.

22. CONTRACTOR SHALL COORDINATE DISPOSAL OF WASTE WITH ARCHITECT/ENGINEER AND OWNER.

PHASING AND SAFETY NOTES:

BY THE ENGINEER AND AIRPORT DIRECTOR.

EDITION.

THE INTENT OF THIS PLAN IS TO ESTABLISH CERTAIN PHASING REQUIREMENTS THAT SHALL BE ADHERED TO BY THE CONTRACTOR DURING CONSTRUCTION OF THE PROJECT.

1. CONTRACTOR SHALL PROVIDE A MINIMUM OF SEVEN (7) DAYS WRITTEN NOTICE TO ENGINEER/ARCHITECT AND OWNER PRIOR TO BEGINNING WORK ON AIRFIELD.

2. IF REQUIRED AS PART OF THE PROJECT, SCHEDULED RUNWAY CLOSURES SHALL BE COMPLETED BETWEEN 2000 (8:00 PM) HOURS AND 0600 (6:00 AM) HOURS LOCAL TIME EACH NIGHT.

3. CLOSED MARKERS AND BARRICADES SHALL BE INSTALLED AS THE FIRST ITEM OF WORK, AND REMOVED AS THE LAST ITEM OF WORK DURING EACH SCHEDULED RUNWAY/TAXIWAY CLOSURE.

4. ALL WORK INVOLVING CONSTRUCTION OPERATIONS WITHIN THE SECURED AREA SHALL BE COORDINATED WITH THE OWNER.

5. OPEN TRENCHES, EXCAVATION, DROP-OFFS, AND STOCKPILED MATERIAL WILL NOT BE PERMITTED WITHIN THE RSA. TSA OR WITHIN 50 FEET OF EDGE OF ACTIVE APRONS. COVERINGS FOR OPEN TRENCHES WITHIN RSA, TSA, OR WITHIN 50 FEET OF EDGE OF ACTIVE APRON MUST BE OF SUCH STRENGTH TO SUPPORT CRITICAL AIRCRAFT AS DETERMINED

6. A DAILY STARTUP AND SHUTDOWN CHECKLIST WILL BE JOINTLY PREPARED BY THE CONTRACTOR AND AIRPORT MANAGEMENT. WHICH WILL BE FOLLOWED THROUGHOUT THE PROJECT. THIS CHECKLIST SHALL INCLUDE, BUT NOT BE LIMITED TO, BARRICADES, FLAGS, HAUL ROUTES, SECURING ALL GATES, CLEAN UP, ETC.

7. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER TO DETERMINE A SUITABLE LOCATION FOR THE PROJECT STAGING AREAS. THE AREAS SHOWN ON THIS SHEET ARE APPROXIMATE. AIRPORT TO APPROVE FINAL STAGING AREA LOCATIONS AND LIMITS.

8. THE CONTRACTOR SHALL COORDINATE INGRESS-EGRESS REQUIREMENTS WITH THE AIRPORT MANAGEMENT. ALL OPEN GATES TO SECURED AIRPORT AREAS SHALL BE MONITORED CONTINUOUSLY BY CONTRACTOR'S PROPERLY BADGED GATE GUARD PERSONNEL TO CONTROL ACCESS TO SECURED AREA. GATE GUARD MUST SPEAK ENGLISH PROFICIENTLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SECURING ALL GATES AT THE END OF EACH DAYS OPERATIONS.

9. PRIOR TO INSTALLATION OF FULL PERIMETER FICHE FOR PROJECT SITE. ALL CONSTRUCTION VEHICLES MUST BE CLEARED FOR ACCESS BY AIRPORT MANAGEMENT. PERSONAL CARS SHALL BE PARKED OUTSIDE OF SECURED AIRFIELD AREAS. ALL VEHICLES OPERATING IN ACTIVE AIR OPERATIONS AREAS SHALL BE LIGHTED OR FLAGGED IN ACCORDANCE WITH ADVISORY CIRCULAR 150/5370-2, CURRENT

10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PENALTIFS ASSOCIATED WITH CONTRACTOR AND SUBCONTRACTOR FORCES THAT ARE INVOLVED IN A VEHICLE DEVIATION/RUNWAY INCURSION.

11. EACH CONTRACTOR VEHICLE DRIVER WITHIN THE AIRPORT SECURITY FENCE MUST HAVE COMPETED (OR ESCORTED BY A CONTRACTOR VEHICLE DRIVER THAT HAS COMPLETED) THE AIRPORT'S GROUND VEHICLE DRIVER TRAINING PROGRAM.

12. ALL CONTRACTOR AND SUBCONTRACTOR EMPLOYEES SHALL ENTER THE AIRPORT WITHIN CONTRACTOR VEHICLES. CONTRACTOR EMPLOYEE PARKING SHALL BE OUTSIDE OF THE AIRPORT SECURITY FENCING.

13. UNLESS DIRECTED OTHERWISE BY OWNER, CONTRACTOR WILL NOT BE ALLOWED TO USE ANY OF THE EXISTING RUNWAYS OR TAXIWAYS AS PART OF THE HAUL ROAD.

14. AT THE END OF EACH WORK DAY, THE CONTRACTOR SHALL POSITION ALL EQUIPMENT, TOOLS, MATERIALS, ETC. IN THE APPROVED CONTRACTOR'S STAGING AREAS UNLESS OTHERWISE REQUESTED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.

15. DURING ALL WORK WITHIN THE SECURED AREA, THE CONTRACTOR'S EMPLOYEES SHALL BE BADGED IN ACCORDANCE WITH OWNER'S REQUIREMENTS.

16. THE CONTRACTOR SHALL NOTIFY AIRPORT MANAGEMENT IMMEDIATELY IN THE EVENT OF AN EMERGENCY SITUATION.

17. AREAS OUTSIDE THE PROJECT LIMITS AREA DESIGNATED AS RESTRICTED AREAS. THE CONTRACTOR'S FORCES ARE PROHIBITED FROM ENTERING RESTRICTED AREAS AT ANY TIME, UNLESS SPECIFICALLY AUTHORIZED BY THE ENGINEER OR AIRPORT MANAGEMENT. ANYONE FOUND ON AN ACTIVE RUNWAY, TAXIWAY OR OTHER RESTRICTED AREA WITHOUT PRIOR PERMISSION FROM THE OWNER, ENGINEER, OR AIR TRAFFIC CONTROL TOWER STAFF WILL BY PROMPTLY AND PERMANENTLEY REMOVED FROM THE PROJECT.

18. CONTRACTOR SHALL REMOVE ALL FOREIGN OBJECT DEBRIS (FOD) CONTINUOUSLY ON ALL AIRFIELD PAVEMETNS.

19. CONSTRUCTION CONTRACTOR PERSONNEL MUST UTILIZE TWO-WAY AVIATION BAND RADIO COMMUNICATIONS WIHT AIRPORT AIR TRAFFIC CONTROL TOWER ON FREQUENCY 121.7 MHZ. WHILE WORKING ON ACTIVE AIRFIELD AREAS.

20. FULL PERIMETER FENCE FOR PROJECT LIMITS SHALL BE INSTALLED AS FIRST ITEM OF WORK.

21. CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMISSION OF ALL FAA REQUIRED 7460'S FOR TEMPORARY CRANES AS PART OF THE PROJECT.

22. THE CONTRACTOR SHALL HAVE A PROFESSIONALLY PRINTED MAGNET/DECAL WITH THEIR COMPANY NAME ADHERED TO THE SIDE ON ANY AND ALL VEHICLES OR EQUIPMENT THAT ARE ON SITE.

SITE PLAN SCALE: 1" = 300'



MICHAEL GRAVES ARCHITECT:

Graves Company

530 North Trade Street, Suite 301 Winston-Salem, NC 27103 CIVIL ENGINEER: **Clayton Engineering and Design** 304 15th Street S.E. P.0. Box 2351 Hickory, NC 28603 T 828.455.3456

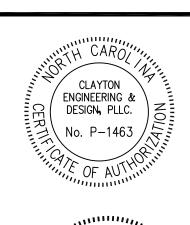
Walter Robbs Architects, a Michael

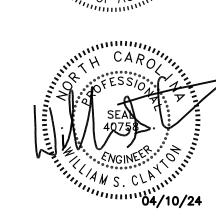
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ELECTRICAL ENGINEER: Consultant Engineering Service 1111 S. Marshall Street, Suite 250 Winston-Salem, NC 27101 T 336.308.4256

CODE CONSULTANT: **Performance Based Fire Protection** Engineering P.O. Box 1847 Pittsboro, NC 27312





NAME: WILLIAM S. CLAYTON LICENSE: NC # 40758

△ DATE ____DESCRIPTION

SHEET NAME:

SAFETY PLAN

CONSTRUCTION

CURRENT:

ORIG SUBMISSION:



MICHAEL GRAVES ARCHITECT:

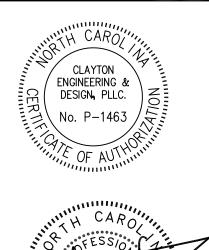
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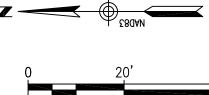
P.O. Box 1847 Pittsboro, NC 27312 T 910.282.7351



NAME: WILLIAM S. CLAYTON LICENSE: NC # 40758

Δ DATE DESCRIPTION

SCALE: 1" = 20'



DEMOLITION PLAN

1. CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL DEMOLITION WITH THE

SAW CUT PAVEMENT

ORIG SUBMISSION:

DEMOLITION PLAN

SHEET NAME:

CURRENT:

Crafe DI 1120.52. REPAIR BOX FOLLOWING PIPE DEMOLITION -NOTES THIS SHEET: CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL DEMOLITION WITH THE ENGINEER, AND OWNER.
 THE SAFETY OF ALL IS OF UTMOST IMPORTANCE. ALL SAFETY PRECAUTIONS POSSIBLE TO BE TAKEN TO ENSURE THE SAFETY OF ALL.
 CONTRACTOR SHALL BE RESPONSIBLE FOR TEMPORARY DRAINAGE AS NECESSARY TO MAINTAIN POSITIVE DRAINAGE ON SITE. 4. DEMOLITION TO BE PHASED IN SUCH A WAY AS TO MAINTAIN ACCESS TO REMAINING STRUCTURES.

CL Inv. 1147.72

EXISTING STORM DRAINAGE TO BE REMOVED — (TYPICAL)

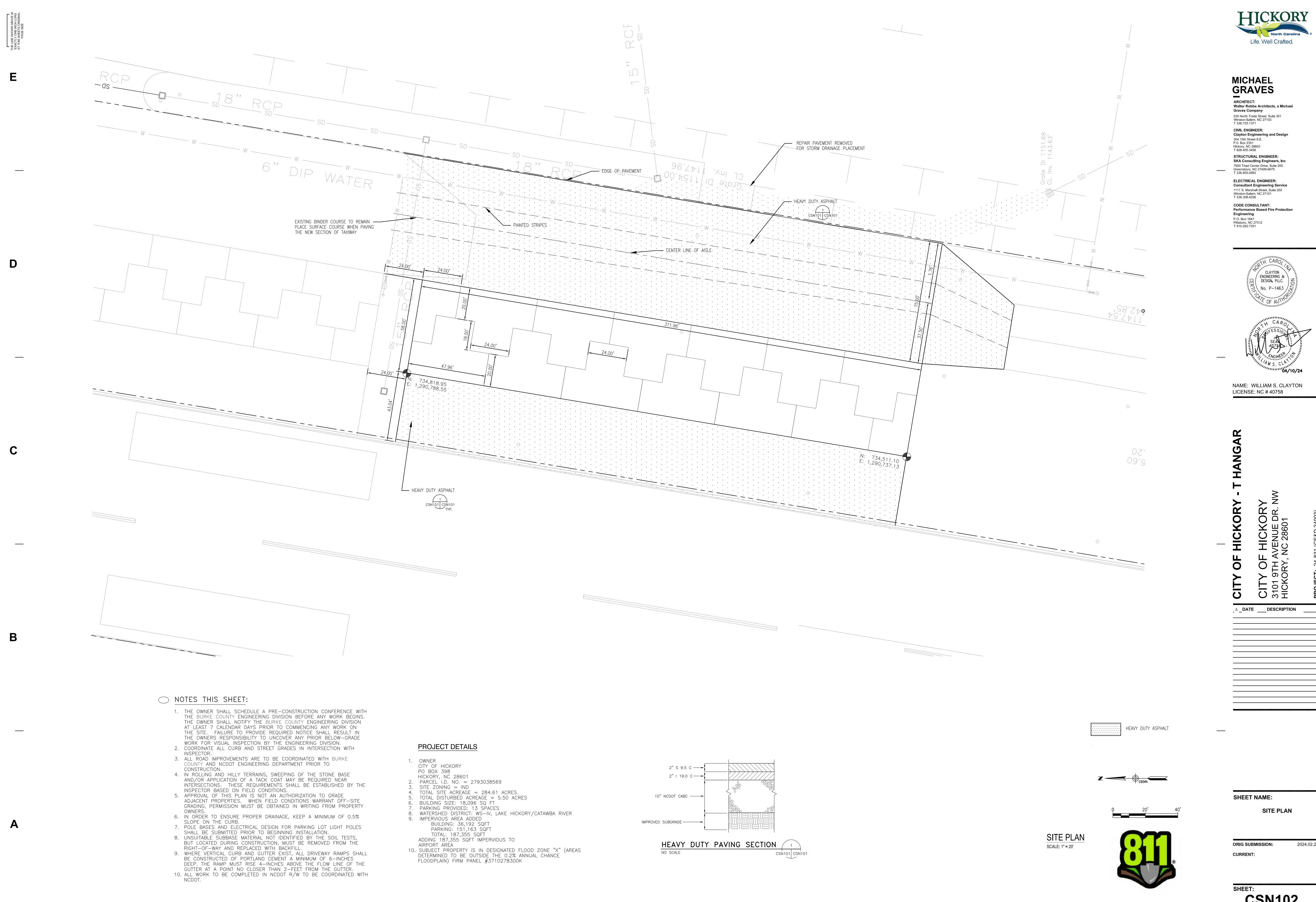
EXISTING BINDER LAYER TO REMAIN

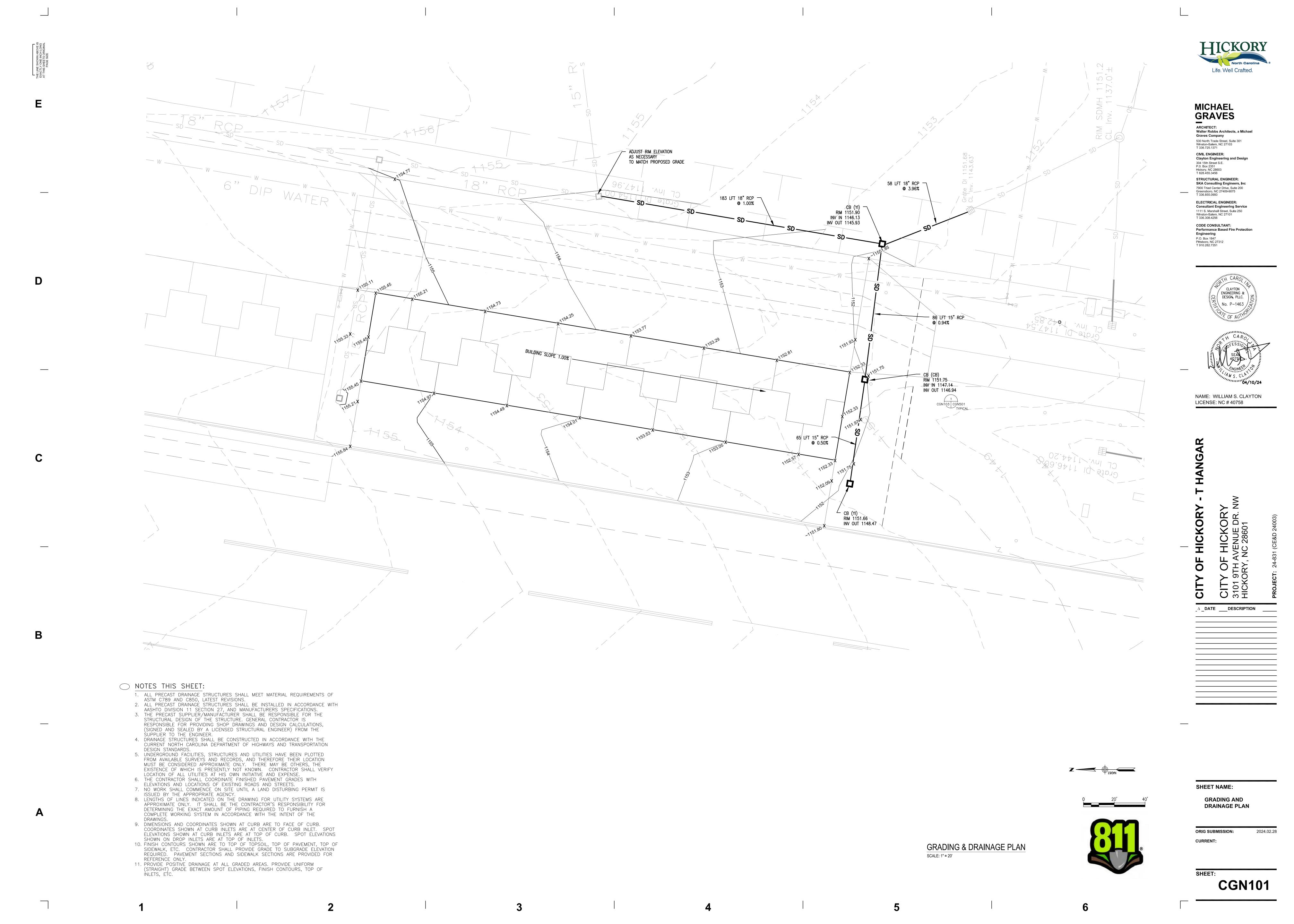
ASPHALT TO BE SAW CUT TO CREATE ______ SMOOTH TRANSITION _____

DISTURBED LIMITS. GC TO INSTALL ANY EROSION — CONTROL MEASURES NECESSARY AS WORK PROGRESSES.

SAW CUT ASPHALT AS

NECESSARY FOR INSTALLATION
OF NEW STORM DRAINAGE







MICHAEL GRAVES

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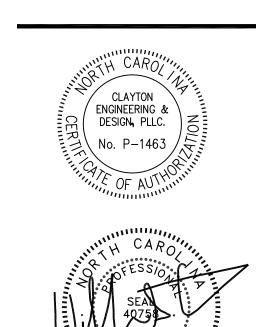
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Performance Based Fire Protecti
Engineering
P.O. Box 1847
Pittsboro, NC 27312
T 910.282.7351



NAME: WILLIAM S. CLAYTON LICENSE: NC # 40758

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19TH AVENUE DR. NW
CKORY, NC 28601

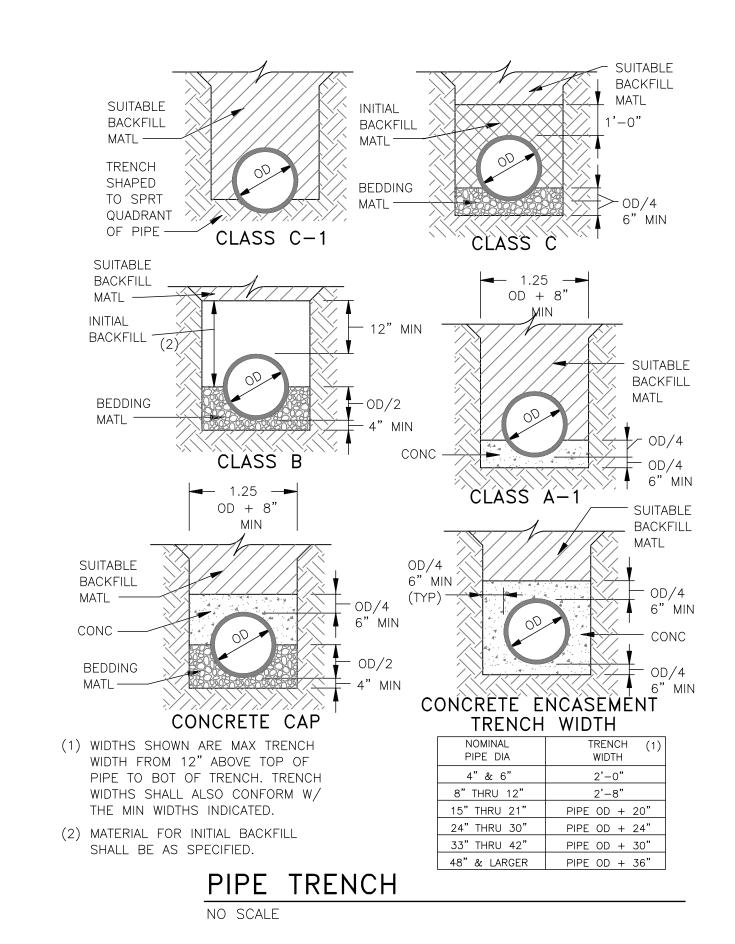
Δ_DATE ___DESCRIPTION

SHEET NAME:
GRADING AND DRAINAGE

ORIG SUBMISSION: 20
CURRENT:

DETAILS

CGN501



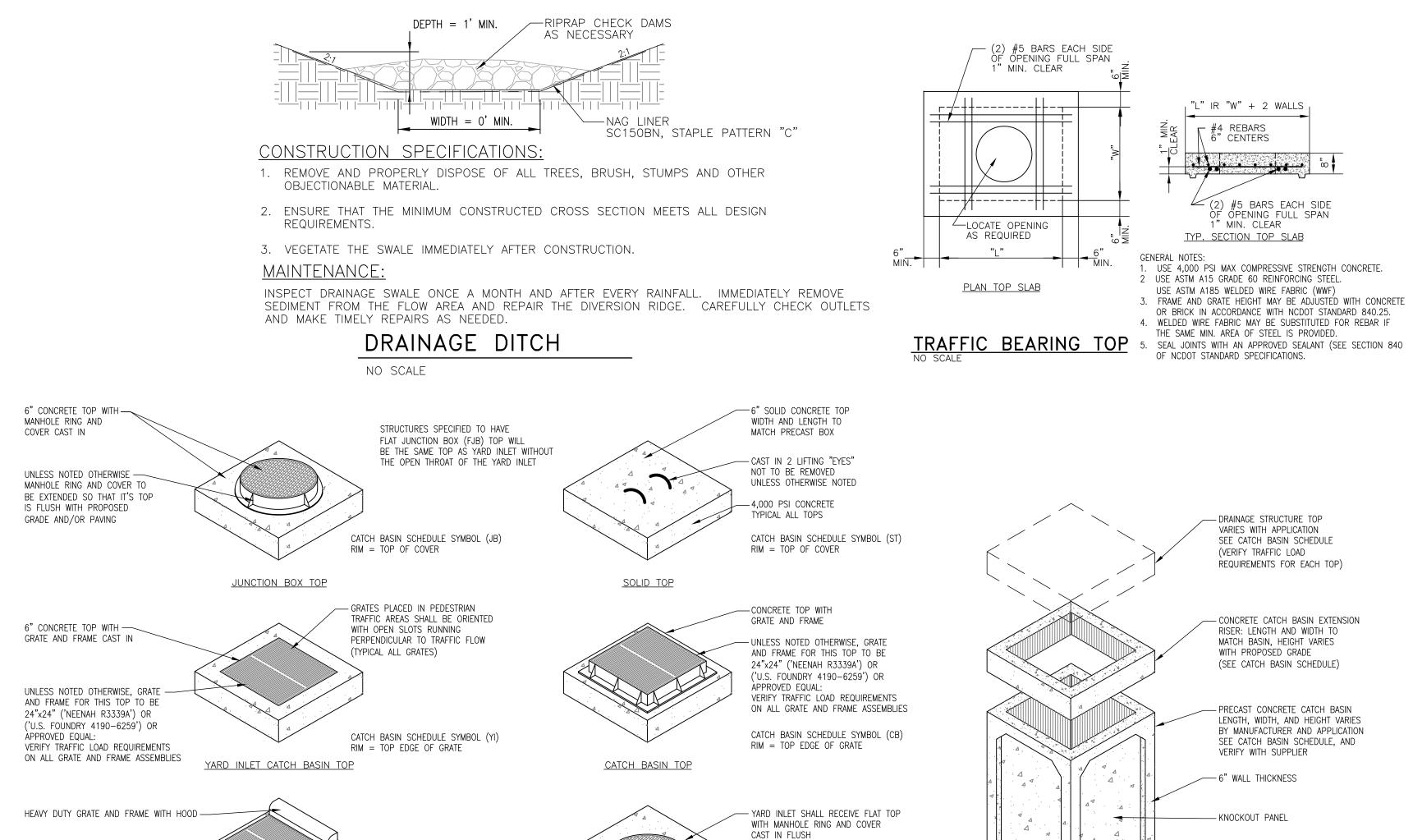
TOP VIEW

EACH WAY

TRAFFIC RATED TOP TO REACH

PROPOSED GRADE

→ 3-#4 EACH CORNER



UNLESS NOTED OTHERWISE, GRATE -

24"x36" ('NEENAH R3233D') OR

('U.S. FOUNDRY 5181-6420') OR

APPROVED EQUAL CONFORMING TO

NCDOT ROADWAY STANDARD 840.03

AND FRAME FOR THIS TOP SHALL BE

CATCH BASIN SCHEDULE SYMBOL (CI)

RIM = TOP OF GRATE DIRECTLY UNDER

CATCH BASIN TOPS DETAILS OPEN THROAT INLET TOP

HOOD OPENING

CURB INLET TOP

—USE PRECAST BOX OR 4" AND 2" CONCRETE BLOCK OR BRICK TO

ELEVATE THE TOP TO ACHIEVE THE

CATCH BASIN SCHEDULE SYMBOL (OTI) RIM = BOTTOM OF THROAT OPENING

DESIRED THROAT OPENING

6"-8" THROAT OPENING ON ALL FOUR SIDES, UNLESS NOTED OTHERWISE

TEMPORARY SKIMMER BASIN #1 117'L × 40'W MIN. DIMENSIONS: 8,360 CUFT MIN. STORAGE: MIN. SURFACE AREA: 4,680 SQFT TOP ELEV: 1050.00 1047.50 BOT. ELEV: SPILLWAY ELEV.: 1049.00 SPILLWAY WIDTH: MAX DRAINAGE AREA: 4.43 AC SKIMMER SIZE: ORIFICE SIZE:

TEMPORARY SEDIMENT TRAP NOTES:

- 1. DIMENSIONS MEASURED AT SPILLWAY ELEVATION. ALL TRAPS SHALL HAVE AN ADDITIONAL 1.5' OF FREEBOARD ABOVE THE SPILLWAY ELEVATION.
- 2. SIDE SLOPES SHALL BE NO STEEPER THAN 2:1 (H:V).
- TST#1 TO BE REMOVED UPON COMPLETION OF DRAINAGE FACILITIES AND INSTALLATION OF INLET PROTECTION.

EROSION CONTROL NOTE:

PER NCDEQ AND NPDES REQUIREMENTS, GROUND STABILIZATION MUST OCCUR WITHIN 7 DAYS ON PERIMETER AREAS AND SLOPES STEEPER THAN 3:1, AND GROUND

STABILIZATION MUST OCCUR WITHIN 14 DAYS ON OTHER AREAS.

THE PURPOSE OF THE EROSION CONTROL MEASURES, SHOWN ON THESE PLANS, SHALL BE TO PRECLUDE THE TRANSPORT OF ALL WATERBORNE SEDIMENTS, RESULTING FROM CONSTRUCTION ACTIVITIES, FROM ENTERING ONTO ADJACENT PROPERTIES OR STATE WATERS. IF FIELD INSPECTION REVEALS THE INADEQUACY OF THE PLAN TO CONFINE SEDIMENT TO THE PROJECT SITE, APPROPRIATE MODIFICATIONS WILL BE MADE TO CORRECT ANY PLAN DEFICIENCIES.

GROUND COVER: WHENEVER LAND-DISTURBING ACTIVITY IS UNDERTAKEN ON A TRACT COMPRISING MORE THAN ONE ACRE, IF MORE THAN ONE CONTIGUOUS ACRE IS UNCOVERED,

GRADE SLOPES & FILLS: THE ANGLE FOR GRADED SLOPES AND FILLS SHALL BE NO GREATER THAN THE ANGLE THAT CAN BE RETAINED BY VEGETATIVE COVER, OR OTHER ADEQUATE EROSION-CONTROL DEVICES OR STRUCTURES.

PROPERTIES. WHEN FIELD CONDITIONS WARRANT OFF SITE GRADING,

PERMISSION MUST BE OBTAINED FROM THE AFFECTED PROPERTY

APPROVAL OF THIS PLAN IS NOT AN AUTHORIZATION TO GRADE ADJACENT

RADING	AND	EROSION	CONTROL	LEGEND
		- EXIST. MINOR CO	ONTOUR	

	EXIST. MINOR CONTOUR
	EXIST. MAJOR CONTOUR
100	PROP. MINOR CONTOUR
100	PROP. MAJOR CONTOUR
100	PROP. SPOT ELEVATION
\$F \$F \$F	SILT FENCE
	LIMITS OF DIST.
	TEMP. INLET PROTECTION
	TEMP. INLET PROTECTION (SILT SACK)
>>	TEMP. DIVERSION DITCH

EROSION AND SEDIMENT CONTROL NOTES:

- 1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PROCEDURES APPROVED BY NCDEQ AND CATAWVA COUNTY.

 THE CONTRACTOR SHALL BE THOROUGHLY FAMILIAR WITH ALL APPROVED PROCEDURES WHICH MAY BE PERTINENT TO THE PROJECT.
- 2. ALL POINTS OF CONSTRUCTION INGRESS AND EGRESS SHALL BE PROTECTED BY A TEMPORARY CONSTRUCTION ENTRANCE TO PREVENT TRACKING OF MUD ONTO PUBLIC RIGHT—OF—WAYS.

 AN ENTRANCE PERMIT FROM NCDOT IS REQUIRED PRIOR TO ANY CONSTRUCTION ACTIVITIES WITHIN STATE RIGHT—OF—WAYS.
- 3. SEDIMENT CONTROL DEVICES, SUCH AS SEDIMENT BASINS AND TRAPS, PERIMETER DIKES, CHECK DAMS OR OTHER MEASURES NOT LOCATED IN PROPOSED FILL OR EXCAVATION AREAS, SHALL BE CONSTRUCTED PRIOR TO ALL OTHER LAND DISTURBANCE. AN ON-SITE PRECONSTRUCTION MEETING WILL BE HELD BETWEEN THE ENGINEER AND THE CONTRACTOR TO IDENTIFY THOSE MEASURES TO BE INITIALLY INSTALLED.
- 4. MAINTENANCE OF ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE ACCOMPLISHED IN ACCORDANCE WITH PROCEDURES APPROVED BY NCDEQ & CATAWBA COUNTY.

 MAINTENANCE WILL INCLUDE THE REPAIR OF MEASURES DAMAGED BY ANY SUBCONTRACTOR INCLUDING THOSE OF THE PUBLIC UTILITY COMPANIES. AT THE PRECONSTRUCTION MEETING, THE CONTRACTOR WILL SUPPLY THE OWNER WITH THE NAME OF THE INDIVIDUAL WHO WILL BE RESPONSIBLE FOR ENSURING MAINTENANCE OF INSTALLED MEASURES ON A DAILY BASIS.
- 5. SURFACE FLOWS OVER CUT AND FILL SLOPES SHALL BE CONTROLLED BY EITHER REDIRECTING FLOWS FROM TRANSVERSING THE SLOPES OR BY INSTALLING MECHANICAL DEVICES TO SAFELY LOWER WATER
- DOWNSLOPE WITHOUT CAUSING EROSION.

 6. SEDIMENT CONTROL MEASURES MAY REQUIRE MINOR FIELD ADJUSTMENTS AT THE TIME OF CONSTRUCTION TO INSURE THEIR INTENDED PURPOSE IS ACCOMPLISHED.
- 7. THE CONTRACTOR SHALL STRIP AND PILE TOPSOIL AT THE LOCATIONS SHOWN ON THIS PLAN OR AS DIRECTED BY THE ENGINEER. SILT FENCE SHALL BE PLACED AT THE TOE OF THE STOCKPILE AFTER STRIPPING OF TOPSOIL IS COMPLETE.
- 8. THE CONTRACTOR SHALL COMPLETE DRAINAGE FACILITIES WITHIN 30 DAYS FOLLOWING COMPLETION OF ROUGH GRADING AT ANY POINT WITHIN THE PROJECT. THE INSTALLATION OF DRAINAGE FACILITIES SHALL TAKE PRECEDENCE OVER ALL UNDERGROUND UTILITIES. OUTFALL DITCHES FROM DRAINAGE STRUCTURES SHALL BE STABILIZED IMMEDIATELY AFTER CONSTRUCTION OF SAME. THIS INCLUDES INSTALLATION OF EROSION CONTROL STONE WHERE
- 9. TEMPORARY VEGETATIVE COVER SHALL BE PROVIDED IN ALL AREAS, WHICH ARE NOT DESIGNATED FOR PAVING, UNDERGROUND UTILITIES OR STRUCTURAL USES. SUCH AREAS SHALL NOT BE EXPOSED FOR PERIODS EXCEEDING 10 DAYS. TEMPORARY VEGETATIVE COVER MAY BE ELIMINATED IN FAVOR OF FINAL VEGETATIVE COVER IF CONSTRUCTION AND SEASONAL CONDITIONS PERMIT.
- 10. ALL AREAS DESIGNATED FOR PAVING, UNDERGROUND UTILITIES, AND STRUCTURAL USE SHALL BE STABILIZED AS SOON AS POSSIBLE, BUT NOT EXCEEDING 10 DAYS FOLLOWING INSTALLATION. NO MORE THAN 300' OF SANITARY SEWER, STORM SEWER, OR WATER LINES ARE TO
- BE OPEN AT ONE TIME.

 11. THE TERM SEEDING, FINAL VEGETATIVE COVER OR STABILIZATION, ON THIS PLAN SHALL MEAN THE SUCCESSFUL GERMINATION AND ESTABLISHMENT OF A STABLE GRASS COVER FROM A PROPERLY PREPARED SEEDBED CONTAINING THE SPECIFIED AMOUNTS OF SEED, LIME, AND FERTILIZER. IRRIGATION SHALL BE REQUIRED AS
- NECESSARY TO ENSURE ESTABLISHMENT OF GRASS COVER.

 12. ALL SLOPES STEEPER THAN 3:1 SHALL REQUIRE THE USE OF EROSION CONTROL BLANKETS SUCH AS EXCELSIOR BLANKETS TO AID IN THE ESTABLISHMENT OF A VEGETATIVE COVER. INSTALLATION SHALL BE IN
- ACCORDANCE WITH MULCHING AND MANUFACTURER'S INSTRUCTIONS.

 13. INLET PROTECTION SHALL BE PROVIDED FOR ALL STORM DRAIN INLETS AS SOON AS PRACTICAL FOLLOWING CONSTRUCTION OF SAME. REPLACE
- TEMPORARY INLET PROTECTION WITH SILT SACK, AFTER INSTALLING FRAME, GRATE, AND CURB AND GUTTER.

 14. BASE COURSE MATERIAL SHALL BE PLACED IN ALL STREET & PARKING AREAS WITHIN 30 DAYS OF FINAL GRADING.
- 15. TEMPORARY EROSION CONTROL MEASURES ARE NOT TO BE REMOVED UNTIL ALL DISTURBED AREAS ARE STABILIZED. AFTER STABILIZATION IS COMPLETE, ALL MEASURES SHALL BE REMOVED AFTER NCDEQ INSPECTION AND RELEASE. TRAPPED SEDIMENT SHALL BE SPREAD AND SEEDED.
- 16. SEE CCN502 FOR SEEDING, SEED BED PREPARATION AND MAINTENANCE
- SCHEDULE

 17. SEE CGN101 FOR STORM DRAINAGE SCHEDULE.
- 18. TOTAL DISTURBED AREA = 2.65 ACRES.
- 19. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING EROSION CONTROL PLAN APPROVAL IF NECESSARY FOR ANY RELATED BORROW AREA.

SITE MUST HAVE AN APPROVED EROSION CONTROL PLAN

20. OFF—SITE WASTE OR BORROW AREAS SHALL BE APPROVED BY
CATAWBA COUNTY & NCDEQ PRIOR TO THE IMPORT OF ANY BORROW
OR EXPORT OF ANY WASTE TO OR FROM THE PROJECT SITE. WASTE/BORROW

21. PROJECT SITE IS LOCATED WITHIN THE CATAWBA RIVER BASIN AND IS IN A WATERSHED IV



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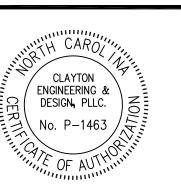
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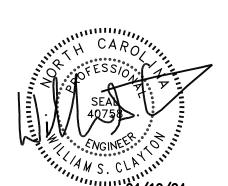
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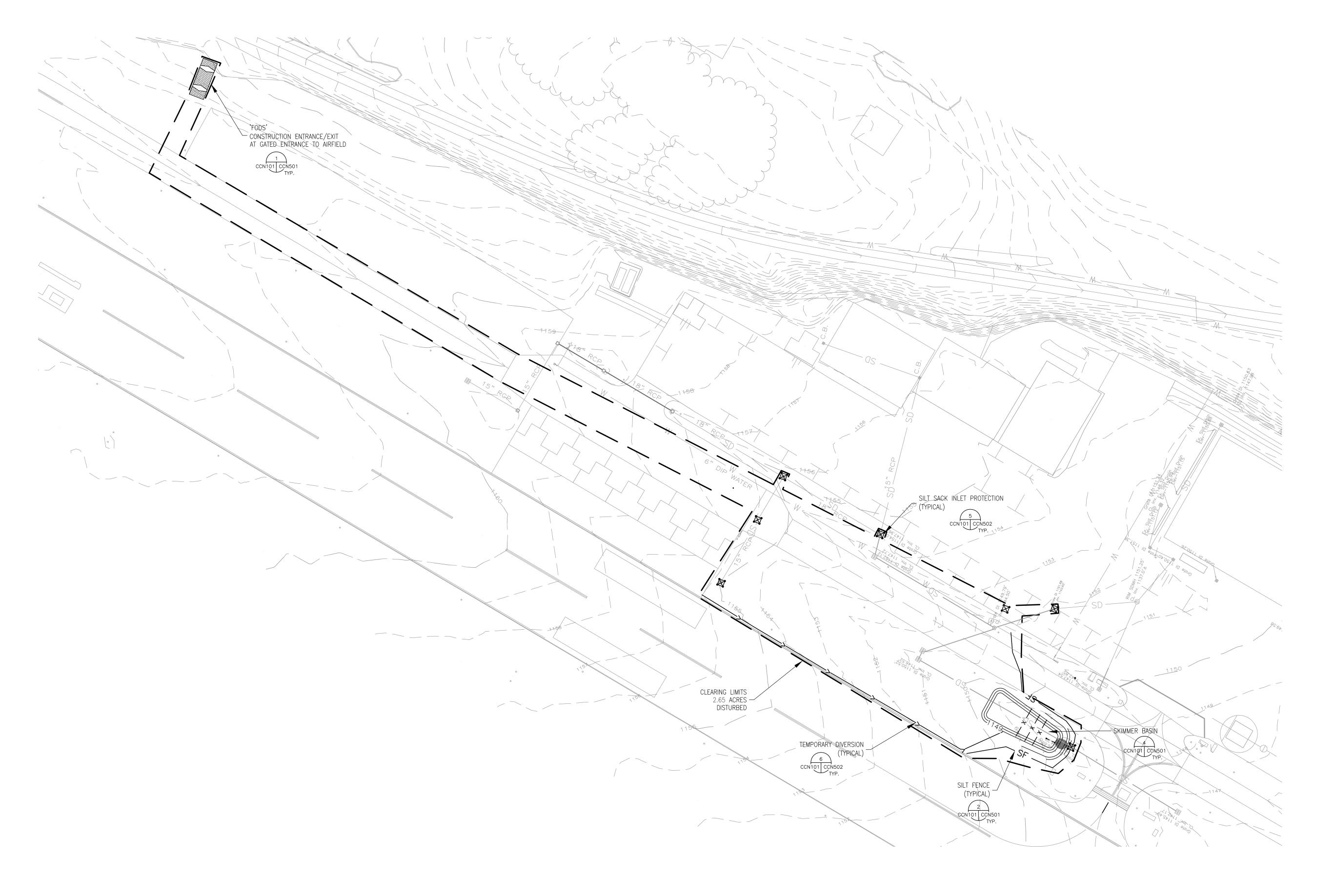
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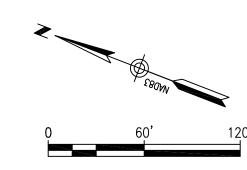
PRE-CONSTRUCTION
EROSION CONTROL PLAN

ORIG SUBMISSION CURRENT:

SHEET:
CCN101

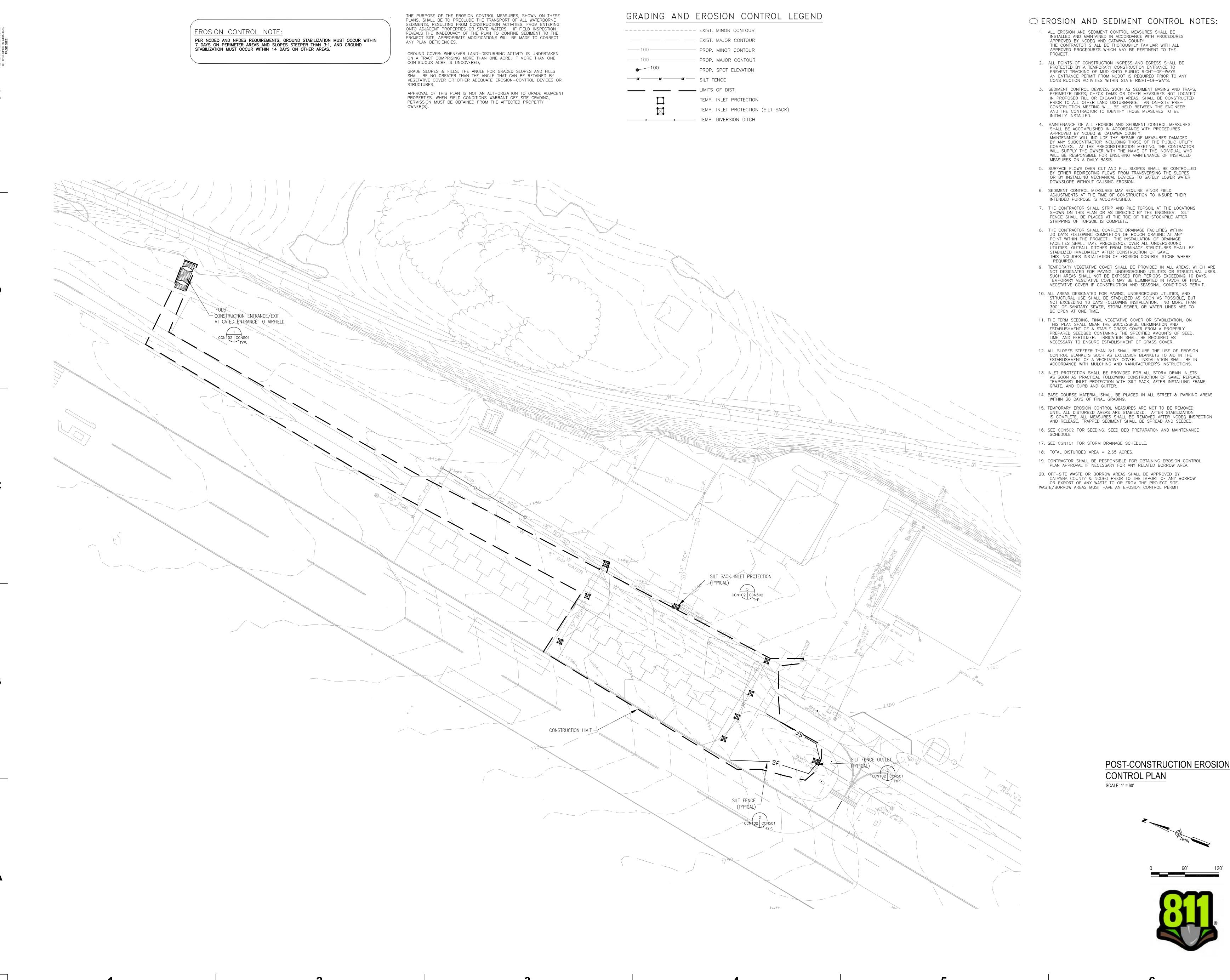


PRECONSTRUCTION EROSION
CONTROL PLAN
SCALE: 1" = 60'





3



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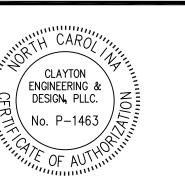
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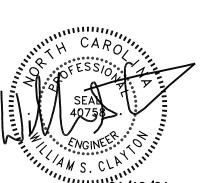
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NAME: WILLIAM S. CLAYTON LICENSE: NC # 40758

_∆ _DATE ____DESCRIPTION

SHEET NAME:

POST-CONSTRUCTION **EROSION CONTROL PLAN**

ORIG SUBMISSION:

SHEET:

CCN102

3. CONSTRUCT THE FILTER FABRIC FROM A CONTINUOUS ROLL CUT TO LENGTH OF THE BARRIER TO AVOID JOINTS. WHEN JOINTS ARE NECESSARY, SECURELY FASTEN THE FILTER CLOTH ONLY AT A SUPPORT POST WITH 4 FEET MINIMUM _A _DATE ____DESCRIPTION 4. SUPPORT STANDARD STRENGTH FILTER FABRIC BY WIRE MESH FASTENED SECURELY TO THE UP-SLOPE SIDE OF THE POSTS. EXTEND THE WIRE MESH FASTENED SECURELY TO THE UP-SLOPE SIDE OF THE POSTS. EXTEND THE WIRE MESH SUPPORT TO THE BOTTOM OF THE TRENCH. FASTEN THE WIRE REINFORCEMENT, THEN FABRIC ON THE UP-SLOPE SIDE OF THE FENCE POST. WIRE OR PLASTIC ZIP TIES SHOULD HAVE MINIMUM 50 POUND TENSILE STRENGTH. 5. WHEN A WIRE MESH SUPPORT FENCE IS USED, SPACE POSTS A MAXIMUM OF 8 FEET APART. SUPPORT POSTS SHOULD BE DRIVEN SECURELY INTO THE GROUND A MINIMUM OF 24 INCHES. 6. EXTRA STRENGTH FILTER FABRIC WITH 6 FEET POST SPACING DOES NOT REQUIRE

WIRE MESH SUPPORT FENCE. SECURELY FASTEN THE FILTER FABRIC DIRECTLY TO POSTS. WIRE OR PLASTIC ZIP TIES SHOULD HAVE MINIMUM 50 POUND TENSILE

1. CONSTRUCT THE SEDIMENT BARRIER OF STANDARD STRENGTH OR EXTRA STRENGTH

2. ENSURE THAT THE HEIGHT OF THE SEDIMENT FENCE DOES NOT EXCEED 24

7. EXCAVATE A TRENCH APPROXIMATELY 4 INCHES WIDE AND 8 INCHES DEEP ALONG THE PROPOSED LINE OF POSTS AND UP-SLOPE FROM THE BARRIER. 8. PLACE 12 INCHES OF THE FABRIC ALONG THE BOTTOM AND SIDE OF THE

9. BACKFILL THE TRENCH WITH SOIL PLACED OVER THE FILTER FABRIC AND COMPACT. THOROUGH COMPACTION OF THE BACKFILL IS CRITICAL TO SILT FENCE PERFORMANCE.

10. DO NOT ATTACH FILTER FABRIC TO EXISTING TREES.

CONSTRUCTION SPECIFICATIONS:

INCHES ABOVE THE GROUND SURFACE.

SYNTHETIC FILTER FABRICS.

INSPECT SEDIMENT FENCES ONCE A WEEK AND AFTER EACH RAINFALL. MAKE ANY REQUIRED REPAIRS IMMEDIATELY. SHOULD THE FABRIC OF A SEDIMENT FENCE COLLAPSE, TEAR, DECOMPOSE OR BECOME INEFFECTIVE, REPLACE IT PROMPTLY. REMOVE SEDIMENT DEPOSITS AS NECESSARY TO PROVIDE ADEQUATE STORAGE VOLUME FOR THE NEXT RAIN AND REDUCE PRESSURE ON THE FENCE. TAKE CARE TO AVOID UNDERMINING THE FENCE DURING CLEANOUT. REMOVE ALL FENCING MATERIALS AND UNSTABLE SEDIMENT DEPOSITS AND BRING THE AREA TO GRADE AND STABILIZE IT AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

6' MAX STD. STRENGTH FABRIC WITH WIRE FENCE 5' MIN STEEL POSTS, DRIVEN MIN 24" INTO GROUND

- WOVEN WIRE FENCE

SPACING)

——— 1.33 LB./LF STEEL POST 5' MIN

/--- NATURAL GROUND

PLASTIC OR WIRE TIE

(14 GAUGE, MAX 6" MESH

6' MAX STRENGTH FABRIC WITH WIRE FENCE

5' MIN STEEL PUSIS, DIMER FENCE

MIN 24" INTO GROUND

PERSPECTIVE VIEW

PLASTIC OR WIRE TIES

WOVEN WIRE FENCE

BACKFILL TRENCH WITH SOIL ---

AND COMPACT THOROUGHLY

EMBED FILTER

CLOTH MIN 8"

(14 GA MIN AND MAX 6"

MESH SPACING) ————

FILTER FABRIC ----

SHEET NAME: **EROSION CONTROL DETAILS**

ORIG SUBMISSION:

CURRENT:

CCN501

ON GROUND BURY 6" OF FABRIC

SS SECTION

SILT FENCE STONE OUTLET

- CCN101-102 CCN50

FRONT VIEW

IN TRENCH

CROSS SECTION

SEDIMENT

STRUCTURAL —

CONTROL STONE

ANTI-SEEP

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12. UPON PLACEMENT OF EACH NEW MAT IN STABILIZE THE MAT AND ENSURE THE SYSTEM 13. SUCCESSIVE MATS CAN THEN BE PLACED

STRUCTURE

SEDIMENT

STORAGE ZONE —

DEWATERING

FILTER FABRIC

BAFFLES

SKIMMER BASIN

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SEEDBED PREPARATION (SP)

SP-1 FILL SLOPES 3:1 OR STEEPER TO BE SEEDED WITH A HYDRAULIC SEEDER (PERMANENT SEEDINGS). GRASS LINED CHANNELS. LEAVE THE LAST 4-6 INCHES OF FILL LOOSE AND UNCOMPACTED, ALLOWING ROCKS, ROOTS, LARGE CLODS AND OTHER

DEBRIS TO REMAIN ON THE SLOPE. ROUGHEN SLOPE FACES BY MAKING GROOVES 2-3 INCHES DEEP, PERPENDICULAR TO THE SLOPE. 3. SPREAD LIME EVENLY OVER SLOPES AT RATES RECOMMENDED BY SEEDING METHODS (SM-1).

SP-2 FILL SLOPES 3:1 OR STEEPER (TEMPORARY SEEDINGS) LEAVE A LOOSE, UNCOMPACTED SURFACE. REMÓVE LARGE CLODS, ROCKS, AND DEBRIS WHICH MIGHT HOLD NETTING

SPREAD LIME AND FERTILIZER EVENLY AT RATES RECOMMENDED BY SEEDING METHODS (SM-3) INCORPORATE AMENDMENTS BY ROUGHENING OR GROOVING SOIL SURFACE ON THE CONTOUR.

SP-3 GENTLE AND FLAT SLOPES

 REMOVE ROCKS, AND DEBRIS. 2. APPLY LIME AND FERTILIZER AT RATES RECOMMENDED BY SEEDING METHODS (SM-2); SPREAD EVENLY AND INCORPORATE INTO THE TOP 6" WITH A DISK, CHISEL PLOW, OR ROTARY TILLER.

3. BREAK UP LARGE CLODS AND RAKE INTO LOOSE, UNIFORM SEEDBED. 4. RAKE TO LOOSEN SURFACE JUST PRIOR TO APPLYING SEED.

14 DAY STABILIZATION CLAUSE ALL DISTURBED AREAS WHICH ARE TO BE LEFT IDLE FOR PERIOD OF 14 DAYS OR LONGER ARE TO RECEIVE TEMPORARY VEGETATION AND /OR MULCH.

SEEDING METHODS (SM)

SM-1 FILL SLOPES STEEPER THAN 3:1 (PERMANENT SEEDINGS) USE HYDRAULIC SEEDING EQUIPMENT TO APPLY SEED AND FERTILIZER. APPLY 4000Ib/acre GROUND AGRICULTURAL LIMESTONE AND 1000Ib/acre 10-10-10 FERTILIZER. AFTER AUG 15, USE UNSCARFIED SEED FOR ONE OF THE FOLLOWING NATIVE SPECIES: SWITCHGRASS, SPLITBEARD BLUESTEM, BEGGARLICE, OR PATRIDGE PEA. FOR NEATER APPERANCES, OMIT NATIVE SPECIES AND SUBSTITUTE 401b/acre BAHIAGRASS OR 15lb/acre BERMUDA GRASS (USE UNHULLED BERMUDA IN THE FALL).

SM-2 GENTLE TO FLAT SLOPES OR TEMPORARY SEEDINGS 1. BROADCAST SEED AT THE RECOMMENDED RATE WITH A CYCLONE SEEDER, DROP SPREADER, OR

- 2. RAKE SEED INTO THE SOIL AND LIGHTLY PACK TO ESTABLISH GOOD CONTACT. 3. APPLY 4000lb/acre GROUND AGRICULTURAL LIMESTONE AND 1000 lb/acre 10-10-10 FERTILIZER.
- 4. BETWEEN MAR 31-AUG 20, APPLY 50Ib/acre ONE OF THE FOLLOWING NATIVE SPECIES: SWITCHGRASS, SPLITBEARD BLUESTEM, BEGGARLICE, OR PATRIDGE PEA, KEEP MOWED; SEED PERMANENT MIXTURE IN
- SM-3 TEMPORARY SEDDING 1. APPLY 2000lb/acre GROUND AGRICULTURAL LIMESTONE AND 750lb/acre 10-10-10

10-10-10 FERTILIZER. PLACE LININGS AS NOTED ON PLANS.

SM-4 GRASS LINED CHANNELS; APPLY 4000lb/acre GROUND AGRICULTURE LIMESTONE AND 1000lb/acre

MULCH (MU)

- MU-1 STEEP SLOPES (3:1 OR GREATER)
- APPLY 100Ib/1,000 sq. ft. GRAIN STRAW. COVER WITH NETTING AND STAPLE TO THE SLOPE. MU-2 GENTLE SLOPES (LESS THAN 3:1)
- APPLY 1001b/1,000 sq. ft. GRAIN STRAW. COVER WITH ASPHALT OR WITH NETTING AND STAPLE TO THE SLOPE. MU-3 APPLY 1001b/1000 sq. ft. AND ANCHOR STRAW BY STAPLING NETTING OVER THE TOP.

MAINTENANCE (MA)

MA-1 REFERTILIZE IN LATE WINTER OR EARLY SPRING THE FOLLOWING YEAR. MOW AS DESIRED. RESEED, FERTILIZE, AND MULCH DAMAGED AREAS IMMEDIATELY.

SPLITBEARD BLUESTEM (SNDROPOGON TERNARIUS) BEGGARLICE (DESMODIUM SPP.) PARTRIDGE PEA (CHAMAECRISTA FASCICULATA)

NATIVE SPECIES

SWITCHGRASS (PANICUM VIRGATUM)

FERTILIZER NOTE:

APPLICATION RATES MAYBE USED.

EROSION CONTROL MAINTENANCE SCHEDULE ALL SEDIMENT AND EROSION CONTROLS ARE TO BE INSPECTED AT LEAST ONCE EVERY SEVEN (7) CALENDAR DAYS AND AFTER ANY STORM EVENT OF 0.5 INCHES OR GREATER OF PRECIPITATION DURING AND 24-HOUR PERIOD.

AREA NO.	DESCRIPTION	SEASON	SEE PERMANENT Ib/ac	EDING N	MIXTURE TEMPORARY Ib/ac		SEEDBED PREPARA— TION	SEEDING METHOD	MULCH	MAINTE- NANCE	NOTES
1	STEEP SLOPES; LOW MAINTENANCE (GREATER THAN 3:1)	AUG 20 - OCT 30 FEB 1 - APR 15	TALL FESCUE SWITCHGRAS BEGGARLICE	100 30 10			SP-1	SM-1	MU-1	MA-1	BETWEEN MAY 1 — AUG 15, ADD 10lb/acre GERMAN MILLET OR 15lb/acre SUNDAN GRASS. PRIOR TO MAY 1 OR AFTER AUG 15 ADD 40lb/acre RYE GRAIN
2	LOW MAINTENANCE AREAS (3:1 SLOPES OR LESS)	AUG 20 - OCT 25 FEB 1 - MAR 31	TWO TURF- TYPE FESCUES	225 25			SP-3	SM-2	MU−2	MA-1	APPLY 40Ib/acre OF NITROGEN AFTER A STAND OF GRASS HAS BEEN ESTABLISHED. AVOID APPLYING NITROGEN DURING THE SUMMER MONTHS. SEE SM-2 (NOTE 4)
3	TEMPORARY SEEDING	JAN 1 - MAY 1 - AUG 15 AUG 15 - DEC 30			RYE GRAIN PARTRIDGE PEA GERMAN MILLET RYE GRAIN	120 50 40 120	SP-2	SM-3	MU-1	MA-1	TREAT TEMPORARY DIVERSION AS LOW— MAINTENANCE, PERMANENT (AREA 2) INCLUDE TOPSOIL STOCK— PILES HERE
4	GRASS LINED CHANNELS	FEB 1 - APR 15 - AUG 20 - OCT 30	TALL FESCUE 200 TALL FESCUE 200				SP-1	SM-4	MU-3	MA-1	BETWEEN APR 15 — AUG 20, PLACE GERMAN MILLET AT 40lb/acre. BETWEEN NOV 1 — FEB 1, PLACE RYE GRAIN 120lb/acre, & KOBE LESPEDEZA 50lb/acre

PER NCDEQ AND NPDES REQUIREMENTS. GROUND STABILIZATION MUST OCCUR WITHIN 7 DAYS ON PERIMETER AREAS AND SLOPES STEEPER THAN 3:1, AND GROUND STABILIZATION MUST OCCUR WITHIN 14 DAYS ON OTHER AREAS.

NPDES STORMWATER DISCHARGE PERMIT FOR CONSTRUCTION ACTIVITIES (NCGO1) NCDENR/DIVISION OF ENERGY, MINERAL AND LAND RESOURCES

		IZATION TIMEFRA fective aug. 3, 2011)	
SITE AF	REA DESCRIPTION	STABILIZATION	TIMEFRAME EXCEPTIONS
	PERIMETER DIKES, SWALES, DITCHES, SLOPES	7 DAYS	NONE
	HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
	SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED
	SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50'IN LENGTH
	ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE, EXCEPT FOR PERIMETERS AND HQW ZONES

INSPECTION NOTES:

BECAME AWARE OF THE CIRCUMSTANCES.

INSPECTION RECORDS.

TEMP. STONE DITCH CHECK

TEMPORARY STONE DITCH CHECK

CLASS A OR

1. A RAIN GAUGE SHALL BE MAINTAINED IN GOOD WORKING ORDER ON THE SITE, FERTILIZER SHOULD BE APPLIED IN ACCORDANCE UNLESS ANOTHER RAIN MONITORING DEVICE HAS BEEN APPROVED BY THE WITH SOIL TEST RESULTS. IF SOIL TEST DIVISION OF WATER QUALITY. CANNOT BE PERFORMED, GENERIC FERTILIZER

- 2. A WRITTEN RECORD OF THE DAILY RAINFALL AMOUNTS SHALL BE RETAINED AND ALL RECORDS SHALL BE MADE AVAILABLE TO DWQ OR AUTHORIZED AGENT UPON REQUEST. (NOTE: IF NO RAINFALL OCCURRED, THE REPORT MUST RECORD
- 3. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED TO ENSURE THAT THEY ARE OPERATING CORRECTLY. INSPECTION RECORDS MUST BE MAINTAINED FOR EACH MEASURE. AT A MINIMUM, INSPECTION OF MEASURES MUST OCCUR AT THE FREQUENCY INDICATED BELOW: (a) ALL EROSION AND SEDIMENTATION CONTROL MEASURES MUST BE INSPECTÉD AT LEAST ONCE EVERY SEVEN CALENDAR DAYS, AND (b) ALL EROSION AND SEDIMENT CONTROL MEASURES MUST BE INSPECTED WITHIN 24 HOURS AFTER ANY STORM EVENT OF GREATER THAN 0.50 INCHES OF
- RAIN PER 24 HOUR PERIOD. 4. ONCE LAND DISTURBANCE HAS BEGUN ON THE SITE, STORMWATER RUNOFF DISCHARGE OUTFALLS SHALL BE INSPECTED BY OBSERVATION FOR EROSION, SEDIMENTATION, AND OTHER STORMWATER DISCHARGE CHARACTERISTICS. INSPECTIONS OF THE OUTFALLS SHALL BE MADE AT LEAST ONCE EVERY SEVEN CALENDAR DAYS WITHIN 24 HOURS AFTER ANY STORM EVENT OF GREATER THAN
- 0.50 INCHES OF RAIN PER 24 HOUR PERIOD. 5. INSPECTIONS ARE ONLY REQUIRED TO BE MADE DURING NORMAL BUSINESS HOURS. 6. THE PERMITTEE SHALL REPORT TO THE DWQ CENTRAL OFFICE OR APPROPRIATE REGIONAL OFFICE ANY VISIBLE SEDIMENT BEING DEPOSITED IN ANY STREAM etc., ORALLY OR ELECTRONICALLY WITHIN 24 HOURS FROM THE TIME THE PERMITTEE
- 7. A WRITTEN SUBMISSION OF THE REPORT SHALL BE PROVIDED WITHIN 5 DAYS OF THE INCIDENT. WRITTEN REPORT SHALL CONTAIN DESCRIPTION OF THE SEDIMENT DEPOSITION, AND ACTIONS TAKEN TO ADDRESS THE CAUSE OF THE DEPOSITION. 8. RECORDS OF INSPECTIONS MADE DURING THE PREVIOUS 30 DAYS SHALL REMAIN ON THE SITE AND AVAILABLE DURING NORMAL WORKING HOURS. OLDER RECORDS

MUST BE MAINTAINED FOR THREE YEARS AFTER THE PROJECT IS COMPLETED.

SEQUENCE DURING POST-CONSTRUCTION PHASE:

NOTE:
DITCH CHECK TO BE REMOVED
INSIDE CLEAR ROADSIDE RECOVERY
AREA PRIOR TO TRAFFIC OPERATIONS.

SPACING = $\frac{\text{HEIGHT OF DITCH CHECK}}{\text{SLOPE (\%)}} \times 100$

ISOMETRIC VIEW

PROP. GRADED SECT.

TYPICAL CROSS SECTION

4' TO 6' +/-

TYPICAL LONGITUDINAL SECTION

RIP-RAP CHECK DAM

NOT TO SCALE

INSTALL INLET AND OUTLET PROTECTION FOR THE STORM DRAINAGE SYSTEM.

ELECTRONIC RECORDS MAY BE USED, IF PROVIDING EQUAL ACCESS AND UTILITY AS THE HARD COPIES. 9. SEE NCG01 PERMIT FOR REQUIRED INFORMATION TO BE INCLUDED IN THE

1. INSTALL STORM DRAINAGE PIPES, AND CATCH BASINS.

4. SET STONE FOR PARKING AND DRIVE AREAS

PERMANENTLY SEED SLOPES.

5. PAVE PARKING AND DRIVES.

SEQUENCE OF CONSTRUCTION ACTIVITIES:

- 1. DETERMINE AND MARK LIMITS OF DISTURBANCE.
- 2. NOTIFY THE EROSION INSPECTOR BEFORE ANY LAND DISTURBING ACTIVITY IS
- 3. CONSTRUCT STABILIZED CONSTRUCTION ENTRANCE.
- 4. PLACE PERIMETER SEDIMENT FENCE, CONSTRUCT SKIMMER BASINS CONSTRUCT CLEAN WATER DIVERSION DITCHES.
- 5. REMOVE TOPSOIL AND STOCKPILE FOR USE ON SLOPES.
- 6. STOCKPILE AREA IS DESIGNATED ON PLANS OR AS DIRECTED BY ENGINEER.
- 7. PLACE REMAINING SEDIMENT FENCES, ROUGH GRADE SITE, CONSTRUCT CHANNELS, INSTALL CHANNEL LININGS.
- 8. CONSTRUCT STORM DRAINAGE. EXCAVATED DROP INLET PROTECTION AND OUTLET PROTECTION TO BE CONSTRUCTED CONCURRENTLY WITH STORM DRAINS.
- 9. PLACE TEMPORARY SEEDING ON ALL DISTURBED AREAS.

WEEKENDS.

VAR. VAR.

SPECIFICATIONS.

GREATER THAN 3:1.

10. COMPLETE FINAL GRADING CONSTRUCT BUILDING.

(WOOD OR MANMADE FIBRE) GAUGE WIRE

-- 12" MAX 4:1 OR FLATTER 6" MAX STEEPER THAN 4:1

EDGE AND END JOINTS TO

SOIL STABILIZATION MATS SHALL BE INSTALLED PER MANUFACTURERS

SOIL STABILIZATION MAT-INSTALLATION

SOIL STABILIZATION MATS SHALL BE PLACED ON ANY DISTURBED SLOPES

- CENTER ROW MAY BE ELIMINATED WHEN SLOPE IS LESS THAN 4:1

5' MAX 4:1 OR FLATTER 3' MAX STEEPER THAN 4:1

BE OVERLAPPED 2" MIN

- 11. GRAVEL AND PAVE PARKING AND DRIVE, PLACE PERMANENT SEEDING AND DO FINAL LANDSCAPING.
- 12. NOTIFY THE EROSION INSPECTOR AFTER SITE IS STABILIZED.
- 13. REMOVE TEMPORARY EROSION CONTROL MEASURES AFTER SITE IS STABILIZED. 14. NO EROSION CONTROL DEVICES CAN BE REMOVED WITHOUT PRIOR APPROVAL
- FROM THE INSPECTOR. 15. NO MAJOR GRADING ACTIVITIES OR BASIN CONSTRUCTION IS TO TAKE PLACE DURING WET WEATHER OR PERIODS OF PREDICTED WET WEATHER. NOTIFY LQS INSPECTOR WHEN PROJECT IS READY FOR A CLOSE OUT INSPECTION. FILE FOR NPDES NCG010000 E-NOTICE OF TERMINATION WHEN FINAL CLOSE OUT INSPECTION REPORT IS RECEIVED FROM NCDEW LQS. SITE MUST BE STORM READY BEFORE ANY EXTENDED BREAKS IN CONSTRUCTION ACTIVITIES INCLUDING

Pin / Staple / Twist Pin, as

Plan View

0 / 0 / 0 / 0 /

	Staple	Staple Pattern						
Dimension	С	D						
W _T	30" (75 cm)	22" (55 cm)						
L _T	30" (75 cm)	22" (55 cm)						
S _T	18" (45 cm)	18" (45 cm)						
Nominal Frequency	1.7 / SY	3.0 / SY						
Application	ECB (Degradable)	TRM (Permanent)						
Required Fastener	Min. 20# pullout	Min. 20# pullout						

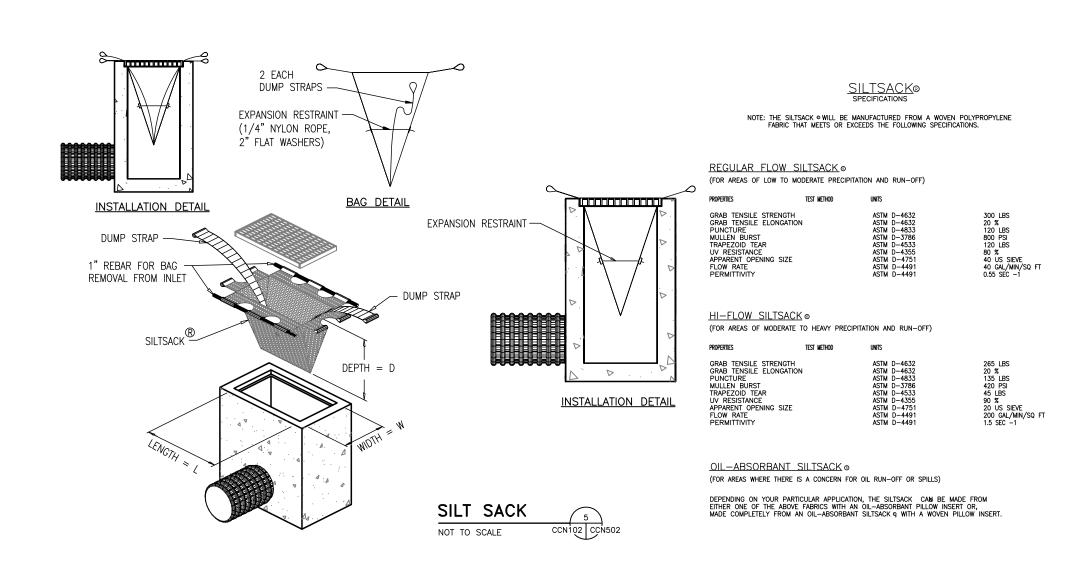
/ RIP RAP CHECK DAMS STEEP CUT OR FILL SLOPE CONSTRUCTION SPECIFICATIONS: C150BN, STAPLE PATTERN "C" 1. REMOVE AND PROPERLY DISPOSE OF ALL TREES, BRUSH, STUMPS AND OTHER

- 2. ENSURE THAT THE MINIMUM CONSTRUCTED CROSS SECTION MEETS ALL DESIGN
- 3. ENSURE THAT THE TOP OF THE DIKE IS NOT LOWER AT ANY POINT THAN THE DESIGN
- 4. PROVIDE SUFFICIENT ROOM AROUND DIVERSIONS TO PERMIT MACHINE REGRADING AND
- 5. VEGETATE THE RIDGE IMMEDIATELY AFTER CONSTRUCTION, UNLESS IT WILL REMAIN IN PLACE LESS THAN 30 WORKING DAYS.

MAINTENANCE:

INSPECT TEMPORARY DIVERSIONS ONCE A WEEK AND AFTER EVERY RAINFALL. IMMEDIATELY REMOVE SEDIMENT FROM THE FLOW AREA AND REPAIR THE DIVERSION RIDGE. CAREFULLY CHECK OUTLETS AND MAKE TIMELY REPAIRS AS NEEDED. WHEN THE AREA PROTECTED IS PERMANENTLY STABILIZED, REMOVE THE RIDGE AND THE CHANNEL TO BLEND WITH THE NATURAL GROUND.

TEMPORARY DIVERSION DITCH NOT TO SCALE



Unroll Direction Underneath Roll Upper Roll-

4-6" (10-15 cm)

appropriate for field conditions

KO JE DF

Δ DATE DESCRIPTION

SHEET NAME:

DETAILS

EROSION CONTROL

CCN502

described:

Self-inspections are required during normal business hours in accordance with the table below. When adverse weather or site conditions would cause the safety of the inspection personnel to be in jeopardy, the inspection may be delayed until the next business day on which it is safe to perform the inspection. In addition, when a storm event of equal to or greater than 1.0 inch occurs outside of normal business hours, the self-inspection shall be performed upon the commencement of the next business day. Any time when inspections were delayed shall be noted in the Inspection Record.

SELF-INSPECTION, RECORDKEEPING AND REPORTING

Inspect	Frequency (during normal business hours)	Inspection Records Must Include:
(1) Rain Gauge maintained in good working order	Daily	Daily rainfall amounts. If no daily rain gauge observations are made during weekend or holiday periods, and no individual—day rainfall rainfall information is available, record the cumulative rain measurement for those unattended days (and this will determine if a site visit is needed). Days on which no rainfall occurred shall be recorded as "zero". The permittee may use another rain—monitoring device approved by the division.
(2) E&SC Measures	At least once per 7 calender days and within 24 hours of a rain event >/= 1.0" in 24 hours	1. Identification of the measures inspected, 2. Date & Time of the inspection, 3. Name of the person performing the inspection, 4. Indication of whether the measures were operating properly, 5. Description of the maintenance needs for the measure, 6.Description, evidence, and date of corrective actions taken.
(3) Stormwater discharge outfalls (SDO's)	At least once per 7 calender days and within 24 hours of a rain event >/= 1.0" in 24 hours	1. Identification of the discharge outfalls inspected, 2. Date & Time of the inspection, 3. Name of the person performing the inspection, 4. Evidence of stormwater pollution indicators such as oil sheen, floating or suspended solids or discoloration, 5. Visible indication of sediment leaving the site, 6.Description, evidence, and date of corrective actions taken.
(4) Perimeter of the site	At least once per 7 calender days and within 24 hours of a rain event >/= 1.0" in 24 hours	If visible sedimentation is found outside site limits, then a record the following shall be made: 1. Actions taken to clean up or stabilize the sediment that has left the site limits, 2. Description, evidence, and date of corrective actions taken, a 3. An explanation as to the actions taken to control future releases.
(5) Streams or wetlands onsite or offsite (where accessible)	At least once per 7 calender days and within 24 hours of a rain event >/= 1.0" in 24 hours	If the stream or wetland has increased visible sedimentation or stream has visible increased turbidity from the construction activity, then a record of the following shall be made: 1. Description, evidence and date of corrective actions taken, a 2. Records of the required reports to the appropriate division regional office per Part III, section C Item (2)(a) of this permit
(6) Ground stabilization measures	After each phase of grading	The phase of grading (installation of perimeter E&SC measures, clearing and grubbing, installation of storm drainage facilities, completion of all land—disturbing activity, construction or redevelopment, permanent ground cover). Documentation that the required ground stabilization measures have been provided within the required timeframe or an assurance that they will be provided as soon as possible.

requirement

SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION B: RECORDKEEPING I.E&SC Plan Documentation The approved E&SC plan as well as any approved deviation shall be kept on the site. The approved E&SC plan must be kept up—to—date throughout the coverage under this permit. The following items pertaining to the E&SC plan shall be documented in the manner

Item to Document	Documentation Requirements							
(a) Each E&SC Measure has been installed and does not significantly deviate from the locations, dimensions and relative elevations shown on the approved E&SC Plan.	Initial and date each E&SC Measure on a copy of the approved E&SC Plan or complete, date and sign an inspection report that lists each E&SC Measure shown on the approved E&SC Plan. This documentation is required upon the initial installation of the E&SC Measures or if the E&SC Measures are modified after initial installation.							
(b) A phase of grading has been completed.	Initial and date a copy of the approved E&SC Plan or comple date and sign an inspection report to indicate completion of construction phase.							
(c) Ground cover is located and installed in accordance with the approved E&SC Plan.	Initial and date a copy of the approved E&SC Plan or complete, date and sign an inspection report to indicate compliance with approved ground cover specifications.							
(d) The maintenance and repair requirements for all E&SC Measures have been performed.	Complete, date and sign an inspection report.							
(e) Corrective actions have been taken to E&SC Measures.	Initial and date a copy of the approved E&SC Plan or complete , date and sign an inspection report to indicate the completion of the corrective action.							

2. Additional Documentation In addition to the E&SC Plan documents above, the following items shall be kept on the site and available for agency inspectors at all times during normal business hours, unless the Division provides a site-specific exemption based on unique site conditions that make this

SELF-INSPECTION, RECORDKEEPING AND REPORTING SECTION C: REPORTING

1. Occurrences that must be reported Permittees shall report the following occurrences: (a) Visible sediment deposition in a stream or wetland.

 They are 25 gallons or more, They are less than 25 gallons but cannot be cleaned up within 24 hours, • They cause sheen on surface waters (regardless of volume), or

• They are within 100 feet of surface waters (regardless of volume).

(a) Releases of hazardous substances in excess of reportable quantities under Section 311 of the Clean Water Act (Ref: 40 CFR 110.3 and 40 CFR 117.3) or Section 102 of CERCLA (Ref: 40 CFR 302.4) or G.S. 143-215.85.

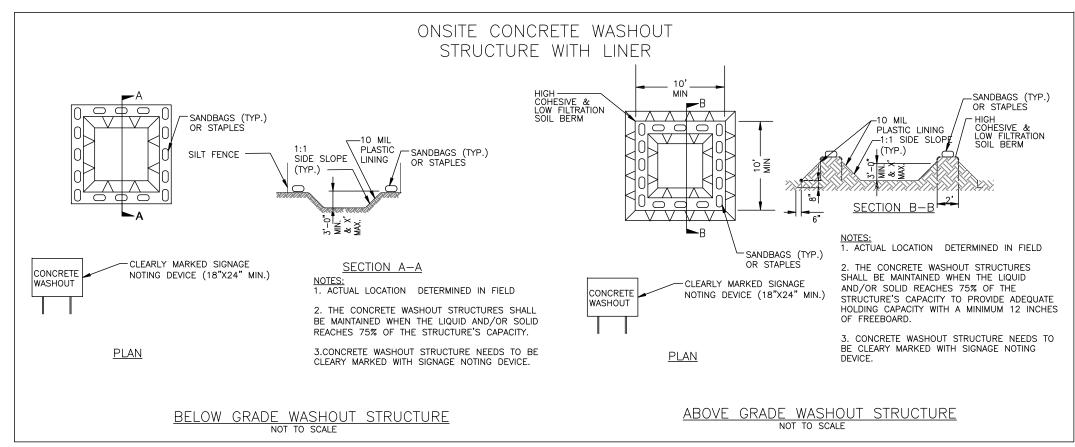
(b) Anticipated bypasses and unanticipated bypasses.

(c) Noncompliance with the conditions of this permit that may endanger health or the environment.

2. Reporting Timeframes and Other Requirements

After a permittee becomes aware of an occurrence that must be reported, he shall contact the appropriate Division regional office within the timeframes and in accordance with the other requirements listed below. Occurrences outside normal business hours may also be reported to the Division's Emergency Response personnel at (800) 662-7956, (800) 858-0368 or (919) 733-3300.

Additional Documentation		Occurrence	Repo	orting Timeframes (After Discovery) and Other Requirements
all be kept on the site and available for agen- siness hours, unless the	C Plan documents above, the following items cy inspectors at all times during normal e—specific exemption based on unique site cal:	(a) Visible sediment deposition in a stream or wetland	•	Within 24 hours, an oral or electronic notification Within 7 calendar days, a report that contains a description of the sediment and the actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis. If the stream is named on the NC 303(d) list as impaired for sediment-related causes, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired-waters conditions.
	well as the certificate of coverage, after it is	(b) Oil spills and hazardous substances per item 1(b)-(c) above	•	Within 24 hours, an oral or electronic notification. The notification shall include information about the date, time, nature, volume and location of the spill or release.
permittee shall record	made during the previous 30 days. The the required observations on the Inspection	(c) Anticipated bypasses [40CFR 122.41(m)(3)]	•	A report at least ten days before the date of the bypass, if possible. The report shall include an evaluation of the anticipated quality and effect of the bypass.
that includes all the records in lieu of the	by the Division or a similar inspection form equired elements. Use of electronically—available required paper copies will be allowed if shown as and utility as the hard—copy records.	(d) Unanticipated bypasses [40 CFR 122.41(m)(3)]	•	Within 24 hours, an oral or electronic notification Within 7 calendar days, a report that includes an evaluation of the quality and effect of the bypass.
records shall be maint	plete the Notice of Intent and older inspection tained for a period of three years after project available upon request. [40 CFR 122.41]	(e) Noncompliance with the conditions of this permit that may endanger health or the enviroment [40CFR 122.41(I)(7)]	:	Within 24 hours, an oral or electronic notification Within 7 calendar days, a report that contains a description of the noncompliance, and its causes; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time noncompliance is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. [40CFR 122.41(I)(6). Division staff may waive the requirement for a written report on a case—by—case basis.
		1		



GROUND STABILIZATION AND MATERIALS HANDLING PRACTICES FOR <u>COMPLIANCE WITH THE NCG01 CONSTRUCTION GENERAL PERMI</u> Implementing the details and specifications on this plan sheet will result in the construction activity being considered compliant with the Ground Stabilization and Materials Handling sections of the NCG01 Construction General Permit (Sections E and F, respectively). The permittee shall comply with the Erosion and Sediment Control plan approved by the delegated authority having jurisdiction. All details and specifications show on this sheet may not apply depending on site conditions and the delegated authority having jurisdiction.

Requ	ired Ground Stabi	lization Timeframes				
Site Area Description	Stabilize within this many calendar days after ceasing land disturbance	Timeframe variations				
(a) Perimeter dikes, swales, ditches, and perimeter slopes	7	None				
(b) High Quality Wate (HQW) Zones	er 7	None				
(c) Slopes steeper than 3:1	7	If slopes are 10' or less in length and are not steeper than 2:1, 14 days are allowed				
(d) Slopes 3:1 to 4:	1 14	 -7 days for slopes greater than 50' in length and with slopes steeper than 4:1 -7 days for perimeter dikes, swales, ditches, perimeter slo and HQW Zones -10 days for Falls Lake Watershed 				
(e) Areas with slopes flatter than 4:1	14	-7 days for perimeter dikes, swales, ditches, perimeter slo and HQW Zones -10 days for Falls Lake Watershed unless there is zer slope				

with temporary ground stabilization shall be converted to permanent ground stabilization as soon as practicable but in no case longer than 90 calendar days after the last land disturbing activity. Temporary laround stabilization shall be maintained in a manner to render the surface stable against accelerated erosion until permanent ground

ilization is achieved.						
OUND STABILIZATION SPECIFICATION Dilize the ground sufficiently so that rain will not dislodge the soil. One of the techniques in the table below:						
emporary Stabilization	Permanent Stabilization					
Temporary grass seed covered with straw or other mulches and tackifiers	Permanent grass seed covered with straw or other mulches or tackifiers Geotextile fabrics such as permanent soil reinforcement matting					

Hydroseeding Shrubs or other permanent plantings covered with mulch

Uniform and evenly distributed ground cover sufficient to

restrain erosion Structural methods such as concrete, asphalt, or

retaining walls Rolled erosion control products with grass seed

POLYACRYLAMIDES (PAMS) AND FLOCCULANTS Select flocculants that are appropriate for the soils being exposed during construction, selecting from the NC DWR List of Approved PAMS/Flocculants.

Hydroseeding

Plastic sheeting

discharging offsite.

structures.

Rolled erosion control products with or without grass seed

Appropriately applied straw or other mulch

. Apply flocculants at or before the inlets to Erosion and Sediment Control Measures. 5. Apply flocculants at the concentrations specified in the NC DWR List of Approved PAMS/Flocculants and in accordance with the manufacturer's instructions. 4. Provide ponding area for containment of treated Stormwater before

5. Store flocculants in leak—proof containers that are kept under storm—resistant cover or surrounded by secondary containment EQUIPMENT AND VEHICLE MAINTENANCE . Maintain vehicles and equipment to prevent discharge of fluids. Provide drip pans under any stored equipment. 3. Identify leaks and repair as soon as feasible, or remove leaking equipment from the project. 4. Collect all spent fluids, store in separate containers and properly dispose as hazardous waste (recycle when possible). . Remove leaking vehicles and construction equipment from service until the problem has been corrected. . Bring used fuels, lubricants, coolants, hydraulic fluids and other

petroleum products to a recycling or disposal center that handles

LITTER, BUILDING MATERIAL AND LAND CLEARING WASTE . Never bury or burn waste. Place litter and debris in approved 2. Provide a sufficient number and size of waste containers (e.g dumpster, trash receptacle) on site to contain construction and domestic wastes. 3. Locate waste containers at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available. 4. Locate waste containers on areas that do not receive substantial amounts of runoff from upland areas and does not drain directly to a storm drain, stream or wetland. 5. Cover waste containers at the end of each workday and before storm events or provide secondary containment. Repair or replace damaged waste containers. 6. Anchor all lightweight items in waste containers during times of high winds. 7. Empty waste containers as needed to prevent overflow. Clean up immediately if containers overflow. 8. Dispose waste off—site at an approved disposal facility.

PAINT AND OTHER LIQUID WASTE . Do not dump paint and other liquid waste into storm drains, streams or wetlands. . Locate paint washouts at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are

9. On business days, clean up and dispose of waste in designated

waste containers.

reasonably available. 3. Contain liquid wastes in a controlled area. 4. Containment must be labeled, sized and placed appropriately for the needs of site. . Prevent the discharge of soaps, solvents, detergents and other liquid wastes from construction sites.

Install portable toilets on level ground, at least 50 feet away from storm drains, streams or wetlands unless there is no alternative reasonably available. If 50 foot offset is not attainable, provide relocation of portable toilet behind silt fence or place on a gravel pad and surround with sand bags. . Provide staking or anchoring of portable toilets during periods of high winds or in high foot traffic areas. Monitor portable toilets for leaking and properly dispose of any leaked material. Utilize a licensed sanitary waste hauler to remove leaking portable toilets and replace with properly operating unit.

EARTHEN STOCKPILE MANAGEMENT Show stockpile locations on plans. Locate earthen—material stockpile areas at least 50 feet away from storm drain inlets, sediment basins, perimeter sediment controls and surface waters unless it can be shown no other alternatives are reasonably

. Protect stockpile with silt fence installed along toe of slope with a minimum offset of five feet from the toe of stockpile. 5. Provide stable stone access point when feasible. 4. Stabilize stockpile within the timeframes provided on this sheet and in accordance with the approved plan and any additional requirements. Soil stabilization is defined as vegetative, physical or chemical coverage techniques that will restrain accelerated erosion

on disturbed soils for temporary or permanent control needs.

CONCRETE WASHOUTS

1. Do not discharge concrete or cement slurry from the site. 2. Dispose of, or recycle settled, hardened concrete residue in accordance with local and state solid waste regulations and at an approved facility. . Manage washout from mortar mixers in accordance with the above item and in addition place the mixer and associated materials on impervious barrier and within lot perimeter silt fence.

. Install temporary concrete washouts per local requirements, where applicable. If an alternate method or product is to be used, contact your approval authority for review and approval. If local standard details are not available, use one of the two types of temporary concrete washouts provided on this detail. Do not use concrete washouts for dewatering or storing defective curb or sidewalk sections. Stormwater accumulated within the washout may not be pumped into or discharged to the storm drain system or receiving surface waters. Liquid waste must be pumped out and removed from project.

6. Locate washouts at least 50 feet from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available. At a minimum, install protection of storm drain inlet(s) closest to the washout which could receive spills or . Locate washouts in an easily accessible area, on level ground and

install a stone entrance pad in front of the washout. Additional controls may be required by the approving authority. 8. Install at least one sign directing concrete trucks to the washout within the project limits. Post signage on the washout itself to identify this location. . Remove leavings from the washout when at approximately 75% capacity to limit overflow events. Replace the tarp, sand bags or other temporary structural components when no longer functional. When utilizing alternative or proprietary products, follow

manufacturer's instructions. 10. At the completion of the concrete work, remove remaining leavings and dispose of in an approved disposal facility. Fill pit, if applicable, and stabilize any disturbance caused by removal of

HERBICIDES, PESTICIDES AND RODENTICIDES . Store and apply herbicides, pesticides and rodenticides in accordance with label restrictions. . Store herbicides, pesticides and rodenticides in their original containers with the label, which lists directions for use, ingredients and first aid steps in case of accidental poisoning.

Do not store herbicides, pesticides and rodenticides in areas where flooding is possible or where they may spill or leak into wells, stormwater drains, ground water or surface water. If a spill occurs, clean area immediately. 4. Do not stockpile these materials onsite.

HAZARDOUS AND TOXIC WASTE Create designated hazardous waste collection areas on—site. . Place hazardous waste containers under cover or in secondary Do not store hazardous chemicals, drums or bagged materials directly on the ground.

NCG01 GROUND STABILIZATION AND MATERIALS HANDLING

EFFECTIVE: 04/01/19

MICHAEL GRAVES

ARCHITECT: Walter Robbs Architects, a Michael Graves Company 530 North Trade Street, Suite 301 Winston-Salem, NC 27103

CIVIL ENGINEER: Clayton Engineering and Design 304 15th Street S.E. P.0. Box 2351 Hickory, NC 28603 T 828.455.3456

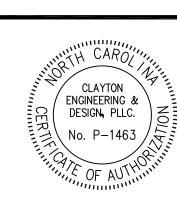
STRUCTURAL ENGINEER: SKA Consulting Engineers, Inc 7900 Triad Center Drive, Suite 200 Greensboro, NC 27409-9075 T 336.855.0993

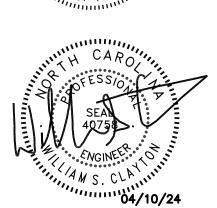
ELECTRICAL ENGINEER:

Consultant Engineering Service

1111 S. Marshall Street, Suite 250

Winston-Salem, NC 27101 T 336.308.4256 CODE CONSULTANT: Performance Based Fire Protection Engineering P.O. Box 1847 Pittsboro, NC 27312





NAME: WILLIAM S. CLAYTON LICENSE: NC # 40758

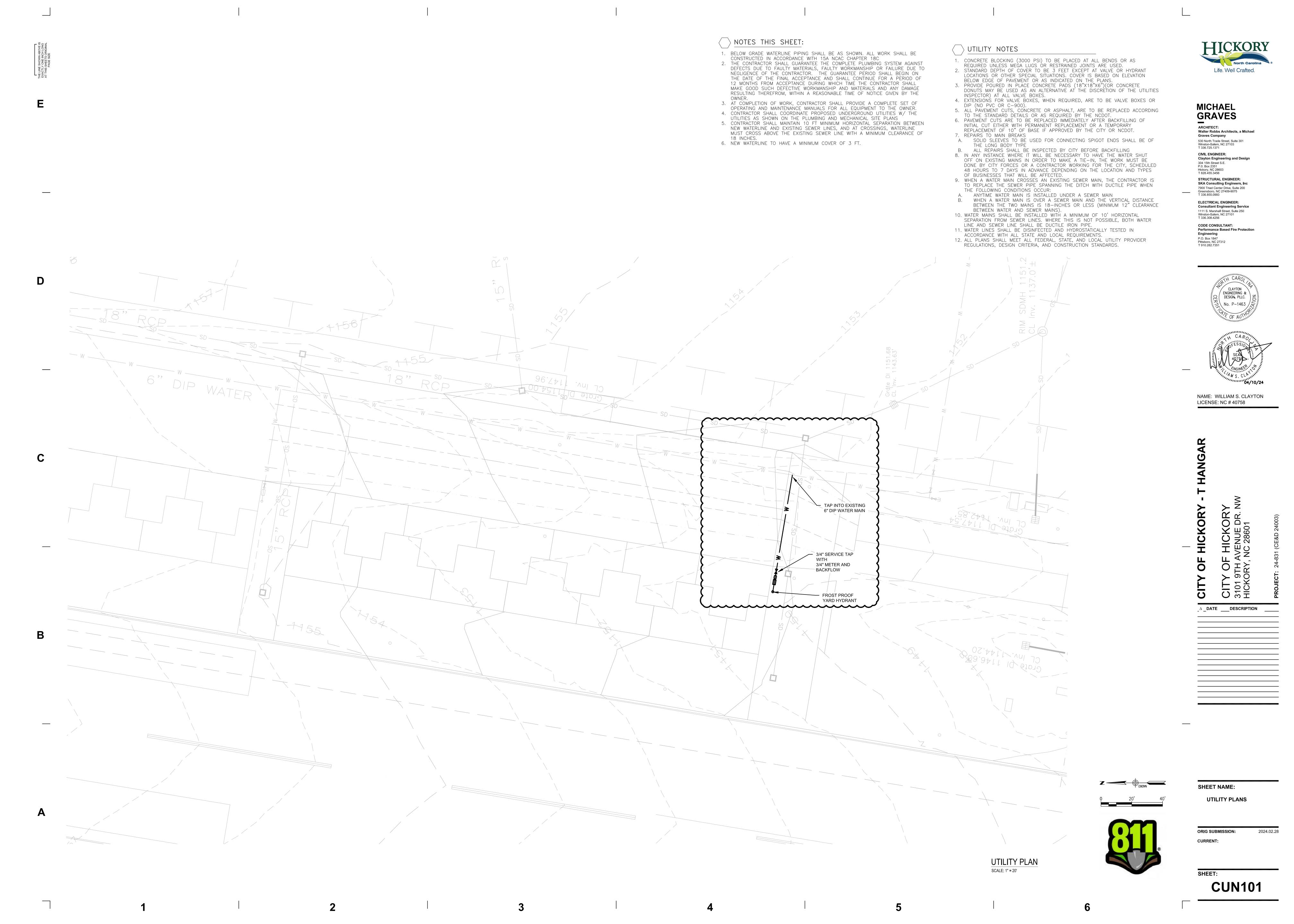
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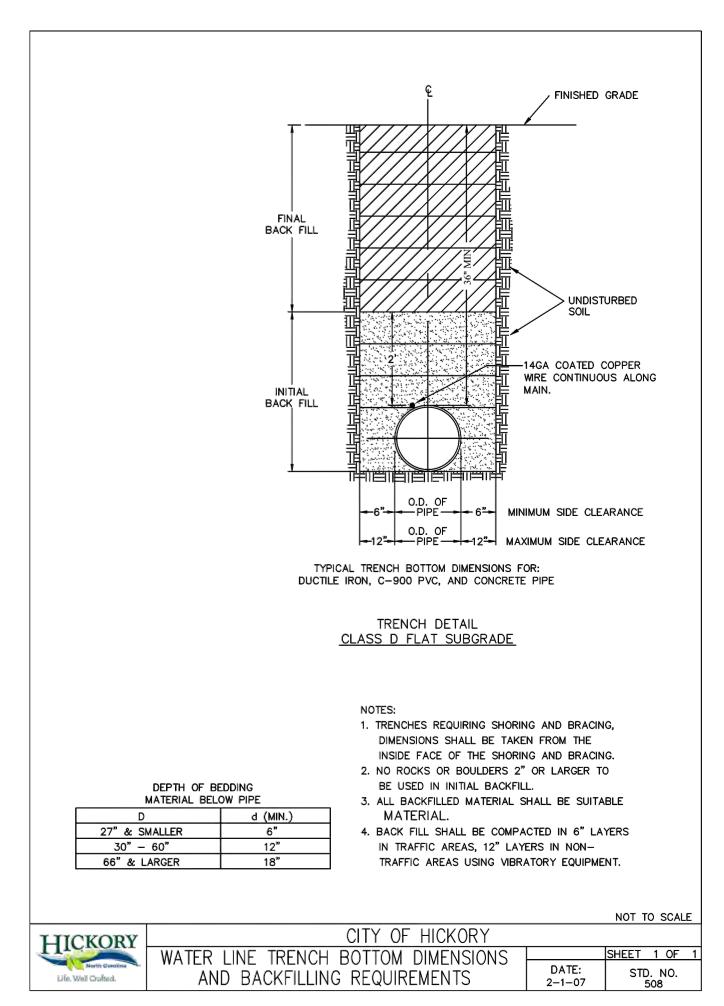
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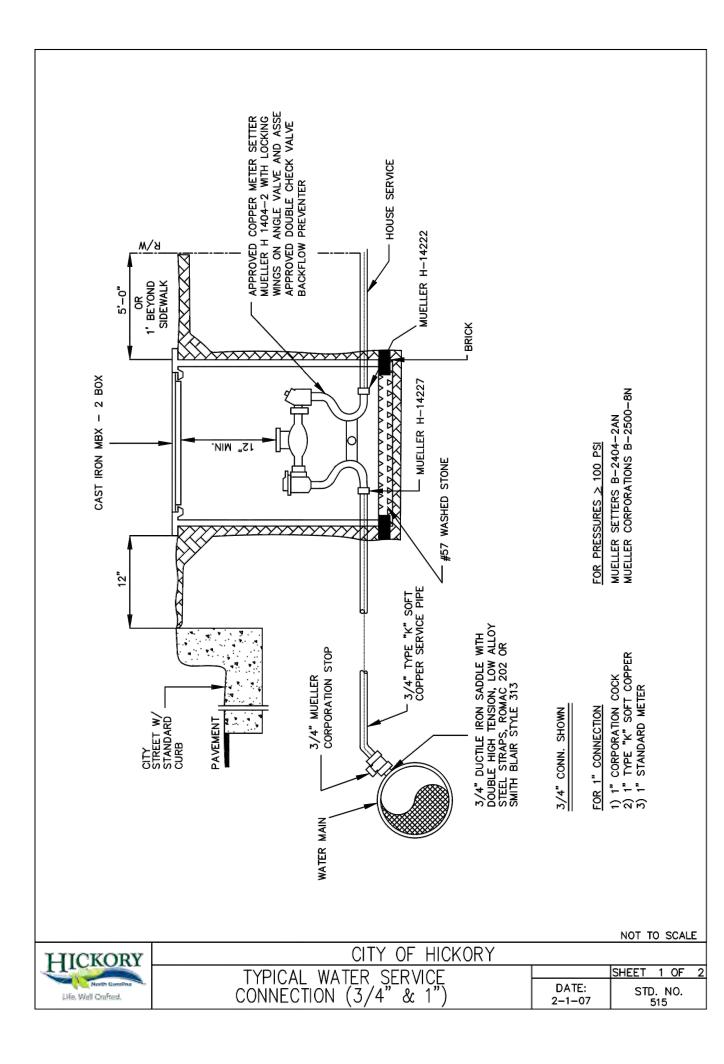
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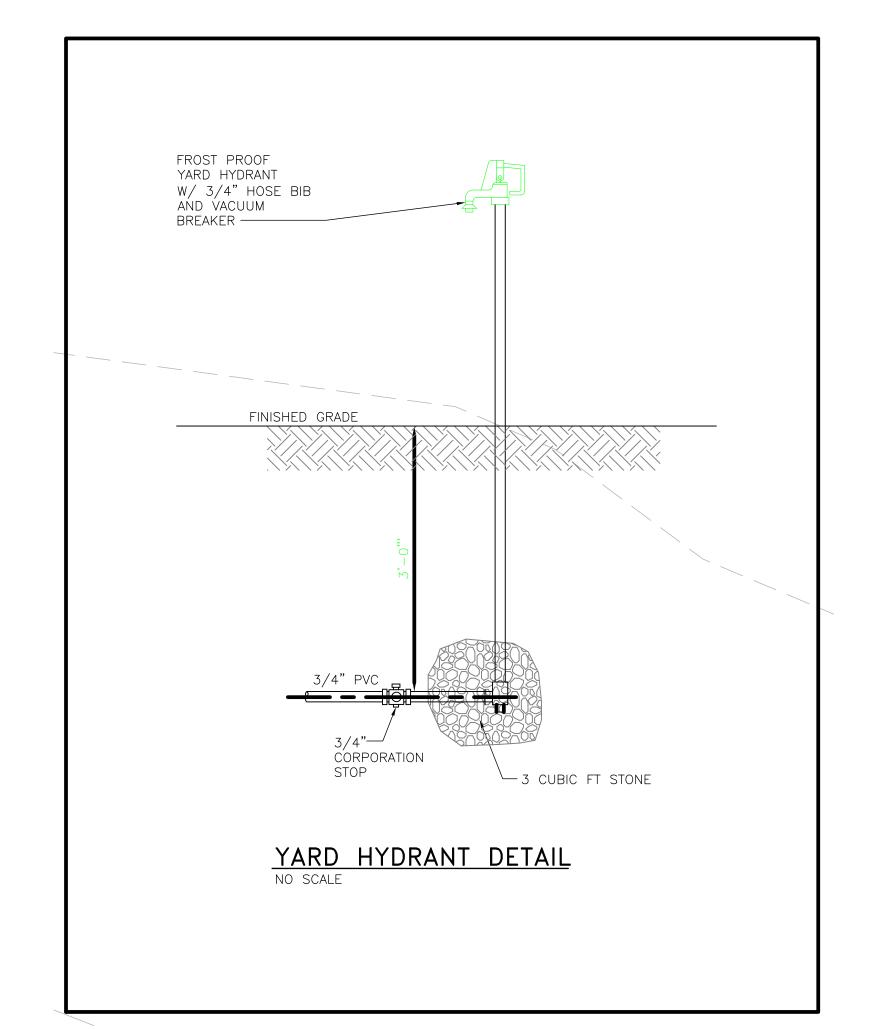
EROSION CONTROL NOTES

CCN503











MICHAEL GRAVES

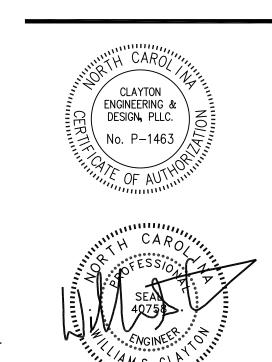
ARCHITECT: Walter Robbs Architects, a Michael **Graves Company** 530 North Trade Street, Suite 301 Winston-Salem, NC 27103 T 336.725.1371

CIVIL ENGINEER: Clayton Engineering and Design 304 15th Street S.E. P.0. Box 2351 Hickory, NC 28603 T 828.455.3456

STRUCTURAL ENGINEER: SKA Consulting Engineers, Inc 7900 Triad Center Drive, Suite 200 Greensboro, NC 27409-9075 T 336.855.0993

> **ELECTRICAL ENGINEER:** Consultant Engineering Service 1111 S. Marshall Street, Suite 250 Winston-Salem, NC 27101 T 336.308.4256 CODE CONSULTANT: Engineering

Performance Based Fire Protection P.O. Box 1847 Pittsboro, NC 27312 T 910.282.7351



NAME: WILLIAM S. CLAYTON LICENSE: NC # 40758

Δ DATE DESCRIPTION

SHEET NAME: **UTILITY DETAILS**

CUN501

ARCHITECT: Walter Robbs Architects, a Michael **Graves Company** 530 North Trade Street, Suite 301 Winston-Salem, NC 27103 T 336.725.1371

CIVIL ENGINEER: Clayton Engineering and Design 304 15th Street S.E. P.0. Box 2351 Hickory, NC 28603 T 828.455.3456

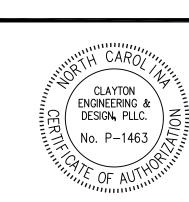
STRUCTURAL ENGINEER: SKA Consulting Engineers, Inc 7900 Triad Center Drive, Suite 200 Greensboro, NC 27409-9075 T 336.855.0993

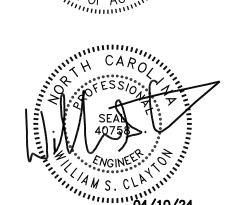
ELECTRICAL ENGINEER:

Consultant Engineering Service

1111 S. Marshall Street, Suite 250 Winston-Salem, NC 27101 T 336.308.4256 CODE CONSULTANT: Performance Based Fire Protection Engineering P.O. Box 1847

Pittsboro, NC 27312





NAME: WILLIAM S. CLAYTON LICENSE: NC # 40758

OR 0 0 7 C

△ _DATE ____DESCRIPTION

SPECIFICATIONS

SPC101

SECTION 01568 SEDIMENT AND EROSION CONTROL

1.1 SECTION INCLUDES

A. Erosion and sediment control shall be provided during the entire construction period as specified herein. 1.2 REFERENCED SECTIONS

A. Section 02820 — Grassing 1.3 REQUIREMENTS

A. Contractor shall comply with all local, state and federal laws, ordinances, rules and regulations pertaining to erosion and sediment control, including those promulgated by the State Administrative Code. Contractor shall indemnify and hold harmless the Owner and Engineer from and against all claims, damages, losses and expenses resulting from such work. B. Obtain Land Disturbance Permit from governmental agency having jurisdiction over project site. C. Contractor shall install and maintain a rain gauge, onsite, during construction.

PART 2 PRODUCTS

3.1 EROSION AND SEDIMENT CONTROL MEASURES

A. Contractor shall take all measures to control erosion and sedimentation along pipeline rights_of_way, at the construction site, including borrow and waste areas and temporary access roads, and at off_site areas especially vulnerable to damage from erosion and sedimentation. Work shall be scheduled so that areas subject to erosion are exposed for the shortest possible time. Temporary protection shall be required for exposed or disturbed areas until permanent vegetation is established, and shall consist of temporary grass cover (see Section 02820 — Grassing), mulch, netting or plastic sheets; except that temporary grass cover shall be provided where specifically noted on the plans. All temporary erosion and sediment control measures shall be removed within 30 days after final site stabilization is achieved or after the temporary measures are no longer required, unless otherwise directed. Trapped sediment remaining in place after removal of temporary measures shall be permanently stabilized to prevent further erosion and sedimentation. B. Temporary Silt Fences: Immediately after site clearing, temporary silt fences shall be placed in the locations as shown on the plans or as necessary to prevent erosion. Silt fences shall

consist of a specially manufactured woven or nonwoven drainage and filtration fabric attached to a temporary support system of galvanized woven wire mesh and steel or wood posts. Height of fabric above grade shall be as shown. Fabric skirt shall be buried to anchor the bottom edge of the fabric. Posts shall be spaced not more than 10 feet apart. 1. As far as practicable, fences shall be located on uniform contours and arranged at right angles to the runoff direction. Fence ends shall be turned up the contour for a short distance to prevent bypass of silt. 2. Silt fences shall be inspected periodically and all necessary repairs promptly made. Sediment deposits shall be removed when deposits reach one_half the height Of the fence. Removed sediment shall be disposed of in a suitable area and stabilized to prevent erosion and sedimentation. 3. Silt fences shall be removed as soon as disturbed areas and slopes have been properly stabilized.

4. Filter fabric attached to existing chain link fence for erosion control purposes shall be installed as detailed for temporary silt fences, including height of fabric above grade and fabric skirt anchoring requirements. Fabric shall be the same material used for temporary silt fences. Fabric shall be removed as soon as disturbed areas and slopes have been stabilized. C. Silt Fence Inlet Protection shall be provided for storm drain inlet protection as detailed on the plans. Barriers shall be inspected after each rainfall and repairs made as required. Sediment deposits shall be removed when deposits reach one—half the height the barrier. Removed sediment shall be disposed of in a suitable area and stabilized to prevent erosion and sedimentation. Barriers shall be removed the area stabilized when the drainage area has been

D. Stream Crossinas: 1. Adequate sedimentation and erosion control measures must be implemented and maintained on the project site to avoid impacts to downstream aquatic resources. Temporary or permanent herbaceous vegetation should be planted on all bare soil within 15 days of ground disturbing activities to provide long—term erosion control. . Under no circumstances should rock, sand or other materials be dredged from the wetted stream channel or opposite banks under authorization of this permit, except in the immediate vicinity of the sewer line crossing. Instream dredging has catastrophic effects on aquatic life, and disturbance of the natural form of the stream channel will likely cause the downstream erosion problems, possible affecting other land owners.

3. All instream construction should be conducted in a dry work area. Sandbags, cofferdams, jersey barriers, flexible pipe, or other diversion structures should be used to minimize excavation into flowing water. 4. If utility lines are to be encased in concrete, adequate precautions should be taken to prevent direct contact between wet concrete and stream water. Uncured concrete affects water quality and is toxic to fish and other aquatic organisms 5. Natural materials should be used as much as possible to restore stream banks at crossings. Riprap should be limited to the stream bank below the high water mark, and vegetation should be used for stabilization above high water mark. . All affected wetland areas must be restored to pre-construction contour and condition.

. All mechanized equipment operated in or near surface waters should be regularly inspected and maintained to prevent contamination of stream waters from fuels, lubricants, hydraulic

fluids, or other toxic materials. 3.2 EMERGENCY CONDITIONS A. If unusually intense storms cause planned control measures to fail, prompt restoration and cleanup of sediment deposits shall be made, including damage to adjacent property. If construction is delayed or shut down, temporary cover of exposed and disturbed areas shall be provided.

SECTION 02050 DEMOLITION AND REMOVAL

1.1. RELATED DOCUMENTS

END OF SECTION

A. GENERAL: Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, material, equipment, and services indicated on the Drawings or specified herein or reasonably necessary for and incidental to a complete job.

A. GENERAL: The demolition of existing vegetation in indicated areas, removal of striping and curb and gutter, removal/reworking/verification of stone base, as well as demolition of sections of the existing retaining wall and fence. Also includes the relocation of one metal storage building at the direction of the Owner. A. GENERAL: Submit proposed salvage, demolition and removal procedures to the Engineer for approval before work is started. Procedures shall provide for careful removal and

disposition of materials specified to be salvaged, coordination with other work in progress, a detailed description of methods and equipment to be used for each operation and of the 1.1. REQUIREMENTS A. GENERAL: The work includes demolition or removal of all construction indicated or specified. Do not begin demolition until authorization is received from the Engineer; refer to paragraph TITLE TO MATERIALS, hereinafter.

Remove rubbish and debris from the job site daily, unless otherwise directed; do not allow accumulations inside or outside the building(s). Store materials cannot be removed daily in areas specified by the Engineer A. EXISTING WORK: Protect existing work which is to remain in place, that is to be reused, or which is to remain the property of the Owner, by temporary covers, shoring, bracing, and supports. Items which are to remain and [which are to be salvaged and] which are damaged during performance of the work shall be repaired to their original condition or replaced

with new. Do not overload structural elements. Provide new supports and reinforcement for existing construction weakened by demolition or removal work. B. TREES: Protect trees within the project site that might be damaged during demolition and that are indicated to be left in place, by a 6-foot high fence. Frect fence a minimum of 5 feet from the trunks of individual trees or follow the outer perimeter of branches of clumps of trees. Restore trees scarred or damaged by Contractor equipment or operations to a satisfactory condition or replace as determined by the Engineer. The Engineer shall approve restoration prior to its initiation. C. FACILITIES: Protect all electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary

covering of exposed areas, and temporary services or connections for electrical and mechanical utilities. 1.1. EXPLOSIVES

A. GENERAL: Use of explosives will not be permitted. 1.1. BURNING

A. GENERAL: Burning will not be permitted. PART 2 PRODUCTS

Not Applicable to this Section T 3 <u>EXECUTION</u>
INSPECTION

A. GENERAL: Examine the areas and conditions under which demolition and removal will be performed and notify the Engineer in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner. 3.2 EXISTING FACILITIES TO BE REMOVED . STRUCTURES: Remove indicated existing structures in their entirety and as indicated.

3.3 DISPOSITION OF MATERIAL A. TITLE TO MATERIALS: Except where indicated otherwise or specifically specified otherwise in other sections, all materials and equipment removed, and not reused, shall become the property of the Contractor and shall be removed from the Owner's property. Title to all materials resulting from demolition, and all materials and equipment to be removed, is vested in the Contractor upon approval by the Engineer of the Contractor's demolition and removal procedures, and authorization by the Engineer to begin demolition. The Owner will not be responsible for the condition or loss of, or damage to, such property after notice to proceed. Materials and equipment shall not be viewed by prospective purchasers or sold on the B. REUSE OF MATERIALS AND EQUIPMENT: Carefully remove and store materials and equipment indicated to be reused or relocated to prevent damage, and reinstall as the work

3.4 CLEAN UP A. DEBRIS AND RUBBISH: Remove and transport debris and rubbish in a manner that will prevent spillage on streets or adjacent areas. Clean up spillage from streets and adjacent

B REGULATIONS: Comply with federal, state, and local hauling and disposal regulations (End of Section 02050)

1.1.1. Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, materials, equipment, and services indicated on the Drawings, or specified herein, or reasonably necessary for or incidental to a complete job. DESCRIPTION OF WORK

3.2.0.d DISPOSAL OF EXCAVATED ROCK: Excavated rock may be used in backfilling trenches subject to the following limitations: 1.2.1. The extent of excavation and backfill is limited to the areas of construction, and includes (but is not necessarily limited to) stockpiling of topsoil, site grading, excavation of footings and trenches, (1) Do not use pieces of rock larger than permitted under the paragraph 3.3.2., TRENCH BACKFILL. de-watering, filling, backfilling, compaction, finish grading, and spreading of topsoi 1.2.2. Perform all excavation, de—watering, sheeting, bracing, and backfilling in such a manner as to eliminate all possibility of undermining or disturbing the foundations of existing structures. .3.1. REFERENCED STANDARDS: Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these Specifications shall in no way

nvalidate the minimum requirements of the referenced standards. Comply with the provisions of the following codes and standards, except as otherwise shown or specified. Standard Specification for Concrete Aggregate 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

meet the compaction requirements as herein specified and perform this work at no additional cost to the Owner. Testing of fill areas will be provided by the Owner and paid for by the Owner, except that tests which reveal non_conformance with the Specifications and all succeeding tests for the same area, until conformance with the Specifications is established, shall be at the expense of the Contractor. .4. JOB CONDITIONS 1.4.1. EXISTING UTILITIES

1.4.1.b. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult the Engineer immediately for directions as to procedure. Cooperate with Owner and more than 6 inches thick, except as specified otherwise herein, and compact each layer evenly to the specified density. Do not backfill against concrete without Engineer's approval. utility companies in keeping respective services and facilities in operation. The Contractor shall repair damaged utilities to the satisfaction of the Owner and utility companies at no additional cost to the 3.3.2 1.4.1.c. Do not interrupt existing utilities serving facilities serving facilities occupied and used by others, except when permitted in writing by the Owner, and then only after acceptable temporary utility services have (1) Unless otherwise specified or indicated on the Drawings, use suitable material for backfill which was removed in the course of making the construction excavations. Do not use frozen material for backfill which was removed in the course of making the construction excavations. 1.4.1.d. Demolish, and completely remove from site, existing underground utilities that conflict with construction and are no longer active. Coordinate with utility companies for shut_off of services if

1.4.2. BLASTING: Perform all necessary blasting in complete accordance with Section 02211, BLASTING: 1.4.3. TEMPORARY PROTECTION: Protect structures, utilities, sidewalks, pavements, and other facilities from damages caused by settlement, lateral movement, undermining, washout, and other hazards created hy earthwork operations. 1.4.4. SHEETING AND BRACING: Make all excavations in accordance with the rules and regulations promulgated by the Department of Labor, Occupational Safety and Health Administration, "Safety and Health 3.3.0.a MATERIALS: The nature of the materials will govern both their acceptability for backfill and the methods best suited for their placement and compaction in the backfill. Both are subject to the Regulations for Construction." Furnish, put in place, and maintain such sheeting, bracing, etc., as may be necessary to support the sides of the excavation and to prevent any movement of earth which approval of the Engineer. Do not place stone or rock fragments larger than (2) inches in greatest dimension in the backfill. Do not drop large masses of backfill material into the trench in such a could in any way diminish the width of the excavation to less than that necessary for proper construction, or could otherwise injure or delay the fall of material dropped from a height of more than 5 feet. Exclude pieces of bituminous pavement from the backfill unless their

1.4.5.a. Provide pumping and drainage facilities adequate to keep the excavated area sufficiently dry from ground water and surface runoff so as not to adversely affect construction procedures or backfill up to a level of 2 feet over the top of the pipe, use only selected materials containing no rock, clods or organic materials. Place the backfill and compact thoroughly under the pipe haunches ause excessive disturbance of underlying natural soils. The drainage of all water resulting from pumping shall be arranged so as not to cause damage to adjacent properties. Control the grading on the site so that the surface of the ground will properly slope to prevent the accumulation of water on excavated or filled areas.

1.4.6. SITE INFORMATION 1.4.6.a. The soil data, included in Appendix "A", is furnished to the Contractor for information only. The data on indicated subsurface conditions are not intended as representations or warranties of the continuity of such conditions. It is expressly understood that the Owner will not be responsible for interpretations or conclusions drawn therefrom by the Contractor. 1.4.6.b. Additional test borings and other exploratory operations may be made by the Contractor at no additional cost to the Owner, provided such operations are acceptable to the Enginee

If the Contractor relies upon any non_factual element of the soils report, such as opinions, interpretations of the facts, extrapolations, comments on the facts, or inferences drawn from the facts, he does so at his own risk. The Owner shall not be liable for any costs incurred as a result of the Contractor's election to rely upon non_factual elements of the soils report.

I. SATISFACTORY SUBGRADE SOIL MATERIALS: Soils complying with ASTM D 3282, soil classification Groups A_I, A_2_4, A_2_5, and A_3. 1.2. UNSATISFACTORY SUBGRADE SOIL MATERIALS: Soils described in ASTM D 3282, soil classification Groups A_2_6, A_2_7, A_4, A_5, A_6, and A_7; also peat and other highly organic soils, unless .1.3. COHESIONLESS SOIL MATERIALS: Gravels, sand_gravel mixtures, sands, and gravelly_sands. or slopes between points where elevations are shown, or between such points and existing grades. .1.4. COHESIVE SOIL MATERIALS: Clayey and silty gravels, sand_clay mixtures, gravel_silt mixtures, clayey and silty sands, sand_silt mixtures, clays, silts, and very fine sands.

2.2.1. BACKFILL AND FILL MATERIALS: Provide satisfactory soil materials for backfill and fill, free of masonry, rock, or gravel larger than (2) inches in any dimension, and free of metal, gypsum, lime, debris, waste, frozen materials, vegetable, and other deleterious matter. Use only excavated material that has been sampled, tested, and certified as satisfactory soil material 2.2.2. CRUSHED STONE: Crushed stone or crushed gravel placed under structures as indicated on the Drawings or used for pipe bedding shall meet the requirement of ASTM C 33, Gradation 57 2.2.3.a. Provide from off site all materials needed in addition to site excavations. Include in the [Unit Price] Bid all costs for obtaining, hauling, and placing this material.

2.2.3.b. All borrow materials proposed for use must be approved by the Engineer before materials are hauled to the site. Notify the Engineer at least fourteen (14) days in advance of hauling any borrow material to the site so that borrow materials can be tested before being used.

3.1.2.a. Prevent surface water and/or ground water from flowing into excavated areas. Use berms or drainage ditches to divert surface drainage away from the excavation. Use an approved subsurface de—watering system, such as bailing, pumping or a well point system as conditions warrant, to remove ground water from areas to be excavated. The costs of de—watering shall be included in the respective hid items as required of the completion of the work in accordance with the Contract Documents. There will be no individual pay item for de-watering compacted as specified, and graded to prevent ponding of water after rains. 3.1.2.b. The design of the subsurface de-watering system shall allow the contractor to develop a substantially dry and workable subgrade for the execution of subsequent operations. Ground water level shall be lowered at least three (3) feet below the final excavation elevation, prior to excavating within two feet of final subgrade elevation. Maintain pumps, sumps, suction and discharge lines, and other de-watering system components necessary to convey water away from the excavation.

.3.a. Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade, and shape stockpiles for proper drainage. Locate and retain soil materials away from edge of excavations.

.1.4. DISPOSAL OF SURPLUS MATERIAL: Surplus excavated material not needed or acceptable for backfill shall, upon approval of the Engineer, be removed from the construction site and legally disposed of. 1.5. BRIDGING TRENCHES 5.1.5.a. Provide suitable and safe bridges and other crossings where required for the accommodation of travel; provide access to the property during construction, and remove said structures thereafter. Bridge or backfill trenches in any portion of the travel lanes of roads at the end of each day's operation to provide for safe travel. No additional compensation will be made for this work. 3.1.6. PROTECTION OF STREAMS: Exercise reasonable precaution to prevent the silting of streams. Provide, at Contractor's expense, temporary erosion and sediment control measures to prevent the silting of streams and existing drainage facilities as directed by the Engineer or as indicated on the Drawings.

3.1.7. AIR POLLUTION: 3.1.7.a. Comply with all pollution control rules, regulations, ordinances, and statutes which apply to any work performed under the Contract, including any air pollution control rules, regulations, ordinances and statutes. or any municipal regulations pertaining to air pollution. 3.1.7.b. During the progress of the work, maintain the area of activity, including sweeping and sprinkling of streets as necessary, so as to minimize the creation and dispersion of dust. If the Engineer decides that it is necessary to use calcium chloride or more effective dust control, furnish and spread the material, as directed, and without additional compensation. EXCAVATION

3.2.1. GENERAL: Excavation consists of the removal and disposal of all materials encountered for footings, foundations, pipe work, and other construction as shown on the Drawings. Perform all excavation work in compliance with applicable requirements of governing authorities having jurisdiction 3.2.2. STRIPPING: Remove all topsoil, vegetable matter, and organic materials over proposed excavations. Stockpile the stripped materials which are suitable for reuse and preserve for respreading on completed surfaces. Protect and maintain topsoil stockpile until needed. 3.2.3. EXCAVATION CLASSIFICATION: All excavation will be performed as unclassified excavation.

excavation by extending the indicated bottom elevation of the concrete to the bottom of the excavation, without altering the required top elevation. Lean concrete fill may be used to bring elevations to proper position only when acceptable to the Engineer 2.4.b. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of the same classification, unless otherwise directed by the Engineer. .2.5. EXCAVATION FOR STRUCTURES

3.2.5.a. Conform to elevations and dimensions shown within a tolerance of plus or minus one inch, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction required, and for inspection, 3.2.5.b. In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete is placed. Trim bottoms to required lines and grades to leave solid base to receive concrete. Final footing excavations should not be allowed to remain open overnight without covering unless permitted by Engineer. 3.2.6. TRENCH EXCAVATION

5.2.0.a. WIDTH OF TRENCHES: Excavate trenches sufficiently wide to allow proper installation of pipe, fittings and other materials and not more than 12 inches clear of pipe on either side at any point. Do not widen trenches by scraping or loosening materials from the sides. Where supports, and sheeting and bracing are required, trench may be of extra width so as to permit the placing of the trench 3.2.0.b. TRENCH EXCAVATION IN EARTH: Earth excavation includes all excavation of whatever substance encountered. In locations where pipe is to be bedded in earth excavated trenches, fine grade the bottoms of such trenches to allow firm bearing for the bottom of the pipe on undisturbed earth. Where any part of the trench has been excavated below the grade of the pipe, fill the part excavated below such grade with pipe bedding material and compact at the Contractor's expense. TRENCH EXCAVATION IN FILL: If pipe is to be laid in embankments or other recently filled material, first place the fill material to the finish grade or to a height of at least one foot above the top of the pipe, whichever is the lesser. Take particular care to ensure maximum consolidation of material under the pipe location. Excavate the pipe trench as though in undisturbed material. 5.2.0.d. TRENCH EXCAVATION IN ROCK: Excavate rock, when encountered, to provide a clearance of at least 12 inches on each side of pipe, valves and fittings. Excavate trench below the bottom of the pipe barrel to a depth of 6 inches, unless shown otherwise on the Drawings, and refill with a compacted gravel bedding as herein specified or indicated on the Drawings. 5.2.0.e. TRENCH BOTTOM IN POOR SOIL: Excavate and remove unstable or unsatisfactory soils to a width and depth, as directed by the Engineer, and refill with a thoroughly compacted gravel bedding. he undercutting and filling with gravel bedding of unstable soils caused by flooding or insufficient dewatering shall be at the expense of the Contractor. BELL HOLES: Provide bell holes at each joint to permit the joint to be made properly and to provide a continuous bearing and support for the pipe.

and other utilities, the approximate locations have been indicated on the Drawings; however, the completeness or accuracy of the information given is not guaranteed. 2) As the excavation approaches pipes, conduits, or other underground structures, discontinue digging by machinery and excavate by means of hand tools, as directed. Such manual excavation, when ncidental to normal excavation, is included in the work to be done under items involving normal excavation. 3) Where determination of the exact location of a pipe or other underground structure is necessary for doing the work properly, the Contractor may be required to excavate test pits to determine such locations. When such test pits may be properly considered as incidental to other excavation, the work is understood to be included as a part of the excavation. (1) Support and protect from damage all existing pipes, poles, wires, fences, guard rails, curbing, catch basins, manholes, property line markers, and other structures which do not require temporary or

Restore or replace damaged items, without compensation, to the condition in which they were found immediately before the work under this project was begun. 3.2.1. ROCK EXCAVATION 3.2.1.a. GENERAL:

3.2.0.a. EXCESS ROCK EXCAVATION:

(1) If rock is excavated beyond the limits indicated on the Drawings, specified, or authorized in writing by the Engineer, the excess excavation, whether resulting from overbreakage or other causes, shall) In pipe trenches, fill excess excavation below the elevation of the top of the bedding, cradle, or envelope with material of the same type, placed and compacted in the same manner, as specified for the bedding, cradle, or envelope. Fill excess excavation above said elevation with earth as specified in the paragrah 3.3.2., TRENCH BACKFILL. 3) In excavations for structures, fill excess excavation in the rock beneath foundations with concrete. Fill other excess excavation with earth as specified in the paragraph 3.3.1., BACKFILL AROUND 3.2.0.a. SHATTERED ROCK: If the rock below normal depth is shattered due to drilling or blasting operations of the Contractor, and the Engineer considers such shattered rock to be unfit for foundations, remove the shattered rock and backfill the excavation with concrete as required, except that in pipe trenches, screened gravel may be used for backfill, if approved. All such removal and

3.2.0.b. PREPARATION OF ROCK SURFACES 1) Whenever so directed during the progress of the work, remove all dirt and loose rock from designated areas and clean the surface of the rock thoroughly, using steam to melt snow and ice, if necessary. Remove water in depressions as required so that the whole surface of the designated area can be inspected to determine whether seams or other defects exist. (2) Leave the surfaces of rock foundations sufficiently rough to bond well with the structures and embankments to be built thereon, and if required, cut to rough benches or steps.

SECTION 02220 EXCAVATION AND BACKFILL

. RELATED DOCUMENTS

Recommended Practice for Classification of Soils and Soil_Aggregate Mixtures for Highway Construction Purpose ASTM D3282 .3.2. SOIL TESTING AND INSPECTION SERVICE: At the option of the Owner, additional compaction tests of all fill areas will be made by an independent testing laboratory. Rework any fill areas which fail to

1.4.1.a. Prior to beginning any excavation, locate all existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork without distortion, cracking, or other damage. Make special leakage tests, if required, as soon as practicable after the structures are structurally adequate and other necessary work has been done. Use

The lowering of the existing groundwater levels due to the construction activities, including de—watering, shall not cause settlement of adjacent structures which would result in damage. If required, provide cutoff walls and/or recharge system to maintain ground water levels at elevations which will not cause damage to adjacent structures or facilities.

.1. INSPECTION: Examine the areas and conditions under which excavating and backfilling is to be performed and notify the Engineer in writing of conditions detrimental to the proper and timely

completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.

3.1.2.c. Dispose of all water pumped or drained from the work in a suitable manner without undue interference with other work, damage to pavements, other surfaces or property. Provide suitable emporary pipes, flumes or channels for water which may flow along or across the site of the work. .3. MATERIAL STORAGE:

3.2.4. UNAUTHORIZED EXCAVATION: 3.2.4.a. Unauthorized excavation consists of the removal of materials beyond indicated elevations without specific direction of the Engineer. Under footings, foundations, bases, etc., fill unguthorized

3.2.6.a. GENERAL: Perform all excavation of every description and of whatever substance encountered so that pipe or conduit can be laid to the alignment and depth shown on the Drawings. Brace and shore all trenches, where required, in accordance with the rules and regulations, promulgated by the Department of Labor, Occupational Safety and Health Administration, "Safety and Health Regulations for Construction" Make all excavations by open cut unless otherwise specified or indicated on the Drawings.

.2.1. EXCAVATION NEAR EXISTING UTILITIES AND STRUCTURES

Attention is directed to the fact that there are pipes, drains, and other utilities in locations [adjacent to] the proposed work. Where information is available as to the location of existing pipes, drains,

1) Rock consists of such materials in the original bed or well defined ledges which, in the opinion of the Engineer, cannot be removed with pick and shovel, ditching machine, backhoe, or other similar devices, and which requires drilling and blasting or the use of jack hammers or bullpoints. Concrete and masonry structures that require drilling and blasting for removal will be considered as rock unless otherwise provided for herein. Boulders or detached pieces of rock having volumes of more than 8 cubic feet are considered as rock. 2) Excavate rock, if encountered, to the lines and grades indicated on the Drawings or as directed; dispose of the excavated materials, and furnish acceptable material for backfill in place of the excavated rock. (3) In general, excavate rock in pipe trenches so as to be no less that 12 inches from the pipe after it has been laid. Before the pipe is laid, backfill the trench to the correct subgrade with horoughly compacted, suitable material or, when so specified or indicated on the Drawings, with the same material as that required for bedding the pipe, furnished and placed at the expense of the

be backfilled, by and at the expense of the Contractor, as specified below: backfilling shall be done by and at the expense of the Contractor.

BACKFILL AROUND STRUCTURES

Remove all free water left on the surface of the rock.

GENERAL: Unless otherwise specified or indicated on the Drawings, use suitable material for backfill which was removed in the course of making the construction excavations. Do not use frozen material for the backfill and do not place backfill upon frozen material. Remove previously frozen material before new backfill is placed. MATERIAL: Approved selected materials available from the excavations may be used for backfilling around structures. Obtain material needed in addition to that of construction excavations from approved banks or other approved deposits. Furnish all borrow material needed on the work. Place and compact all material, whether from the excavation or borrow, to make dense, stable fill. Use fill material which contains no vegetation, masses or roots, individual roots over 18 inches long or more than 1/2—inch in diameter, stones over 4 inches in diameter, or porous matter. Organic matter must not exceed minor auantities. 3.3.1.c PLACING BACKFILL: Do not place backfill against or on structures until they have attained sufficient strength to support the loads (including construction loads) to which they will be subjected, the best of the excavated materials in backfilling within 2 feet of the structure. Avoid unequal soil pressures by depositing the material evenly around the structure. Place fill and backfill in layers not

Before any structure or embankment is built on or against the rock, clean from the rock all vegetation, dirt, sand, clay, boulders, scale, excessively cracked rock, loose fragments, ice, snow,

and other objectionable substances. Use picking, barring, wedging, streams of water under sufficient pressure, stiff brushes, hammers, steam jets, and other effective means to accomplish this cleaning.

REMOVAL OF BOULDERS: Remove piles of boulders or loose rock encountered within the limits of earth embankments to a suitable place of disposal.

The auantity of rock used as backfill in any location must not be so great as to result in the formation of voids.

Dispose of surplus excavated rock as specified in the subsection entitled DISPOSAL OF SURPLUS MATERIAL.

Do not place rock backfill within 16 inches of the surface of the finish grade, or in embankments for aeration basins.

the backfill and do not place backfill on frozen material. Remove previously frozen material before new backfill is placed. Start backfilling as soon as practicable after the pipes have been laid, or the structures have been built and are structurally adequate to support the loads, including construction loads to which they will be subjected, and proceed until its completion. With the exception mentioned below in this paragraph, do not backfill trenches at pipe joints until after that section of the pipeline has successfully passed any specified tests required. Should the Contractor wish to minimize the maintenance of lights, and barricades, and the obstruction of traffic, he may, at his own risk, backfill the entire trench as soon as practicable after installation of pipe and the related structures have acquired a suitable degree of strength. He shall, however, be responsible for removing and later replacing such backfill, at his own expense, should he be ordered to do so in order to locate and repair or replace leaking or defective joints or pipe. use is expressly permitted. 3.3.0.b ZÓNE AROUND PIPE: Place bedding material to the level shown on the Drawings and work material carefully around the pipe to insure that all voids are filled, particularly in bell holes. For

and up to the mid-line of the pipe in layers not exceeding 6 inches in depth. Place each layer and tamp carefully and uniformly so as to eliminate the possibility of lateral displacement. Place and compact the remainder of the zone around the pipe and to a height of one foot above the pipe in layers not exceeding 6 inches and compact to a maximum density of at least 100 percent as determined by ASTM D698. (1) Deposit and spread backfill materials in uniform, parallel layers not exceeding 12 inches thick before compaction. Tamp each layer before the next layer is placed to obtain a thoroughly compacted mass. Furnish and use, if necessary, an adequate number of power driven tampers, each weighing at least 20 pounds for this purpose. Take care that the material close to the bank, as well as in all

other portions of the trench, is thoroughly compacted. When the trench width and the depth to which backfill has been placed are sufficient to make it feasible, and it can be done effectively and without damage to the pipe, backfill may, on approval, be compacted by the use of suitable rollers, tractors, or similar powered equipment instead of by tamping. For compaction by tamping (or rolling), the rate at which backfilling material is deposited in the trench shall not exceed that permitted by the facilities for its spreading, leveling and compacting as furnished by the Contractor. (2) Wet the material by sprinkling, if necessary, to insure proper compaction by tamping (or rolling). Perform no compaction by tamping (or rolling) when the material is too wet either from rain or applied water to be compacted properly. 3.3.0.a TRENCH COMPACTION: Compact backfill in pipe trenches to the maximum density as shown on the Drawings, or as listed in the subsection entitled COMPACTION, with a moisture content within the range of values of maximum density as indicated by the moisture-density relationship curve.

GENERAL: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finish the surface within specified tolerances; compact with uniform levels

GROUND SURFACE PREPARATION: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface. Shape the subgrade as indicated on the Drawings by forking, furrowing, or plowing so that the first layer of new material placed thereon will be well bonded to it. Place backfill and fill materials in layers not more than 6 inches in loose depth. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content. Compact each layer to the required percentage of maximum density for each area classification. Do not place backfill or material on surfaces that are muddy, frozen or contain frost or ice. 3.4.3.b In areas not accessible to rollers or compactors, compact the fill with mechanical hand tampers. If the mixture is excessively moistened by rain, aerate the material by means of blade graders, harrows, or other approved equipment, until the moisture content of the mixture is satisfactory. Finish the surface of the layer by blading or rolling with a smooth roller, or a combination thereof, and leave the surface smooth and free from waves and inequalities.

3.4.3.c Place backfill and fill materials evenly adjacent to structures, to the required elevations. Take care to prevent wedging action of backfill against structures. Carry the material uniformly around all parts of the structure to approximately the same elevation in each lift. 3.4.3.d When existing ground surface has a density less than that specified under the subsection entitled COMPACTION for the particular area classification, break up the ground surface, pulverize, moisture—condition to the optimum moisture content, and compact to required depth and percentage of maximum density. GRADING OUTSIDE BUILDING LINES: Grade to drain away from structures to prevent ponding of water. Finish surfaces free from irregular surface changes. PLANTING AREAS: Finish areas to receive topsoil to within not more than one inch above or below the required subgrade elevations, compacted as specified, and free from irregular surface WALKS: Shape the surface of areas under walks to line, grade, and cross—section, with the finish surface not more than zero inches above or one inch below the required subgrade elevation,

3.4.7.a Shape the surface of the areas under pavement to line, grade and cross section, with finish surface not more than 1/2—inch above or below the required subgrade elevation, compacted as specified, and graded to prevent ponding of water after rains. Include such operations as plowing, discing, and any moisture or aerating required to provide the optimum moisture content for compaction. 3.4.7.b Fill low areas resulting from removal of unsatisfactory soil materials, obstructions, and other deleterious materials, using satisfactory soil material. Shape to line, grade, and cross section as 3.4.8 GRADING SURFACE OR FILL UNDER BUILDING SLABS: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/4-inch when tested with a 10-foot straightedge. PROTECTION OF GRADED AREAS: Protect newly graded areas from traffic and erosion, and keep free of trash and debris. Repair and re-establish grades in settled, eroded, and rutted areas specified tolerances 3.4.10 RECONDITIONING COMPACTED AREAS: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather prior to acceptance of work, scarify surface, reshape, and compact to required density prior to further construction. RESPREADING TOPSOIL

3.5.1.a This work consists of preparing the ground surface for topsoil application and removing topsoil from stockpile and placing and spreading the topsoil on smooth, graded areas in accordance with Supply topsoil reasonably free from subsoil, clay lumps, stones, or other similar objects larger than 2 inches in greatest diameter, brush, stumps, roots, objectionable weeds or litter, excess acid or alkali, or any other material or substance which may be harmful to plant growth or a hindrance to subsequent smooth grading, planting, and maintenance operations.

Respread topsoil on all excavated areas and areas damaged by the work. 3.5.1.d Clear the surface of the areas to be topsoiled of all stones larger than (2) inches in greatest dimension and all litter or other material which may be detrimental to proper bonding, the rise of capillary moisture, and the proper growth of the desired planting. Maintain the grades on the areas to be topsoiled in a true and even condition. Where grades have not been established, smooth grade the area and leave the surface at the prescribed grades in an even and properly compacted condition, which insofar as practical will prevent the formation of low places or pockets where water will Dump the topsoil in separate piles uniformly distributed on the designated areas so that when spread it will give a 4-inch depth of compacted topsoil over the graded area. Leave in place the piles of topsoil on any given area until it has been determined that the requirements of the Specifications have been met and spreading has been authorized by the Engineer. Evenly spread the topsoil over the areas by a blade grader or other equipment. Spread in such a manner that grassing operations can proceed with a minimum of soil preparation or tilling. Correct any irregularities in the surface, resulting from topsoiling or other operations, insofar as practical to prevent the formation of low places and pockets where water will stand. Do not place topsoil when it or the ground surface is frozen, excessively wet, or in a condition otherwise unsatisfactory for preparation of planting surfaces or smooth grading operations. After the topsoil has been spread and the area smoothed to the specified grades, clear the surface of all stones, roots, other objects larger than 2 inches in greatest diameter, and of all wire, brush or other objects that may interfere with subsequent planting or maintenance operations. Remove promptly any topsoil or other dirt which may be brought upon concrete as a result of hauling

GENERAL: Control soil compaction during construction providing at least the minimum percentage of density specified for each area classification. PERCENTAGE OF MAXIMUM DENSITY REQUIREMENTS: After compaction, all fill will be tested in accordance with Method "C" of ASTM D698, unless specified otherwise. Except as noted otherwise for the zone around pipe, provide not less than the following percentages of maximum density of soil material compacted at optimum moisture content, for the actual density of each layer of soil material—in—place. STRUCTURE FOUNDATIONS:Top 12" — 100%; Remainder — 95%UNDER BUILDING SLABS:Top 12" — 100%; Remainder — 95%UNPAVED AREAS:Compact full depth to — 92%WALKWAYS:Top 18" — 100%;

Remainder - 95%DRIVES AND PARKING:Top 24" - 100%; Remainder - 98%TRENCH BACKFILL (PAVED AREAS):Top 18" - 100%; Remainder - 95%TRENCH BACKFILL (UNPAVED AREAS):Compact full depth to - 92%ALL OTHER BACKFILL: Top 24" - 100%; Remainder - 95%. MOISTURE CONTROL: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing, until moisture content is reduced to a satisfactory value, as determined by moisture—density relation tests.

CARE AND RESTORATION OF PROPERTY Enclose the trunks of trees which are to remain adjacent to the work with substantial wooden boxes of such height as may be necessary to protect them from piled material, equipment or equipment operation. Use excavating machinery and cranes of suitable type and operate the equipment with care to prevent injury to remaining tree trunks, roots, branches and limbs. 3.7.1.b Do not cut branches, limbs, and roots except by permission of the Engineer. Cut smoothly and neatly without splitting or crushing. In case of cutting or unavoidable injury to branches, limbs, and trunks of trees, neatly trim the cut or injured portions and cover with an application of grafting wax or tree healing paint as directed. Protect by suitable means all cultivated hedges, shrubs and plants which might be injured by the Contractor's operations. Promptly heel in any such trees or shrubbery necessary to be removed and replanted. Perform heeling in and replanting under the direction of a licensed and experienced nurseryman. Replant in their original position all removed shrubbery and trees after construction operations have been substantially completed and care for until growth is re-established. 3.7.1.d Replace cultivated hedges, shrubs, and plants injured to such a degree as to affect their growth or diminish their beauty or usefulness, by items of kind and quality at least equal to the kind 3.7.1.e Do not operate tractors, bulldozers or other power—operated equipment on paved surfaces if the treads or wheels of the equipment are so shaped as to cut or otherwise injure the surfaces.

Restore all surfaces, including lawns, grassed, and planted areas which have been injured by the Contractor's operations, to a condition at least equal to that in which they were found

FENCES: Remove fences which interfere with the Contractor's operation and (unless otherwise specified) later restore them to a condition at least as good as that in which they were found

immediately before the work was begun. Use suitable materials and methods for such restoration. Maintain all restored plantings by cutting, trimming, fertilizing, etc., until acceptance. Restore existing

(End of Section 02220)

immediately before the work was begun, all without additional compensation. Restore fences as promptly as possible and do not leave until the end of the construction period.

PROPERTY MARKERS: Replace property line markers which are disturbed or removed. Have this work performed by a Registered Land Surveyor.

property or structures as promptly as practicable and do not leave until the end of construction period.

SHEET NAME:

ARCHITECT:

Graves Company

CIVIL ENGINEER:

304 15th Street S.E.

Hickory, NC 28603

P.0. Box 2351

T 828.455.3456

____ Greensboro, NC 27409-9075 T 336.855.0993

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Engineering

P.O. Box 1847 Pittsboro, NC 27312

Walter Robbs Architects, a Michael

Clayton Engineering and Design

530 North Trade Street, Suite 301

STRUCTURAL ENGINEER:

SKA Consulting Engineers, Inc

Consultant Engineering Service

Performance Based Fire Protection

DESIGN, PLLO

NAME: WILLIAM S. CLAYTON

LICENSE: NC # 40758

KOR

C

1111 S. Marshall Street, Suite 250

7900 Triad Center Drive, Suite 200

ELECTRICAL ENGINEER:

Winston-Salem, NC 27101

CODE CONSULTANT:

Winston-Salem, NC 27103

1.02 <u>RELATED REQUIREMENTS</u> Construction drawing Specs. Section 02110 SITE PREPARATION Specs. Section 02200 EARTHWORK

indicated on drawings and contract documents.

A. Shop drawings or details pertaining to site utilities are not required unless use of materials, methods, equipment or procedures contrary to drawings or these specifications are proposed. Do not perform work until required shop drawings have been accepted by Owner. 3. The Contractor shall contact all utility companies and determine if additional easements will be required to complete the project. Contractor shall provide written confirmation of the status of all easements to the owner's Construction Manager at the time of the preconstruction conference or no later than 90 days prior to the project possession date.

This section includes the excavation, bedding and backfilling of utilities necessary to perform work

A. Bedding Material: Processed sand and gravel free from clay lumps, organic or other deleterious material and complying with following gradation requirements: Percent Passing (by weight) U.S. Sieve Size

3/4-inch 90-100 3/8—inch 20 - 550 - 10

B. Steel Casing Pipe: Comply with AWWA C-201 or C-202, minimumgrade B, size and wall thickness as indicated on drawings. PART 3 - EXECUTION

A. Set all lines, elevations and grades for utility and drainage system work and control system for duration of work, including careful maintenance of bench marks, property corners, monuments or other reference points. Maintain in operating condition existing utilities, active utilities and drainage systems encountered in utility installation. Repair any surface or subsurface improvement shown on drawings. Verify location, size, elevation and other pertinent data required to make connections to existing utilities and drainage systems as indicated on drawings. Contractor shall comply with local codes and regulations.

3.02 EXCAVATION, TRENCHING AND BACKFILLING Perform excavation as indicated for specified depths. During excavation, stockpile materials suitable for backfilling in orderly manner far enough from bank of trench to avoid overloading, slides or B. Remove excavated materials not required or not suitable for backfilling or embankments and waste off-site. Any structures discovered during excavation(s) shall be disposed of as specified. Prevent surface water from flowing into trenches or other escalations by temporary grading or other methods, as required. Remove accumulated water in trenches or other excavations by pumping or

D. Open cut excavation with trenching machine or backhoe. Where machines other than ladder or wheel—type trenching machines are used, do not use clods for backfill. Dispose of unsuitable material and provide other suitable material at no additional cost to owner. All excavation shall be unclassified.

A. The local utility companies shall be contacted before excavation shall Dig trench at proper width and depth for laying pipe, conduit or Cut trench banks as nearly vertical as practical and remove stones as necessary to avoid point—bearing. Over—excavate rock, wet or unstable soil, if encountered, from trench bottom as necessary to provide suitable base for continuous and uniform pedding as directed by soils engineer. B. All trench excavation side walls greater than 5 feet in depth shall be sloped, shoring, sheeted, braced or other wise supported by means of the sufficient strength to protect the workmen within them in accordance with the applicable rules and regulations established for construction by the Department of Labor, Occupational Safety and Health Administration and by local ordinances. Lateral

travel distance to an exit ladder or steps shall not be greater than 25 feet in trenches 4 feet or Accurately grade trench bottom to provide uniform bearing and support for each section of pipe on bedding material at every point along entire length, except where necessary to excavate for bell holes, proper sealing of pipe joint, or other required connections. Dig bell holes and depressions for joints after trench bottom has been graded. Dig no deeper, longer or wider than deeded to make joint connection properly.

Trench width requirements below the top of the pipe shall not be less than 12" not more than 18" wider than outside surface of any pipe or conduit that is to be installed to designated elevations and grades. All other trench width requirements for pipe, conduit or cable shall be at least practical width that will allow for proper compaction of trench backfill. Trench depth requirements measured from finished grade or paved surface shall meet the following requirements or applicable codes and ordinances. 1. Water Mains: 36" to top of pipe barrel

2. Sanitary Sewer: Elevations and grades as indicated on drawings.

5. Storm Sewer: Depths, elevations and grades as shown on drawings 4. Electrical Conduits: 24" minimum to top of conduit or as required by NEC 300-5, NEC 710-36 codes or the local utility company requirements, whichever is deeper 5. TV Conduits: 18" minimum to top of conduit or as required by the local utility company, whichever

6. Telephone Conduits: 18" minimum to top of conduit, or as required by the local utility company, whichever is deeper. 7. Gas Mains and service: 30" minimum to top of pipe, or as required by the local utility company,

whichever is deeper. 3.04 <u>SHEETING AND BRACING</u> Provide sheeting and bracing, when necessary, in trenches and other excavations where protection of workmen required. Sheeting may be removed after sufficient backfilling to protect against damaging or injurious caving.

3.05 PIPE BEDDING Accurately cut trenches for pipe or conduit that is installed to designed elevations and grades to line and grade from 4" below bottom of pipe and to width as specified. Place 4" of bedding material, compact in bottom of trench, and accurately shape to conform to lower portion of pipe barrel. After pipe installation, place select backfill as determined in Section 02200, and compact in maximum 8" layers measured loose to the top of the trench.

3.06 TRENCH BACKFILLING Criteria: Trenches shall not be backfilled until required tests are performed and the utility systems comply with and are accepted by applicable governing authorities. Backfilling trenches as specified. If improperly backfilled, reopen to depth required to obtain proper compaction. Backfill and compact. as specified, to properly correct condition in an acceptable manner

B. Backfilling: After pipe or conduit has been installed, bedded and tested as specified, backfill trench or structure excavation with specified material placed in 8" maximum loose lifts. Compact to minimum density of 98% of optimum density in accordance with ASTM D 698.

Compaction: Exercise proper caution when compacting immediately over top of pipes or conduits. Water jetting or flooding is not permitted as method of compaction. Compaction Testing: If determined by the owner and at the owner's expense an independent testing laboratory shall perform testing at intervals not exceeding 200'-0" or trench for the first and every other eight—inch (8") lift of compacted trench backfill and furnish copies of test results as

SECTION 02401 - WATER VALVES, VALVE BOXES, AIR RELIEF VALVES AND TAPPING SLEEVE & VALVES

A. Gate Valves:

his section covers the requirements for furnishing and installing the abovementioned items and their respective appurtenances as detailed on the plans. This shall include all labor, equipment, materials and incidentals that are necessary to complete installation of subject items in accordance with the plans and specifications. All supplied materials shall be of a type and class as specified herein. This section will specify storage and handling, excavation, bedding, laying and coupling of joints and backfilling. All construction shall be as specified as herein, unless written deviation is received from the Engineer. Work under this section shall be measured by the actual number of components and paid for at unit prices established in the Contract.

1.2 <u>CATALOG CUT SUBMITTALS</u> Contractor shall submit 4 copies of catalog cuts to Engineer for review for all materials that are required to complete the work as described in the associated plans. Engineer will retain two sets of original submittals and return two sets to the Contractor with the

1.3 STORAGE AND HANDLING The Contractor shall inspect the materials upon receipt for visible defects prior to off loading. The Contractor shall unload all valves and appurtenances as so to avoid any deformation or other injury. The Contractor shall implement appropriate measures during storage such that no storm water may pass through or encumber the materials. All materials shall be stored in such a manner that they will drain and so protect them from contamination or freezing. If any material is found to be defective during installation, then same material shall be removed and replaced with appropriate quality and type at the Contractors expense. 1.4 <u>MATERIALS</u>

All Gate Valves shall as a minimum reflect a rating of 200 psi, contain clearway equal to the full nominal diameter of the adjoining pipe, be open left operation (counterclockwise), reflect the name and date of manufacture, be of non-rising stem type, contain a directional arrow for operation cast into the body, have a 2" operating nut for control and contain Mechanical Joint connections. All requirements shall be meet unless specified on the plans or directed by the Engineer in writing. All materials shall withstand a hydraulic test pressure of equal to twice the rated pressure and Contractor shall provide written proof of test from manufacturer upon request.

A.1 Resilient Seated Wedge Valve: Gate Valves 2" through 36" diameter shall be of cast iron or ductile iron body, resilient seated wedge type valves conforming to the requirements of AWWA Standard C 509 and/or AWWA Standard C 500. Unless specifically approved in writing by the Engineer all valves shall be from one manufacturer and all parts interchangeable.

Gate valves shall conform to ASTM A-536 as it relates to cast iron or ductile iron manufacturer of the body, bonnet and gate. Shell thickness of components shall conform to the thickness in Table 2, Sect. 4.4 of AWWA Standard C 509 or AWWA Standard C 500 as appropriate. Valve body and bonnet coating shall conform to AWWA Standard C 550 and include fusion bonded epoxy coating for the interior and exterior surfaces of the valve. The gate shall be completely covered with a rubber coating securely fixed to all ferrous surfaces. The gate and rubber coating shall conform to ASTM D429. Valve stems shall be of cast bronze construction. Valves shall contain a stuffing box, which located above the thrust collar, which will contain O—rings for sealing. The valve shall be of type construction that allows replacement of the ring seals while the valve is fully open and under pressure. Valves 16" and larger in diameter shall be designed and constructed in such a manner as to include beveled reduction gears to reduce the number of turns and torque required to operate valves.

A.2 Double Disc Valves: Gate valves larger than 36" diameter shall be ductile iron body, double disc parallel seat conforming to AWWA Standard C 500. All valves shall be from one manufacturer with interchangeable parts. Gate valves shall conform with ASTM A 536 as it relates to manufacturer of body, bonnet and gate constructed of ductile iron. Entire valve body and bonnet shall be coated on interior and exterior surfaces.

Gates shall be constructed of cast iron smooth and continuous without pockets on either face. Cam surfaces shall be open to the bottom. Gate ring seals shall be inserted into a dovetail groove under pressure and make up a single insertable finish. Gate valves shall operate as a bottom wedging design with a two—part wedge contact. Wedge and Hook shall be separate castings. Valve stems shall be of cast bronze construction. Valves shall contain a stuffing box, which located above the thrust collar, which will contain 0-rings for sealing. The valve shall be of type construction that allows replacement of the ring seals while the valve is fully open and under pressure. Valves 16" and larger in diameter shall be designed and constructed in such a manner as to include beveled reduction gears to reduce the number of turns and torque required to operate valves. All rollers, tracks and scrapers shall be of bronze casting. Bypasses shall be supplied and installed as a part of all valves. Bypass shall be a minimum of 3" diameter and operating mechanism shall be of resilient seated wedge type.

All valve boxes shall be adjustable screw type with a base sized to fit over the valve yoke and a lid with "water" cast integral. All valve boxes shall be constructed of domestic or foreign cast iron that complies with the requirements of ASTM A 48. Valve boxes shall be the appropriate range of adjustment for the site and Contractor should minimize the use of extensions.

All air valves shall operate as both an air/vacuum valve and air release valve simultaneously in one unit. The air/vacuum portion of the appurtenance shall operate such that during the filling operation, or when necessary, it will allow large amounts of air to be expelled from the line to avoid substantially compressing air in the line and also operate to effectively allow air to reenter the line in the case that internal pressures would approach negative values, such as happens with line breaks or separations. The air release portion of the valve shall operate such that it automatically releases minute amounts of air as necessary while in service. All air valves shall contain a rating of 150 psi with a test rating of 300 psi. Body and cover shall be manufactured of cast iron conforming to ASTM A126. Class B The float shall be stainless steel with stainless steel guide and rated to withstand ultimate system surge pressure successfully. Valves 4" and larger shall have floats of stainless steel with dual stainless steel guides and rated to withstand ultimate system surge pressure successfully. The body and cover shall be constructed of cast iron and be concentrically located. All internal parts shall be stainless steel

D. Tapping Sleeve and Valve: All sleeves shall have flanged outlet of appropriate size and strength to accommodate the tapping valve. Tapping valve shall be resilient seat wedge gate valve design with each flange capable of accepting the sleeve, tap machine face, or mechanical joint connection to adjacent pipe. Tapping sleeves up to 12" shall be Stainless Steel Wrap Around type. Tapping sleeves 12" and larger shall be Ductile Iron Full Body type. All tapping sleeve and valves shall be of the size and type detailed on the plans. Stainless steel tapping sleeves shall be constructed of two—piece stainless steel jointed by grade 18—8 stainless steel bolts. The gasket shall be girded virgin SBR compound rated for water service per ASTM D2000 and the gasket shall provide full range pipe coverage. Outlet pipe shall be constructed of grade 18-8 stainless steel and be schedule 5. All sleeves shall contain a ¾ "test outlet with brass plug for the purpose of air testing he sleeve. All connections to the existing system shall be coordinated with the Water Purveyor having jurisdiction. .5 <u>INSTALLATION</u>

This section shall cover the excavation and proper disposal of any and all materials disturbed during the construction of trenches which is further defined as all excavation necessary for the proper installation storm or sanitary sewers and any appurtenances and waterlines and any appurtenances. This section shall further cover any work deemed appropriate by the Engineer. Excavation shall be done to the lines and grades as depicted or detailed on the plans or as directed by the Engineer. All work involving this section shall be coordinated with any Grading, Site Utility work or other construction on the project site and shall be maintained satisfactorily so that adequate drainage is provided at all times. Any roots that protrude into the trench lines shall be trimmed flush with the trench walls. All excavation shall be open cut unless otherwise depicted on the plans or specifically authorized by the Engineer. If after excavation the bottom of the proposed trench is found to contain rock, materials which can not be removed with standard and prudent construction equipment or is unsuitable for providing a uniform bearing surface then same material shall be removed to a depth not less than 8" below proposed depth, backfilled with approved material and compacted. Excavation widths shall be such that not less than one full diameter of the pipe is clear between the outside face of the pipe and each closest trench wall or inside face sheeting, shoring, or trench box as necessary. Excavated materials to be used during backfill operation shall be suitable material, significantly free from debris and/or rocks and approved by the Engineer. Acceptable material which is excavated shall be neatly and compactly deposited at the sides of the trench where space provides but at no time closer than 2'0" from the closest side of the trench. When stockpiling of material is required, the Contractor at his expense shall do so at an approved site and this site shall be kept and neat to avoid unsightly appearance. Stockpiling shall be arranged to allow for natural drainage without pollution of water by erosion.

B. Sheeting, Bracing and Trench Boxes As appropriate reference to OSHA Regulation 1926.652(b), the Contractor will be required to keep the sides of excavation vertical by sheet, bracing or the use of trench boxes to prevent movement by slides or settling of the side, to prevent injury or displacement of pipe or appurtenance or diminished the required working space adjacent to pipe. Furthermore, the Contractor may be required, for the purpose of preventing injury to persons, property or adjacent structures, to leave sheeting or bracing in place. All measures employed, when required, shall extend a minimum of 18" above existing grade and a maximum of 48" above grade. In no case shall timbers, beams or other sheeting/bracing materials be left in the trench, which may form or promote voids that cannot easily be corrected during the backfilling operation or compaction of backfill. It is agreed upon by these specifications that where it is necessary to leave sheeting or bracing intact and backfilled that the Owner is under no obligation to pay Contractor for time or materials involved in constructing such measures. Contractor shall assume and accept any and all risk associated with or encumbered by failure to implement proper and necessary sheeting, bracing or trench box use on any excavation and will be held responsible for caving, settlement and all other

damages resulting there from. Prior to each installation, the Contractor shall make sure the interior is wiped clean and the valve is test operated by opening and closing. All valves shall be set with the operating mechanism plumb and at the location depicted on the plans. Initial backfill shall be thoroughly compacted by hand around the valve body to a distance of 12" in all directions and compaction by mechanical means such

D. Valve Boxes A valve box shall be installed over every underground valve. All valve boxes shall be set plumb with the valve; the operating mechanism of the valve shall be centered in the top opening and their lid flush with finished grade.

as vibratory trench roller or striking compactor shall be thoroughly achieved to a distance of 3'0" each side.

All air valves shall be installed in a cast iron meter box with a minimum of 18" by 24" clear inside dimension and at the exact location as depicted on the plans. F. Tapping Sleeve and Valve All tapping sleeves shall be installed at the exact location as depicted on the plans. All tapping sleeves shall be installed per strict

conformance with manufactures specification, flange perfectly horizontal with existing pipe and bolts tightened with a torque wrench to the proper specification. All tapping valves shall follow valve installation requirements. The tapping sleeve shall be air tested prior to performing the tap into the existing line.

1.6 BACKFILLING AND COMPACTION Trenches shall be backfilled immediately upon approval of pipeline construction.

Roadways and Crossing Full depth and width of trench shall be backfilled by placing material in uniform layers not to exceed 12" thick and shall be thoroughly compacted by approved mechanical compactors under optimum moisture conditions. Compaction of the trench shall be to 95% as determined by Standard Proctor Test for all areas outside the paved area and any depth exceeding 18" below finished surface of asphalt. The top 18" of any trench directly under pavement or within 36" of the edge of pavement shall be compacted to 100% as determined by Standard Proctor Test. If existing material is not suitable for obtaining compaction then select backfill shall be used when requested by the Engineer. All paving and base course affected shall be removed and replaced with new material of equal or better quality with like texture and color as the adjacent pavement. All backfill methods shall be in strict compliance with manufacturer's recommendations and all methods shall be instituted such that no damage, misalignment, or unjointing of the pipe or appurtenances is experienced. Backfill shall be kept free of organics (grasses, sticks, stumps, roots etc.), stones (all stones over 1" diameter within first 12" of backfill and all stones over 2.5" diameter for the remainder of the backfill), any frozen soil or other soil which is not suitable for backfill (highly plastic clay) or any other objectionable items. All backfill shall be installed and graded in a manner that erosion or saturation will not negatively affect the backfilled area. Heavy equipment shall not be operated over any pipe or appurtenance until it has been properly backfilled and has minimum cover as required by the plans. Where any part of the required cover is above proposed finished grade, the Contractor shall place, maintain and lastly remove such material at no additional cost to the Owner. Any pipe or appurtenance, which becomes mis—aligned, shows excessive settlement or has been damaged by the Contractor shall be corrected or replaced as deemed necessary by the Engineer/Owner at no additional cost to the Owner. Prior to acceptance, the Contractor shall properly maintain all installations in such a manner that they will operate without failure.

C. Finish Gradina All areas disturbed shall be graded to a continuous finish without irregularities or abrupt changes and shall not consist of areas, which will retain water or cause foreseeable future maintenance. Prior to acceptance, all debris, excess material, trash or any unsightly occurrence shall be removed and the project site shall be in a neat and satisfactory condition.

SECTION 02451 REINFORCED CONCRETE PIPE

RELATED DOCUMENTS . Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, material, equipment, and services indicated on the Drawings or specified herein or reasonably necessary for and incidental to a complete job.

ne work includes the installation of all reinforced concrete pipe shown on the Drawings. 1.2.2. <u>RELATED WORK SPECIFIED ELSEWHERE</u>:

1. REFERENCED STANDARDS: Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these Specifications shall in no way invalidate the minimum requirements of the referenced standards: North Carolina Department of Transportation Standard Specifications for Highway Construction, Latest Edition

Concrete Aggregates Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe

Reinforced Concrete Low_ Head Pressure Pipe Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets

AASHTO M 198 Joints for Circular Concrete Sewer and Culvert Pipe Using Flexible Watertight Gaskets Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe

External Sealing Bands for Noncircular Concrete Sewer, Storm Drain, and Culvert Pipe Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants

1.3.2. MANUFACTURER'S QUALIFICATIONS: Only the products of a manufacturer regularly engaged in the manufacture of pipe used for the conveyance of water will be acceptable. 1.3.3. INSPECTION AND ACCEPTANCE OF PIPE: Acceptance will be on the basis of design, material tests, and inspection of the complete product. The quality of all materials used in the pipe, the process of manufacture, and the finished pipe shall be subject to inspection by the Engineer. Inspection may be made at the place of manufacture, or on the job site after delivery, or at both places and the pipe shall be subject to rejection at any time on account of failure to meet any of the specification requirements, even though sample pipe units may have been accepted as

atisfactory at the place of manufacture. All pipe which is rejected must be immediately removed from the project site by the Contractor. 1.3.4. SUBMITTALS SHOP DRAWINGS; PIPE: Before fabrication, submit for approval drawings showing pipe dimensions, joints, reinforcement and other details. 1.3.5. MANUFACTURER'S CERTIFICATION: Manufacturer shall submit a letter certification stating that the pipe is manufactured and tested in accordance with ASTM C76 (latest edition).

. <u>PIPE LENGTHS</u>: Furnish pipe in nominal 8 foot lengths. Shorter lengths may be used where required by Construction details or when approved by the Engineer.

. GENERAL: Use new pipe complying with ASTM C76 or ASTM C507, and with the additional requirements specified herein. Unless otherwise noted on the Drawings, provide Class III pipe with Wall B. All pipe approved will have an interior surface which is free from roughness, projection, ations, offsets or irregularities of any kind.

HOLES will not be permitted in pipe. 2.1.4. REPAIRS: Pipe may be repaired, if necessary, because of occasional minor imperfections in manufacture or accidental injury during handling and will be acceptable if, in the opinion of the Engineer, the repaired and cured, and the repaired pipe conforms to the equirements of ASTM C76. Use mortar for repairs which has a compressive strength of 6,000 psi at the end of 28 days.

5. <u>MARKING</u>: Mark all pipe in accordance with ASTM C76; no pipe will be accepted unless these markings appear on all pipe. .1. <u>GENERAL</u>: Use rubber gaskets for flexible watertight joints. Conform to ASTM C443.

Examine the areas and conditions under which the pipe is to be installed and notify the Engineer in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.

. GENERAL: Excavate trenches in accordance with Section 02220, EXCAVATION AND BACKFILL.

. GENERAL: Transport pipe to the job site and handle in such a manner as not to damage the pipe.

3.3.2. STOCKPILING: Stockpile within the rights_ of_ way so that no dangerous conditions will exist to life or property. Store pipe so that damage to surfaces and/or structures will be prevented. Provide suitable devices to support pipe when it is lifted. PIPE INSTALLATION

GENERAL: Adhere to the rules, regulations and requirements of OSHA, Occupational Safety and Health Act. 3.4.2. PRECAUTIONS: Lay pipe in dry trenches only. Keep all trenches completely free of water during bedding, laying and jointing of pipe. De—water and use sheeting where required by field conditions. Pump or drain all water away from the work and dispose of in a suitable manner so that no damage occurs outside the construction easement. Do not permit water to rise in an unbackfilled trench after pipe has been placed. Promptly repair any damage within the construction easement.

3.4.3. TOLERANČES: Unless otherwise directed by the Engineer in writing, lay all pipe straight between changes in alignment and at uniform grade between change in grade. When jointed in the trench, the pipe shall form a true and smooth line. PE LENGTHS. Lay pipe in nominal 8 foot lengths; except the joints adjacent to any manhole shall have a minimum length of 2 feet. 3.4.5. TRENCH AND BED FOR PIPE: Conform to the requirements of NCDOT Standard Specifications.

3.4.5.a. After delivery alongside the trench, visibly inspect each length of pipe for damaged surfaces, breakage and conformance to specifications. 3.4.5.b. Acceptable pipe may be marked with paint or other permanent marking material so that the marks are plainly visible after installation in the trench and before the pipe is covered. Reject, stockpile, and remove from the site all pipe not conforming to specifications. 3.4.5.c. See Drawings for Bedding Conditions. Where no other bedding is indicated, place pipe on a shaped bed of undisturbed material. Before pipe is placed on the bedding material, excavate suitable bell holes so that after placement of the pipe, only the barrel receives bearing pressure from the supporting material. Support the entire length of the unit as shown on the Drawings. 3.4.5.d. Place pipe into its position in the trench in such manner and by such means as approved by the Engineer. Furnish approved devices to support all parts of the pipe unit when it is lifted. Protect pipe during handling against impact shocks and free falls. Do not permit hooks to come in contact with premoulded joint surfaces. Lower pipe into position in the trench and joint without disturbing the bedding or adjoining section of pipe.

3.4.5.c. Handle pipe having premoulded joint rings or attached couplings so that no weight, including the weight of the pipe itself, will bear on or be supported by the jointing material. Take care to avoid dragging the spigot ring on the ground or allowing it to be damaged by contact with gravel, crushed stone, or other hard objects. Do not subject the bell and spigot sections to direct stress of any kind except that required to effect the jointing. 3.4.6. PIPE LAYING:

3.4.6.a. Unless otherwise shown on the Drawings, all pipe will be laid in open trench construction. Start laying pipe at the lowest point and install the spigot end points in the direction of flow. Lay pipe to conform to the lines and grades indicated on the Drawings, unless otherwise directed by the Engineer in writing. 3.4.6.b. Clean all joint surfaces after the pipe units are aligned in the trench and are ready to be joined. Immediately before jointing the pipe, lubricate the bell or groove in accordance with the manufacturer's recommendations. Then carefully push pipe unit into place without damage to the pipe or gasket. Use suitable devices to force the pipe together so that they will fit with a minimum open recess inside or outside and so that they will have tightly sealed joints. Lay each pipe unit to form a close joint with the next adjoining pipe and bring the inverts continuously to the

3.4.6.c. Immediately after the pipe units are put together, inspect the position of the gasket in the joint using an approved feeler gauge to make sure it is properly positioned. Pull apart and remake all joints, using new gaskets, if the gasket has become damaged or improperly positioned. 3.4.6.d. Make all joints in accordance with manufacturer's recommendations which are subject to approval by the Engineer. Prior to backfill, fill bell holes with bedding materials and compact so that the spigot will not move in the bell of the adjoining pipe under backfill load. Do not permanently support pipe on saddles, blocking or boulders. 3.4.7. TEMPORARY PLUGS: At all times when pipe laying is not actually in progress, close the open end of pipe by temporary watertight plugs or by other approved means. If water is in the trench when work is resumed, do not remove the plug until all danger of earth or other material entering the pipe has passed.

3.4.8. STOPPERS: Close open ends of pipe or fittings to be used for future connections as shown on the Drawings. 5.4.9. BLOCKING: Provide concrete blocking where indicated on the Drawings. 3.4.10.BACKFILL: When pipe has been properly bedded, backfill trenches in accordance with Section 02220, EXCAVATION AND BACKFILL.

3.5.1. Follow backfill, as closely as conditions will allow, with clean up operations.

4. <u>MEASUREMENT AND PAYMENT</u> The Bid Price shall constitute full compensation for doing each item of work including all activities and incidentals required for the installation and completion of each item in accordance with the Contract Drawings, Specifications and requirements. Unless otherwise indicated and identified as a separate Bid Item to be measured and paid for as an individual and independent item of work, the Bid Price for each item shall be full compensation for the following activities: Furnishing and installing all materials and equipment, including excavation, disposal of surplus excavated or material, backfill, compaction, all necessary shoring and bracing, de-watering, handling water flows, protection of or removing and pavement, property corners, signs, fences, landscaping, lawns, above and below ground utility lines and appurtenances, installation and maintenance of temporary sediment and erosion control facilities, maintenance of drives and streets, and cleaning up and establishing a permanent stand of grass on all unpaved disturbed surfaces incidental to the work item specified in the Contract Documents or required in restoring existing property disturbed during construction to its original condition or better. The price shall also constitute full compensation for all cleaning and testing of pipelines, testing of materials installed, and barricades, lighting, and flagmen as required for the

ITEM NO. 1 - REINFORCED CONCRETE PIPE Pipe will be paid for at the unit price per linear foot for pipe of various materials, types, and sizes measured from center to center of manholes and for various depths of cut measured on the centerline of the trench from the invert of the pipe to ground surface. The price shall include clearing, grubbing, unclassified excavation, stone removal, material laying, pipe bedding material, jointing, backfill, compaction, cleanup, and all other work required for the satisfactory installation of pipe, except for other items listed in

SECTION 02454 STRUCTURES

protection of public.

 GENERAL 1.1. RELATED DOCUMENTS Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, materials, equipment, and services indicated on the Drawings, or specified herein, or reasonably necessary for or incidental to a complete job.

1.2. DESCRIPTION OF WORK This item shall consist of constructing catch basins, drop inlets and junction boxes, in accordance with these specifications, at the specified locations and conforming to the lines, grades, and dimensions shown on the plans or required by the Engineer. 1.3. RELATED WORK SPECIFIED ELSEWHERE:

Excavation and Backfill Section 02220 1.4. QUALITY ASSURANCE

1.4.1. REFERENCE STANDARDS: Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these specifications shall in no way invalidate the minimum requirements of the referenced standards. North Carolina Department of Transportation Standard Specifications for Highway Construction (Latest Edition)

Deformed and Plain Billet _ Steel Bars for Concrete Reinforcement ASTM A616 Rail_ Steel Deformed and Plain Bars for Concrete Reinforcement

ASTM A617 Axle_ Steel Deformed and Plain Bars for Concrete Reinforcement ASTM A706 Low_ Alloy Steel Deformed Bars for Concrete Reinforcement

ASTM C55 Concrete Building Brick

ASTM C270 Mortar for Unit Masonry 1.5. SUBMITTALS

1.5.1. SHOP DRAWINGS; MANHOLE FRAME AND COVERS AND MANHOLE STEPS: Submit for approval shop drawings for grates, drains, manhole covers, frames and steps. 1.5.2. SHOP DRAWINGS; PRECAST CONCRETE MANHOLE SECTIONS: Submit for approval shop drawings for each type precast manhole sections.

. GENERAL: Unless otherwise noted on the Drawings, the Contractor has the option of providing manholes constructed of concrete brick, concrete masonry units or precast manholes or vaults. 2.2. PORTLAND CEMENT CONCRETE: Concrete shall be 3,000 psi (28 day), as defined by the North Carolina Department of Transportation Standard Specifications, (Latest Edition), Portland Cement and Portland Cement Concrete. All concrete shall be ready_ mixed as produced by a reputable manufacturer, acceptable to the Engineer. 2.3. REINFORCING STEEL: Reinforcing steel shall conform to ASTM A615, A616, A617, or A706, Grade 60 and of the applicable size as indicated on the Detail Drawings.

2.4. CONCRETE BRICK: Concrete brick shall be sound, hard, regular and uniform in shape and of standard size (8" long x 2_ 1/4" high x 3_ 5/8" wide). Concrete brick shall conform to ASTM Specifications C55, Grade N_ 1. 2.5. MORTAR: Mortar shall be composed of Portland Cement, hydrated lime, and sand, in which the volume of sand shall not exceed three times the sum of the volumes of cement and lime. The proportions of cement and lime shall be as directed and may vary from 1:1/4 to 1:1/2. Mortar shall

2.6. CASTINGS: 2.6.1. The casting for the frames and covers shall be of good quality, strong, tough, even_ grained cast iron, smooth, free from scale, lumps, blisters, sand holes, and defects of every nature which would render them unfit for the service for which they are intended.

2.6.2. Frames and covers shall be as shown on the Drawings or approved equal. 2.7. PRECAST MANHOLES OR VAULTS 1. MANHOLE BASES, CAST-IN-PLACE CONCRETE: Conform to the requirements of Section 03300, CAST_ IN_ PLACE CONCRETE.

2. MANHOLE BASES, PRECAST CONCRETE: Conform to the requirements of ASTM C478. 2.7.3. MANHOLE SECTIONS. PRECAST CONCRETE 2.7.3.a.Precast concrete manholes consist of a base section, riser sections, a transition and cone. Provide pipe openings, of suitable size to fit the pipe, in the base section or riser sections as required. Conform to the requirements of ASTM C478 with the following exceptions and

Cement: Type II, except as otherwise approved

Minimum Wall Thickness: 5 inches Use gasket type joints as specified herein.

Steam cure sections, do not ship for at least five days. 2.7.3.b.Acceptance of the sections will be on the basis of material tests and inspection of the completed project.

3.4.3. WALL OPENINGS: Opening in walls around pipes shall be filled with either brick and mortar or non_ shrink grout.

2.7.3.c.Suitably shape the tops of the bases by means of accurate bell—ring forms to receive the barrel sections. 2.7.4. RISER JOINTS: Provide riser joints of the rubber gasket type in which the gaskets are in compression and which will permit both longitudinal and angular movement. Design the bell and spigot ends to confine the gasket when the joint is in its final position. Provide each section with proper ends made of concrete formed on machined rings to insure accurate joint surfaces. The diameters of the joint surface, depended upon to compress the gasket, shall not vary from the theoretical diameters by more than 1/16 inch. Seal the joint with a rubber gasket so that

the joint will remain tight under all conditions of service. Joints must be capable of withstanding an internal hydrostatic pressure of 10 psi with no visible signs of leakage. 2.7.5. GASKETS: Provide gaskets which conform to applicable sections of ASTM C361. Use gaskets of a special rubber composition having a texture to assure a watertight and permanent seal and the product of a manufacturer having at least five years experience in the manufacture of rubber gaskets for pipe joints. Use gaskets which are a continuous ring of flexible joint rubber of a composition and texture which are resistant to common ingredients of sewage, industrial wastes, and ground_ water and which will endure permanently under the conditions likely to be imposed 2.8 CONCRETE MASONRY UNITS

2.8.1. HOLLOW LOAD_ BEARING CONCRETE MASONRY UNITS: All concrete masonry units shall be modular in size with a nominal 8" by 16" face dimension for standard units and shall conform to ASTM C90, Grade N, Type I. 2.8.2. MASONRY JOINT REINFORCING: Joint reinforcing shall be made of zinc coated steel wire conforming to ASTM A_ 166 Class 1 or ASTM A_ 82 and shall be of the welded wire ladder type design with Standard No. 9 gauge (0.1483") side rods and No. 9 gauge cross ties. Acceptable products include, "Blok_ Lok" by A. A. Wire Products Co. and "Ladur Type" by Duro_ O_ Wal, Inc.

3. <u>EXECUTION</u> 3.1. GENERAL

3.1.2. BASES: Structure bases may be precast or cast_ in_ place as indicated on the Drawings.

3.1.3. FRAMES, COVERS, AND/OR GRATES: Set manhole frames with the tops conforming accurately to the grade of the pavement of finished ground surface or as indicated on the Drawings or as directed. Set frames in a full bed of mortar so that the space between the top of the structure masonry and the bottom flange of the frame shall be completely filled with mortar and made watertight. Place a thick ring of mortar extending to the outer edge of the masonry all around the bottom flange. Finish the mortar flush with the top of the flange and with a slight slope to shed water away from the frame. 3.2. PRECAST STRUCTURES 3.2.1. PRECAST MANHOLE SECTIONS:

3.2.1.a. Handle and install each section in such a manner and by such means as to prevent damage. Set sections vertical with sections in true alignment. 3.2.1.b Install base sections on firm stabilized foundation so prepared to prevent settlement and misalignment. Place pipe openings at the exact elevation and location to receive entering pipes.

3.2.1.c. Install riser sections, transitions and top sections level and plumb. Make joints in accordance with manufacturer's instructions to ensure a watertight installation. 3.2.1.d. After entering pipes are placed in the pipe openings and set to true alignment and grade, fill the annular space between the pipe and opening with a non_ shrink grout to seal the joint watertight or with brick and mortar. When brick and mortar are used the outside of the brick shall be plastered with mortar 1/2 inch thick. 3.2.1.e. Lift holes will be allowed in precast manhole sections. After setting sections in place, thoroughly plug all holes in sections with mortar one part cement to 1_ 1/2 parts sand; mix with water until slightly damp to the touch (just short of balling) and hammer mortar into the

holes until it is dense and an excess of paste appears on the surface. Then finish smooth and flush with the adjoining surfaces. 3.3. BRICK STRUCTURES 3.3.1. LAYING BRICK: 3.3.1.a. Use only clean brick. Moisten as directed until bricks are neither so dry as to absorb water from the mortar, nor so wet as to be slippery when laid. Lay each brick in a full bed of mortar without requiring subsequent grouting, flushing, or filling. Walls of all structures shall consist of two

widths of brick. When laying brick, the direction of every sixth (6) course shall be rotated 90 degrees to provide a tie between the brick courses. 3.3.1.b. Lay brick in level courses with mortar joints approximately 1/2" wide and uniform in thickness. Tool exposed joints and strike flush joints which will be plastered. 3.3.1.c. Set pipes as the work progresses. Completely fill the space between the pipe and masonry to insure a watertight seal. 3.3.2. PLASTERING AND CURING BRICK: Plaster outside face of masonry with mortar 1/2 inch thick. If required, moisten masonry prior to application of plaster. Carefully spread and trowel the plaster so that all cracks are thoroughly worked out. After hardening, check the plaster for bond and

soundness by tapping. Remove replace any unbonded or unsound plaster. 3.4. CONCRETE MASONRY UNIT STRUCTURES (CMU) 3.4.1. LAYING CMU'S: CMU's shall not be wetted prior to laying. Lay CMU's in a level running bond pattern and in a full bed of mortar approximately 3/8 inch wide and uniform in thickness. Tool all exposed joints and strike flush joints which will be plastered. Cut CMU's by acceptable methods. 3 4 2 REINFORCEMENT

3.4.2.a. All CMU structures shall have both wall reinforcement and joint reinforcement. Wall reinforcement. Wall reinforcement shall be tied with a minimum 12 inch lap. Upon placing rebar each cell of CMU's shall be filled with 4,000 psi concrete. 3.4.2.b. Joint reinforcement shall consist of the ladder type and shall be placed every 16" in height. Joint reinforcing shall be set in a full bed of mortar and shall be tied to adjoining walls with corner "L" units, 32"x32" minimum.

SHEET NAME:

ORIG SUBMISSION

PROJECT

0 0 7

<u>DATE</u> DESCRIPTION

SPECIFICATIONS

CURRENT:

ARCHITECT: Walter Robbs Architects, a Michael **Graves Company** 530 North Trade Street, Suite 301 Winston-Salem, NC 27103

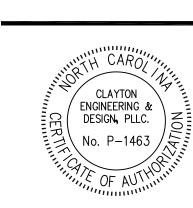
CIVIL ENGINEER: Clayton Engineering and Design 304 15th Street S.E. P.0. Box 2351 Hickory, NC 28603 T 828.455.3456 STRUCTURAL ENGINEER:

SKA Consulting Engineers, Inc 7900 Triad Center Drive, Suite 200 Greensboro, NC 27409-9075 T 336.855.0993 **ELECTRICAL ENGINEER:** Consultant Engineering Service

1111 S. Marshall Street, Suite 250

T 336.308.4256 CODE CONSULTANT: **Performance Based Fire Protection** Engineering P.O. Box 1847 Pittsboro, NC 27312

Winston-Salem, NC 27101



NAME: WILLIAM S. CLAYTON LICENSE: NC # 40758

0 0 -C

△ DATE ____DESCRIPTION

SHEET NAME:

PROJECT SPECIFICATIONS

CURRENT

SECTION 02500 - LEAKAGE TESTING

organized by the Contractor at the Engineers convenience. All labor, equipment, water, materials, gauges, meters and any other items shall be furnished by the Contractor at his expense. In the case of a failed test, minor defects will be corrected and retested immediately. Any failure due to a major defect will constitute stopping the test and rescheduling with Engineer/Owner.

All structures are required to be watertight and all pressure and gravity piping and pipelines shall be tested by the Contractor as directed by this section and/or the Engineer/Owner. All tests shall be

All fluid containing structures shall be subject to a gravity pressure test by filling the structure with water to overflow, or as directed by the Engineer, and observing the water level for a period not less than 24 hours. Leakage will be considered to be within the allowable limits for structures when there is no visible sign of leakage evident by either moisture on exposed surfaces or water level drop in excess of 1 inch within the 24—hour period. All wall castings or penetrations shall be plugged temporarily during the test period. If leakage exceeds the allowable limit, the work shall be repaired by removing and replacing the defective portions, waterproofing the inside and outside or by other methods as approved by the Engineer.

1.3 PRESSURE PIPING All pressure piping shall be subject to a hydrostatic pressure/leakage test in accordance with AWWA C605—13. Upon satisfactorily constructing the pipeline, including all appurtenances called for on the associated plans, and effectively backfilling the trench the hydrostatic test shall be conducted. The Contractor shall prepare a testing plan/schedule to be approved by the Engineer, which will effectively test the entire section to be constructed, and at no time test more than 4000 If of pipeline at one time. As the pipeline is being filled with water in preparation of the test, all air shall be expelled from the pipe. If sufficient exit points are not available, the Contractor at his expense shall install air reliefs of a type and location as approved by the Engineer. The pipeline shall be subjected to a hydrostatic pressure of 150 psi or 50 psi above existing line static pressures, which ever is greater, for a period of 2 hours or as specified by the Engineer. Pressure shall be applied to the line by means of hand pump for lines 2" and smaller or by approved mechanical means for larger lines

Allowable leakage shall not exceed that determined by the following formula:

 $L = SD (P)\frac{1}{2}$ 148.000 L = Allowable leakage in gallons per hour.

1 INTRODUCTION

S = Length of line under test in feet. D = Nominal diameter of pipe in inches.

P = Average test pressure in psi.

Any visible leak shall be corrected to minimize water leakage no matter of the allowable leakage calculation. All pipe and appurtenances found to be defective during the hydrostatic test shall be removed and/or corrected at the Contractors expense and Engineers approval. All materials shall be subject to manufacturer's recommendations for storage, pretesting, etc. After a successful test has been obtained the Contractor shall notify the Engineer in writing and request written recognition from Engineer of acceptable test results.

SECTION 02611 GRADED AGGREGATE BASE COURSE Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, material, equipment, and services indicated on the Drawings, or specified herein or reasonably

necessary for and incidental to a complete job. 1.2. DESCRIPTION OF WORK The work includes the placement of a graded aggregate base course upon a prepared subgrade and a prime coat, when directed, at locations shown on the Drawings. 1.3. RELATED WORK SPECIFIED ELSEWHERE

Excavation and Backfill Section 02220 1.4. QUALITY ASSURANCE 1.4.1. Referenced Standards: Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these Specifications shall in no

way invalidate the minimum requirements of the referenced standards. NCDOT North Carolina Department of Transportation Standard Specifications for Highway Construction, Latest Edition 1.4.2. Qualifications Of Workmen: Assign at least one person who is thoroughly trained and experienced in the skills required, who is completely familiar with the design and application of the work described for this Section, and who will be present at all times during progress of the work of this Section and direct all work performed under this Section. 1.4.3. For actual finishing of asphaltic concrete surfaces and operation of the required equipment, use only personnel thoroughly trained and experienced in the skills required.

1.5.1. DUST CONTROL: Use all means necessary to prevent the spread of dust during performance of the work of this Section. Thoroughly moisten all surfaces as required to prevent dust being a nuisance to the public, neighbors, and concurrent performance of other work on the job site.

.1. GRADED AGGREGATE BASE COURSE 2. Comply with the applicable material requirements of NCDOT Standard Specifications for Highway Construction.

2.4. Comply NCDOT Standard Specifications for Highway Construction, Bituminous Materials, for base priming when specified on the Drawings or directed by the Engineer.

3.1. INSTALLATION, GENERAL 3.1.1. Subgrade: Preparation of the subgrade is covered in the applicable provisions of Section 02220, EXCAVATION AND BACKFILL. Construct the subgrade to consist of compacted fill material specified in the referenced section.

3.1.2 Loose Material: Remove all loose material from the compacted subgrade surface immediately before placing base course. 3.1.3 Proof-Roll: Proof-roll prepared subgrade surface to check for unstable areas and the need for additional compaction. Notify the Engineer of unsatisfactory conditions. Do not begin base course work until such conditions have been corrected and are ready to receive paying. 3.1.4 Thicknesses: Install thickness of base course as indicated on the Drawings. In-place compacted thicknesses will not be acceptable if exceeding the following allowable variation from thicknesses

shown on the Drawings: 3.1.5 Base Course: 1/2-inch 3.1.6 Surface Smoothness: Test the finished surface of the base course for smoothness, using a 3.1m straightedge applied parallel with, and at right angles to, centerline of paved area. Surfaces will

not be acceptable if exceeding the following tolerance for smoothness: 3.1.7 Base Course Surface: 1/4-inch 3.1.8 Grade Control: Establish and maintain the required lines and grades, including crown and cross—slope, for each course during construction operations

3.2.1 General: This work shall consist of a graded aggregate base course composed of materials as described in NCDOT Standard Specifications for Highway Construction, placed on a prepared foundation, mixed, shaped, compacted, and primed (when directed), all in accordance with these specifications. The base course shall conform to the lines, grades, dimensions and cross—sections shown on the Plans or as directed by the Engineer. 3.2.2 Installation Requirements: Comply with the requirements of NCDOT Standard Specifications for Highway Construction.

3.2.3 Prime Coat: Comply with the requirements of NCDOT Standard Specifications for Highway Construction. (End of Section 02611)

SECTION 02612 BITUMINOUS PAVING <u>GENERAL</u> . RELATED DOCUMENTS

1.2. Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, material, equipment, and services indicated on the Drawings, or specified herein or reasonably necessary for and incidental to a complete job. 1.3. DESCRIPTION OF WORK

1.3.1.a. The extent of bituminous paving is shown on the Drawings and includes (but is not necessarily limited to) bituminous paving of roads, driveways, and parking areas. 1.3.1.b. The work includes the placement of an graded aggregate base course upon a prepared subgrade, a bituminous tack coat and wearing surface of asphaltic concrete. 1.3.2. RELATED WORK SPECIFIED ELSEWHERE: Excavation and Backfill Section 02220

1.4.1. REFERENCED STANDARDS: Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these Specifications shall in no way invalidate the minimum requirements of the referenced standards. NCDOT North Carolina State Highway Department Standard Specifications for Highway Construction, Latest Edition 1.4.2. QUALIFICATIONS OF WORKMEN:

1.4.2.a. Assign at least one person who is thoroughly trained and experienced in the skills required, who is completely familiar with the design and application of the work described for this Section, and who will be present at all times during progress of the work of this Section and direct all work performed under this Section. 1.4.2.b. For actual finishing of asphaltic concrete surfaces and operation of the required equipment, use only personnel thoroughly trained and experienced in the skills required.

1.5.1. WEATHER LIMITATIONS: Apply bituminous tack coats only when the ambient temperature in the shade is above 50 degrees F. and when the temperature has not been below 35 degrees F. for 12 hours immediately prior to application. Construct bituminous surface course only when atmospheric temperature is above 40 degrees F., when the underlying base is dry, and when the weather is not

rainy. Base course may be placed when air temperature is not below 30 degrees F. and rising, unless otherwise directed by the Engineer. 1.5.2. DUST CONTROL: Use all means necessary to prevent the spread of dust during performance of the work of this Section. Thoroughly moisten all surfaces as required to prevent dust being a nuisance to the public, neighbors, and concurrent performance of other work on the job site. 1.5.3. PROTECTION: Use all means necessary to protect pavement materials before, during, and after installation, and to protect the installed work and materials of all other trades. 1.5.4. REPLACEMENTS: In the event of damage, immediately make all repairs and replacements necessary, to the approval of the Engineer, and at no additional cost to the Owner.

1.6. PRODUCT DELIVERY 1.6.1. GENERAL: Transport asphalt cement mixtures from the mixing plant to the project site in trucks having tight, clean compartments. Provide covers over asphalt cement mixture when delivering to protect the mixture from weather and to prevent loss of heat. During period of cool weather or for long—distance deliveries, provide insulation around entire truck bed surfaces.

GRADED AGGREGATE BASE COURSE: Comply with the applicable Subsections of NCDOT Specifications, GRADED AGGREGATE BASE COURSE (with prime). HOT MIX ASPHALT SURFACE COURSE: Comply with the requirements of NCDOT Specifications, HOT MIX ASPHALT SURFACE COURSE.

. COMPOSITION OF MIXTURE: Comply with the requirements of NCDOT Specifications, Composition of Mixture, Type 1. Furnish samples if requested by the Engineer PARKING LINE PAINT: Provide white lane marking paint with chlorinated rubber base, a factory—mixed, quick—drying, non—bleeding material complying with FS TT—P—115, Type III, unless otherwise

3.1.1. Examine the areas and conditions under which the bituminous paving will be installed and notify the Engineer in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.

3.1.2. Verify that pavement may be installed in strict accordance with the original design, all pertinent codes and regulations, and all pertinent portions of the referenced standards. INSTALLATION, GENERAL 3.2.1. SUBGRADE: Preparation of the subgrade is covered in the applicable provisions of Section 02220, EXCAVATION AND BACKFILL. Construct the subgrade to consist of compacted fill material specified in the referenced section.

3.2.2. LOOSE MATERIAL: Remove all loose material from the compacted subgrade surface immediately before placing bituminous materials. 3.2.3. PROOF—ROLL: Proof—roll prepared subgrade surface to check for unstable areas and the need for additional compaction. Notify the Engineer of unsatisfactory conditions. Do not begin paving work until such conditions have been corrected and are ready to receive paving. 3.2.4. THICKNESSES: Install thicknesses of base courses and surface courses as indicated on the Drawings for varying traffic and loading conditions. In-place compacted thickness' will not be acceptable if exceeding the following allowable variation from thickness' shown on the Drawings:

Surface Course: 1/4", plus or minus . SURFACE SMOOTHNESS: 3.3.1. Test the finished surface of each asphalt concrete course for smoothness, using a 10' straightedge applied parallel with, and at right angles to, centerline of paved area. Surfaces will not be acceptable if exceeding the following tolerances for smoothness: Base Course Surface: 1/4"

Wearing Course Surface: 3/16" 3.3.2. Check surfaced areas at intervals as directed by the Engineer. Test crowned surfaces with a crown template, centered and at right angles to the crown. Surfaces will not be acceptable if the finished crown surfaces vary more than 1/4" from the crown template. 3.3.3. GRADE CONTROL: Establish and maintain the required lines and grades, including crown and cross—slope, for each course during construction operations.

3.4. FRAME ADJUSTMENTS: 3.4.1. Set frames for manholes and other such units, within areas to be paved, to final grade as part of this work. Include existing frames or new frames furnished in other sections of these 3.4.2. Surround frames set to grade with a ring of compacted asphalt concrete base prior to paving. Place asphalt concrete mixture up to one inch below top of frame; slope to grade, and compact with

3.4.3. Adjust frames as required for paving. Provide temporary closures over openings until completion of rolling operations. Remove closures at completion of the work. Set cover frames to grade, flush with surface of adjacent pavement. FQUIPMENT:

3.5.1. The method employed in performing the work and all equipment, plant, machinery and tools, used in handling the materials and performing any part of the work shall be subject to the approval of the Engineer before work is started, and when found unsatisfactory shall be changed and improved as required. All equipment, tools, machinery and plants used must be maintained in a satisfactory working condition. 3.5.2. Comply with the requirements of NCDOT Specifications.

3.6. CONSTRUCTION REQUIREMENTS: 3.6.1. Comply with the requirements of NCDOT Specifications.

Base Course: 1/2", plus or minus

GRADED AGGREGATE BASE COURSE

3.7.1. GENERAL: This work consists of a base course composed of course aggregate, together with fine aggregate or binder material with water which is mixed, compacted, and primed, all in accordance with these Specifications and in conformity with the lines, grades, and typical cross section shown on the Drawings or as otherwise specified. 3.7.2. INSTALLATION REQUIREMENTS: Comply with the requirements of NCDOT Specifications. 3.7.3. PRIME COAT: Comply with the requirements of NCDOT Specifications.

3.8. HOT MIX ASPHALT SURFACE COURSE

3.8.1. INSTALLATION REQUIREMENTS: 3.8.1.a. Comply with the requirements of NCDOT Specifications, Equipment Requirements, and Construction Requirements.

3.8.1.b. Conform to the lines, grades, and cross sections indicated on the Drawings with thickness shown after full compaction 3.8.2. TYING TO EXISTING BITUMINOUS PAVEMENT: Where new pavement ties to existing pavement, cut the existing pavement to a straight line and completely remove all materials on the new pavement side of the cut and replace with new materials. Coat the cut line with a tack coat to furnish a bond between the existing surface course and the new surface course. Do not allow the new work to overlap the existing work. Notify the proper authorities at least 10 days before beginning the work of tying to the existing work. 3.8.3. DELAY OF SURFACE COURSE INSTALLATION: Install the base course during construction of the project. Immediately prior to the completion of the project, bring the base course to the specified

thickness, true the edges, apply a tact coat, in accordance with the type of base course used, then apply the surface course. 3.8.4. DRAINAGE: Crown or slope all paved areas for complete water drainage under all weather conditions. If required by the Engineer, hose down the surface to demonstrate proper drainage at the preliminary review when the project is completed and again at the end of the one year guarantee period. Remove and replace any area that shows puddling 30 minutes after hosing, at no 3.8.5. REMEDIAL MEASURES: Upon direction of the engineer, cut out and/or rework all surfaces and subgrade areas which do not meet the requirements of this Section; perform all remedial measures at

.8.6. PARKING LINE PAINTING: Paint parking lines 4 inches wide and of lengths indicated on the Drawings. Paint with mechanical equipment providing uniform straight edges, applied in 2 coats at the manufacturer's recommended rates

3.8.7. CLEAN UP: Upon completion of paving, remove all surplus materials, dunnage, cartons, and other debris resultant from work of this Section. Leave entire work in satisfactory, acceptable, broom-clean condition. (End of Section 02612)

SECTION 02722 - EXTERIOR SANITARY SEWERS AND APPUTENANCES

.1 GENERAL DESCRIPTION: This section covers the furnishing of supervision, materials, labor, equipment and miscellaneous items necessary to construct sewers and appurtenances as shown on the plans and as specified herein, complete, tested, and ready for service. All pipe and appurtenances shall be of the class and type as indicated on the plans and designated hereon.

1.2 GENERAL INTENTION: The work covered by this section consists of all supervision, excavation, bedding, laying pipe, jointing and coupling pipe sections, and backfilling necessary to install the various types of pipe required to complete the project. PART 2 – MATERIALS 2.1 MATERIALS: All materials shall be first quality with smooth interior and exterior surfaces, free from cracks, blisters, honeycombs and other imperfections, and true to theoretical shapes and forms throughout. All materials shall be subject to the inspection of the Engineer at the plant, trench, or other point of delivery, for the purpose of culling and rejecting material that does not conform to the requirements of these specifications. Such material shall be marked by the Engineer and the

Contractor shall remove it from the project site upon notice being received of its rejection. As particular specifications are cited, the designation shall be construed to refer to the latest revision under the same specification number, or to superseding specifications under a new number except provisions in revised specifications that are clearly inapplicable. 2.1.1 Handling and storing materials: The Contractor shall unload pipe so as to avoid deformation or other injury thereto. Pipe shall not be rolled or dragged over gravel or rock during handling. When any joint or section of pipe is damaged during transporting, unloading, handling, or storing, the undamaged portions of the joint or section may be used where partial lengths are needed, or, if damaged sufficiently, the Engineer will reject the joint or section as being unfit for installation. If any defective pipe is discovered after installation, it shall be removed and replaced with sound pipe or shall be repaired by the Contractor in an approved manner and

at his own expense. 2.2 Pipe and Fittings: 2.2.2 Polyvinyl Chloride Pipe (PVC): Polyvinyl Chloride Pipe (PVC) pipe shall meet the requirements of ASTM D 3034, latest editions, and be suitable for use as a gravity

sewer conduit. The pipe shall be SDR 35 unless otherwise specified. The pipe shall be supplied in standard laying lengths of 20 feet and 12.5 feet. 2.2.2.1 PVC Pipe Joints: All PVC pipe joints shall be of an integral bell and spigot of the same material as the pipe with a solid cross—section rubber "0" ring securely locked in place at the point of manufacture. Service saddles and other fittings shall be supplied by the pipe manufacturer and shall be of the same material and 2.2.3 Ductile Iron Pipe (DIP): Ductile Iron Pipe shall be manufactured in accordance with ANSI Specification A 21.51. All ductile iron pipe shall be Class 50 unless other

wise specified and shall be lined with cement mortar not less than 1/16"-inch thick conforming to ANSI Specification A 21.4. 2.2.3.1 DIP Joints: Slip or "push-on" joints shall be manufactured in accordance with ANSI Specification A 21.11. Bells of "slip" joint pipe shall be contoured to receive a bulbshaped, circular rubber gasket, and plain ends shall have a slight taper to facilitate installation. The pipe manufacturer shall furnish the lubricant used in making up the joints. The jointing shall be done by guiding the plain end into the bell until contact is made with the gasket and by exerting a sufficient compressive force to drive the joint home until plain end makes full contact with the base of the bell.

2.2.4 Reinforced Concrete Pipe: Reinforced concrete pipe shall be furnished in sizes and classes shown and specified on the Contract Drawings and the Bid Schedule. All pipes under this Section shall conform to the latest revisions of ASTM CC-76 - Reinforced Concrete Culvert, Storm and Sewer Pipe. The provisions of ASTM C-655 may also be utilized. Reinforced concrete pipe shall be anufactured by centrifugal or vertical casting methods. For vertical casting methods, mechanical vibration shall be provided to insure proper consolidation of concrete. Density of cured concrete shall be 150 lbs./ft. or greater 2.2.4.1 Concrete Pipe Test: All shipments of pipe shall be tested at the Contractor's expense in accordance with ASTM C-76 Section 11 (2) except as modified.

Preliminary testing for extended deliveries shall include 3—edge bearing tests to the .01—inch crack on three (3) sections of each size pipe. Testing shall be by an approved testing laboratory. Specimens up to 0.5 percent of the number of each size of pipe furnished shall be tested, except that in no case shall less than two specimens be tested. The laboratory making the tests shall furnish the Engineer with three (3) certified copies of these tests. No pipe shall be laid before the Engineer approves test reports. 2.2.4.2 Concrete pipe shall be manufactured in joint lengths of 8 feet or greater.

2.2.4.3 Results of absorption tests performed on the pipe shall not exceed 6.5 percent. 2.2.4.4 The alkalinity of the concrete cover over the inner reinforcing steel on the inside pipe wall at the crown shall be no less than 0.50 (50 percent) expressed as calcium carbonate equivalent. The manufacturer shall determine the alkalinity of the concrete cover at intervals determined by the Engineer. Samples for alkalinity determination shall be obtained by drilling one—inch diameter holes in the pipe interior to the reinforcing steel. The ground concrete from this drilling shall be the sample material used for the alkalinity determination. Core holed in test pipe may be suitably repaired by a method approved by the Engineer and used on the project. The laboratory making the test shall furnish the Engineer with three (3) certified copies of these tests. No pipe shall be laid before the Engineer approves

2.2.4.5 Bell and spigot reinforced concrete sewer pipe shall be joined with an O-ring rubber gasket type joint conforming to the applicable provisions of ASTM C-361, latest revisions. A groove shall be provided in the spigot end to receive the rubber gasket and it shall be so formed that when the joint is complete, the gasket will be deformed to a near rectangular shape and confined on all four sides. All inside surfaces of the bell and outside closure of the joint, and at any degree or partial closure shall be parallel within one degree and have an angle of not more than two degrees with the longitudinal axis of the pipe. The gasket shall be the sole element utilized in sealing the joint from either internal or external hydrostatic pressure. Gaskets shall be the product of a manufacturer having at least five years experience in the manufacturer of rubber gaskets for pipe joints. The gaskets shall have smooth surfaces free from blisters, porosity, and other imperfections. The joint shall be assembled in accordance with the standard directions of the gasket manufacturer. 2.2.4.6 The pipe manufacturer shall design walls to meet the following requirements.

2.2.4.6.1 Pipe wall sections shall meet the structural requirements for pipe classes stated in the Bid Schedule for each size pipe. 2.2.4.6.2 Concrete cover over the inner reinforcing cage shall be a minimum of 1 inch greater than that required to meet structural properties. This may be accomplished by moving the inner reinforcing cage towards the outside of the pipe, by adding concrete on the inside of the pipe, by adding concrete on the outside of the pipe, or both. Inside pipe diameter shall not be decreased. 2.2.4.6.3 Reinforcing shall be sufficiently strong so that the pipe, without the additional interior cover, will meet the 3-edge bearing test requirements of ASTM C-76 for

2.2.5 Steel Sanitary Sewer Pipe: Steel sanitary sewer pipe shall conform to ASTM A-53 Grade B or ASTM A-139 Grade B standard specifications. Steel sewer pipe shall have minimum yield strength of 35,000 psi and a minimum tensile strength of 60,000 psi with a wall thickness of .375 inches. External and internal surfaces shall have protective coatings. Coating shall consist of a coal—tar primer followed by hot coal—tar enamel at least 1/16—inch thick, or approved equal.

2.2.6 Steel Casing Pipe: Steel casing shall conform to ASTM A—53 Grade B or ASTM A—139 Grade B Standard specifications. Casing pipe shall have a wall thickness as 30" 0.312 inches wall thickness 26" 0.312 inches wall thickness 16" 0.250 inches wall thickness

External surfaces of steel casing pipe to have a protective coating. This coating shall consist of a coal—tar primer followed by hot coal—tar enamel at least 1/16-inch thick, or approved equal. 2.3 Manholes: See Section 02601 Manholes, Drop Manholes and Conflict Manholes <u>PART 3 – EXECUTION</u> I Preparation of pipe foundation: The pipe foundation shall be prepared to be uniformly firm and shape be true to the lines and grades as shown on the Contract

Drawings. Any deviation or field adjustment will require the approval of the Engineer. The Contractor shall be responsible for the finished work conforming to proper 3.1.1 Bedding: Whenever the nature of the ground will permit, the excavations at the bottom of the trench shall have the shape and dimensions of the outside lower third of the circumference of the pipe, care being taken to secure a firm bearing support uniformly throughout the length of the pipe. A space shall be excavated under and around each bell to sufficient depth to relieve it of any load and to allow ample space for filling and finishing the joint. The pipe, when thus bedded firmly, shall be on the exact grade. In case the bed shape in the bottom of the trench is too low, the pipe shall be completely removed from position, and earth of suitable quality shall be placed and thoroughly tamped to prepare a new foundation for the In no case shall the pipe be brought to grade by blocking up under the barrel or bell of the same, but a new and uniform support must be provided for the full length of the pipe. Where rock or boulders are encountered in the bottom of the trench, the same shall be removed to such depth that no part of the pipe, when laid to grade, will be closer to the rock or boulders than 6 inches. A suitable tamped and shaped foundation of approved material shall be placed to bring the bottom of the trench to proper subgrade over rock or boulders. The preparation of the pipe bedding shall be in accordance with the typical trench cross sections as shown on the Contract Drawings for the type of pipe being installed. Crushed stone use for pipe bedding shall be shovel sliced so that the material fills and supports the haunch area and encases the pipe to the limits

shown on the trench cross sections 3.1.2 Bedding at creek crossing: Where it is necessary to cross a creek, the following requirements pertain.

1a) One foot of cover where the sewer is located in rock. 2a) Three feet of cover in other material unless ferrous pipe is specified. More cover in major streams. 3a) In paved stream channels, the top of the sewer line shall be placed below the bottom of the channel pavement. 3.1.3 Proper backfilling shall take place to prevent erosion or siltation. b) If crossing above water, Ductile Iron Pipe shall be used and the bottom of the pipe shall be above the 25—year flood elevation and special care taken to ensure

3.1.3 Poor foundation material: Where the foundation material is found to be of poor supporting value, the Engineer may make minor adjustment in the location of the pipe to provide a more suitable foundation. Where this is not practical, the foundation shall be conditioned by removing the existing foundation material by undercutting to the depth as directed by the Engineer and backfilling with foundation conditioning material consisting of crushed stone.

3.1.4 Crushed stone for pipe bedding: Crushed stone for pipe bedding and for foundation conditioning is to be size #67 in ASTM designation D 488, "Standard Sizes of Coarse Aggregate for Highway Construction: (AASHTO M-43, size #67) The sieve analysis of #67 stone is as follows:

90% - 100% passing 3/4 20% - 55% passing 3/8" 0% - 10% passing #4

0% - 5% passing #8

3.2 Water in pipe trench: The Contractor shall remove all water which may encountered or which may accumulate in the trenches by pumping or bailing and no pipes shall be laid until the water has been removed from the trench. Water so removed from the trench must be disposed of in such a manner as not to cause damage to work completed or in progress.

5.3.1 Manufacturer's recommendations: All piping is to be installed in strict accordance with the manufacturer's recommendations and the contract material specifications. 3.3.2 Proper tools and equipment: Proper tools, implements, and facilities satisfactory to the Engineer shall be provided and used for the safe and convenient prosection of pipe laying. All pipe and other materials used in the laying of pipe will be lowered into the trench piece by piece by means of a suitable equipment in such a manner to prevent damage to the pipe, materials, to the protective coating on the pipe, materials, and to proved a safe working condition to all personnel in the trench. Each piece of pipe being lowered into the trench shall be clean, sound and free from defects. It shall be laid on the prepared foundation, as specified elsewhere to produce a straight line on a uniform grade, each pipe being laid so as to form a smooth and straight inside flow line. Pipe shall be removed at any time if broken, damaged or displaced in the process of laying same, or of backfilling the trench.

3.3.3 Cutting pipe: When cutting short lengths of pipe, a pipe cutter as approved by the Engineer will be used and care will be taken to make the cut at right angles to the center line of the pipe or on the exact skew as shown on the plans. In the case of push—on pipe, the cut ends shall be tapered with a portable grinder or coarse file to match the manufactured taper. 3.3.4 Location of groove or bell: All pipe shall be laid with the groove or bell end upgrade, and the spigot or tongue fully inserted. All pipe joints will be constructed in strict accordance with the pipe manufactures specifications and materials and any deviation must have prior approval of the Engineer.

3.3.5 Pipe deflection: All pipe installations shall be tested for deflection. No pipe shall exceed deflection of 5 percent. The maximum deflection per joint of flexible joint pipe shall be that deflection recommended by the manufacturer. A stopper or plug shall be installed in the pipe mouth when pipe laying is not in progress. 3.4.1 The following minimum separations must be maintained.

any private or public water supply source, including and WS—1 waters or class I or class II impounded reservoirs used as a source of drinking water. 100 ft. waters classified WS-II, WS-III, B, SA, ORW, HQW, or SB 50 ft.

any other stream, lake or impoundment 10 ft. any building foundation 5 ft.

any basement 10 ft. top slope of embankment or cuts of 2 feet or more vertical height 10 ft. interceptor drains 5 ft.

groundwater lowering and surface drainage ditches 10 ft. any swimming pool 10 ft.

storm sewers (vert.) 12 in. (horz.) 12 ft. water mains (vert.) 18 in. (horz.) 10 ft. benched trenches (horz.) 18 in.

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3.10.3 Corrective Measures: If elapsed time is less than the specified amount, Contractor shall locate and repair leaks and repeat the test until elapsed time exceeds the specified amount. 3.11 Infiltration/Ex-filtration Test (Use All manholes): 3.11.1 The use of this method for sewer pipe, in lieu of air tests may be used as an alternate test method. 3.11.2 Procedure:

3.4.2 Where the required minimum separations cannot be maintained, ferrous sanitary sewer pipe with joints equivalent to water main standards must be used. However, the minimum

3.6.1 Sanitary sewer lines shall be deep enough to serve all adjoining property and allow for sufficient slope in lateral lines. All sanitary sewer mains shall have the following minimum covers:

3.6.5 Where sanitary sewer lines and water lines must cross, ductile iron pipe shall be used and pipes shall cross at near 90 degree angles with 18" minimum separation, as stated in the

3.7.1 Initial backfill: The initial backfill for pipe shall be carefully placed to a level of 12 inches over the top of the pipe. This backfill shall be excavated soil free from debris, organic material

3.7.2 Final backfill: Final backfill for pipelines shall be defined as that portion of the trench from an imaginary line drawn 12 inches above the top of the pipe to the original ground surface.

3.8.1 Within traffic areas: When pipelines installed within the ditch to ditch limits of any roadway, driveway or parking area etc., backfill shall be compacted to a minimum dry density of 95

percent of the maximum dry density in pounds per cubic foot as determined by the Standard Proctor Compaction Test. Backfill material shall be placed in 6 inch layers and thoroughly

3.8.2 Outside Traffic Areas: In areas outside the ditch to ditch limits of a roadway, driveway, parking areas, etc., backfill shall be compacted to a minimum dry density of 90% of the maximum

3.8.3 Equipment Traffic: Heavy equipment shall not be operated over any pipe until it has been properly backfilled and has a minimum cover of 24 inches. Where any part of the required

3.8.4 Pipe maintenance: The Contractor shall maintain all pipes installed in a condition that they will function continuously from the time the pipe is installed until the project is accepted.

3.9.1 Precast concrete manhole: A precast concrete manhole shall be installed at each break in line or grade in each sanitary sewer as shown in detail on the Contract Drawings. Manhole

3.9.2 Manholes shall be spaced at a maximum distance of 400 feet apart for lines 12 inches in diameter or smaller and at a maximum of 500 feet apart for lines greater than

3.9.3 Manholes for sewers under 21 inches in diameter shall be a minimum of 4 feet in diameter. Manholes for sewer 21 inches in diameter or greater shall be 5 feet in diameter. All

sections shall be set plumb and on firm foundations. Each joint between sections and all wall openings shall be sealed with 2:1 sand—cement mortar mix and made watertight. An

eccentric cone section and standard frame and cover is to be installed on each new manhole. Final adjustment to grade of all manholes shall be done with brick and mortar and each

manholes requiring inside drops shall be a minimum of 5 feet in diameter. When two or more inside drops occur at one manhole, a minimum of 6 feet in diameter manhole shall be

3.9.4 Manholes inverts: Manhole inverts shall be constructed of concrete or concrete and brick of semicircular section conforming to the inside diameter of the outlet sewer. Changes in size of

pipe or grade shall be made gradually and changes in direction constructed by using true Each manhole shall be provided with such channels for all connecting sewer pipes. Drop

3.9.5.2 Manholes shall be pre-cast concrete or poured-in-place concrete. Manhole lift holes and grade adjustment rings shall be sealed with non-shrinking mortar or other material approved

3.9.5.3 Inlet and outlet pipes shall be joined to the manhood with a gasketed flexible watertight connection or any watertight connection arrangement that allows differential settlement of the

3.9.5.4 Watertight manhole covers are to be used wherever the manhole tops may be flooded by street runoff or high water. Locked manhole covers may be desirable in isolated easement

3.9.6.1 Where corrosive conditions due to septicity or other causes are anticipated, consideration shall be given to providing corrosion protection on the interior of the manholes.

3.9.6.2 Where high flow velocities are anticipated, the manholes shall be protected against displacement by erosion and impact. High velocity is defined as 15 fps or greater.

manholes during testing. Equipment used for air testing shall be equipment specifically designed for this type of test, and is subject to approval of the Inspector.

make corrections as specified herein and retest the section. The correct/retest procedure shall continue until such time as test requirements are met.

Manholes shall be watertight and vented 12 inches (1 foot) above the 100—year flood elevation. Manholes shall be vented every 1,000 feet or every other manhole, whichever is greater.

3.10 TESTING: All pipe installations shall be tested as specified herein. Tests shall be performed by Contractor at his expense in the presence of the Engineer or his representative. Testing shall

3.10.1.1 Air test shall be conducted in strict accordance with the testing equipment manufacturer's instructions, including all recommended safety precautions. No one will be allowed in the

3.10.1.3 For pipe within test sections above the ground water table, add air slowly to the portion of the pipe installation under test until the internal air pressure is raised to the starting

3.10.1.2 The test shall be performed only on clean sewer mains after services are installed and the pipe is completely backfilled. Clean sewer mains by propelling snug fitting inflated rubber

Multiply the result in part 2 by 0.43 and round to the nearest 0.5 psig. After this starting pressure is obtained, continue the test in accordance with the procedure in the paragraph

3.10.2 Requirement: The test section shall be acceptable if the elapsed time for pressure drop of 1.0 psig is greater than the sum of the times shown below for all pipe sizes within the

not be performed until such time that all work which may affect the results of the testing has been completed. Where a test section fails to meet test requirements, Contractor shall

pressure of 4 psig. After the starting pressure is obtained, allow at least two minutes for air temperature to stabilize, adding only the amount of air required to maintain pressure. When

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excessive settlement, or has been otherwise damaged by the Contractor's operations shall be removed and replaced by the Contractor at no cost to the Owner.

cover is above the proposed finish grade, the Contractor shall place, maintain, and finally remove such material at no cost to the Owner. Pipe which becomes misaligned, shows

tamped or rolled to the required degree of compaction by sheepsfoot or pneumatic rollers, mechanical tampers, vibrators, etc. Successive layers shall not be placed until the layer under

and large rock and stones. Initial backfill shall be shovel sliced so that the material fills and supports the haunch area and encases the pipe to the limits shown on the trench cross

Final backfill will be done with suitable excavated material and tamped in 12 inch lifts. Debris, material not given to adequate compaction, and stone over one cubic foot will not be

allowed within the trench limits. If material excavated is not suitable for backfilling, the Contractor shall, at no increased cost to the Owner, remove and dispose of such unsatisfactory

3.6.7 Sewer line easements shall be graded smooth, free from rocks, boulders, roots, stumps, and all other obstructions and seeded and mulched upon completion of construction.

3.7.3 Steep Slope Protection: Sewers on 20 percent slopes or greater shall be anchored securely with concrete, or equal, with the anchors spaced as follows:

dry density in pounds per cubic foot as determined by the Standard Proctor Compaction Test. Any settlement shall be immediately corrected.

3.9.5 Manholes located within the 100 year flood plain or in areas of high ground water shall abide by the following when applicable:

ball through the pipe with water. After completely cleaned, plug all pipe outlets with suitable test Brace each plug securely.

pressure decreases to 3.5 psig. Start stopwatch. Determine the time that is required for the internal air pressure to reach 2.5 psig.

3.10.1.4 For pipe with test sections below the ground water table, determine the starting pressure for the test section, in psig, as follows:

3.6.8 Downstream manholes on sanitary sewer lines under construction shall be plugged and secured to prevent any seepage of water into or out of the line while under construction.

separations shall not be less than 25 feet from a private well or 50 feet from a public water supply source.

3.6.2 The above requirements may be waved by authority of Director, in which case ductile iron pipe shall be used.

3.6.6 Sewer mains shall be installed in dedicated public right of ways or in dedicated utility easements.

material and shall backfill the trench with suitable material obtained elsewhere.

a) Not greater than 36 feet center to center on grades 21% to 35%

Not greater than 24 feet center to center on grades 35% to 50%

Not greater than 16 feet center to center on grades 50% and over

a) 4 ft. from top of pipe to finish subgrade when under a roadway.

3.6.3 Sewer mains deeper than 12 feet require stone bedding.

sections on the Contract Drawings.

construction has been thoroughly compacted.

frame and cover shall be grouted firmly into place.

used. All manholes shall have a minimum access of 22 inches in diameter.

3.9.5.5 Manholes shall be designed for protection from the 100—year flood by either:

Determine the maximum depth of pipe within the test section in feet.

Multiply this depth by 0.67 feet and add 9.3 feet.

a) Manhole rims shall be 12 inches (1 foot) above the 100-year flood elevation or,

manholes shall be provided where invert separations exceed 2.5 feet.

3.8 Manhole installation:

12 inches in diameter.

by the Division.

pipe and manhole wall to take place.

3.9.6 Corrosion Protection for Manholes:

10.1 Air Test: All aravity sewer pipe.

test section.

locations or where vandalism may be a problem.

3.6.4 Transitions between pipe materials shall occur at manholes

3 ft. from top of pipe to finished subgrade when outside a roadway.

Infiltration: Immediately following a period of heavy rain a test of work constructed up until the time shall be made. Three measurements shall be made at one (1) hour intervals to compute the amount of the infiltration. Test for manholes only shall be conducted on individual manholes. Tests for pipe and manholes shall be performed on test sections not exceeding 600 linear feet of collector sewer and shall include both pipe and manholes. The Engineer reserves the right to use his judgment as to whether the ground is sufficiently saturated and/or whether the fall of rain is adequate to permit making infiltration tests. In the event that sufficient rain does not occur before the date of completion, the Contractor shall be required to conduct the tests at any time during a 30-day period following this date. Should the Engineer determine that certain pipe of manholes couldn't be tested by infiltration methods, the Engineer may direct the filling of lines and the measurement of ex-filtration. The allowable rate of ex-filtration shall be the same as for infiltration. 2. Ex-filtration: Determine test sections as outlined for infiltrations tests. Install a temporary water plug at the inlet and outlet of the test section. Fill test section with clean water up to the

bottom of the lowest manhole frame within the test section. Allow time for saturation of pipe and manholes refilling test section as required. Beginning with a full test section, allow at least eight (8) hours to elapse without adding water. Measure the water level at the beginning and end of the elapsed time above. Compute the volume of water lost in gallons per hour. 3.11.3 Test Requirements: The rate of water loss/gain shall be less than the rate, in gallons per hour, calculated for the test section using the following allowances:

1. Sewer main and manholes with or without service laterals; 100 gallons per 24 hours per inch of sewer main diameter per mile of sewer main (gpd/in-mil). 2. Manholes only; 1 gallon per 24 hours per vertical foot of manhole. 3.11.4 Corrective Measures: If actual leakage rate is greater than required leakage rate, Contractor shall locate and repair leaks and repeat the test until actual leakage is less than the

SECTION 03300 CAST-IN-PLACE CONCRETE

1.1 SECTION INCLUDES A. Cast-in-place concrete

required rate.

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced to in the text by basic designation only.

AMERICAN CONCRETE INSTITUTE (ACI) a. ACI 304R Guide for Measuring, Mixing, Transporting, and Placing Concrete b. ACI 318/318R Building Code Requirements for Reinforced Concrete

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) a. ASTM A 615 Deformed and Plain Billet-Steel Bars for Concrete Reinforcement Ready-Mixed Concrete

ASTM C 94 A. SD-05, Design Data

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301. PART 2 PRODUCCTS

A. Concrete: ASTM C 94: 4500 psi at 28 days using Type I or Type II cement; air-entrained to produce 5 - to 7-percent air content, 4-inch maximum slump.

Aggregate for concrete: ACI 318 Bar reinforcement: ASTM A 615, Grade 60, deformed.

A. The Engineer shall be contacted prior to placing all concrete to allow time for inspection. Place concrete in accordance with ACI 304R. Protect concrete from premature drying and excessively hot and cold temperatures. Maintain minimal moisture loss at a relatively constant temperature for the time necessary for hydration of the cement and proper hardening of the concrete. Cure for a

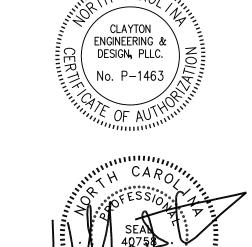
A. Provide formed surfaces with plywood finish. Use commercially manufactured metal ties and other form accessories. Leave no metal within 1 inch of surface in exposed work. Patch tie holes and repairable defective areas immediately after form removal. Remove honeycombed and defective concrete down to sound concrete. Use patching mortar consisting of one part cement to 2-1/2 parts sand with no more mixing water than necessary for handling and placing.

CIVIL ENGINEER:

304 15th Street S.E.

P.0. Box 2351

Clayton Engineering and Design



NAME: WILLIAM S. CLAYTON LICENSE: NC # 40758

KOR 0 0 7 C

△ DATE ____DESCRIPTION

SHEET NAME:

ORIG SUBMISSION

SPECIFICATIONS

CONSTRUCTION STANDARD SPECIFICATION SECTION 02665 UNDERGROUND WATER LINES FOR DOMESTIC AND FIRE PROTECTION SYSTEMS

PART 1 – <u>GENERAL</u> 1.1 SUMMARY

A. This section shall apply to the materials and operations required for the installation of underground water distribution lines and underground fire protection lines. The scope for fire protection lines begins at the connection to the water supply main and ends at the base of the building fire riser. The scope for non—fire protection lines ends 5 feet from the building foundation.

B. The extent of the work is indicated on the contract drawings.

C. Related Work: Refer to the following sections for related work: Section 02200, "Earthwork".

Section 03300, "Cast-in-Place Concrete".

Section 09900, "Painting". Section 15310, "Automatic Sprinklers and Water Based Fire Protection Systems".

A. American Society of Mechanical Engineers (ASME) B1.20.1 Pipe Threads, General Purpose (Inch)

B16.1 Cast Iron Pipe Flanges and Flanged Fittings

B16.3 Malleable Iron Threaded Fittings B16.4 Gray Iron Threaded Fittings

B. American Society of Testing Materials (ASTM) A48 Specification for Gray Iron Castings

A53 Standard Specification for Pipe, Steel, Black and Hot-Dipped Zinc - Coated Welded and Seamless (Replaces A120)

A536 Specification for Ductile Iron Castings Specification for Composition Bronze or Ounce Metal Castings

Specification for Seamless Copper Water Tubes

D2000 Standard Classification System for Rubber Products in Automotive Applications D2774 Standard Practice for Underground Installation of Thermoplastic Pressure Piping

F477 Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

C. American Water Works Association (AWWA) C104 Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water

C105 Polyethylene Encasement for Ductile—Iron Piping for Water and Other Liquids C110 Ductile—Iron and Gray—Iron Fittings, 3 in. Through 48 in., for Water and Other Liquids

C111/A21.11 Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

C115 Standard for Flanged Ductile—Iron Pipe with Ductile—Iron or Gray—Iron Threaded Flanges C116 Standard for Protective Fusion—Bonded Epoxy Coating for the Interior and Exterior Surfaces of Ductile—Iron and Gray—Iron Fittings for Water Supply Service

C151 Ductile—Iron Pipe, Centrifugally Cast, for Water and Other Liquids C153/A21.53 Ductile—Iron Compact Fittings, 3 in. Through 16 in., for Water and Other Liquids

C207 Steel Pipe Flanges for Waterworks Service—Sizes 4 In. Through 144 In. (100 mm Through 3,600 mm)

C213 Fusion—Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines C500 Metal—Seated Gate Valves for Water Supply Service

C502 Dry-Barrel Fire Hydrants

C504 Rubber-Seated Butterfly Valves C509 Resilient—Seated Gate Valves for Water Supply Service

C512 Air-Release, Air/Vacuum, and Combination Air Valves for Waterworks Service

C515 Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service C550 Protective Epoxy Interior Coating for Valves and Hydrants

C600 Standard for Installation of Ductile—Iron Water Mains and Their Appurtenance C605 Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water

C651 Disinfecting Water Mains C800 Underground Service Line Valves and Fittings

C900 Polyvinyl Chloride (PVC) Pressure Pipe, 4 in. Through 12 in., for Water Distribution

D. Copper Development Association (CDA)

E. Copper Tube Handbook International Conference of Building Officials (ICBO)

F. Code Council (ICC) — International Plumbing Code (IPC) G. National Fire Protection Association (NFPA) 24 — Standard for the Installation of Private Fire Service Mains and Their Appurtenances

1.3 SUBMITTALS A. General: Submit the following in accordance with conditions of Contract and Division 1, Section "Descriptive Submittals".

B. Product Data: Submit product data, or manufacturer's specifications including laboratory test reports and other data to show compliance with specifications (including

C. All pipe materials, valves, fittings, equipment, and accessories shall be submitted for approval. Product data shall indicate the maximum allowable operating pressure of each

component and any related manufacturing standard as appropriate. Product data and certification for mechanical joint t-bolts is required. D. Test Reports: Submit test reports conducted on shop— and field—bolted and welded connections. Include data on type(s) of tests conducted and test results.

A. Codes and Standards: All work shall comply with the applicable portions of the most current edition of the AWWA Standards referenced is Section 1.03, and the most current edition of the Code Council (ICC) - International Plumbing Code (IPC).

B. The materials and practices comprising the work shall conform to this and other referenced specifications. Where this specification conflicts with the requirements of another referenced specification, this specification shall prevail.

C. All materials used shall not contain any asbestos fibers. D. All persons performing or supervising testing shall be qualified by either training or experience to perform such tests.

E. Soldering shall conform to ASME B31.3, Process Piping and Copper Development Association recommended practices. F. Brazing: Certify brazing procedures, brazers, and operators in accordance with ASME B31.3, Process Piping, for shop and jobsite brazing of piping work. PART 2 - PRODUCTS

2.1 PIPE AND JOINTS A. Lines 4" and larger shall be ductile iron pipe (DIP). All pipes shall be permanently marked to allow identification of type and class and Underwriters Laboratories (UL) listed or Factory Mutual (FM) approved if used for fire protection and shall conform to the following material requirements:

Ductile Iron Pipe (DIP) 4" and larger shall be as noted on the drawings but not less than pressure class 350, conforming to AWWA C151, with rubber—gasket joints conforming to AWWA C111, and cement—mortar lining conforming to AWWA C104. The pipe exterior shall have a bituminous outside coating conforming to AWWA C151.

Flanged Ductile Iron Pipe shall conform to AWWA C115. B. Service Lines 3" and smaller shall conform to the applicable provisions of AWWA C800, and shall conform to the material requirements for one of the following piping

Copper Tubing: Type K, hard drawn or annealed, conforming to ASTM B88. Joints shall be AWS A5.8, BCuP silver braze.

Ductile Iron Pipe: Conforming to the requirements of article 2.01A for ductile iron pipe.

A. Fittings for mainlines 4" and larger shall be ductile iron, Class 350 pressure rating minimum, mechanical joint conforming to AWWA C153 Ductile Iron Compact Fittings, or Class 250 ductile iron flange joint / Class 350 mechanical joint conformingto AWWA C110 Ductile Iron or Grey Iron Fittings, with cement—mortar lining conforming to AWWA C104. Mechanical joint fittings, with rubber—gasket joints conforming to AWWA C111 shall be used in all buried installations. Flanged fittings shall be used in aboveground installations, and inside underground structures, such as valve pits and vaults.

1. All hardware shall be in full compliance with the requirements of AWWA C111 / ANSI A21.11. The bolts shall be manufactured from corrosion resistant low alloy steel, and shall comply fully with Public Law 1001—592, the "Fastener Quality Act".

B. Fittings for service lines 3" and smaller shall conform to the applicable requirements of AWWA C800 and the following requirements: 1. Copper fittings shall conform to the following requirements: brass or bronze body with compression connections or flared compression joints at transition points or points

of connection. Wrought copper solder type fittings conforming to ANSI B16.22, or cast copper alloy solder joint fittings conforming to ANSI B16.18. 2. Fittings for ductile iron pipe shall be cast or ductile iron in accordance with AWWA C800.

C. Special fittings, reducers, flares, saddles, rings, caps, wyes or other as specified on the drawings shall be ductile iron unless otherwise specified or shown, with a 350 psi minimum pressure rating, mechanical joints conforming to AWWA C153 or flange joints conforming to AWWA C110, and shall be coated with 2 coat fusion bonded epoxy coating per AWWA C-116. 2.3 COUPLINGS

Couplings 4" and larger shall only be used to join asbestos cement pipe to approved piping materials. The coupling shall have a 200-psi minimum working pressure rating; the body (middle ring) and followers shall be made from steel or ductile iron. The bolts and nuts shall be ANSI 304/303 Stainless Steel, or corrosion—resistant alloy bolts and nuts. The coupling shall have an NSF-61—registered fusion bonded powder epoxy coating, and shall meet all applicable requirements of AWWA C-219. The coupling shall be Dresser Style 253 Modular Cast Coupling, Total Piping Solutions — Hymax 2000, Smith Blair 413, or approved equal.

2.4 VALVES Distribution, fire, and service line valves shall conform to the following requirements:

A. Resilient seat gate valves 2" — 12" conforming to AWWA C509. The valve shall open when turning counterclockwise. The stem shall be the non—rising type with inside screw and shall contain "0"-ring seals. All valve end joints shall be mechanically connected and 0-ring retainer shall be secured with nuts and bolts. Brass and bronze parts shall conform to AWWA C509. The resilient seat shall be mechanically retained or bonded to the gate or wedge. All Valves shall be UL listed in accordance with NFPA 24, and FM approved. Resilient seat gate valves shall be Mueller A-2360, Kennedy KEN-SEAL II Resilient-Wedge Valves, M&H C509 Style 4067, or approved equal. B. Resilient seat gate valves 2" — 12" conforming to AWWA C515. The valve shall open when turning counterclockwise. The stem shall be the non—rising type with inside screw

and shall contain "0"-ring seals. All valve end joints shall be mechanically connected and 0-ring retainer shall be secured with nuts and bolts. Brass and bronze parts shall conform to AWWA C515. The resilient seat shall be mechanically retained or bonded to the gate or wedge. All Valves shall be UL listed in accordance with NFPA 24, and FM approved. Resilient seat gate valves shall be American Flow Control Series 2500 or M&H Style 7571. C. Resilient wedge tapping valves sizes 3" through 12" shall conform to AWWA C509. The valve shall be UL listed in accordance with NFPA 24 and FM approved. The stem

shall be the non-rising type with inside screw and shall contain "O"-ring seals. The inlet flange shall comply with ANSI B16.1, Class 125, and the outlet shall be mechanical joint in compliance with AWWA C111. Valve shall be fully compatible with approved tapping sleeve. The resilient wedge tapping valves shall be Mueller T—2360 or approved

D. All valves smaller than 2" shall be of "O"—ring sealed ball or gate—operating, full—opening port type design. The valve shall have a cast bronze body, as per ASTM B62. The plug or key shall be cast bronze, as per ASTM B62, machined and/or deburred to create a smooth, true surface and assure a positive, durable seal. Valves shall be Mueller, Ford Meter Box Co. Inc., or approved equal.

1. The inlet and outlet connections shall be tightened by a one—way gripper band or a compression nut. A positive seal shall be obtained by a replaceable "0"—ring for use with the gripper band system or a beveled Buna—N gasket, as per ASTM D2000, for use with the compression nut system. 2. Curb boxes shall be installed with all valves smaller than 2" and shall be Mueller H—10306, Ford EA 2—25—50, or approved equal. Curb boxes shall be telescopic type with heavy cast—iron arch pattern base, steel upper section, and heavy cast—iron lid with a bronze bushed, bronze standard waterworks counter—sunk pentagon nut and shall be installed with a 12" x 12" x 4" concrete collar. Curb boxes shall be adjustable from 18" to 30" and held at the desired depth by a strong phosphor bronze opening. Upper sections of these boxes must be at least 1-1/4" to accept a shut-off rod. Boxes shall be coated inside and out with a tar-based enamel for

E. Indicator posts shall have a cast—iron body, 1—1/4" square operating nut, lockable operating wrench, with "OPEN" and "SHUT" targets appearing in full view when the valve is fully open or closed. Base shall be flanged and shall bolt onto the indicator post flange provided on top of the valve. The indicator post shall be fully compatible with the approved valve, capable of accepting a tamper switch, and the bury depth shall govern post dimensions. The Indicator posts shall be UL listed in accordance with NFPA 24 and FM approved. Indicator Posts shall be Mueller, No. A—20806, Kennedy Style 2945 or 2945A, American Flow Control IP—71, or approved equal.

F. Butterfly valves 14" and larger shall be rubber—seated, iron body, short body flanged, Class 150B, conforming to AWWA C504 for valves 14" and larger. Valves shall be

installed so that the disc rotates about a horizontal axis. Operator shall be manual, side—mounted, with standard 2" square operating nut, opening counterclockwise. Butterfly valves shall be Mueller Lineseal III, Keystone Figure 47 or 504, McWane M&H450, American Darling, Pratt, Kennedy or approved equal. Butterfly valves shall not be G. Valve boxes shall have a gray cast—iron ring and cover with 5 1/4 inch shaft, screw type as designated on the standard drawing conforming to ASTM A48, Class 25C. The

word "WATER" shall be cast onto the top of the cover in raised letters. Valve Boxes shall be installed with a concrete collar as shown in the drawings. 2.5 FIRE HYDRANTS Fire hydrants shall have a cast or ductile iron body, traffic, dry barrel, post type, 150 psi working pressure, with two drain outlets constructed of bronze, conforming to AWWA C502. Main valve shall be compression type, 5—1/4" diameter. Hydrants shall have one 4—1/2" pumper connection and two 2—1/2" hose connections, with national standard fire hose coupling screw threads. Operating nut shall be pentagonal, 1-1/2" point to flat, opening counterclockwise. Indicate connection is 6" mechanical joint. Hydrants shall

be capable of being field lubricated. Fire hydrants shall be Mueller A—423 Centurion, Kennedy Guardian K—81D, McWane M&H129T Model, or approved equal.

Pressure reducing valves (PRV) shall be cast—iron body, flanged end connections, globe pattern, single—seated, pilot—controlled, psi diaphragm type, Class 125 pressure rating, adjustable from 15 to 75 psi and shall operate hydraulically. PRV shall be a CLA-VAL Clayton Model 90-01 Series, size as designated on the contract drawings, or approved

2.7 AIR AND VACUUM VALVES

Air and vacuum valves shall have a cast—iron body, stainless steel float, with baffle, sizes 1/2" through 3", as designated on the contract drawings. Valves shall be APCO Model Series 140, with NPT threaded outlet, or approved equal. Ring and cover for valve pit shall be gray cast—iron conforming to ASTM A48, Class 30 minimum, and shall be a NEENAH No. R-1910-A or an approved equal. Cover shall have the word "WATER" cast onto it in raised letters.

Cast—in—place concrete for use in concrete thrust blocks, valve box and indicator post collars, and other concrete structures required by the contract drawings, shall conform to the requirements of Division 3, Section "Cast—in—Place Concrete".

A. Direct Tapping

Direct tapping is not allowed.

B. Tapping Saddles Tapping saddles shall be used only when shown on the drawings and shall have a cast—iron, ductile iron, or bronze body with stainless steel or bronze straps, nuts, bolts and washers. Tapping Saddles shall be manufactured in conformance with AWWA C800. Gaskets shall be vulcanized elastomeric rubber or synthetic rubber compound. Saddles shall be compatible with Mueller threaded inlet or approved equal. Saddles used on PVC pipe shall be double—strap type. The tapping saddle model shall be rated for use on type specific piping material. Unless shown otherwise on the drawings the maximum allowable saddle tap shall be 2". Tapping Saddles shall be manufactured by the Ford Meter Box Company, Inc., the Mueller Co, or approved equal.

Tapping sleeves shall be used only when shown on the drawings and shall not exceed one—half the diameter of the line being tapped.

Heavy welded steel tapping sleeves shall be epoxy coated with stainless steel bolts and nuts, Buna-N rubber gaskets, flat face steel flange per AWWA C207 Class D, ANSI class150—outlet flange, and minimum150 psi working pressure rating. Tapping Sleeves shall be Ford FTSC, Smith—Blair 622, or Romac Industries, No. FTS 419. Cast iron tapping sleeves shall be mechanical joint type with a working pressure of 200 psi, outlet flange to be Class 125, ASME B16.1, sleeves to include side and endgaskets of Buna—N rubber, eight high strength steel bolts and nuts to secure the halves of the sleeve to the pipe. Cast iron tapping sleeves shall be Mueller H—615.

Corporation stops shall not be used directly on PVC pipe or Ductile Iron. Corporation stops shall have a bronze body, Mueller thread inlet by compression or flared outlet, 3/4"

to 2", conforming to the applicable requirements of AWWA C800. Compression connection outlets shall be provided with a stainless steel liner.

A. Cast—in—place concrete blocking, clamps and tie rods, shall conform to the requirements of Section 03300. "Cast—in—Place Concrete". SNL Standard Drawinas. and construction drawings. Steel or cast—iron hardware shall be fully coated with asphalt or plastic varnish. A polyethylene liner, minimum thickness of 8 mils, shall be installed B. Mechanical joint restraint, for ductile iron pipe shall be the Series 1100 Megalug restraint as produced by EBAA Iron, Inc. or approved equal. The restraint shall be incorporated into the design of the follower gland. The restraining mechanism shall consist of individually actuated wedges that increase their resistance to pull—out as

pressure or external forces increase. The device shall be capable of full mechanical joint deflection during assembly and the flexibility of the joint shall be maintained after burial. The joint restraint ring and its wedging components shall be made of grade 60—42—10 ductile iron conforming to ASTM A536. The wedges shall be ductile iron heat treated to a minimum hardness of 370 BHN. Dimensions of the gland shall be such that it can be used with the standardized mechanical joint bell conforming to ANSI/AWWA C111/A21.11 and ANSI/AWWA C153/A21.53 of the latest revision. Torque limiting twist—off nuts shall be used to insure proper actuation of the restraining wedges. They shall have a rated working pressure of 350 psi in sizes sixteen inch and smaller and 250 psi in sizes eighteen inch through forty—eight inch. The devices

shall be listed by Underwriters Laboratories up through the twenty—four inch size and approved by FM up through the twelve—inch size. C. Mechanical joint restraint, for PVC pipe, shall be incorporated into the design of the follower gland. The restraint mechanism shall consist of a plurality of individually—actuated gripping surfaces to maximize restraint capability. Glands shall be manufactured of ductile iron conforming to ASTM A536. The gland shall be such that it can replace the standardized mechanical joint gland and can be used with the standardized mechanical joint bell conforming to ANSI/AWWA C111/A21.11 and ANSI/AWWA C153/A21.53 of latest revision. Twist off nuts, sized same as tee—head bolts, shall be used to insure proper actuating of restraining devices. The restraining gland shall have a pressure rating equal to that of the pipe on which it is used. The restraining glands shall be listed by UL, and be approved by Factory Mutual. The restraint shall

be the EBAA Iron Series 2000PV. D. Restraint Harness for Ductile Iron Pipe push on bells size 4" and greater shall be made of ductile iron components. All ductile iron shall conform to ASTM A536. A split ring shall be used behind the bell and restraining ring shall have actuated wedges provide increased resistance to pull-out as pressure of external forces increase. The connecting tie rods that join the two rings shall be made of low alloy steel that conforms to ANSI/AWWA C111/A21.11. The assembly shall have a rated pressure of 350 psi for size sixteen inch and smaller and a rated pressure of 250 psi in sizes eighteen inch through thirty—six inch. The restraint shall be the Series 1700 Megalug Restraint Harness as produced by EBAA Iron, Inc or approved equal.

E. Restraint for existing Ductile Iron Pipe push on bells shall be made of ductile iron components conforming to ASTM A536. The split rings shall incorporate individually actuated gripping surfaces on the pipe ring opposite of the bell. A sufficient number of bolts shall be used to connect the bell ring and the pipe ring. The combination shall have a minimum working pressure rating of 350 psi for sizes eight inches and less, 300 psi for sizes ten inches through 16 inches, and 200 psi sizes 18 inches through 36 inches. The restraint shall be the Series 1100HD Restraint for Existing Push—on Joints for Ductile Iron Pipe as manufactured by EBAA Iron, Inc or approved Equal. F. Restraint Harness for C900 PVC pipe bells size 4" - 12" shall be made of ductile iron components. All ductile iron shall conform to ASTM A536. A split ring shall be used

combination shall have a minimum working pressure rating of 150 psi. The restraint shall be the Series 1600 as produced by the EBAA Iron, Inc. G. Restrained flange adapters shall be made of ductile iron conforming to ASTM A536 and have flange bolt circles that are compatible with ANSIAWWA C115/A21.15. Restraint for the flange adapter shall consist of a plurality of individually actuated gripping wedges to maximize restraint capability. Torque limiting actuating screws shall be used to insure proper initial set of the gripping wedges. The flange adapters shall be capable of deflection during assembly or permit lengths of pipe to be field cut to allow a minimum 0.6 in. gap between the end of the pipe and the mating flange without affecting the integrity of the seal. For PVC pipe, the flange adapters will have a pressure rating equal to the pipe. For Ductile Iron Pipe, the flange adapter shall have a safety factor of 2:1 minimum. The use of flange adapters must be approved by SNL System Engineering. The flange adapter shall be the Series 2100 Megaflange adapter as produced by EBAA Iron, Inc. PART 3 - <u>EXECUTION</u>

behind the bell and a serrated restraint ring shall be used to grip the pipe. A sufficient number of bolts shall be used to connect the bell ring and the pipe ring. The

3.1 PIPE LAYING A. General: Provide water pipe of the size, type and class specified and install at the locations and to the elevations and grades indicated on the contract drawings. B. Pipe installation shall be in accordance with the applicable provisions or requirements of the following specifications, drawings and references:

Ductile iron pipe installation shall conform to AWWA C600. Where indicated on the contract drawings, pipe shall be encased in polyethylene film according to AWWA C105. Plastic pipe installation shall conform to AWWA C605 "Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water"

Install detectable warning tape that can be detected by a standard metal pipe locator on all water line per Section 02200, "Earthwork". Copper tubing service lines shall conform to AWWA C800 and the CDA "Copper Tube Handbook".

C. The installation of the fire protection line shall conform to NFPA 24, NFPA 13, and SNL Standard Drawing FX5003STD. Fire protection lines shall terminate inside the building with a flange and spigot piece. The spigot piece shall be plumb with the flange installed level, and set not less than 4" above the finished floor. A blank flange shall be temporarily installed on top of the flange and spigot piece to prevent the entrance of foreign matter into the supply line. Upon arrival at the job site, each section of pipe shall be inspected for damage and defects, and for compliance with the applicable piping materials products requirements listed in Part 2 of this specification. Defective sections of pipe may be marked by the Sandia Delegated Representative (SDR). Any sections of pipe found to be defective shall be immediately removed from the job site

D. Immediately prior to laying, each pipe section shall be visually inspected for defects or damage. Any damaged or defective pipe section shall not be used. Each pipe section shall be cleaned so that the interior and joining surfaces of the pipe are free of soil and debris. E. Pipe shall be laid on a smoothly graded prepared subgrade soil foundation true to alignment and grade as indicated on the contract drawings. The allowable vertical and horizontal tolerance from drawing elevations and alignment shall be 2". Bell holes shall be hand-excavated so that the bottom of the pipe is in continuous contact with the surface of the prepared subgrade material. Any pipe that has its grade or joints disturbed after laying shall be taken up and the pipe laid back in the trench. At

times when pipe laying is not in progress, the open ends of the pipe shall be closed by a watertight plug. Pipe shall not be laid in standing water or when trench or weather conditions are deemed unsuitable by the SDR. If conditions warrant, the inspector may require that the pipe be anchored to prevent floating. F. Trenching and Backfill 1. Trench Type 4: Unless otherwise shown on the drawings the trench for pipe installation shall be Type 4 as defined by AWWA C600. Pipe bedded in 4" of sand,

gravel, or crushed stone. Maximum size of pipe bedding material shall not exceed 1/2" particle size and material shall be uniformly—graded, Backfill compacted 2. Ductile Iron Pipe (DIP): The trench width from the bottom of pipe to 12" above top of pipe shall not exceed the outside diameter plus 24". The pipe haunch shall be backfilled so no voids exist and than backfilled in 8" maximum lifts. Unless otherwise specified, continue 8" lifts and 90 percent compaction in areas under roadways and paving. Compact to normal soil density in areas not supporting roadways or paving unless noted otherwise.

3. Polyvinyl Chloride Pipe (PVC): Proper placement of soils around existing PVC pipe is extremely important. Only hand tampers shall be used to compact backfill around the pipe. Care shall be taken not to damage or misalign the pipe during compaction. The trench width from the bottom of pipe to 12" above top of pipe shall not exceed the outside diameter plus 24". If trench width exceeds the maximum allowed or PVC pipe is placed in compacted backfill than the pipe embedment shall be compacted to 2.5 diameters on each side of the pipe. The pipe haunch shall be backfilled so no voids exist and than backfilled in 8" maximum lifts compacted to 90 percent density to the centerline of pipe. Unless otherwise specified continue 8" lifts and 90 percent compaction in areas under roadways and paving. Compact to normal soil density in areas not supporting roadways or paving unless noted otherwise. 4. Minimum depth of cover for water lines shall be 3 feet from the top of pipe to finished grade. Unless otherwise indicated on the contract drawings.

5. When it is necessary to deflect ductile iron pipe for changes in horizontal or vertical alignment, the amount of deflection shall not exceed 2/3 of the manufacturer's recommended maximum deflection. A fitting or several shorter lengths of pipe shall be used when necessary. PVC pipe shall not be deflected at

and spigot ends thoroughly cleaned and lubricated with a suitable sterile soft vegetable soap compound. Field—cut plastic pipe sections shall be beveled for joining as recommended by the pipe manufacturer 2. Mechanical Joints: The socket and plain ends shall be thoroughly cleaned immediately prior to making the joint. Wash the seating surfaces and the rubber gasket with a soapy solution. Seat the plain end fully in the socket before slipping the gasket into the socket. The joint shall be kept straight during assembly. If a joint deflection is required, make the deflection after assembly, but before tightening bolts, tighten nuts 180 degrees apart in pairs. Alternate pairs until all nuts are within the manufacturer's recommended range of torque. The Contractor shall have a torque wrench on hand at the work site so that

1. Push—on—Joints: Immediately prior to making the joint, the rubber gasket shall be removed and cleaned, the groove cleaned, the gasket replaced, and the bell

the Sandia National Laboratories (SNL) Inspector may verify tightening torque on any joint. 3. Flanged Joints: Clean the flanged ends to be joined immediately prior to joining. Only one gasket shall be permitted in a flange joint. Nuts shall be tightened similar to mechanical joints to within the torque range recommended by the pipe manufacturer. 4. Hardware: All nuts and bolts utilized in underground pipe connections shall be stainless steel, high-strength, cast-iron or high-strength, high-grade steel and shall be of the proper size and type for the application in which they are utilized. All iron or high-strength steel bolts shall be cadmium-zinc plated or coated with bituminous material prior to backfilling. Additionally, all other hardware shall be fully coated with an asphalt or plastic varnish prior to backfilling.

3.2 LOCATION OF WATER AND SEWER LINES

E. Installation of Mechanical Joints per AWWA C600

3.8 INDICATOR POSTS

3.13 FLUSHING

3.9 PRESSURE REDUCING VALVES

18" X 6" concrete collar as detailed on the contract drawings or SNL Standard Drawing WW3001STD.

A. Mains: Water and sewer mains running parallel shall be laid at least 10 feet apart horizontally, with the water main at a higher elevation than the top of the sewer line. Water and sewer mains shall be laid in separate trenches in all cases. Where water and sewer mains are laid closer than 10 feet or where they are crossing, the bottom of the water main shall be at least 12" higher than the top of the sewer line, otherwise, the sewer line shall be of pressure class pipe, or shall be encased in concrete, within

B. Service Lines: Water and sewer service lines shall not be laid in the same trench, unless the bottom of the water line, at all points, is at least 12" above the top of the sewer line, and the water line shall be laid on a solid shelf excavated at one side of the common trench. Where water and sewer service lines cross, the water line shall be at least 12" higher than the sewer. 3.3 THRUST RESTRAINT

All thrust restraint shall be accomplished by mechanical means unless shown otherwise on the contract drawings. Provide mechanical joint restraints at all tees, plugs, caps,

bends, reducers, valves, and other mechanical joint fittings. Concrete blocking shown at a point of connection to an existing does eliminate the requirement for restrained joints at the fitting in question unless specifically stated in the contract drawings. Restrained joints will be subject to the hydrostatic test pressure as specified under hydrostatic testing. Restrained lengths shall be in accordance with the contract documents or applicable SNL Standard Drawings. C. Mechanical joint restraints shall be installed as shown in the contract drawings and per AWWA C600. The use of mechanical joint restraints for modifications to existing piping shall not constitute proper thrust restraint unless verification is made that the uncovered adjacent joints are properly restrained. Concrete blocking may be used in

addition to required mechanical joint restraints as alternative to verification of existing joints. Prior to pressure testing the system shall be adequately sections of pipe between joints shall be backfilled and compacted to prevent separation of the joints. D. Concrete blocking shall be installed in accordance to the requirements of Section 03300, "Cast—in—Place Concrete". Blocks shall be placed in the general shape and to the minimum dimensions indicated on the standard drawings, and shall be placed between the fitting and the undisturbed wall of the trench. Concrete shall be placed so that it does not make contact with any bolts or nuts on the fittings. A polyethylene film shall be placed between the fitting or valve and the thrust block. Pipe shall not be flushed, pressurized, or otherwise disturbed, until the new concrete blocking has reached its initial set and developed adequate strength. The pipe must be properly restrained against movement, backfilled, and compacted between joints. All hardware shall be fully coated with asphalt or plastic varnish.

5. Clean the socket and plain end. Lubrication and additional cleaning should be provided by brushing both the gasket and plain end with soapy water or an approved pipe lubricant meeting the requirements of ANSI/AWWA C111/A21.11, just prior to slipping the gasket onto the plain end for joint assembly. Place the gland on the plain end with the lip extension toward the plain end, followed by the gasket with the narrow edge of the gasket toward the plain end. 6. Insert the pipe into the socket and press the gasket firmly into the gasket recess. Keep the joint straight during assembly.

7. Push the gland toward the socket and center it around the pipe with the lip against the gasket. Insert bolts and hand tighten nuts. Make deflection after joint assembly but before tightening. 8. Tighten the bolts to the normal range of bolt torque as indicated in the table below while at all times maintaining approximately the same distance between the gland and the face of the flange at all points around the socket. This can be accomplished by partially tightening the bottom bolt first, then the top bolt, next the bolts at either side, finally the remaining bolts. Repeat the process until all bolts are within the appropriate range of torque. Pipe SizeTorque3"45-60 ft-lbs4"-24"75-90 ft-lbs30"-36"100-120 ft-lbs 3.4 VALVES

Gate and butterfly valves shall be installed at the locations indicated and as detailed on the contract drawings, and in accordance with AWWA C600. No change in the vertical or horizontal alignment of the pipe shall be allowed at connections to the valve. Valves shall be INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. Install valve boxes over all gate and butterfly valves as detailed on the contract drawings, and in accordance with AWWA C600. Boxes shall be installed plumb and true, and

shall be centered on the valve operating nut. The weight of the valve box shall not bear upon the control valve or pipeline. The valve box shall be accompanied by an 18" X

Where the valve operating nut is at a depth greater than 2 feet below the valve box cover, an extension stem shall be installed in the box with the required size square wrench nut. Extension stems shall be equipped with a minimum of one stem guide or stem guides at intervals not exceeding 10 feet, and shall be affixed to the interior of the valve

3.7 FIRE HYDRANTS A. Install fire hydrants at the locations indicated and as detailed on the contract drawing, and in accordance with AWWA C600. Hydrants shall be set plumb and true to the elevations indicated, with the center of the lowest nozzle at least 16" above surrounding finished grade. The traffic flange shall be a minimum of 2" above finished grade and maximum of 8". The 4—1/2" pumper nozzle shall face toward the nearest street, road, drive or parking area or as directed by the SDR. Not less than 8 cubic feet of crushed rock or gravel, 1/2" mean particle size, well—graded, not more than 5% by weight passing #100 sieve, shall be placed around the shoe of the hydrant so that drainage from the hydrant shall run readily from the drain ports and into the rock. The concrete thrust block at the hydrant shall not block the flow of drainage water from the drain ports. Each hydrant shall be connected to the main by a 6" lateral pipe controlled by a 6" gate valve as indicated on the contract drawings. A concrete collar shall be placed around the hydrant barrel at ground level as indicated in the contract documents or the referenced SNL standard drawing. Hydrants shall be painted per SNL specification division 9 "Painting". B. Bollards shall be installed around fire hydrants as required by the construction drawings or per the SNL standard drawings referenced in the contract documents.

A. Install indicator posts over valves on fire protection lines and on non fire protection lines in remote areas. Posts shall be bolted to the flange at the top of the valve and shall be installed plumb and true to the elevations indicated. The bury line on the indicator post shall match the final grade at the location of the indicator post. Paint indicator posts per SNL specification division 9 "Painting". Indicator posts installed on fire protection mains shall be painted red, and on non fire protection lines shall be painted yellow. Indicator posts shall be installed such that grade mark is level with the finish grade. Indicator posts installed on fire protection mains shall be installed with the following provisions: a 3/4" inch rigid metal conduit stubbed up through the concrete collar to facilitate the installation of an electric valve supervision switch in accordance with the contract documents. Refer to SNL Standard Drawing WW3002.

B. Bollards shall be installed around post indicator valves as required by the construction drawings or per the SNL standard drawings referenced in the contract documents.

Install pressure—reducing valves in valve vaults at locations and elevations indicated and as detailed on the contract drawings. 3.10 AIR AND VACUUM VALVES Install air and vacuum (A/V) valves at high points on the water line where indicated and as detailed on the contract drawings. A/V valves shall be installed in precast

reinforced concrete pipe vaults with appurtenant piping, fittings and valves as detailed in the drawings. Provide water meter type cover with vent and concrete collar as detailed. 3.11 CONNECTIONS TO SUPPLY MAINS A. Service connections to existing or new mains shall be made with fittings suitable for the particular conditions encountered and in a manner acceptable to the SDR.

Connections shall be made by cutting the supply main and inserting a standard tee, by pressure—tapping using a tapping sleeve and valve, or by saddle and corporation stop. Provide non-conducting dielectric connections wherever jointing dissimilar metals on service lines. B. All equipment used for drilling, tapping and the installation of tapping saddles and tapping sleeves shall be subject to approval by the SDR.

C. Direct—taps and multiple service saddle taps staggered around the circumference of the pipe or in a straight line are not allowed on the water main. D. Pipe coupons shall not be left inside the water main when the tapping method is used. All pipe coupons removed shall be turned over to the SDR. E. Connections 3"or larger to existing mains that are made with a tapping sleeve require the appropriate size thrust block behind the tapping sleeve.

F. Connections to existing lines made with standard fittings shall require a thrust block at the fitting in locations where mechanical joint restraint requirements can not be 3.12 SERVICE LINES A. Install service lines at the locations designated on the contract drawings. The installation of the plumbing systems shall conform to the International Plumbing Code (IPC) and

this specification. B. Copper tubing shall be cut by using cutters designed for that purpose. Bends in copper tubing shall be made using fittings or by using proper tubing benders. Bends in polyethylene tubing shall be made only with the appropriate fittings, and shall not be made by deflecting the tubing.

1. All underground joints shall be brazed.

2. Cut tube ends square. Ream, remove burrs, and size. 3. Brazed copper—to—copper joints shall be made with a silver—brazing alloy conforming to AWS A5.8, BCuP—5 (15% silver). Joints shall comply with ANSI/ASME

4. Brazed copper to brass joints shall be made with a silver—brazing alloy conforming to AWS A5.8, BAg—7 (45% silver). Joints shall comply with ANSI/ASME B31.3 5. Use sand cloth or a steel wire brush to clean surfaces to be joined. Steel wool is not permitted.

Flushing shall be performed in accordance with SNL Specification 02516 Flushing and Disinfection.

3.14 HYDROSTATIC TESTING A. WARNING: The testing methods described in this section are specifically for water pressure testing. These procedures are not permitted for air pressure testing due to the serious safety hazards involved. B. New water line installations shall be hydrostatically tested in accordance with AWWA C600 for ductile—iron pipe. The SDR shall be present at all times for the duration of the

C. All temporary plugs, taps, thrust restraints, gauges, and other necessary testing equipment must meet the same nationally recognized standards as listed in Part 2 — Products. They shall be provided by the Contractor and shall be subject to approval by SNL, except that SNL may elect to provide the gauges used in the test. D. New lines shall be tested without being connected to existing lines.

E. Hydrostatic test pressure for new lines (excluding the section of fire protection line which runs from the Post Indicator Valve (PIV) to the sprinkler riser), shall be 150 psi or 1.5 times the normal working pressure of the line, whichever is greater. In addition, test pressure for new fire lines, as defined above, shall be a minimum of 200 psi or 50 psi in excess of static pressures greater than 150 psi, per NFPA 24. Before applying the specified test pressure, air shall be expelled completely from the pipe, valves, and hydrants. If permanent air vents are not located at all high points, the contractor shall install corporation cocks at such points so that the air can be expelled as the line is filled with water. After all the air has been expelled, the corporation cocks shall be closed and the test pressure applied. At the conclusion of the pressure test, the corporation cocks shall be removed and plugged or left in place at the discretion of the SDR. Test duration shall be not less than 2 hours. During the test, the test pressure shall not drop for lines less than 1000 feet long. For lines greater than 1000 feet long, see article 3.14 F. Each section of the new line between valves shall be tested individually to demonstrate that each valve will hold the test pressure. In cases where a new main is being connected to an existing main without the installation of a new valve, the end of the new main shall be temporarily capped and restrained, and the test shall be performed on the new line. Tests shall not be made with an existing main included in the test section.

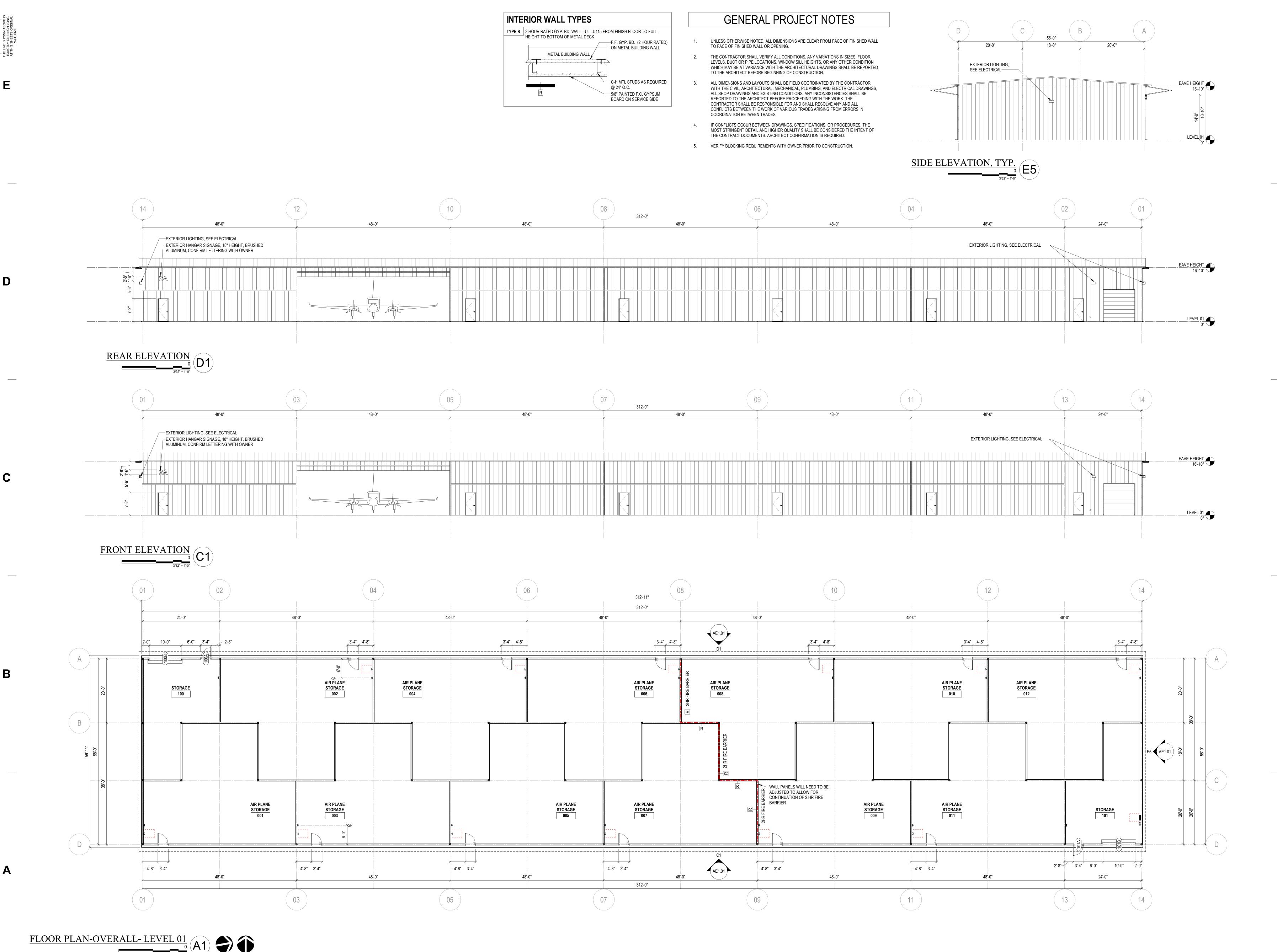
F. The allowable leakage rate for lines greater than 1000 feet long shall be 11.65 gpd, per mile, per inch nominal diameter while maintaining the test pressure. The new waterline may be accepted if the total test leakage is less than the calculated allowable leakage. If the actual leakage is greater than the allowable leakage, the Contractor shall locate the leakage and make repairs as necessary at no additional cost to SNL. The Contractor shall repeat the test until the leakage is within the specified allowance. All visible leaks, regardless of the amount of leakage, shall be repaired. G. The Contractor shall submit a calculation and the data sheet to SNL for each test, showing all data and measured quantities, including the actual leakage, the location of each test section, and a calculation of the allowable leakage for the test section. The test sheet shall be signed and dated by the Contractor's representative. For

dedicated Fire Protection lines, complete and submit a Contractor's Material and Test Certificate for Underground Piping in accordance with the current NFPA 24. 3.15 DISINFECTING Disinfection of the water system shall be performed in accordance with SNL Construction Standard Specification 02516, Flushing and Disinfection of Underground Water Lines for Domestic and Fire Protection Systems.

3.16 STORAGE A. All plastic pipe shall be protected from sunlight for long—term storage. Any plastic pipe showing discoloration shall be rejected. B. Joint materials for pipe shall be stored in as cool and shaded a place as practicable, preferably at 70 degrees F or less.

END OF SECTION

CURRENT:



HICKORY

North Carolina

Life Well Crafted

MICHAEL GRAVES

ARCHITECT:
Walter Robbs Architects, a Michael
Graves Company

530 North Trade Street, Suite 301 Winston-Salem, NC 27103 T 336.725.1371 CIVIL ENGINEER: Clayton Engineering and Design 304 15th Street S.E. P.0. Box 2351 Hickory, NC 28603 T 828.455.3456

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CODE CONSULTANT:
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Engineering

Consultant Engineering Service

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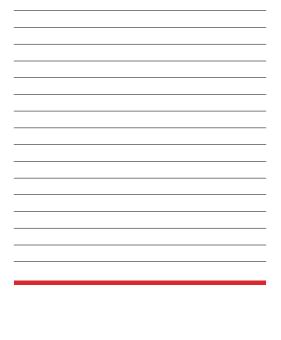
L. KENNETH MCDANIEL II

Y OF HICKORY - T HAN

TY OF HICKORY

1 9TH AVENUE DR. NW

Δ DATE DESCRIPTION



SHEET NAME:
FLOOR PLAN & ELEVATIONS

2024.02.28

ORIG SUBMISSION:
CURRENT:

SHEET:
AE1.01

GENERAL NOTES- RCP'S

1. LIGHT FIXTURES, ELECTRICAL FIXTURES, OUTLETS SHOWN ARE FOR ARCHITECTURAL COORDINATION AND DIMENSIONAL CONTROL ONLY. REF: ELECTRICAL DRAWINGS AND

FLOOR, BASE, WALL & CEILING FINISH KEY

W-1 INTERIOR LINER PANEL PROVIDED BY PEMB MANUFACTURER, COLOR TO BE SELECTED BY OWNER

C-1 PAINT ALL EXPOSED COLUMNS, METAL BUILDING FRAMES IN HANGAR WITH 2 COATS INDUSTRIAL

PAINT ALL EXTERIOR DOORS AS SPECIFIED, COLOR TO BE SELECTED BY THE OWNER

SEE KEY ON FINISH FLOOR PLAN FOR ALL FINISHES

F-# FLOOR FINISH B-# BASE FINISH

W-# WALL FINISH

C-# CEILING FINISH

F-1 SEALED CONCRETE FLOORS

ENAMEL PAINT

DOORS & DOOR FRAMES

FLOOR:

BASE:

B-1 NONE WALL FINISHES:

CEILING FINISHES:

2. NOT ALL FIXTURES MAY BE SHOWN ON ARCHITECTURAL PLANS/ELEVATIONS





ARCHITECT: Walter Robbs Architects, a Michael **Graves Company**

530 North Trade Street, Suite 301 Winston-Salem, NC 27103 T 336.725.1371 CIVIL ENGINEER: Clayton Engineering and Design 304 15th Street S.E.

P.0. Box 2351 Hickory, NC 28603 T 828.455.3456 STRUCTURAL ENGINEER: SKA Consulting Engineers, Inc

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P.O. Box 1847 Pittsboro, NC 27312 T 910.282.7351





L. KENNETH MCDANIEL II

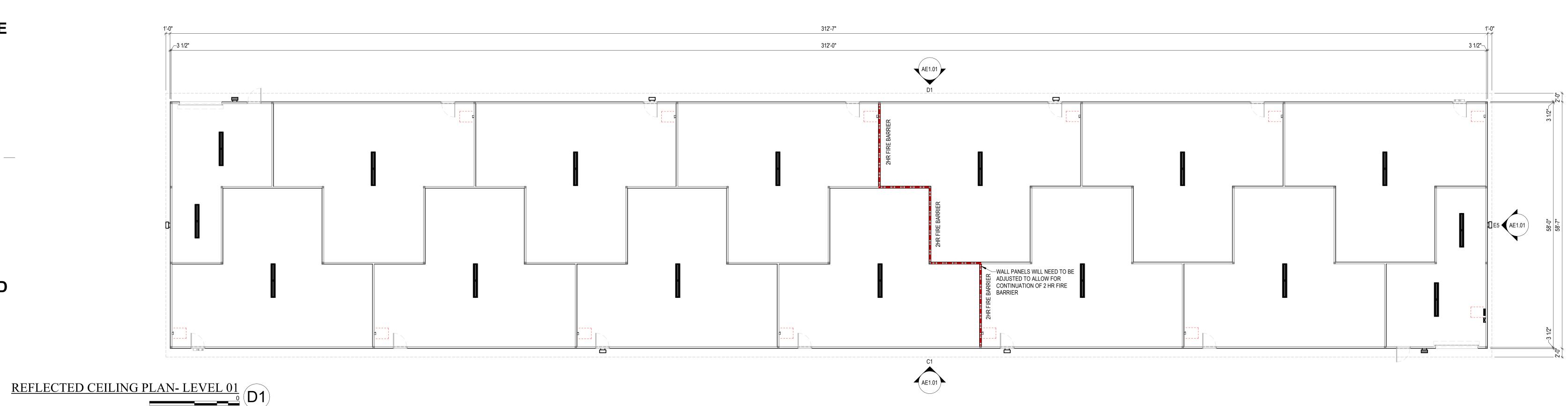
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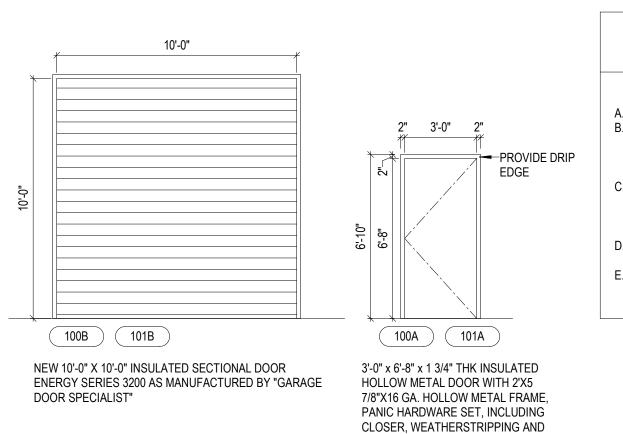
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SHEET NAME:

REFLECTED CEILING PLAN, INTERIOR FINISH PLAN & **SCHEDULES**

ORIG SUBMISSION: CURRENT:





DOOR HARDWARE NOTES

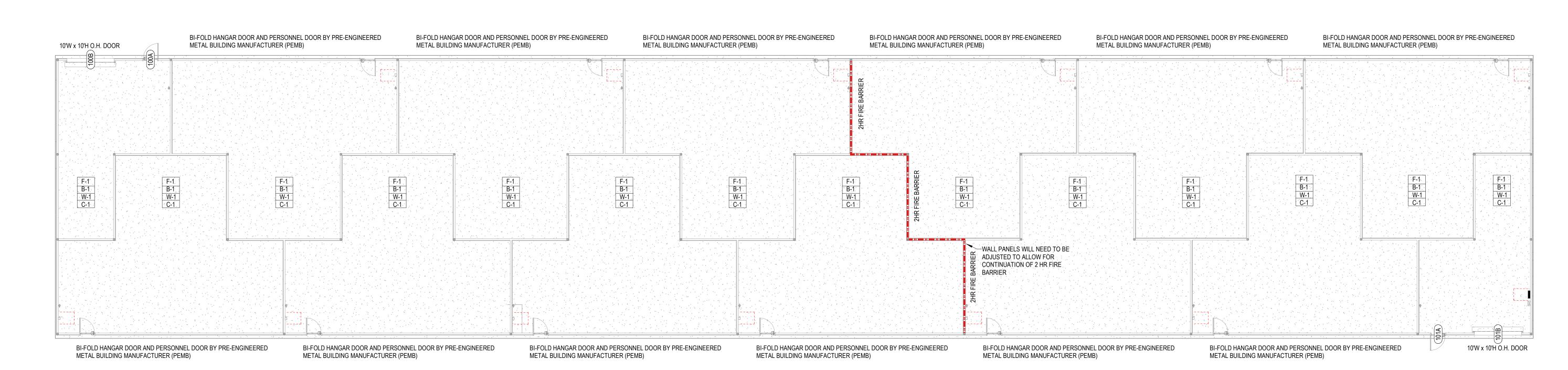
- * DOOR HARDWARE ALLOWANCE = \$1,200 EACH FOR DOORS 100A AND 101A DOOR CLOSER WILL BE INSTALLED AS REQUIRED BY APPLICABLE CODE, CLOSER SHALL BE NON-HANDED SLIM LINE DOOR CLOSER WITH COVER, MULTI-SIZED SPRING ADJUSTMENT, ADJUSTABLE BACKCHECK, SWEEP SPEED CONTROL, LATCH SPEED CONTROL AND LOW OPENING RESISTANCE. LOCK CYLINDERS SHALL BE HEAVY DUTY COMMERCIAL FIVE PIN, SOLID BRASS CYLINDER LOCKSET, 2 3/4" BACKSET, NO EXPOSED SCREWS, DE-MOUNTABLE OUTSIDE KNOBS FOR EASY CYLINDER REPLACEMENT, CORROSION RESISTANT MECHANISM AND EXPOSED TRIM TO MATCH EXISTING STANDARD. LOCK SETS SHALL BE GRADE 1 BY ANSI STANDARDS, ALL LOCK SETS SHALL HAVE LEVER TYPE HANDLES/HARDWARE. THE CONTRACTOR SHALL COORDINATE KEYING WITH THE OWNER.

EXTERIOR PAINT SCHEDULE

SHEEN SUBSTRATE PRIMER COAT TWO FINISH COATS								
SATIN / EGGSHELL GYPSUM BOARD PREPRITE PROBLOCK PRIMER, B51W620 RESILIENCE EXTERIOR SATIN K43 SERIES								
METAL-FERROUS & PRO INDUSTRIAL PRO-CRYL PRIMER PRO INDUSTRIAL DTM ACRYLIC EG-SHEL, B66-1250 SERIES								
SEMI-GLOSS / GLOSS METAL-FERROUS & PRO INDUSTRIAL PRO-CRYL PRIMER B66-1310 SERIES PRO INDUSTRIAL WB ALKYD URETHANE SEMI-GLOSS, B53-1150 SERIES								
GLOSS METAL-FERROUS & PRO INDUSTRIAL PRO-CRYL PRIMER B66-1300 SERIES PRO INDUSTRIAL PRE-CATALYZED WB URETHANE GLOSS, B65W1120 SERIES PRO INDUSTRIAL PRE-CATALYZED WB URETHANE GLOSS, B65W1120 SERIES								

	(OTTOOTOTE)			
BASED ON SHERWIN WI MANUFACTURER'S GUIL	ILLIAMS PAINTS, MAY SUE DELINES	BSTITUTE EQUIVALENT,	ALL PREPARATION AND	AF

0 1/4" = 1'-0"	OOR SCHEDULE	PO
	1/4" = 1'-0"	B3





STRUCTURAL DESIGN DATA

PLUS/MINUS

SQUARED

A. 2018 N. C. REVISIONS TO THE 2015 INTERNATIONAL BUILDING CODE.

B. MIN. DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES, ASCE 7-10. BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, ACI 318-14. BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES, ACI 530-13.

BUILDING CATEGORY II OCCUPANCY GROUP S-1, EXPOSURE C

2. FOUNDATIONS:

A. FOOTINGS - ALLOWABLE SOIL BEARING PRESSURE...... 2000 PSF (ASSUMED)

ELEVATED SLAB

SLAB-ON-GRADE

WALL FOOTING

RETAINING WALL FOOTING

 $..C_t = 1.2$

GRAVITY LOADS: A. FLOOR LIVE LOADS: **-125** PSF STORAGE . ROOF LIVE LOAD (MINIMUM) **20** PSF C. ROOF SNOW LOADS: GROUND SNOW LOAD. SNOW EXPOSURE FACTOR. . Ce = 0.9

7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGNING, FURNISHING, ERECTING, AND REMOVING ANY SHORING AND BRACING REQUIRED DURING CONSTRUCTION, INCLUDING BRACING REQUIRED FOR SIDES OF EXCAVATIONS DURING FOUNDATION CONSTRUCTION AND TEMPORARY BRACING FOR WALLS.

THE CONTRACTOR SHALL INFORM THE DESIGNER, IN WRITING, OF ANY DEVIATION FROM THE CONTRACT DOCUMENTS. CONTRACTOR SHALL NOT BE RELIEVED OF THE RESPONSIBILITY FOR SUCH DEVIATION BY VIRTUE OF THE DESIGNER'S REVIEW OF SHOP DRAWINGS, PRODUCT DATA, ETC. UNLESS THE CONTRACTOR HAS SPECIFICALLY INFORMED THE DESIGNER OF SUCH DEVIATION AT TIME OF SUBMISSION, AND THE DESIGNER HAS GIVEN WRITTEN APPROVAL FOR THE SPECIFIC DEVIATION.

PLATE

AND PROPERTY EITHER ON OR ADJACENT TO THE PROJECT AND SHALL PROTECT

THE CONTRACTOR IS SOLELY RESPONSIBLE FOR ALL SAFETY REGULATIONS,

PROGRAMS, AND PRECAUTIONS RELATED TO ALL WORK ON THIS PROJECT

SAFETY REGULATIONS SHALL BE STRICTLY FOLLOWED AT ALL TIMES.

BETWEEN EXISTING AND PROPOSED NEW CONSTRUCTION.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEANS AND METHODS OF

CONSTRUCTION AND ERECTION OF STRUCTURAL MATERIALS IN ACCORDANCE

CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO ORDERING

CONDITIONS. THE DESIGNER SHALL BE INFORMED IN WRITING OF CONFLICTS

THE STRUCTURE IS DESIGNED TO FUNCTION AS A UNIT UPON COMPLETION, AND

CONSTRUCTION LOAD IMPOSED ON NEW AND/OR EXISTING STRUCTURES. SUCH

LOADS SHALL NOT EXCEED THE CAPACITY OF THE STRUCTURE AT ANY TIME.

ANY TEMPORARY BRACING OR SUPPORT REQUIRED TO ACCOMMODATE THE

CONTRACTOR'S MEANS AND METHODS ARE THE RESPONSIBILITY OF THE

THE CONTRACTOR IS RESPONSIBLE FOR LIMITING THE AMOUNT OF

MATERIALS OR PROCEEDING WITH NEW WORK IN AREAS AFFECTED BY EXISTING

POUNDS PER SQUARE FOOT

POUNDS PER SQUARE INCH

NO OPENINGS NOR ANY CHANGES IN SIZE, DIMENSION OR LOCATION SHALL BE MADE IN ANY STRUCTURAL ELEMENTS WITHOUT WRITTEN APPROVAL OF THE

10. WHERE CONSTRUCTION TOLERANCES ALLOW FOR VARIATIONS IN LOCATION, SIZE, ETC. OF STRUCTURAL ELEMENTS, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE ALL MATERIALS AND LABOR NECESSARY TO MODIFY CONNECTION ELEMENTS AS REQUIRED TO PROVIDE A FINISHED PRODUCT WHICH IS IN ACCORDANCE WITH THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS. ANY SUCH MODIFICATIONS REQUIRED SHALL BE REVIEWED AND APPROVED BY THE DESIGNER PRIOR TO EXECUTION.

11. THE DESIGNER SHALL BE NOTIFIED AT THE PROPER TIME WHEN ITEMS ARE READY FOR FIELD REVIEW. SUFFICIENT NOTICE SHALL BE GIVEN TO ALLOW SCHEDULING OF THE FIELD REVIEW.

DRAWINGS & COORDINATION

FLANGE

FACE OF BRICK

SAME AGAINST INJURY, DAMAGE, OR LOSS.

WITH THE DRAWINGS AND SPECIFICATIONS.

FOOT: FEET

FOOTING

CONSTRUCTION

STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH ARCHITECTURAL, MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS, AND DRAWINGS OF OTHER TRADES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SEEING THAT THE WORK OF ALL TRADES IS COORDINATED WITH THE STRUCTURAL WORK.

CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL DIMENSIONS SHOWN ON THE CONTRACT DOCUMENTS.

ANYTHING WHICH, IN THE OPINION OF THE CONTRACTOR, APPEAR TO BE DEFICIENCIES, OMISSIONS, CONTRADICTIONS OR AMBIGUITIES IN THE PLANS OR SPECIFICATIONS, SHALL BE BROUGHT TO THE ATTENTION OF THE DESIGNER. CORRECTIONS OR WRITTEN INTERPRETATIONS SHALL BE ISSUED BEFORE CONSTRUCTION OF THE AFFECTED WORK MAY PROCEED.

DETAILS ARE MARKED AT THE SPECIFIC LOCATION WHERE THEY APPLY, BUT ALSO INDICATE GENERAL CONSTRUCTION REQUIREMENTS FOR OTHER LOCATIONS WITH SIMILAR CONDITIONS.

DETAILS NOTED AS "TYPICAL" MAY NOT BE REFERENCED ON THE DRAWINGS TYPICAL DETAILS APPLY AT ALL LOCATIONS WHERE THE TYPE OF CONSTRUCTION SHOWN IN THE TYPICAL DETAIL OCCURS.

THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE PROTECTION OF PERSONS 1. CODES AND STANDARDS:

SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS, AISC 360-10.

AF&PA - NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION. CONSTRUCTION TYPE II-B

IMPORTANCE FACTOR . I_S = 1.0 FLAT ROOF SNOW LOAD.. ..**15** PSF SNOW EXPOSURE FACTOR... . Ce = 0.9

THERMAL FACTOR WIND LOADS:

A. BASIC DESIGN WIND SPEED BUILDING CATEGORY RISK CATEGORY. IMPORTANCE FACTOR.. EXPOSURE CATEGORY INTERNAL PRESSURE COEFFICIENT. GCpi = +/- 0.18 G. COMPONENTS & CLADDING DESIGN PRESSURES (MIN. TRIBUTARY AREAS): SEE SCHEDULE ON 5/S1-01

H. DESIGN BASE SHEAR: SEE PEMB DRAWINGS. COMPONENTS AND CLADDING SHALL BE DESIGNED FORTHE ULTIMATE WIND PRESSURE TABULATED BELOW:

EARTHQUAKE (SEISMIC) LOADS:

A. BUILDING CATEGORY B. SITE CLASS.. SEISMIC FACTOR .. MAPPED SPECTRAL RESPONSE ACCELERATION SHORT PERIOD. SECOND PERIOD. $S_1 = 0.096$ E. MAPPED SPECTRAL RESPONSE ACCELERATION: SHORT PERIOD.. $S_{DS} = 0.240$ SECOND PERIOD. $S_{D1} = 0.153$

F. RISK CATEGORY (SEISMIC USE GROUP). G. SEISMIC DESIGN CATEGORY. H. SEISMIC FORCE RESISTING SYSTEM - STRUCTURAL STEEL SYSTEMS NOT SPECIFICALLY DESIGNED FOR SEISMIC RESPONSE MODIFICATION COEFFICIENT (R).......XXXX

SYSTEM OVERSTRENGTH FACTOR (Ω O)........ DEFLECTION AMPLITUDE FACTOR (Cd).. ..XXXX SEISMIC RESPONSE COEFFICIENT (Cs).... ANALYSIS PROCEDURE - EQUIVALENT LATERAL FORCE DESIGN BASE SHEAR - SEE PEMB DRAWINGS.

PREFABRICATED METAL BUILDING

FOUNDATION DESIGN HAS BEEN BASED ON PRELIMINARY LOADS AND MUST BE VERIFIED BY STRUCTURAL ENGINEER. METAL BUILDING SHOP DRAWINGS AND CALCULATIONS SHALL BE SUBMITTED FOR REVIEW AND FOUNDATION DESIGN PRIOR TO FABRICATIONS OF FOUNDATION REINFORCEMENT.

ALL ANCHOR BOLTS SHALL BE ASTM F1554 GRADE 36 AND SHALL BE OF THE SIZE SHOWN ON THE METAL BUILDING SHOP DRAWINGS. ANCHOR BOLTS SHALL BE SET AT AS DETAILED ON THE METAL BUILDING SHOW DRAWINGS.

METAL BUILDINGS SHALL BE DESIGNED IN ACCORDANCE WITH THE 2018 NORTH CAROLINA STATE BUILDING CODE. A. DESIGN LOADS:

ROOF LIVE LOAD = 20 PSF SNOW LOAD PLUS DRIFT

COLLATERAL DL = 5 PSF B. CONCENTRATED LOADS FROM ROOF TOP AND SUSPENDED EQUIPMENT AND ACCESSORIES SHALL BE COORDINATED WITH ARCHITECTURAL DRAWINGS AND INCLUDED IN THE DESIGN OF THE METAL BUILDING.

CONCRETE SHALL BE NORMAL WEIGHT CONCRETE UNLESS NOTED OTHERWISE. CONCRETE SHALL HAVE THE FOLLOWING MINIMUM 28-DAY COMPRESSIVE STRENGTHS UNLESS NOTED OTHERWISE IN THE PLANS OR SPECIFICATIONS.

COLUMN GRID DESIGNATION

INSULATION

INSULATION

PLYWOOD

STONE FILL

WOOD (FINISH)

WOOD (ROUGH)

PRECAST CONC.

- DETAIL NUMBER

(SIM., O.H. ETC.)

- DETAIL NOTE:

- SHEET WHERE

INDICATES AREA

SHOWN IN

EXISTING

DETAIL

DETAIL IS

DRAWN

(LARGE SCALE)

(RIGID)

(BATT)

STEEL

BRICK

BRICK

SECTION)

(ELEVATION)

CONCRETE

(SECTION)

SECTION)

ELEVATION)

DEPRESSED

SLAB AREA

EARTH/SOIL

ILL GROUT

——— SECTION NUMBER

(SIM., O.H. ETC.)

SHEET WHERE

INDICATES

SECTION IS DRAWN

DIRECTION OF VIEW

ELEVATION NUMBER

ELEVATION IS DRAWN

DIRECTION OF VIEW

NEW

SHEET WHERE

INDICATES

SECTION NOTE:

VIEW SYMBOLS

CMU

SLABS ON GRADE. PERMANENTLY EXTERIOR EXPOSED CONCRETE.. **4500** PSI ALL OTHER CONCRETE... 2. CONCRETE PERMANENTLY EXPOSED TO WEATHER SHALL HAVE A MAXIMUM

WATER/CEMENT RATIO OF 0.50 AND SHALL CONTAIN APPROXIMATELY 6% ENTRAINED AIR. SEE SPECIFICATIONS FOR FURTHER REQUIREMENTS.

CONCRETE SHALL BE BATCHED USING MATERIALS AND PROPORTIONS DESIGNATED IN THE APPROVED DESIGN MIXES. THE GENERAL CONTRACTOR SHALL PROVIDE QUALITY CONTROL OF THE CONCRETE MIX.

4. CONCRETE SLUMP SHALL BE AS INDICATED IN THE SPECIFICATIONS

THE ADDITION OF WATER TO INCREASE SLUMPS ABOVE THE LEVEL SPECIFIED OR TO RETEMPER CONCRETE WHICH HAS EXPERIENCED SLUMP LOSS DUE TO EXCESSIVE MIXING OR HEAT BUILD-UP IS NOT PERMITTED.

6. CONCRETE SHALL BE HANDLED, PLACED, AND CONSOLIDATED IN ACCORDANCE WITH THE REQUIREMENTS OF THE SPECIFICATIONS.

7. SEE SPECIFICATIONS FOR CURING AND HOT AND COLD WEATHER REQUIREMENTS FOR CONCRETE.

8. PROVIDE PRE-MOLDED EXPANSION-JOINT FILLER AT EDGES OF SLABS ON GRADE AGAINST VERTICAL SURFACES UNLESS NOTED OTHERWISE.

DOWELS FROM FOOTINGS SHALL BE ACCURATELY LOCATED AND SECURELY TIED IN PLACE PRIOR TO PLACEMENT OF THE CONCRETE. PLACEMENT OF DOWELS IN FRESH CONCRETE AFTER THE CONCRETE HAS BEEN PLACED WILL NOT BE PERMITTED. USE TEMPLATES FOR THE PLACEMENT OF DOWELS IN COLUMNS AND SHEAR WALLS.

THE CONTRACTOR SHALL USE INSTRUMENTS TO MAINTAIN A CONTINUOUS CHECK OF THE ELEVATIONS OF THE TOP SURFACES OF SLABS DURING THE PLACEMENT AND FINISHING OF THE CONCRETE. ADJUSTMENTS SHALL BE MADE TO MAINTAIN THE SURFACES WITHIN THE SPECIFIED TOLERANCES.

11. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING AND INSTALLING ALL ANCHOR BOLTS, CLIPS, INSERTS, SLEEVES AND OTHER REQUIRED ITEMS IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND IN COOPERATION WITH OTHER TRADES PRIOR TO THE PLACING OF CONCRETE.

12. CONCRETE FORMWORK SHALL NOT BE REMOVED UNTIL CONCRETE HAS REACHED SUFFICIENT STRENGTH TO NOT BE DAMAGED BY FORMWORK REMOVAL. SEE ALSO SPECIFICATIONS.

FOUNDATIONS

THE CONTRACTOR SHOULD CONFIRM THE ASSUMED ALLOWABLE SOIL BEARING PRESSURE PRIOR TO BEGINNING FOUNDATION CONSTRUCTION. ALL SUBGRADE PREPARATION SHALL BE PERFORMED AS DEFINED IN THE PLANS AND SPECIFICATIONS AND IN COOPERATION WITH THE OWNER'S GEOTECHNICAL TESTING SERVICE (IF APPLICABLE).

SPECIAL FOUNDATIONS FOR THE SUPPORT OF MECHANICAL, ELECTRICAL, OR OTHER EQUIPMENT INSIDE OR OUTSIDE OF THE BUILDING SHALL BE DESIGNED BY THE EQUIPMENT SUPPLIER(S) AND REVIEWED BY THE STRUCTURAL ENGINEER FOR COMPATIBILITY WITH THE BUILDING FOUNDATION SYSTEM. DRAWINGS OF THE FOUNDATIONS SHALL BE SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE WHERE THE BUILDING IS LOCATED.

FOUNDATION DRAINAGE AND GROUNDWATER CONTROL SYSTEMS MAY BE INDICATED IN PART ON THE STRUCTURAL DRAWINGS TO SHOW APPROXIMATE LOCATIONS RELATIVE TO CERTAIN STRUCTURAL COMPONENTS. FOUNDATION DRAINAGE AND GROUNDWATER CONTROL SYSTEMS ARE NOT A PART OF THE STRUCTURAL DESIGN. SEE OTHER DRAWINGS FOR DESIGN REQUIREMENTS OF THESE SYSTEMS.

ALL FOOTINGS ARE DESIGNED TO BEAR ON RESIDUAL SOIL OR COMPACTED ENGINEERED FILL AND TO HAVE A MINIMUM BEARING CAPACITY AS LISTED UNDER "STRUCTURAL DESIGN DATA" IN THE GENERAL NOTES. FOOTING EXCAVATIONS ARE TO BE INSPECTED BY AN INDEPENDENT TESTING LABORATORY FOR SUITABLE SOILS, BEARING PRESSURE, AND COMPACTION. COMPACTION OF SOIL UNDER FOOTINGS TO BE 100% OF THE MAXIMUM STANDARD PROCTOR DRY DENSITY.

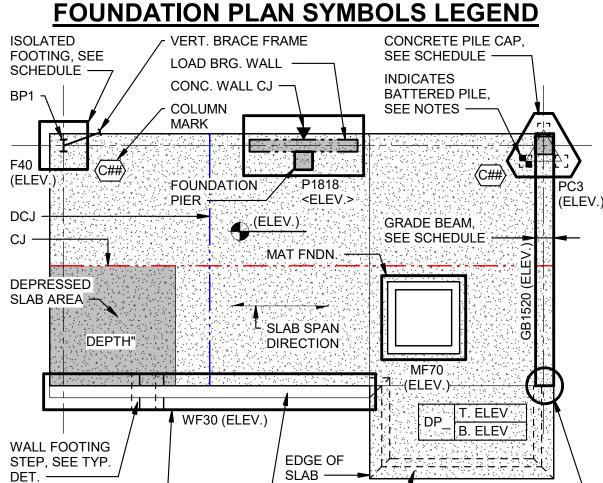
SEE FOUNDATION PLAN NOTES FOR FURTHER REQUIREMENTS.

CAISSON, SEE

TYP. DET. ———

S1-01

S2-01



THICKENED

SEE TYP. DET.

SLAB EDGE,

DETAILING, FABRICATION, STORAGE, AND INSTALLATION OF REINFORCING,

UNLESS OTHERWISE SHOWN ON THE PLANS, SHALL COMPLY WITH APPLICABLE

CONCRETE" (ACI 318) AND THE "MANUAL OF STANDARD PRACTICE FOR DETAILING

REQUIREMENTS OF THE "BUILDING CODE REQUIREMENTS FOR REINFORCED

REINFORCED CONCRETE STRUCTURES" (ACI 315), BOTH BY THE AMERICAN

REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60. REINFORCING

STEEL WELDED TO EMBEDDED STEEL PLATES OR SHAPES SHALL CONFORM TO

MARKED ON THE PLANS AS BEING CONTINUOUS SHALL BE LAPPED AT SPLICE

REINFORCING STEEL SHALL BE CLEAN OF MUD, DEBRIS, LOOSE RUST, CEMENT

GROUT, OR ANY OTHER MATERIAL WHICH MAY INHIBIT BOND BETWEEN THE

REINFORCING SHALL BE SECURELY TIED AND ANCHORED IN PLACE BEFORE

BARS SHALL BE BENT ONLY USING APPROVED METHODS. BARS SHALL NOT BE

ROLLED STEEL W-SHAPES SHALL CONFORM TO ASTM A992, GRADE 50, FY=50

KSI. STEEL PIPE SHALL CONFORM TO ASTM A53, TYPE-E, GRADE-B, FY=35 KSI.

COLD FORMED STEEL TUBING SHALL CONFORM TO ASTM A500, GRADE-B, FY=46

KSI. ALL OTHER ROLLED STEEL SHAPES, PLATES, AND BARS, SHALL CONFORM

CONNECTION DESIGNS SHALL COMPLY WITH THE REQUIREMENTS OF THE OF

A. ALL WELDS SHALL BE MADE IN ACCORDANCE WITH AWS D1.1 STRUCTURAL

B. GALVANIZED STEEL SHALL BE WELDED IN ACCORDANCE WITH AWS D1.9 -

WELDING ZINC COATED STEEL BY THE AMERICAN WELDING SOCIETY.

WELDS SHALL BE MADE BY WELDERS WHO HAVE BEEN QUALIFIED BY

D. ALL SHOP WELDS SHALL BE A MINIMUM 3/16" AND ALL FIELD WELDS SHALL

CONNECTED PARTS SHALL BE "CONTINUOUS" OR "ALL AROUND" AS

BOLTED CONNECTIONS SHALL BE MADE USING HIGH-STRENGTH BOLTS, 3/4"

6. SPLICES FOR ALL STEEL MEMBERS NOTED AS "CONTINUOUS" SHALL OCCUR

PROVIDE ADEQUATE SEPARATION BETWEEN STRUCTURAL STEEL AND

CORROSION. SEPARATION MATERIALS SHALL BE ADEQUATE TO TRANSFER

PEDESTRIANS OR OCCUPANTS SHALL BE CLASSIFIED AS ARCHITECTURALLY

EXPOSED STRUCTURAL STEEL (AESS) AS DEFINED BY THE AISC CODE OF

ALUMINUM AND OTHER DISSIMILAR METALS TO PREVENT GALVANIC

ALL STEEL WHICH IS PERMANENTLY EXPOSED TO NORMAL VIEW BY

9. SEE ARCHITECTURAL DRAWINGS FOR FIREPROOFING REQUIREMENTS.

WELDS SHALL BE CLEANED AND TOUCHED UP WITH THE APPROPRIATE

DIAMETER CONFORMING TO ASTM A325N, UNLESS OTHERWISE NOTED ON PLAN.

PROVIDE SEAL WELDS ON ALL WELDED STEEL JOINTS EXPOSED TO VIEW

MOISTURE, OR CORROSIVE CONDITIONS WHICH WOULD NOT OTHERWISE

STEEL SURFACES SHALL BE FREE OF ZINC IN THE AREA TO BE WELDED

TESTS AS PRESCRIBED IN AWS D1.1 BY THE AMERICAN WELDING SOCIETY,

BE A MINIMUM 1/4", UNLESS NOTED OTHERWISE. INDICATED WELDING OF

WELDING CODE - STEEL BY THE AMERICAN WELDING SOCIETY FOR THE

MATERIAL BEING WELDED. WELDS SHALL BE MADE USING E70XX LOW-

TO ASTM A36, FY=36 KSI. ANCHOR BOLTS SHALL CONFORM TO ASTM F1554,

ACCORDANCE WITH AISC SPECIFICATIONS, COMMENTARY, AND CODE OF

CONNECTIONS NOT DETAILED ON THE PLANS SHALL BE DESIGNED AND

THE GOVERNING BUILDING CODE AND "AISC SEISMIC PROVISIONS FOR

DETAILED BY THE FABRICATOR AND APPROVED BY THE DESIGNER.

STRUCTURAL STEEL BUILDINGS, AISC 341-10 & AISC 341S1-10".

HYDROGEN ELECTRODES UNLESS OTHERWISE NOTED

TO PERFORM THE TYPE OF WORK REQUIRED.

APPLICABLE, UNLESS NOTED OTHERWISE.

SEE SPECIFICATIONS FOR BOLT TIGHTENING METHODS.

PAINT OR ZINC COATING.

OVER SUPPORTING MEMBERS.

STANDARD PRACTICE.

BE WELDED FOR STRENGTH.

BENT AFTER PARTIAL EMBEDMENT IN HARDENED CONCRETE.

2. FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL BE IN

UNLESS OTHERWISE NOTED, CONCRETE COVERAGE ON REINFORCING STEEL

ASTM A706. DO NOT WELD REINFORCING BARS TO EACH OTHER.

INTERSECTIONS OF WALLS AND BEAMS, SEE TYPICAL DETAILS.

4. UNLESS NOTED OTHERWISE ON PLANS OR IN DETAILS, REINFORCING BARS

LOCATIONS AS SHOWN IN SCHEDULE. FOR SPLICES AT CORNERS OR

3. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185.

CONCRETE PLACEMENT TO PREVENT DISLOCATION.

STEEL AND THE CONCRETE.

SHALL BE AS FOLLOWS:

STANDARD OF PRACTICE.

STRUCTURAL STEEL

FOOTINGS - ALL FACES...

SLAB-ON-GRADE - BOTTOM..

SLAB-ON-GRADE - TOP.

CONT. WALL FOOTING | NON-LOAD

REINFORCING STEEL

SEE SCHEDULE ------ BRG. WALL -

DRAWING INDEX

GENERAL NOTES, ABBREVIATIONS, DRAWING LEGENDS AND SHEET INDEX

FOUNDATION PLAN AND NOTES

FOUNDATION PLAN SECTIONS AND DETAILS

MICHAEL GRAVES

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AARON B. BOPP

DATE DESCRIPTION

SUGGESTED SPECIFICATION FOR HOT DIP GALVANIZING AMERICAN SOCIETY FOR TESTING AND MATERIALS: ASTM A 123 ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL

E. ASTM A 153 ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE ALL STRUCTURAL STEEL MATERIALS AND ACCESSORIES WHICH ARE HOT-DIP GALVANIZED SHALL MEET SPECIFIED SPECIAL MATERIAL REQUIREMENTS.

GALVANIZING OF STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH THE

LATEST EDITION OF THE FOLLOWING PUBLICATIONS:

AMERICAN GALVANIZERS ASSOCIATION:

3. THE FOLLOWING ITEMS SHALL BE GALVANIZED:

PRODUCTS

4. ALL STEEL MATERIAL THAT EITHER SUPPORTS OR IS BUILT INTO EXTERIOR EXPOSED MASONRY CONSTRUCTION, IS OUTSIDE THE BUILDING THERMAL AND

ALL CONNECTION MATERIALS FOR GALVANIZED MEMBERS AND FOR PRECAST CONCRETE. CONNECTION MATERIALS SHALL INCLUDE, BUT NOT BE LIMITED TO, NUTS, BOLTS, WASHERS, ANCHOR BOLTS, AND ITEMS EMBEDDED IN CONCRETE.

MOISTURE BARRIERS, OR IS EXPOSED TO EXTERIOR WEATHER CONDITIONS.

6. ITEMS NOTED ON DRAWINGS TO BE GALVANIZED.

GALVANIZED STEEL SHALL BE WELDED IN ACCORDANCE WITH AWS D19 -WELDING ZINC COATED STEEL BY THE AMERICAN WELDING SOCIETY. STEEL SURFACES SHALL BE FREE OF ZINC IN THE AREA TO BE WELDED.

8. AFTER GALVANIZED MATERIALS ARE INSTALLED. REPAIR DAMAGE AND EXTEND GALVANIZED COATING WITH SPECIFIED ZINC TOUCH-UP MATERIAL TO PROVIDE THE FULL SPECIFIED EXTENT OF ZINC COATING COVERAGE.

GALVANIZED COATING SHALL BE REPAIRED BY CLEANING SURFACE, POWER DISC SANDING TO BRIGHT METAL, AND APPLYING AN ORGANIC COLD GALVANIZING COMPOUND WITH A MINIMUM OF 94% ZINC DUST IN THE DRY FILM, 8 MILS MINIMUM DFT, THREE COATS MINIMUM.

SUBMITTAL NOTES

ALL SHOP DRAWINGS MUST BE REVIEWED AND STAMPED BY THE GENERAL CONTRACTOR PRIOR TO SUBMITTAL. SUBMITTAL WITHOUT CONTRACTOR REVIEW WILL RESULT IN DELAYS. THE CONTRACTOR SHALL CONFIRM THAT SHOP DRAWINGS HAVE BEEN COMPLETED AND CHECKED BY THE SUPPLIER PRIOR TO SUBMISSION.

CONTRACTOR SHALL SUBMIT SHOP DRAWINGS IN ELECTRONIC FORMAT.

SHOP DRAWINGS SUBMITTALS REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL SPECIFICATIONS. CHANGES OR ADDITIONS MADE ON RESUBMITTED SHOP DRAWINGS SHALL BE CLEARLY INDICATED, AND THE PURPOSE OF THE RESUBMITTAL SHALL BE NOTED ON THE TRANSMITTAL REVIEW OF THE RESUBMITTED SHOP DRAWINGS SHALL BE LIMITED SPECIFICALLY TO THE ITEMS NOTED FOR CORRECTION ON THE PREVIOUS

THE NOTATIONS FOLLOWING SUBMITTAL ITEMS INDICATE THE FOLLOWING:

A. INCLUDE A CERTIFICATE OF COMPLIANCE WITH CONTRACT DOCUMENTS SIGNED AND SEALED BY THE PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF NORTH CAROLINA RESPONSIBLE FOR THE DESIGN.

SUBMIT ONE COPY FOR INFORMATION AND RECORD ONLY. CALCULATIONS AND SHOP DRAWINGS SHALL BE SIGNED AND SEALED BY A PROFESSIONAL ENGINEER THAT IS REGISTERED IN THE STATE WHERE THE BUILDING IS LOCATED.

MANUFACTURER'S LITERATURE: SUBMIT TWO COPIES OF MANUFACTURER'S LITERATURE FOR ALL MATERIALS AND PRODUCTS USED IN CONSTRUCTION OF

THE ENGINEERS'S REVIEW OF SHOP DRAWINGS IF FOR GENERAL CONFORMANCE OF THE DESIGN CONCEPT. CONTRACTOR SHALL SUBMIT A SCHEDULE OF SHOP DRAWINGS SUBMITTALS THAT IS ACCEPTABLE TO BOTH CONTRACTOR AND ENGINEER. AFTER THE CONTRACTOR HAS REVIEW THE SHOP DRAWINGS, PROMPT REVIEW BY THE ENGINEER WILL BE MADE OF AL SUBMITTALS FOR LARGE SUBMITTALS, REASONABLE REVIEW TIME SHALL BE ALLOW AND MAY EXCEED TWO WEEKS. THE CONCURRENT SUBMITTAL OF MULTIPLE SHOP DRAWINGS ("DUMPING") WILL FURTHER EXTEND THE REVIEW PROCESS AND TIME FRAME NECESSARY TO PROPERLY REVIEW EACH SUBMITTAL.

THE CONTRACTOR IS RESPONSIBLE FOR PROPER CHECKING AND COORDINATION OF DETAILS, DIMENSIONS, SIZES AND QUANTITIES AS REQUIRED TO FACILITATE COMPLETE AND ACCURATE FABRICATION AND ERECTION.

REPRODUCTION OF THESE CONTRACT DOCUMENTS FOR USE IN SHOP DRAWINGS IS NOT PERMITTED.

SHEET INDEX ORIG SUBMISSION:

CURRENT:

SHEET NAME:

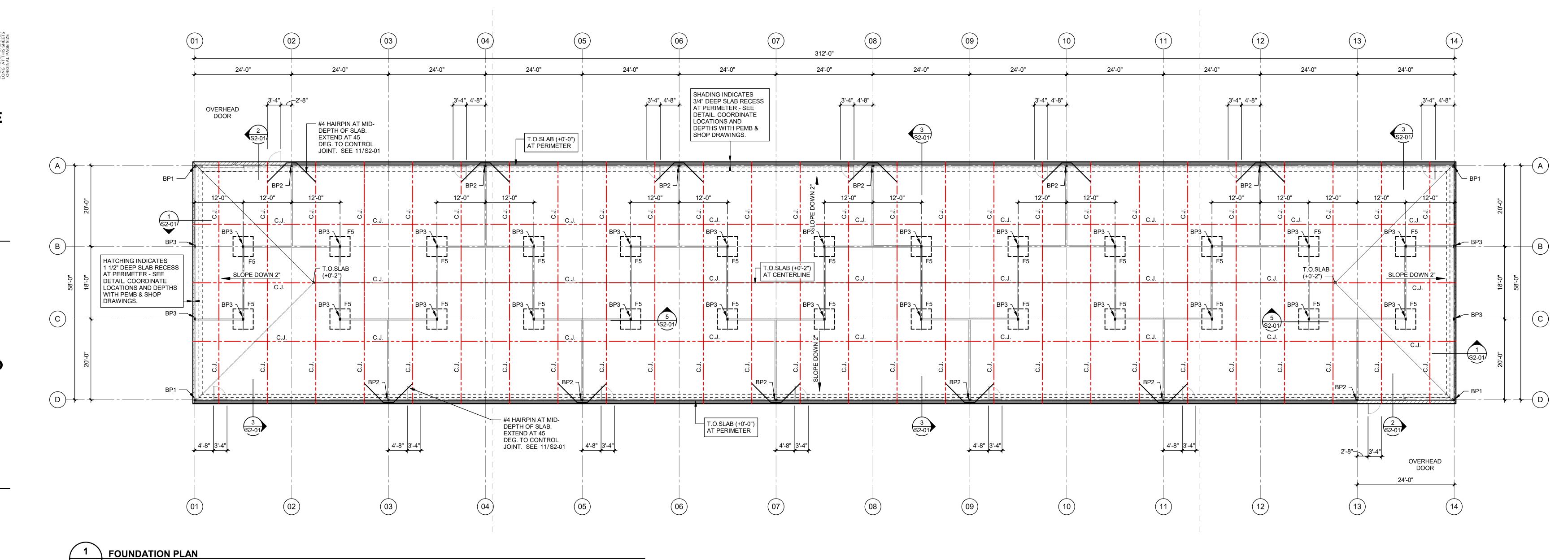
GENERAL NOTES,

ABBREVIATIONS.

DRAWING LEGENDS AND

SHEET:

02-28-2024



FOUNDATION PLAN NOTES

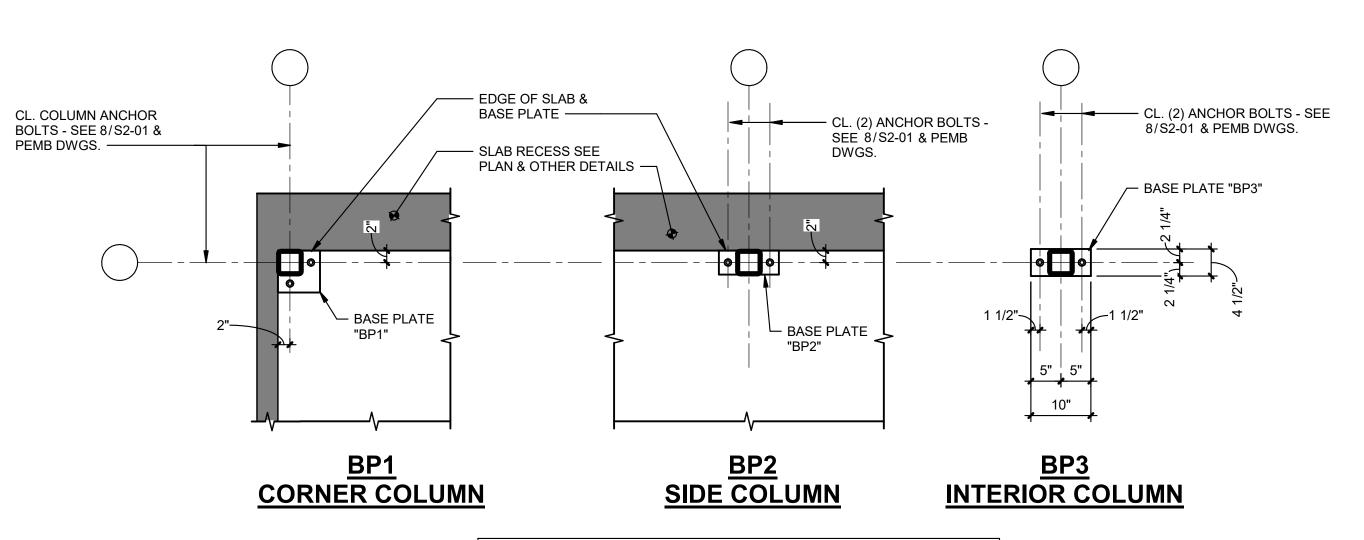
- 1. ELEVATIONS: THE REFERENCE ELEVATION (0'-0") FOR ALL ELEVATIONS SHOWN ON THE FOUNDATION PLAN SHALL BE AT THE TOP OF THE EXISTING SLAB ON GRADE AND NEW SLAB-ON-GRADE. SEE SITE PLAN FOR SPECIFIED ELEVATION OF FIRST FLOOR.
- 2. 'F5' DENOTES 5'-0" X 5'-0" X 1'-6" THICKENED SLAB COLUMN FOOTING. SEE DETAIL 5/S2-01.
- 3. 'BPX' DENOTES COLUMN BASE PLATE. SEE SCHEDULE AND 2/S1-01.

4. SEE MATERIALS AND SYMBOL LEGEND ON SHEET **\$0-01** FOR SCHEDULE KEY

- FOR ALL SCHEDULED ITEMS USED ON THIS PLAN: SEE ARCHITECTURAL AND CIVIL DRAWINGS FOR EXTERIOR CONCRETE PADS,
- DRIVEWAYS, AND SIDEWALKS NOT SHOWN ON THIS DRAWING.
- 2. WALL PROJECTIONS, CHASES, PIERS, AND SIMILAR DETAIL ITEMS MAY NOT BE SHOWN; SEE ARCHITECTURAL DRAWINGS FOR THESE ITEMS.

SLAB-ON-GRADE NOTES

- 1. UNLESS OTHERWISE NOTED, THE CONCRETE SLAB-ON-GRADE SHALL COMPLY WITH THE FOLLOWING:
 - THICKNESS: REINFORCING:
- #4 @ 16" O/C EACH WAY. 2" CLEAR FROM TOP OF SLAB. VAPOR BARRIER: 15 MIL POLYETHYLENE PLACED ON TOP OF STONE BASE STONE BASE: 6" COMPACTED #57 WASHED STONE
- 2. SEE MATERIALS AND SYMBOL LEGEND ON SHEET S1.1 FOR SCHEDULE KEY FOR ALL SCHEDULED ITEMS USED ON THIS PLAN:
- JOINTS:
 - A. SLAB CONSTRUCTION JOINTS SHALL BE LOCATED AT INDICATED CONTROL JOINT LOCATIONS. ALL CONSTRUCTION JOINTS SHALL HAVE DOWELS. B. COORDINATE ALL SLAB JOINT LOCATIONS WITH JOINTS IN ARCHITECTURAL
- FLOOR FINISHES TO ASSURE THAT ALIGNMENT IS APPLICABLE. 2. SLAB DEPRESSIONS: DEPRESSED AREAS ARE SHOWN ON THE PLAN FOR
- ESTIMATING PURPOSES ONLY. LOCATIONS AND DEPTHS OF ALL SLAB DEPRESSIONS SHALL BE DETERMINED IN ACCORDANCE WITH ARCHITECTURAL DRAWINGS. SLAB SLOPES: SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS OF FLOOR DRAINS
- AND SLOPED SLAB AREAS. SLOPE SURFACE UNIFORMLY TO DRAIN. SLOPED SLABS WHICH POND WATER SHALL BE REPLACED.
- 4. SEE ALL TYPICAL DETAILS SHOWING CONSTRUCTION RELATED TO SLABS-ON-GRADE INCLUDING THOSE INDICATED BELOW:
- "SLAB-ON-GRADE JOINTS" "SLAB-ON-GRADE REINFORCING" "DEPRESSION AT SLAB-ON-GRADE"



NOTE:
BASE PLATE SIZES AND ANCHOR BOLT DIAMETERS ARE BY PRE-ENGINEERED METAL BUILDING (PEMB) MANUFACTURER AND SHOWN HERE FOR FOUNDATION LOCATION. COORDINATE WITH PEMB DRAWINGS.

COLUMN BASE PLATE TYPES

NOTE: THE CONTRACTOR SHALL SUBMIT FINAL METAL BUILDING REACTIONS PRIOR TO SUBMITING FOUNDATION REINFORCING SHOP DRAWINGS. THE FINAL FOOTING SIZES WILL NOT BE CONFIRMED UNTIL FINAL METAL BUILDING REACTIONS ARE SUBMITTED TO THE ENGINEER OF RECORD. FINAL FOOTING SIZES MAY VARY BASED ON FINAL REACTIONS.

PRELIMINARY COLUMN REACTION SCHEDULE										
COLUMN (LBS.)	COL. LINES A & D	COL. LINES B & C	COL. B1, C1, B14, C14							
MAX. VER. REACTION	>13,600	>11,800	>2800							
MAX. NET UPLIFT	-5300	-5600	-2000							
MAX. HOR. SHEAR X-DIR.	2000	3200	2400							
MAX. HOR. SHEAR Z-DIR.	2000	0	1800							

GENERAL NOTE:

1. ALL COLUMN REACTIONS PROVIDED BY METAL BUILDING MANUFACTURER.

REMARKS:
PRELIMINARY COLUMN REACTIONS ARE ASD.

ULTIMATE WIND PRESSURE SCHEDULE							
ZONE PER FIG. 30.4-1	EFFECTIVE WIND AREA	POSITIVE PRESSURE (PSF)	NEGATIVE PRESSURE (PSF)				
1	50	+10.7	-41.4				
2	50	+10.7	-54.8				
3	50	+10.7	-68.6				
4	10	+30.7	-33.3				
4	20	+29.3	-31.9				
4	50	+27.5	-30.1				
4	100	+26.1	-28.6				
5	10	+30.7	-41.2				
5	20	+29.3	-38.3				
5	50	+27.5	-34.7				
5	100	+26.1	-31.0				



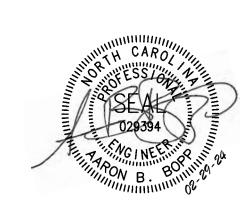
MICHAEL

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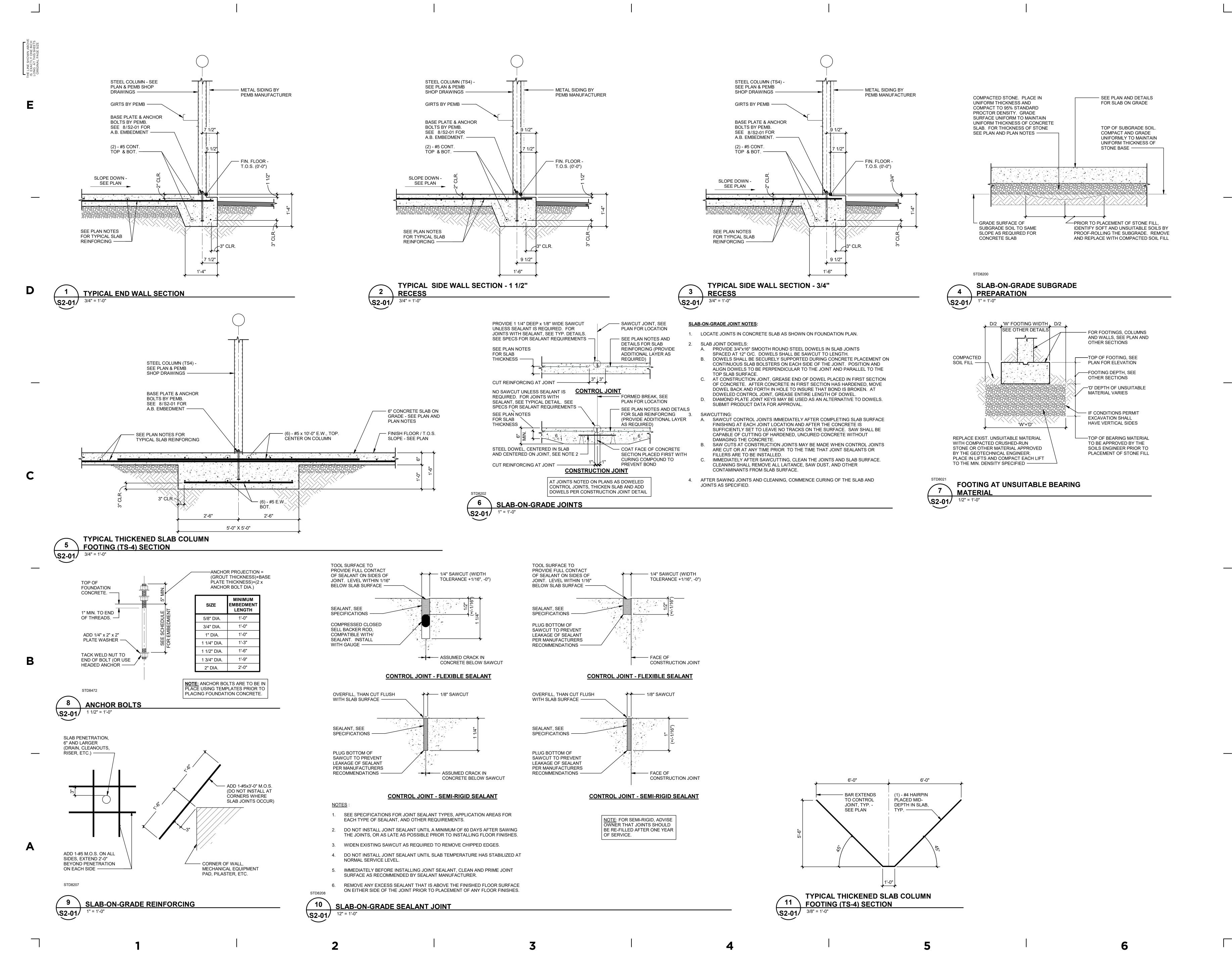
AARON B. BOPP

△ DATE DESCRIPTION

SHEET NAME: FOUNDATION PLAN AND NOTES

ORIG SUBMISSION:

S1-01





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AARON B. BOPP

R DR

08

△ DATE DESCRIPTION

FOUNDATION PLAN **SECTIONS AND DETAILS**

ORIG SUBMISSION: CURRENT:

SHEET NAME:

SHEET:

S2-01

2024.02.28

ELECTRICAL SPECIFICATIONS AND NOTES

CODES AND STANDARDS

ASHRAE/IES 90.1 ENERGY CONSERVATION CODE

NCSBC NORTH CAROLINA STATE BUILDING CODE NATIONAL ELECTRICAL CODE NATIONAL ELECTRICAL SAFETY CODE

ALL WORK SHALL BE FIRST CLASS IN NATURE AND SHALL BE IN ACCORDANCE WITH RECOGNIZED STANDARDS, PROCEDURES, AND MATERIALS. RECOGNIZED STANDARDS INCLUDE, BUT ARE NOT LIMITED TO:

ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST FEDERAL, STATE, AND LOCAL CODES, AS AMENDED BY THE STATE IN WHICH THE WORK IS BEING PERFORMED. THIS

AMERICAN ASSOCIATION OF EDISON ILLUMINATING COMPANIES ASTM AMERICAN SOCIETY FOR TESTING AND MATERIALS

ENVIRONMENTAL PROTECTION AGENCY INTERNATIONAL CODE COUNCIL

INSULATED CABLE ENGINEERS ASSOCIATION ICEA

INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS ILLUMINATING ENGINEERING SOCIETY

NECA NATIONAL ELECTRICAL CONTRACTOR ASSOCIATION NEIS NATIONAL ELECTRICAL INSTALLATION STANDARDS NEMA NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION

INTERNATIONAL ELECTRICAL TESTING ASSOCIATION

NATIONAL FIRE PROTECTION ASSOCIATION OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION TOXICITY CHARACTERISTIC LEACHING PROCEDURE

UNDERWRITERS LABORATORIES (OR APPROVED 3RD PARTY TESTING AGENCY)

THE INSTALLATION SHALL ALSO COMPLY WITH ALL PERTINENT ORDINANCES, REGULATIONS, AND THE MANUFACTURER'S INSTRUCTIONS.

MATERIAL INSTALLED SHALL BE NEW AND CONFORM TO INDUSTRY STANDARDS.

NETA

EQUALS: SPECIAL ATTENTION IS DIRECTED TO N.C. GENERAL STATUE 133-3 ON APPLICABLE PROJECTS. THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS IS TO ENCOURAGE FREE AND OPEN COMPETITION ON PUBLIC CONTRACTS. REFER TO THE GENERAL CONDITIONS AND SPECIFICATIONS FOR SUBMITTING APPROVED EQUALS

DOCUMENTS: REFER TO THE GENERAL CONDITIONS, SUPPLEMENTAL GENERAL CONDITIONS, AND INSTRUCTIONS TO BIDDERS FOR ADDITIONAL INFORMATION. THESE DOCUMENTS ARE A PART OF THE CONTRACT DOCUMENTS.

OBTAIN ALL CONTRACT DOCUMENTS THAT PERTAIN TO THIS PROJECT. THIS INCLUDES DRAWINGS, SPECIFICATIONS, AND SUBMITTALS FOR OTHER TRADES. CONNECT AND PROVIDE SERVICES FOR EQUIPMENT AS SHOWN OR INDICATED WHEN APPLICABLE.

ADDENDA: OBTAIN EACH ADDENDA AND INCORPORATE THEM INTO THE BID.

INSURANCE: PROVIDE INSURANCE AS INDICATED IN THE GENERAL CONDITIONS, SPECIFICATIONS, OR AS DIRECTED BY THE OWNER PRIOR TO BID.

FEES: PAY ALL REQUIRED INSPECTION FEES PERTAINING TO THIS CONTRACTOR'S SCOPE OF WORK AND INCLUDE THE COST IN THE BID.

ALTERNATES & UNIT PRICES: EACH BIDDER IS RESPONSIBLE FOR BIDDING ALTERNATES AND UNIT PRICES AS INDICATED COMPLETE INSTALLATION: FURNISH ALL MATERIAL, LABOR, AND EQUIPMENT FOR A COMPLETE INSTALLATION FOR EACH ITEM OR SYSTEM.

THE TERM "PROVIDE" MEANS TO FURNISH, INSTALL, AND CONNECT WITH ALL RELATED HARDWARE, SOFTWARE, AND ACCESSORIES FOR A COMPLETE INSTALLATION READY FOR USE.

NOTIFY INSPECTORS: NOTIFY THE APPROPRIATE INSPECTORS TO SCHEDULE REQUIRED INSPECTIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ELECTRICAL INSPECTOR, FIRE MARSHAL, AUTHORITY HAVING JURISDICTION, AND THE ENGINEER OF RECORD.

CONTRACT SUPERVISOR: ASSIGN AND MAINTAIN A SINGLE QUALIFIED PERSON AS THE JOB SUPERINTENDENT THAT IS DEDICATED TO THIS PROJECT. QUALIFIED PERSONNEL: PROVIDE ADEQUATE MANPOWER TO MEET THE SCHEDULE. THIS INCLUDES QUALIFIED ELECTRICIANS AND MECHANICS THAT ARE PROPERLY

LICENSED AND SKILLED IN THE INSTALLATION OF THIS TYPE OF WORK.

MODIFICATIONS: MINOR CHANGES IN LOCATIONS OF EQUIPMENT SUCH AS RECEPTACLES, LIGHT FIXTURES, AND OTHER EQUIPMENT MAY BE MADE AT ANY TIME PRIOR TO ELECTRICAL ROUGH-IN WITHOUT CAUSING ADDITIONAL COST TO THE OWNER.

ITE CONDITIONS: VISIT THE PROJECT SITE PRIOR TO THE BID TO BECOME FAMILIAR WITH THE PROJECT CONDITIONS. DIRECT ANY QUESTIONS TO THE ENGINEER A MINIMUM

COORDINATION: COORDINATE INSTALLATION WITH THE OWNER'S REPRESENTATIVE, GENERAL CONTRACTOR, AND OTHER TRADES AS APPLICABLE. AVOID CUTTING OR DAMAGING THE WORK OF OTHER TRADES. WHERE CUTTING IS UNAVOIDABLE, COORDINATE WITH OTHER CONTRACTORS FIRST. REPAIR WORK TO MATCH

STRUCTURE: DO NOT CUT THE STRUCTURE WITHOUT WRITTEN APPROVAL FROM THE STRUCTURAL ENGINEER.

SLEEVES: PROVIDE, PLACE, AND NEATLY GROUT SLEEVES FOR ELECTRICAL WORK IN WALLS AND PARTITIONS.

FIRE CAULK: SEAL AIRTIGHT AROUND ALL CONDUITS, CABLES, BOXES, ETC...THAT ARE RUN THROUGH WALLS, FLOORS, PARTITIONS, AND CEILINGS. USE FIRE BARRIER CAULK AND PUTTY EQUAL TO 3M TYPE 303 PUTTY OR TYPE CP-25 CAULK AS APPLICABLE.

PENETRATIONS: PENETRATIONS THROUGH SMOKE RATED PARTITIONS AND FIRE WALLS SHALL BE PROTECTED PER CODE. APPROVED ASSEMBLIES AND MATERIALS SHALL BE USED AS REQUIRED. COORDINATE WITH THE GENERAL CONTRACTOR AND/OR ENGINEER.

DEFECTIVE EQUIPMENT: REMOVE AND REPLACE EQUIPMENT THAT IS DEFECTIVE OR THAT IS DAMAGED DURING CONSTRUCTION.

CHANGES: DEVIATIONS FROM THE DRAWINGS AND SPECIFICATIONS SHALL BE REQUESTED IN WRITING PRIOR TO CHANGES BEING MADE. DEVIATIONS SHALL NOT BE MADE

SUBMITTALS: SUBMIT 6 COPIES OF SUBMITTAL DATA FOR ALL MATERIALS AND EQUIPMENT TO BE INSTALLED ON THIS PROJECT. ELECTRONIC SUBMITTALS ARE ALSO ACCEPTABLE.

SUBMITTALS SHALL COMPLY WITH THE DRAWINGS, SPECIFICATIONS, AND CODE. INCLUDE MANUFACTURER CURRENT SPECIFICATION AND LITERATURE HIGHLIGHTED AND CLEARLY MARKED INDICATING MATERIALS AND EQUIPMENT TO BE PROVIDED.

SUBMITTAL DATA SHALL INCLUDE EQUIPMENT SIZES, CAPACITIES, VOLTAGE, AMPERAGE, ACCESSORIES, REQUIREMENTS FOR ACCESS AND MAINTENANCE, CLEARANCES, AND OTHER PERTINENT INFORMATION.

ONCE SUBMITTALS COMPLY AND ARE CLEARLY MARKED, STAMP AND SUBMIT TO THE THE ENGINEER FOR APPROVAL. SUBMITTALS WILL NOT BE REVIEWED IF THEY ARE NOT

RECORD DRAWINGS: MAINTAIN A SET OF RECORD DRAWINGS ON SITE THROUGHOUT CONSTRUCTION AND UPDATE DAILY.

MARK RECORD DRAWINGS WITH ALL REVISIONS, CHANGES, AND DEVIATIONS SHOWING ACCURATE AS-BUILT CONDITIONS. INCLUDE REVISIONS TO ALL SCHEDULES AS WELLS AS REVISED LOCATIONS FOR DEVICES, CONDUITS, PANELBOARDS, EQUIPMENT, BOXES, WALLS, ETC..

SUBMIT 2 COPIES OF THE MARKED UP RECORD DRAWINGS TO THE ENGINEER AT THE COMPLETION OF THE PROJECT.

<u>UTILITIES:</u> ON APPLICABLE PROJECTS, COORDINATE POWER, TELEPHONE, TELEVISION, AND DATA SERVICE REQUIREMENTS WITH LOCAL UTILITIES PRIOR TO SUBMITTING A BID PROPOSAL.

PROVIDE TEMPORARY UTILITIES AS INDICATED IN THE GENERAL CONDITIONS OR AS DIRECTED BY THE OWNER.

TEMPERATURE RATINGS: ALL ELECTRICAL CONNECTORS, LUGS, BREAKERS, EQUIPMENT, ETC... SHALL BE RATED A MINIMUM OF 75 DEGREES CELSIUS.

BUILDING WIRE AND CABLE

A. <u>GENERAL</u>

1. ALL WIRE AND CABLE SHALL BE LISTED BY AN "APPROVED" THIRD-PARTY AGENCY ACCREDITED BY THE NCBCC

2. PRIOR TO ENERGIZING FEEDERS, SUB-FEEDERS AND SERVICE CONDUCTORS, TEST CONDUCTORS FOR ELECTRICAL CONTINUITY AND SHORT CIRCUITS. A COPY OF THESE TESTS SHALL BE SENT TO THE ENGINEER OF RECORD, THE OWNER, AND MADE AVAILABLE TO THE AUTHORITY HAVING JURISDICTION.

ALL WIRE AND CABLE SHALL BE RUN IN RACEWAY.

4. MINIMUM FULL SIZE NEUTRAL WIRE SHALL BE PROVIDED FOR EACH SINGLE PHASE BRANCH CIRCUIT REQUIRING A NEUTRAL. SHARING OF NEUTRALS BETWEEN BRANCH CIRCUITS IS NOT ALLOWED.

B. <u>CONDUCTORS</u>

1. CONDUCTORS AND CABLES SHALL BE 600 VOLTS, THHN/THWN, COPPER. ALUMINUM CONDUCTORS ARE NOT ALLOWED

2. POWER AND LIGHTING CIRCUITS #10AWG AND SMALLER SHALL HAVE SOLID COPPER CONDUCTORS. CONDUCTOR SIZES #8AWG AND LARGER SHALL HAVE CLASS B STRANDED COPPER CONDUCTORS. ALUMINUM CONDUCTORS ARE NOT ALLOWED.

3. POWER AND LIGHTING CIRCUITS' MINIMUM CONDUCTOR SIZE SHALL BE #12AWG, AND MAXIMUM SIZE ALLOWED SHALL BE 500 KCMIL UON.

4. FIRE ALARM AND CONTROL WIRING SHALL HAVE STRANDED COPPER CONDUCTORS.

5. FULL SIZE NEUTRAL CONDUCTOR SHALL BE PROVIDED FOR EACH SERVICE PANEL AND SUB-PANEL.

C. <u>INSULATION</u>

1. THE INSULATION TYPE FOR INTERIOR WIRING SHALL BE DUAL-RATED THHN/THWN OR XHHW.

D. <u>VOLTAGE DROP</u>

1. WHERE THE CONDUCTOR LENGTH FROM THE PANEL TO THE FIRST OUTLET ON A 120-VOLT CIRCUIT EXCEEDS 50 FEET, THE BRANCH CIRCUIT CONDUCTORS FROM THE PANEL TO THE FIRST OUTLET SHALL NOT BE SMALLER THAN #10 AWG.

E. COLOR CODING

THE SECONDARY SERVICE, FEEDERS, AND BRANCH CIRCUITS SHALL BE COLOR CODED AS FOLLOWS:

240/120\ BLACK RED

NEUTRAL WHITE GROUND GREEN F. SPLICING

1. JOINTS IN SOLID CONDUCTORS SHALL BE SPLICED USING IDEAL "WIRE NUTS," 3M COMPANY "SCOTCHLOCK" OR T&B CONNECTORS IN JUNCTION BOXES, OUTLET BOXES,

2. "STA-KON," "PIGGY," OR OTHER PERMANENT TYPE CRIMP CONNECTORS SHALL NOT BE USED FOR #10 AWG AND SMALLER CONDUCTORS.

3. JOINTS IN STRANDED CONDUCTORS SHALL BE SPLICED BY APPROVED MECHANICAL CONNECTORS AND GUM RUBBER TAPE OR FRICTION TAPE. PERMANENT COMPRESSION CONNECTORS FOR SPLICES AND TAPS, PROVIDED UL-APPROVED INSULATING COVERS, MAY BE USED INSTEAD OF MECHANICAL CONNECTORS PLUS TAPE. 4. CONDUCTORS, IN ALL CASES, SHALL BE CONTINUOUS FROM OUTLET TO OUTLET AND NO SPICING SHALL BE MADE EXCEPT WITHIN OUTLET OR JUNCTION BOXES, TROUGHS AND GUTTERS.

A. GROUNDING CONDUCTORS SHALL BE COLORED SOLID GREEN. CONDUCTORS INTENDED AS NEUTRAL SHALL BE COLORED SOLID WHITE ON 120/208

B. THE RACEWAY SYSTEM SHALL NOT BE RELIED ON FOR EQUIPMENT GROUND CONTINUITY. A GREEN EQUIPMENT GROUNDING CONDUCTOR PROPERLY SIZED PER NEC TABLE 250-122, SHALL BE RUN IN ALL RACEWAYS EXCEPT FOR TELECOMMUNICATIONS, DATA, AUDIO, AND LOW VOLTAGE RACEWAYS FOR FIRE ALARM SYSTEMS.

C. BOND CABLE TRAYS TO MAKE THEM ELECTRICALLY CONTINUOUS. GROUND PER CODE.

D. THE ELECTRICAL SERVICE SHALL BE GROUNDED BY THREE MEANS, WHEN AVAILABLE, PER THE NEC

1. TO THE METALLIC COLD-WATER PIPE, PER NEC 250-52.

VOLT CIRCUITS AND NATURAL GRAY ON 277/480 VOLT CIRCUITS.

2. TO THE STEEL FRAME OF THE BUILDING, PROVIDED THE BUILDING FRAME IS EFFECTIVELY GROUNDED. IN NEW CONSTRUCTION, EFFECTIVELY GROUND AND BOND STEEL BUILDING FRAME.

3. TO GROUND ROD(S). GROUND RODS SHALL BE 10 FEET LONG AND 3/4 INCH IN DIAMETER, AND SHALL BE OF COPPER-CLAD STEEL CONSTRUCTION. ALL GROUND CONNECTIONS SHALL BE ACCESSIBLE. PROVIDE A TEST WELL FOR EACH GROUND ROD DRIVEN.

E. BOXES WITH CONCENTRIC, ECCENTRIC, OR OVER-SIZED KNOCKOUTS SHALL BE PROVIDED WITH BONDING BUSHINGS AND JUMPERS. THE JUMPER

SHALL BE SIZED PER NEC TABLE 250-122 AND LUGGED TO THE BOX. F. WHERE ONE BUILDING IS FEEDING ANOTHER BUILDING, THE INSTALLATION SHALL COMPLY WITH APPLICABLE REQUIREMENTS OF NEC ARTICLES 225

G. THE GAS PIPING SYSTEM SHALL BE BONDED TO THE EQUIPMENT GROUND AS REQUIRED PER THE NEC AND NC FUEL GAS CODE. H. IDENTIFY EACH GROUNDING ELECTRODE CONNECTED TO A COMMON GROUND BUS. THE COMMON GROUND BUS SHALL NOT BE LESS THAN 4" HIGH BY 1/4" THICK, WITH LENGTH AS REQUIRED. LENGTH SHALL BE PROVIDED WITH 25% CAPACITY.

SUPPORTING DEVICES A. RACEWAY AND BOXES SHALL BE SUPPORTED IN A METHOD AND AT A SPACING AS APPROVED BY THE NEC, EXCEPT AS NOTED HEREIN.

B. CONDUIT SHALL BE SUPPORTED BY APPROVED PIPE STRAPS OR CLAMPS.

C. CONDUITS INSTALLED ON THE INTERIOR OF EXTERIOR BUILDING WALLS SHALL BE SPACED OFF THE WALL SURFACE A MINIMUM OF 1/4 INCH USING CLAMP-BACKS OR STRUT.

D. PIPE STRAPS OR CLAMPS SHALL BE SECURED BY MEANS OF: TOGGLE BOLTS ON HOLLOW MASONRY

2. METAL EXPANSION SHIELDS AND MACHINE SCREWS, OR STANDARD PRE-SET INSERTS, ON CONCRETE OR SOLID MASONRY.

3. MACHINE SCREWS OR BOLTS ON METAL SURFACES.

4. WOOD SCREWS ON WOOD CONSTRUCTION. POWER ACTUATED FASTENERS ARE NOT ALLOWED.

A. BELOW SLAB ON GRADE AND UNDERGROUND: PVC SCHEDULE 40 WITH ASPHALT COATED RIGID ELBOWS AND GROUND WIRE. ALL THREADED AND CONNECTIONS AND JOINTS SHALL BE WATERTIGHT.

B. <u>ABOVE SLAB ON GRADE AND OVERHEAD:</u> EMT CONDUIT WITH STEEL, COMPRESSION TYPE FITTINGS UNLESS OTHERWISE NOTED OR REQUIRED BY

C. <u>HAZARDOUS AREAS, SPECIAL OCCUPANCIES, OR CONDUITS SUBJECT TO DAMAGE:</u> INSTALL CONDUIT AND WIRING PER NEC 501.10(B) AND 501.15(B) (C)(E). IN IDENTIFIED HAZARDOUS AREAS, GALVANIZED RIGID STEEL CONDUIT, EXPLOSION PROOF BOXES, AND CONDUIT SEAL OFFS ARE TO BE USED

AS REQUIRED. COORDINATE ALL HAZARDOUS LOCATIONS AND REQUIRMENTS WITH OWNER AND ARCHITECT. D. MOTOR CONNECTIONS: LIQUID TIGHT FLEXIBLE METAL CONDUIT PER THE NEC.

E. WHIPS (6 FEET OR LESS TO LIGHTING FIXTURES): MC CABLE WHERE ALLOWED PER THE NEC.

F. DEVIATIONS: ANY DEVIATION SHALL BE APPROVED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO BID AND THE AHJ PRIOR TO ROUGH-IN

G. MINIMUM CONDUIT SIZES: 3/4" ABOVE GROUND AND 1" UNDERGROUND.

UNDERGROUND RACEWAYS

A. RACEWAYS RUN EXTERNAL TO BUILDING FOUNDATION, EXCEPT BRANCH CIRCUIT RACEWAYS, SHALL BE ENCASED WITH A MINIMUM OF THREE INCHES OF CONCRETE ON ALL SIDES.

B. ENCASED RACEWAYS MUST HAVE A MINIMUM COVER OF EIGHTEEN INCHES, EXCEPT RACEWAYS CONTAINING CIRCUITS WITH VOLTAGES ABOVE 1000 VOLTS, WHICH MUST HAVE A MINIMUM COVER OF THIRTY INCHES.

C. ENCASED RACEWAYS SHALL BE OF A TYPE APPROVED BY THE NEC AND SUITABLE FOR CONCRETE ENCASEMENT.

D. STEEL REINFORCING SHALL BE REQUIRED UNDER ROADWAYS AND WITHIN 10 FEET OF ALL MANHOLES AND BUILDING ENTRANCES. THE STEEL REINFORCING SHALL BE TIED TO THE WALL REINFORCING AT MANHOLES AND BUILDING ENTRANCES.

E. BRANCH CIRCUITS RUN UNDERGROUND EXTERNAL TO BUILDING FOUNDATION WALLS SHALL BE RUN IN ACCORDANCE WITH THE NEC, AND SHALL BE APPROVED AS SUITABLE FOR DIRECT BURIAL. MINIMUM SIZE SHALL BE 1 INCH.

ABOVE THE RACEWAY 6 TO 8 INCHES BELOW FINISHED GRADE. TAPE SHALL BE PERMANENT, BRIGHT COLORED, CONTINUOUS PRINTED, PLASTIC TAPE COMPOUNDED FOR DIRECT BURIAL NOT LESS THAN 6 INCHES WIDE AND 4 MILS THICK.

G. WHERE UNDERGROUND RACEWAYS ARE REQUIRED TO TURN UP TO CABINETS. EQUIPMENT. ETC., AND ON TO POLES. THE ELBOW REQUIRED AND THE STUB-UP OUT OF THE SLAB OR EARTH SHALL BE OF GALVANIZED RIGID STEEL FOR THE LAST TWO FEET MINIMUM.

F. ALL UNDERGROUND RACEWAYS, EXCEPT BRANCH CIRCUITS, SHALL BE IDENTIFIED BY UNDERGROUND LINE MARKING TAPE LOCATED DIRECTLY

H. WHERE PASSING THROUGH A BELOW GRADE WALL FROM A CONDITIONED INTERIOR BUILDING SPACE, RACEWAYS SHALL BE SEALED UTILIZING FITTINGS SIMILAR AND EQUAL TO OZ/GEDNEY TYPE FSK THRU-WALL FITTING WITH FSKA MEMBRANE CLAMP ADAPTER IF REQUIRED.

A. SUPPORT AND ATTACH ALL CONDUITS AND RACEWAYS PER THE NEC WITH APPROVED HANGERS AND CLAMPS. DO NOT SUPPORT CONDUITS, RACEWAYS, OR CABLES, FROM DUCTWORK, PIPING, CEILING GRID SUPPORT WIRES, OR CEILING SUPPORT SYSTEM. PROVIDE SUPPLEMENTAL STEEL SUPPORTS BETWEEN JOISTS, BEAMS, PURLINS, TRUSSES, ETC... AS REQUIRED.

B. CONDUITS AND RACEWAYS SHALL BE SEISMICALLY SUPPORTED WHERE REQUIRED BY THE BUILDING CODE.

TERMINATIONS

A. IMC AND GRC SHALL TERMINATE WITH EITHER A DOUBLE LOCKNUT/BUSHING SET, OR IN A THREADED HUB. B. WHERE CONCENTRIC, ECCENTRIC, OR OVER-SIZED KNOCKOUTS ARE ENCOUNTERED, A GROUNDING-TYPE INSULATED BUSHING SHALL BE

C. ALL CONDUIT TERMINATIONS SHALL BE PROVIDED WITH INSULATED THROAT.

D. EMT TERMINATIONS SHALL BE MADE UTILIZING PLATED STEEL HEXAGONAL COMPRESSION CONNECTORS. NO POT METAL, SET SCREW, OR INDENTED TYPE FITTINGS SHALL BE UTILIZED.

A. WHERE CONDUITS OF ANY TYPE PASS OVER A BUILDING EXPANSION JOINT, A STANDARD EXPANSION JOINT FITTING, COMPATIBLE WITH THE TYPE

RACEWAY BEING USED, SHALL BE PROVIDED. B. CONDUIT COUPLINGS FOR IMC, GRC, AND PVC SHALL BE IN ACCORDANCE WITH THE NEC.

C. EMT COUPLINGS SHALL BE OF THE PLATED STEEL HEXAGONAL COMPRESSION TYPE. NO POT METAL, SET SCREW, OR INDENTED TYPE COUPLINGS

D. IN OUTDOOR LOCATIONS OR INTERIOR DAMP LOCATIONS, GASKETED FITTINGS INCLUSIVE OF COUPLINGS SHALL BE USED IN ALL METALLIC RACEWAYS.

ELECTRICAL IDENTIFICATION

REFER TO DETAIL ON THE DRAWINGS.

INTERIOR LUMINAIRES

REFER TO THE LIGHTING FIXTURE SCHEDULE AND THE LIGHTING FIXTURE SUPPORT DETAIL ON THE DRAWINGS.

A. VACUUM AND CLEAN ALL BOXES AFTER ROUGH-IN AND PROTECT FROM CONSTRUCTION DEBRIS/PAINTING.

B. CLEAN ALL CONDUITS, HANGERS, SUPPORTS, PANELS, LIGHTS, DEVICES, ETC... AND LEAVE READY FOR USE OR PAINTING.

C. COORDINATE ALL PAINTING REQUIREMENTS WITH THE ARCHITECT, GENERAL CONTRACTOR, AND/OR OWNER PRIOR TO BID.

D. TOUCH UP ALL SCRATCHED SURFACES ON FACTORY FINISHED EQUIPMENT AND MATERIALS WITH PAINT OF SAME TYPE AND COLOR.

A. PERFORM ALL TESTS REQUIRED BY CODE. MEG-TEST ALL PANELS TO ELIMINATE GROUNDS AND SHORT CIRCUITS. TEST ALL LIGHTS. RECEPTACLES, EQUIPMENT, ETC... FOR PROPER CONNECTION AND GROUNDING.

B. TEST THE GROUND SYSTEM WITH "EARTH MEGGER." FURNISH TEST RESULTS TO THE OWNER AND ENGINEER. ADD ADDITIONAL GROUND RODS

C. ENSURE THAT ALL LUGS ON ALL FEEDERS ARE TIGHT THROUGHOUT CONSTRUCTION. TORQUE AS REQUIRED.

GUARANTEE:

A. INSTRUCT OWNER'S REPRESENTATIVES IN PROPER OPERATION AND MAINTENANCE OF ALL SYSTEMS AND EQUIPMENT.

B. FURNISH TO OWNER COPIES OF OPERATING AND MAINTENANCE MANUALS, INCLUDING GUARANTEES AND SPARE PARTS LIST.

A. GUARANTEE ALL MATERIALS, EQUIPMENT, AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM THE TIME OF FINAL ACCEPTANCE BY THE OWNER UNLESS OTHERWISE INDICATED. REPAIR AND/OR REPLACE, WITHOUT ANY COST TO THE OWNER, ANY DEFECTIVE PART OR WORKMANSHIP WITHIN THE GUARANTEE PERIOD.

APPROVED THIRD PARTY TESTING AGENCY.

METHOD OF COMPLIANCE:

1. LINK TRADE PERMITS WITH THE BUILDING PERMIT. 2.ALL PRE-WIRED EQUIPMENT SHALL BE LISTED BY STATE OF NC APPROVED 3RD PARTY AGENCY, [NEC 90.7;110.3(B)] 3. CLEARANCE REQUIRED AT ELECTRICAL EQUIPMENT, (NEC 110.26).

4.ALL GROUNDING AND BONDING REQUIRED TO COMPLY WITH NEC ARTICLE 250, (NEC 250.1) 5. FLEXIBLE CORDS SHALL NOT PASS THROUGH CEILINGS, WALLS OR FLOORS, (NEC 400.8)

6.ALL WIRING, INCLUDING LOW VOLTAGE, DATA, PHONE, FIRE ALARM, SECURITY, HVAC CONTROLS, AND POWER SHALL BE PERMITTED AND INSPECTED PER NC GENERAL STATUTES PER COUNTY, AND CITY ORDINANCE. 7.ALL ELECTRICAL MATERIALS, DEVICES, APPLIANCES, AND EQUIPMENT SHALL BE LABEL LISTED BY A NORTH CAROLINA

ELECTRICAL SUMMARY

REFER TO FIXTURE SCHEDULE

REFER TO FIXTURE SCHEDULE

ELECTRICAL SYSTEM AND EQUIPMENT

ENERGY CODE: X PRESCRIPTIVE PERFORMANCE

ASHRAE90.1: PRESCRIPTIVE PERFORMANCE LIGHTING SCHEDULE (EACH FIXTURE TYPE)

LAMP TYPE REQUIRED IN FIXTURE NUMBER OF LAMPS IN EACH FIXTURE BALLAST TYPE IN FIXTURE

REFER TO FIXTURE SCHEDULE REFER TO FIXTURE SCHEDULE NUMBER OF BALLAST IN FIXTURE REFER TO FIXTURE SCHEDULE TOTAL WATTAGE PER FIXTURE 2,896 W SPECIFIED VS 13,464 W ALLOWED TOTAL INTERIOR WATTAGE SPECIFIED VERSUS ALLOWED:

TOTAL EXTERIOR WATTAGE SPECIFIED VERSUS ALLOWED: 1,390 W SPECIFIED VS 2,684 W ALLOWED

ADDITIONAL PRESCRIPTIVE COMPLIANCE

C406.2 MORE EFFICIENT HVAC PERFORMANCE X C406.3 REDUCED LIGHTING POWER DENSITY SYSTEM

C406.4 ENHANCED LIGHTING CONTROLS C406.5 ON-SITE SUPPLY OF RENEWABLE ENERGY C406.6 DEDICATED OUTDOOR AIR SYSTEM FOR CERTAIN HVAC EQUIPMENT

C406.7 HIGH-EFFICIENCY SERVICE WATER HEATING

TO THE BEST OF MY KNOWLEDGE AND BELIEF, THE DESIGN OF THIS BUILDING COMPLIES WITH THE THERMAL ENVELOPE REQUIREMENTS OF THE STATE OF NORTH CAROLINA 2018 ENERGY CODE

SIGNED: Christopher R. Stroupe NAME: CHRISTOPHER R. STROUPE

LICENSE #

KOR C

△ DATE DESCRIPTION

SHEET NAME:

ELECTRICAL COVER SHEET

ORIG SUBMISSION:

CURRENT:

Electrical Sheet Schedule

E0.1 SYMBOL LEGENDS AND ABBREVIATIONS.

E1.0 ELECTRICAL LIGHTING AND POWER PLANS

E1.1 PARTIAL SITE ELECTRICAL PLAN

LUMINAIRE SCHEDULE, POWER RISER

E0.0 ELECTRICAL COVER SHEET

E6.0 ELECTRICAL DETAILS

SHEET:

02/28/2024



MICHAEL

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STRUCTURAL ENGINEER:

CODE CONSULTANT: **Performance Based Fire Protection** Engineering P.O. Box 1847 Pittsboro, NC 27312 T 910.282.7351



Ε

200A METER COORDINATE AVAILABLE FAULT CURRENT 120/240V 1PH/3W BASE. COORDINATE WITH UTILITY COMPANY. PROVIDE S.E. RATED INSTALLATION WITH PERMANENT PLAQUE ON PANEL "A" WITH NEMA 1 UTILITY PROVIDERS AVAILABLE FAULT CURRENT AND DATE REQUIREMENTS INSTALLED. → PROVIDE 3"C WITH PULL STRING, UNDERGROUND, TO PAD MOUNTED #4 S.G. 3 #3/0, 3"C UTILITY TRANSFORMER. COORDINATE LOCATION AND ROUTING WITH CIVIL SITE PLAN AND UTILITY

2 POWER RISER DIAGRAM E0.1 1/8" = 1'-0"

Panelboard: A **VOLTAGE**: 240 V, 1Ø, 3W MAINS TYPE: MCB MAINS RATING: 225 A BUS RATING: 225 A LOCATION: STORAGE ROOM **NEUTRAL**: 100% SUPPLY: FEED-THRU LUGS: No SCCR: 30 kA **MOUNTING:** SURFACE FEATURES & **MODIFICATIONS** -**ENCLOSURE**: NEMA 1 PHASE A LOAD PHASE B LOAD WIRE & CKT DESCRIPTION DESCRIPTION CONDUITS CONDUITS 1 RCPT - GENERAL

 2#12,#12G,3/4"C
 720
 360
 2#12,#12G,3/4"C

 2#10,#10G,3/4"C
 720
 540
 2#12,#12G,3/4"C

 2#12,#12G,3/4"C
 360
 360
 2#12,#12G,3/4"C

 2#12,#12G,3/4"C
 540
 540
 2#12,#12G,3/4"C

 2#12,#12G,3/4"C
 360
 360
 2#12,#12G,3/4"C

 2#12,#12G,3/4"C
 540
 540
 2#12,#12G,3/4"C

 2#12,#12G,3/4"C
 360
 360
 2#12,#12G,3/4"C

 2#12,#12G,3/4"C
 540
 540
 2#12,#12G,3/4"C

 2#12,#12G,3/4"C
 540
 540
 2#12,#12G,3/4"C

 RCPT - HANGAR BAY 2#12,#12G,3/4"C 3 RCPT - GENERAL RCPT - HANGAR BAY RCPT - HANGAR BAY 5 RCPT - HANGAR BAY RCPT - HANGAR BAY 7 RCPT - HANGAR BAY 9 RCPT - HANGAR BAY RCPT - HANGAR BAY RCPT - HANGAR BAY 11 RCPT - HANGAR BAY RCPT - HANGAR BAY 13 RCPT - HANGAR BAY RCPT - HANGAR BAY RCPT - HANGAR BAY
 2#12,#12G,3/4"C
 540
 540

 2#12,#12G,3/4"C
 360
 1920

 2#12,#12G,3/4"C
 540
 1920

 2#12,#12G,3/4"C
 360
 1920

 2#10,#10G,3/4"C
 540
 1920

 2#10,#10G,3/4"C
 540
 1920

 2#10,#10G,3/4"C
 540
 1920

 2#10,#10G,3/4"C
 360
 1920

 2#10,#10G,3/4"C
 540
 1920

 2#12,#12G,3/4"C
 360
 1920

 2#10,#10G,3/4"C
 540
 1920

 2#10,#10G,3/4"C
 540
 1920

 2#10,#10G,3/4"C
 540
 1920

 2#10,#10G,3/4"C
 0
 1920
 RCPT - HANGAR BAY HANGAR DOOR — 2#12,#12G,3/4"C 2 20 19 RCPT - HANGAR BAY RCPT - HANGAR BAY 2#12,#12G,3/4"C 2 20 HANGAR DOORS 23 RCPT - HANGAR BAY 25 RCPT - HANGAR BAY HANGAR DOORS -2#8,#8G,3/4"C 2 20 27 RCPT - HANGAR BAY 29 RCPT - HANGAR BAY HANGAR DOORS -31 RCPT - HANGAR BAY 33 RCPT - HANGAR BAY HANGAR DOORS 2#10,#10G,3/4"C 2 20 35 RCPT - HANGAR BAY 0 1920 HANGAR DOORS -2#12,#12G,3/4"C 2 20 2#10,#10G,3/4"C LTS - HANGAR BAYS/STORAGE 0 1638 0 1638 2#8,#8G,3/4"C LTS - HANGAR BAYS/STORAGE 2#12,#12G,3/4"C LTS - EXTERIOR - NORTH 4 0 870 2#8,#8G,3/4"C LTS - EXTERIOR - SOUTH 49 SPARE 2#12,#12G,3/4"C LIGHTING CONTACTOR (LC) 53 SPARE SPARE 5 177 A CONNECTED CURRENT: 159 A LOAD CLASSIFICATION CONNECTED **PANEL TOTALS** 23040 VA 104.17% 24000 VA 0 VA 0.00% 0 VA CONNECTED LOAD: 40 kVA 5019 VA 125.00% 6274 VA CONNECTED CURRENT: 168 A 90.85% 11120 VA Receptacle - General 12240 VA **DEMAND LOAD:** 41 kVA DEMAND CURRENT: 172 A PANEL TO BE SERVICE ENTRANCE RATED; PROVIDE WITH MECHANICAL LUGS, COPPER BUS, AND HINGED COVER.

Electrical Abbreviations Electrical Symbol Legend <u>Lighting Symbols</u> Power Symbols Telecom Symbols Fire Alarm Symbols 1P 1 Pole (2P, 3P, 4P, ETC.) MCB Main Circuit Breaker MCC Motor Control Center A, Amp Ampere Wall Ceilin Floor F Manual Pull Station AC Above Counter MDC Main Distribution Center Lighting Fixtures, Typical, Rectangular ACLG Above Ceiling MDP Main Distribution Panel • F Horn, Wall (Various Symbols) ADO Automatic Door Opener MFR Manufacturer Filled circles indicate recessed. AF Amp Frame MFS Main Fused Disconnect Switch ① ① Duplex Receptacle ▼ Telephone Outlet F Horn, Ceiling Open circles indicate surface-mounted. AFF Above Finished Floor MH Manhole Diagonal line indicates lensed. ▼ Data/Telephone Outlet AFG Above Finished Grade MIC Microphone Outer dots indicate suspended. Strobe, Wall, Candela as indicated AFI Arc Fault Circuit MIN Minimum •• Outlet Modifiers: MISC Miscellaneous Strobe, Ceiling, Candela as indicated Interrupter ##": Height AFF OC Receptacle Modifiers: AHU Air Handling Unit MLO Main Lugs Only Lighting Fixtures, Typical, Round AC: Above Counter MMS Manual Motor Starter Horn/Strobe, Wall, Candela as indicated Aluminum (Various Symbols) ##": Height AFF OC Wireless Access Point Center dot indicates pendant. ALT Alternate MOA Multioutlet Assembly AC: Above Counter Horn/Strobe, Ceiling, Candela as indicated AMP Ampere MSP Motor Starter Panelboard Diagonal line indicates lensed. GFI: Ground-Fault Circuit Interrupter →TV TV Outlet AMPL Amplifier MSBD Main Switchboard Chevron indicates wall wash. WP: Weatherproof In-Use Cover Remote Indicator w/ Test Switch, Wall ANNUN Annunciator MSS Motor Starter Switch Half shading indicates split (typically switched) Wall-mounted fixtures, Typical APPROX Approximately Mount Remote Indicate w/ Test Switch, Ceiling AQ-STAT Aquastat (Various Symbols) MT.C Empty Conduit ◆ P Outside shading indicates emergency circuit Nurse Call Symbols ARCH Architect, Architectural MTS Manual Transfer Switch Tenter shading indicates isolated ground (2) Smoke Detector Nurse Call Corridor Light Nurse Call Control 2.3...

Number of lights as indicated AS Amp Switch MTR Motor, Motorized Strip Fixture AT Amp Trip N.C. Normally Closed \$ Single-Pole Switch (I) Heat Detector ✓ Directional Light, Track Light, Flood Light ATS Automatic Transfer Switch NEC National Electrical Code X Nurse Call Device \$ Two-Pole Switch AUTO Automatic NEMA National Electrical Carbon Monoxide Detector B: Code Blue Linear Light, Tape Light \$ Three-Pole Switch AUX Auxiliary Manufacturer's Association D: Duty Station AV Audio Visual Beam Detector T: Transmitter R: Receiver NFDS Non-Fused Safety Disconnect Switch Modifiers: E: Emergency Emergency Lighting Unit, Ceiling-Mounted, AWG American Wire Gauge K: Keyed P: Patient Call BATT Battery Integral Battery Not In Contract Combination Detector (Up to Three) S: Staff T: Timer BD Board Emergency Lighting Unit, Ceiling-Mounted, Night Light XXXX Nurse Call Control Unit AC: Above-Counter BLDG Building
BMS Building Management System N.O. Duct Smoke Detector Normally Open Remote Battery M: Motor-Rated NCAP: Nurse Call Annunciator Panel NPF Normal Power Factor NCHS: Nurse Call Host Constroller Multioutlet Assembly Conduit NTS Not To Scale 2)+++++ Smoke Damper Emergency Lighting Unit, Wall-Mounted, NCPA: Nurse Call Power Supply CAB Cabinet CAT Catalog Filled squares indicate 120V outlet On Center Integral Battery NCTC: Nurse Call Terminal Cabinet Open squares indicate with USB DH Door Holder Overhead NCUPS: Uninterruptable Power Supply CATV Cable Television Overloads DCL Door Closer Emergency Lighting Unit, Wall-Mounted, Cord Reel, Device Varies CB Circuit Breaker
CCTV Closed Circuit Television Public Address Remote Battery Pull Box Or Pushbutton Fire Service Phone Security Symbols CKT Circuit Pneumatic Electric ФФ Drop Cord, Device Varies Addressible Module CLG Ceiling Pedestal □ Security Camera Exit Light, Ceiling-Mounted. COMB Combination Power Factor Shading and arrows indicate faces and PTZ: Pan/Tilt/Zoom AIM: Addressible Input Module Junction Box CMPR Compressor Phase directional chevrons. AOM:Addressible Output Control Module HCR Card Reader CONN Connection Post Indicating Valve F1 Floor Box, see schedule for type AIO: Addressible Input/Output Module Exit Light, Wall-Mounted. CONST Construction Panel HCK Card Reader with Keypad XXXX Fire Alarm Control Unit Shading and arrows indicate faces and CONT Continuation Or Continuous Emergency Power Off Power Pole directional chevrons. CONTR Contractor **EVAC: Voice Evacuation Control Panel** Pair Closed Circuit TV Outlet Door Opener Push Plate CONV Convector PRI FAA: Fire Alarm Annunciator Primary Exit/ELU Combo CP Circulating Pump PROJ Projection FACP: Fire Alarm Control Panel M Power Meter DC Door Contact CRT Cathode-Ray Tube PRV Power Roof Ventilator FATC: Fire Alarm Terminal Cabinet CT Current Transformer Safety Switch, Fused NACP: Notification Appliance Circuit Panel Potential Transformer ES Electric Strike Pole/Area Lights PVC CTR Center Polyvinyl Chloride (Conduit) FAMN: Fire Alarm Mass Notification Control Safety Switch, Unfused PWR Power CU Copper HIC Intercom DCP QUAN Quantity Post-Top Area Light Domestic Water Circulating Pump Motor Starter Supervisory or Interface Device DEPT Department RCPT Receptacle ML Magnetic Lock Ø Bollard Light Combination Starter/Disconnect DET REQD Required PIV: Post Indicator Valve Supervisory Detail Request to Exit Button DIA Diameter RM PS: Pressure Switch Room Diagonal hatch indicates light on a critical Contactor DISC Disconnect RSC Rigid Steel Conduit R: Non-Addressible Relay circuit. REX Request to Exit Sensor DIST Distribution RTU VS: Valve Supervisory Switch Roof Top Unit Solid hatch indicates light on an emergency or Power Device and Equipment Tags WF: Water Flow Switch DN Down Surface Conduit life safety circuit. MD Motion Detector DPR Damper SEC Secondary Electrical DeviceTags: Uppercase letter(s) indicates DS Safety Disconnect Switch SHT Sheet Panel ID and circuit number. Lowercase letter XXX Security Control Unit Single-Pole Switch SIM Double Throw Similar indicates designation of controlling switch (where SCP: Security Control Panel Two-Pole Switch DWG Drawing EC Electrical C SLD Single-Line Diagram SPS: Security Power Supply Unit S/N Electrical Contractor Solid Neutral Three-Pole Switch ELEC Electric, Electrical SPEC Specification Equipment Tags: Equipment ID is indicated by an Switch Modifiers: Construction Phasing ELEV Elevator SPKR underlined tag adjacent to the equipment. See the Speaker (Typical All Symbols and Equipment) 3: 3-Way OS: Occupancy Sensor ELU Emergency Lighting Unit Spare equipment connection schedule for description, Single-Point Power 4: 4-Way SPP VS: Vacancy Sensor Emergency electrical requirements, and panel and circuit K: Keyed EMS Energy Management System AC: Above-Counter Existing to Remain Surface Raceway number. Symbols/graphic appearance of equipment Electrical Metallic Tubing Stainless Steel D: Dimming LV: Low-Voltage Existing to Be Demolished T: Timer Electric Pneumatic SSW M: Motor-Rated Selector Switch EQUIP Equipment Stop/Start Pushbuttons → New Lighting Contactor EWC Electric Water Cooler STA Station Solid, arced lines connecting equipment, devices, or EXIST Existing STD Standard Lighting Control Panel Existing to Be Demolished fixtures indicate unswitched power circuiting. Wires are EXH Exhaust SURF Surface Mounted only intended to indicate to what circuit devices are OS Occupancy Sensor EXP Explosion Proof SW Switch connected. Actual connections, circuit routing, SWBD Switchboard <u>Miscellaneous</u> FA Fire Alarm (DL) Daylight Harvesting Sensor installtion, junction boxes, etc. shall be field-determined FABP Fire Alarm Booster Power SYM Symmetrical by the contractor. Supply Panel SYS System Area Not in Contract FACP Fire Alarm Control Panel TEL Telephone <u>Lighting Tags</u> Dashed, arced lines connecting equipment, devices, or TERM Terminal FCU Fan Coil Unit fixtures indicate switched power. Keynote FIXT Fixture Top Value: Fixture Type ID (<u>Underlined</u>) Twist Lock FLR Floor Tamper Resistant A a Home run to branch circuit panelboard. The equipment T-STAT Thermostat FLUOR Fluorescent name and circuit number(s) are indicated, separated by Top Value: Detail Number on Sheet FU Fuse TTC Telephone Terminal Cabinet Bottom Value, Lowercase Letter: Switch ID a hyphen. Homeruns are only intended to indicate panel Bottom Value: Sheet Number of Detail FUDS Fused Safety Disconnect Switch Television and circuit number. Actual homerun location shall be Bottom Value, Number(s): Circuit Number GA Gauge GAL Gallon TVTC Television Terminal Cabinet field-determined by the contractor. Typical Bottom Value, Uppercase Letter(s): Panel ID Room Name and Number GALV Galvanized Under Counter Absence of a switch designation on a lighting fixture indicates GC General Contractor Underground Electrical Power Distribution Equipment fixture is controlled by the only switch in the space. An "x" in place GEN Generator Underground of the switch designation indicates unswitched. Ground Fault Circuit Interrupter Unit Heater GFP Ground Fault Protector Underground Telephone GND Ground Switch ID indicated by a lowercase letter. Switch IDs are UTIL Utility GRS Galvanized Rigid Steel (Conduit) Ultraviolet unique per space. A switch with an ID "a" controls all GYP BD Gypsum Board Volt devices within the space in which it is located tagged with HOA Hands-Off-Automatic Switch (OS) "a". A switch without a tagged ID controls all lighting Volt-Amperes HORIZ Horizontal VDT Video Display Terminal fixtures within a space. ID tags may be used on control HP Horsepower VERT Vertical devices other than switches, such as occupancy sensors or Hatched fill indicates distribution panel or switchboard. HPF High Power Factor VFD Variable Frequency Drive Solid fill indicates branch panel or load center. HT Height VOL Volume Dashed box indicates code-required clearance (width and depth). HTG Heating Watt Grounding and Lightning Protection Symbols Door indicates front of recessed panel. HTR Heater W/ With HV High Voltage WG Wire Guard Panelboards are assigned an abbreviated indicator (or Panel Ground Rod HVAC Heating, Ventilating And Air WH Water Heater ID) for use with circuit numbers. Panel ID is listed within the W/O Without Ground Rod with Test Well Conditioning panel schedule and in the panel abbreviation schedule. WP Weatherproof Interrupting Capacity Equipment is tagged with Panel Name and with Panel ID in Static Ground Receptacle XFMR Transformer Isolated Ground parentheses. Panel ID is intended as a design documentation XFR Transfer IMC Intermediate Metal Conduit Lightning Protection Air Terminal aid only. Do not include Panel ID in field-applied circuit INCAND Incandescent directories or labels. IR Infrared Lightning Protection Conductor Splice I/W Interlock With Devices and fixtures are tagged with Panel ID and circuit J-BOX Junction Box number. For example, a device tagged with "A1" indicates the Angle KV Kilovolt device is circuited to panel designated "A," circuit number 1. The KVA Kilovolt-Ampere panel schedule circuit number contans both the panel ▲ Delta KVAR Kilovolt-Ampere Reactive abbreviation and the circuit number. KW Kilowatt Inches KWH Kilowatt Hour Number Transformer: Typically transformer names begin with LOC Locate Or Location Phase or contain the letter "T". See Single-Line Diagram for LT Light Center Line description and requirements. LTG Lighting LTNG Lightning LV Low Voltage MAX Maximum MAG.S Magnetic Starter M/C Momentary Contact MC Mechanical Contractor

LUMINAIRE SCHEDULE															
ID	Manufacturer	Model Number	Description	Direct Lumens	Indirect Lumens	Total Lumens	Lamp	ССТ	CRI	Ballast/Driver	Voltage	Watts	Emergency Component	Equivalent Manufacturers	Notes
Α	LITHONIA	TMSL 20000L, L/LV GZ10 50K 80CRI WH W/ LA0ZU (360 DEG. MOTION SENSOR PRE-WIRED)	8'-0" FIXTURE, 10" WIDE, ACRYLIC LENS	20000 lm	0 lm	20000 lm	Integral LED	5000 K	82	LED Driver, 0-10V Dimming, 1%	120 V	181 W		COLUMBIA, WILLIAMS, METALUX, ELITE	
EM1	LITHOINA	ELM6L UVOLT LTP	ELU Indoor, Two-Head	1100 lm	0 lm	1100 lm	Integral LED	6500 K	80		120 V	3 W	BATTERY	SURELITES, ISOLITE, DUAL LITE, MULE	PROVIDE WITH 0 DEGREE BATTERY
FL	LITHONIA	RSFX4LED-P4-50K-WFL-MVOLT-AAWB-SF-UBV-DD BXD	WALL MOUNTED FLOOD LIGHT, DARK BRONZE FINISH, TOP VISOR, WIDE FLOOD OPTICS, ADJUSTABLE TILT ARM WITH WALL BRACKET.	56215 lm	0 lm	56215 lm	Integral LED	5000 K	70	LED Driver	120 V	431 W	-	COOPER, CURRENT, PHILIPS, ELITE	TILT AT 45 DEG. TO ILLUMINATE PAVEMENT IN FRONT OF HANGAR. CONTRACTOR TO PROVIDE NECESSARY BACKING IN WALL FOR MOUNTING BRACKET.
W	LITHONIA	WDG3-P4-50K-70CRI-RFT-MVOLT-E20WC-DDBXD	WEDGE SHAPED EXTERIOR WALL PACK, 90 DEGREE CUTOFF, DARK BRONZE FINISH, FORWARD THROW OPTICS. PROVIDE WITH 18W, 0 DEGREE EMERGENCY BATTERY.	12000 lm	0 lm	12000 lm	Integral LED	5000 K	70	LED Driver	120 V	88 W		MCGRAW-EDISON, WILLIAMS, ELITE, CURRENT	
Χ	LITHOINA	LHQM LED R HO R0	Exit Sign, Thermoplastic, Red Lettering, 1-Sided	0 lm	0 lm	0 lm	Integral LED	0 K	0		120 V	1 W	BATTERY	SURELITES, ISOLITE, DUAL LITE, MULE	PROVIDE WITH 0 DEGREE BATTERY



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CES LICENSE NO. F-0238 DESIGNER ADL

4423 APPROVED TM

NAME LICENSE #

HICKORY
HICKORY

CITY OF 3101 9TH / HICKORY,

Δ DATE DESCRIPTION

C

SEAL 15886 2/28/2024 WILLIAM OF R. STRUMBER OF STRUMBE

SHEET NAME:

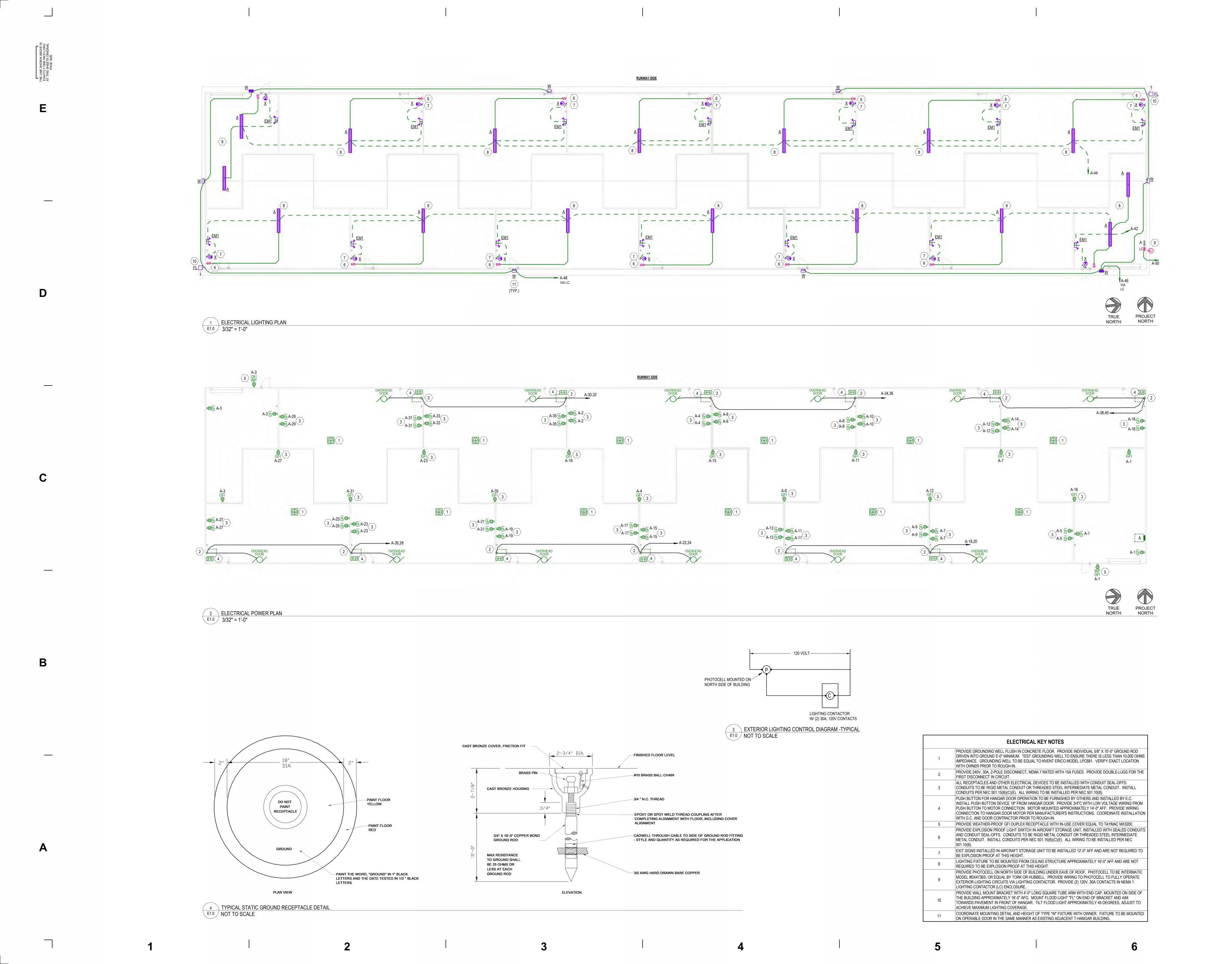
SYMBOL LEGENDS AND ABBREVIATIONS, LUMINAIRE SCHEDULE, POWER RISER

ORIG SUBMISSION: CURRENT:

SHEET:

E0.1

3





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PROJECT NO. 4423 APPROVED TM

Winston Salem, NC 27101

NAME LICENSE #

Δ DATE DESCRIPTION

SHEET NAME:

ELECTRICAL LIGHTING AND POWER PLANS

02/28/2024

ORIG SUBMISSION: CURRENT:

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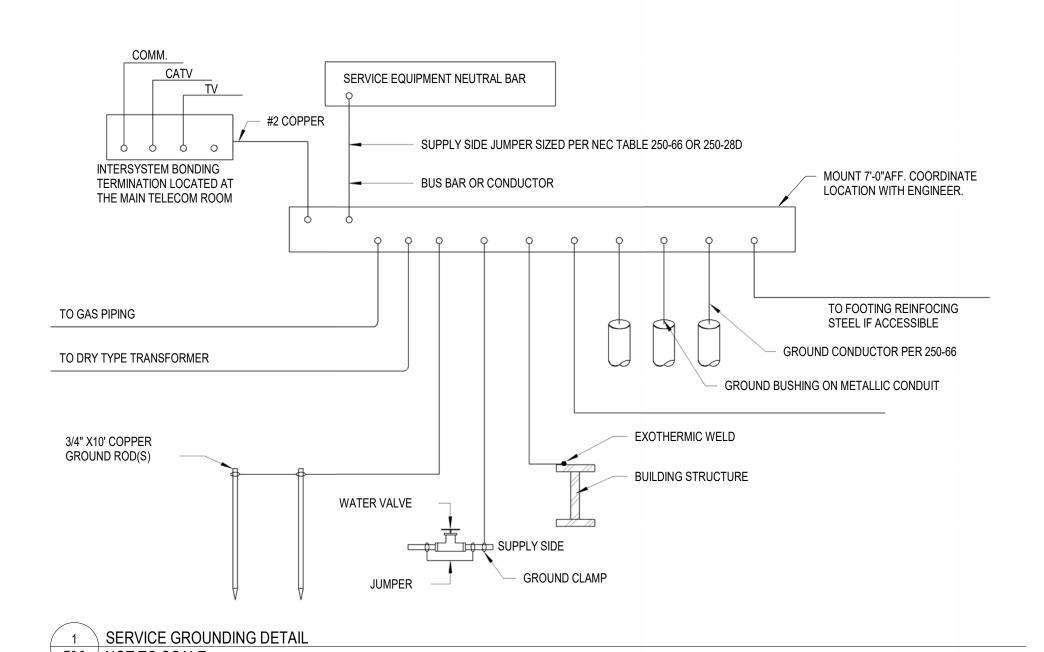
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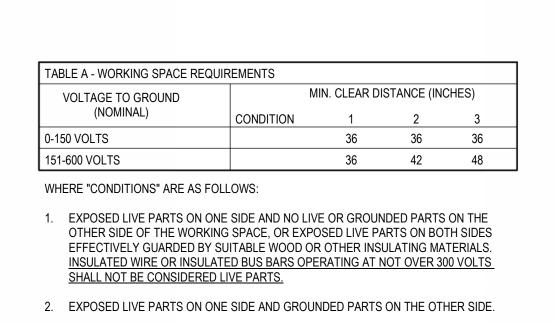
PARTIAL SITE ELECTRICAL PLAN

ORIG SUBMISSION:

E1.1

SHEET:





3. EXPOSED LIVE PARTS ON BOTH SIDES OF THE WORK SPACE (NOT GUARDED AS

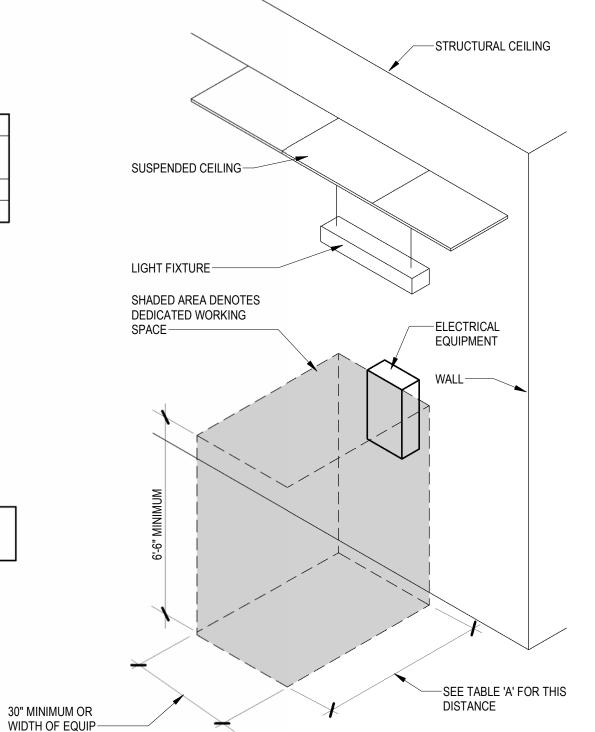
NOTE: THIS FIGURE ILLUSTRATES THE WORKING SPACE IN FRONT OF THE ELECTRICAL

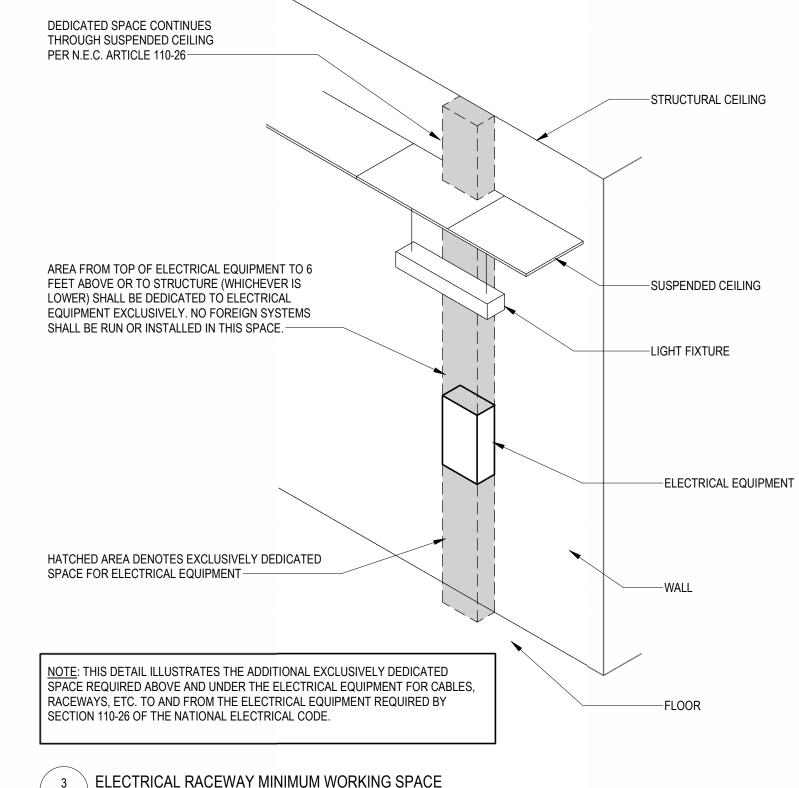
EQUIPMENT REQUIRED BY SECTION 110-26 OF THE NATIONAL ELECTRICAL CODE.

ELECTRICAL EQUIPMENT MINIMUM WORKING SPACE

E6.0 NOT TO SCALE

PROVIDED IN CONDITION 1) WITH THE OPERATOR BETWEEN.





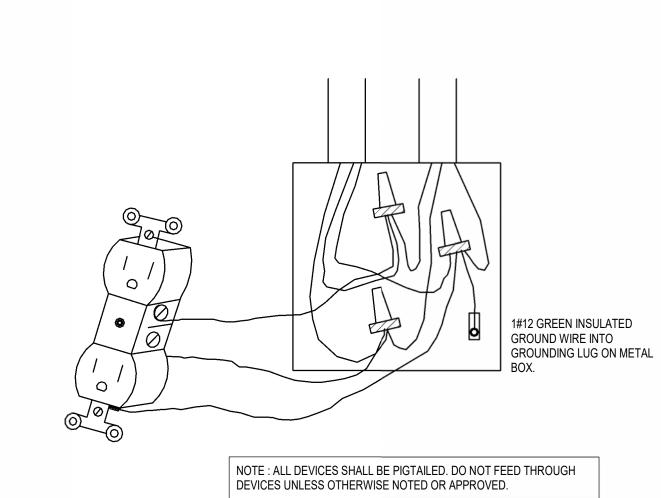
3 ELECTRICAL RACEWAY MINIMUM WORKING SPACE E6.0 NOT TO SCALE

KEYNOTES: # 1. LAY-IN LIGHT FIXTURE. y----/--2. CEILING GRID. 3. SUPPORT WIRE. USE CEILING TYPE SUPPORT WIRE. ONE AT EACH OF TWO DIAGONALLY OPPOSITE CORNERS (EITHER 'A' & 'C' OR 'B' & 'D' - TWO REQUIRED PER LIGHT). WIRES SHALL BE SINGLE LENGTH (DO NOT SPLICE) 45 DEG | 45 DEG INSTALLED AT NO MORE THAN 45 DEGREES FROM VERTICAL IN ANY DIRECTION, TAUT (NO SLACK), PAINTED A DIFFERENT COLOR (RED) THAN THE 45 DEG | 45 DEG OTHER CEILING SUPPORT WIRES. 4. SHEET METAL SCREW (FOUR REQUIRED PER LIGHT). THE SCREWS SHALL BE SUPPORT WIRES SHALL INSTALLED CONCEALED FROM SIGHT IN SUCH A MANNER THAT THE LIGHT IS NOT TOUCH ADEQUATELY SECURED TO THE GRID AND THE SCREWS DO NOT INTERFERE WITH ANY DOOR TRIMS, FLANGES, LOUVERS, ETC. INSTALL SCREWS TIGHTLY SO NO GAPS APPEAR IN THE LIGHT FIXTURE FRAMING OR TRIM. 5. STRUCTURE (METAL OR WOOD TRUSS, METAL OR WOOD BAR JOIST, CONCRETE, ETC.). 6. BRIDGING BETWEEN STRUCTURAL MEMBERS (WHERE APPLICABLE). NOTE: SUPPORT WIRES ARE NOT PERMITTED TO ATTACH TO THE BRIDGING AT ANY 7. PIPING, HVAC DUCT, ETC, WITH OR WITHOUT INSULATION, NOTE: SUPPORT WIRES ARE NOT PERMITTED TO CONTACT ANY PIPING, HVAC DUCTS, INCLUDING INSULATION AT ANY POINT. NOTE: ADDITIONAL SUPPORT MATERIALS MAY BE REQUIRED IN ORDER TO ACHIEVE AN ANGLE OF 45 DEGREES OR LESS, TO AVOID CONTACTING PIPING OR DUCTS, TO PREVENT FROM ATTACHING TO BRIDGING, ETC. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ADDITIONAL SUPPORT MATERIALS APPROVED FOR THE PURPOSE (UNISTRUT, ANGLE IRON, ETC.) AS REQUIRED TO INSTALL THE SUPPORT WIRES PER THIS DETAIL.

4 LAY-IN LIGHT FIXTURE SUPPORT

E6.0 NOT TO SCALE

E6.0 NOT TO SCALE



5 TYPICAL BOX RECEPTACLE CONNECTION E6.0 NOT TO SCALE

112.5 KVA 480::120/208 FED FROM PANEL XX INSTALLED: 2023

LINE 2: RATING (KVA) LINE 3: VOLTAGE CONFIGURATION LINE 4: FEEDER SOURCE LINE 5: FOUR-DIGIT YEAR INSTALLED

LINE 1: EQUIP. TAG/NAME

TRANSFORMER NAMEPLATE NOTES:

1. MATERIAL SHALL BE CORE-ENGRAVED BAKELITE.

2. COLOR SCHEME: 120/208 VOLT SYSTEMS - BLUE SURFACE WITH WHITE CORE 277/480 VOLT SYSTEMS - BLACK SURFACE WITH WHITE CORE

EMERGENCY SYSTEMS - RED SURFACE WITH WHITE CORE.

3. LETTERING SHALL BE 1/4" HIGH. 4. FASTEN WITH STAINLESS STEEL SCREWS OR POP RIVETS.

DRY-TYPE TRANSFORMER

PANEL MP 400A, 277/480V, 3PH, 4W FED FROM PANEL MSP IN CAROLINA BUILDING INSTALLED: 2023

LINE 1: PANEL TAG/NAME LINE 2: AMPS, SYSTEM VOLTAGE, PHASE, WIRE LINE 3: FEEDER SOURCE LINE 4: FEEDER SOURCE (IF NEEDED) LINE 5: FOUR-DIGIT YEAR INSTALLED

PANEL NAMEPLATE NOTES: 1. MATERIAL SHALL BE CORE-ENGRAVED BAKELITE

2. COLOR SCHEME:

120/208 VOLT SYSTEMS - BLUE SURFACE WITH WHITE CORE 277/480 VOLT SYSTEMS - BLACK SURFACE WITH WHITE CORE EMERGENCY SYSTEMS - RED SURFACE WITH WHITE CORE

3. LETTERING SHALL BE 1/4" HIGH.

4. FASTEN WITH STAINLESS STEEL SCREWS OR POP RIVETS.

ELECTRICAL PANEL

6 TYPICAL ELECTRICAL EQUIPMENT LABELS E6.0 NOT TO SCALE

CONTACTOR INSTALLED: 2023

INE 1: EQUIP. DESCRIPTION LINE 2: EQUIP. DESCRIPTION LINE 3: EQUIP. TAG/NAME LINE 4: FOUR-DIGIT YEAR INSTALLED

LIGHTING CONTACTOR NAMEPLATE NOTES:

2. COLOR SCHEME:

120/208 VOLT SYSTEMS - BLUE SURFACE WITH WHITE CORE 277/480 VOLT SYSTEMS - BLACK SURFACE WITH WHITE CORE EMERGENCY SYSTEMS - RED SURFACE WITH WHITE CORE.

3. LETTERING SHALL BE 1/4" HIGH.

4. FASTEN WITH STAINLESS STEEL SCREWS OR POP RIVETS.

LIGHTING CONTACTOR

LINE 1: EQUIP. TAG/NAME SWHP-1 LINE 2: SYSTEM VOLTAGE LINE 3: FEEDER SOURCE

LINE 4: FEEDER SOURCE (IF NEEDED)

PANEL NAMEPLATE NOTES:

1. MATERIAL SHALL BE CORE-ENGRAVED BAKELITE

BHP-1,3,5

2. COLOR SCHEME: 120/208 VOLT SYSTEMS - BLUE SURFACE WITH WHITE CORE 277/480 VOLT SYSTEMS - BLACK SURFACE WITH WHITE CORE

EMERGENCY SYSTEMS - RED SURFACE WITH WHITE CORE 3. LETTERING SHALL BE 1/4" HIGH.

4. FASTEN WITH STAINLESS STEEL SCREWS OR POP RIVETS

SAFETY DISCONNECT

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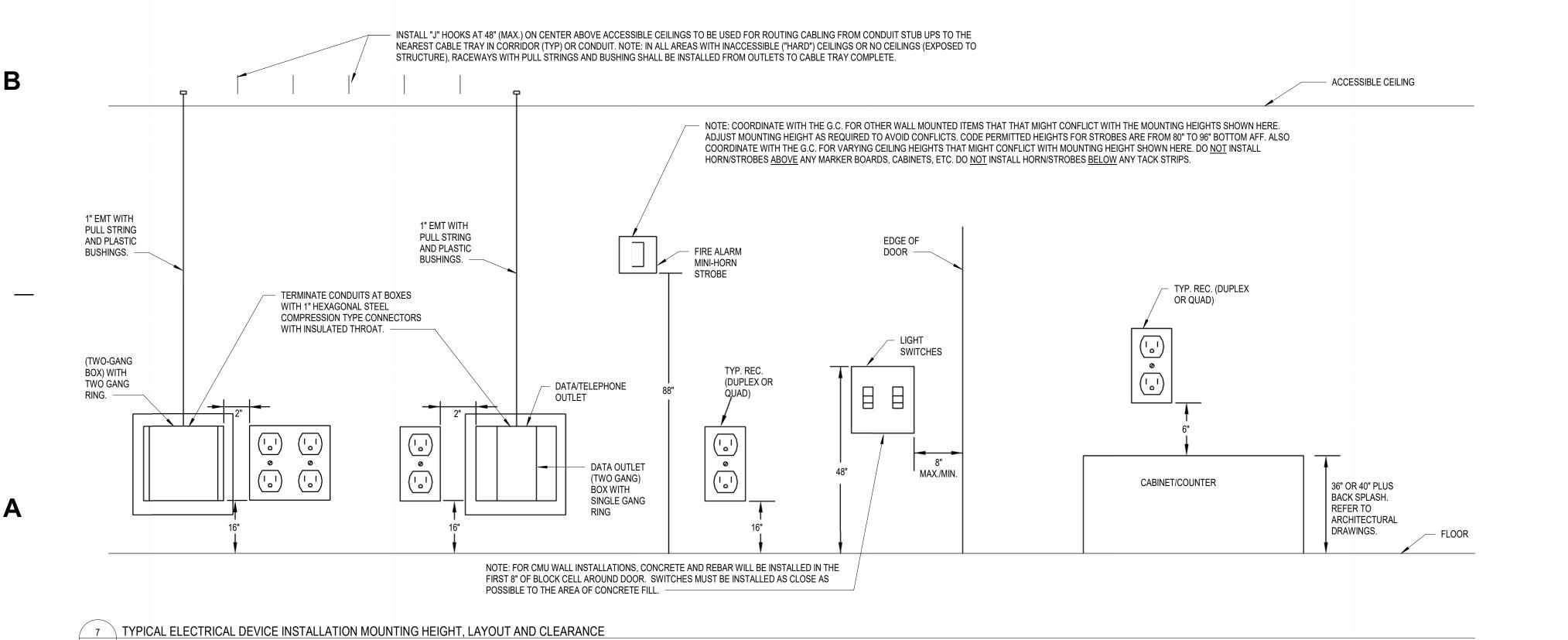
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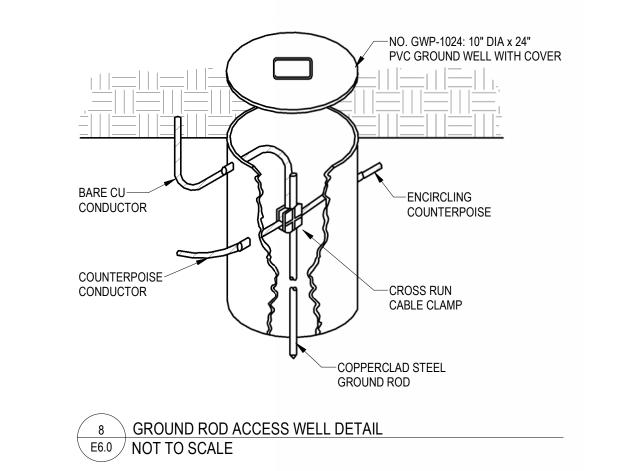
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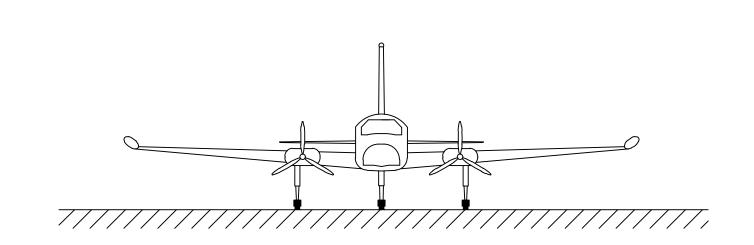
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02/28/2024

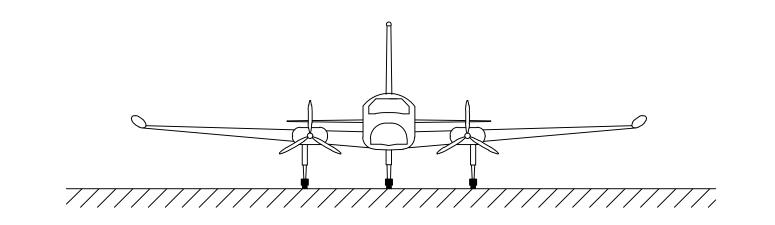
E6.0







T-HANGAR PROJECT HICKORY REGIONAL AIRPORT HICKORY, NORTH CAROLINA FEBRUARY 2024



INDEX OF DRAWINGS

COVER SHEET

PC12LK48 PLAN AND ELEVATIONS

FC291 TYPICAL DETAILS

ST171 DESIGN ANALYSIS

BUILDING CODE

INTERNATIONAL BUILDING CODE 2018

BUILDING CATEGORY II

OCCUPANCY GROUP S-1, EXPOSURE C

CONSTRUCTION TYPE II-B

12 UNIT HANGAR - AREA = $58' \times 312' = 18,096 \text{ SQ. FT.}$ HT. = 19'-4''

ALLOWABLE AREA = 17,500 SQ. FT.

FRONTAGE INCREASE $I_f = (740/740 - .25)30/30 = .75$

REVISED ALLOWABLE AREA = 17,500 (1.75) = 30,625 SQ. FT.

BUILDING DESIGN LOADS

A. GRAVITY LOADS

GROUND SNOW LOAD Pg = 15 PSF

Ce = 0.9, $I_s = 1.0$, $C_t = 1.2$

FLAT ROOF SNOW LOAD = $0.7 C_e C_t I_s P_g = 11.34 PSF$

DESIGN ROOF LOAD = 20 PSF PLUS 3 PSF COLLATERAL LOAD

B. WIND LOADS

BASIC WIND SPEED = 108 MPH

ALLOWABLE STRESS DESIGN WIND SPEED, V = 85 MPH

BUILDING CATEGORY II

EXPOSURE C

C. SEISMIC LOADS

SEISMIC USE GROUP II

SEISMIC SITE CLASS D

SEISMIC FACTOR $I_F = 1.0$

 $S_S = 0.207g$ $S_1 = 0.080g$

 $S_{DS} = 0.221g$ $S_{D1} = 0.128g$

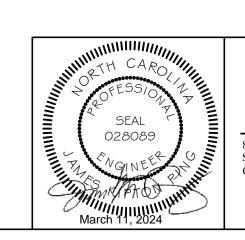
 $C_s = 0.068g R = 3.25$

SEISMIC BASE SHEAR = 6.7 KIPS

SEISMIC DESIGN CATEGORY B

SEISMIC FORCE RESISTING SYSTEM - BRACED FRAME

SEISMIC ANALYSIS PROCEDURE - EQUIVALENT LATERAL FORCE



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	Fax: (513) 984-1688
Cincinnati, Ohio 45242	projects@pinneng.com
North Carolina Certificate of	C A41i4i C 4400

PEI Project Number: 24099

NO DATE BY

BY

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REVISIONS

FULFAB, INC.

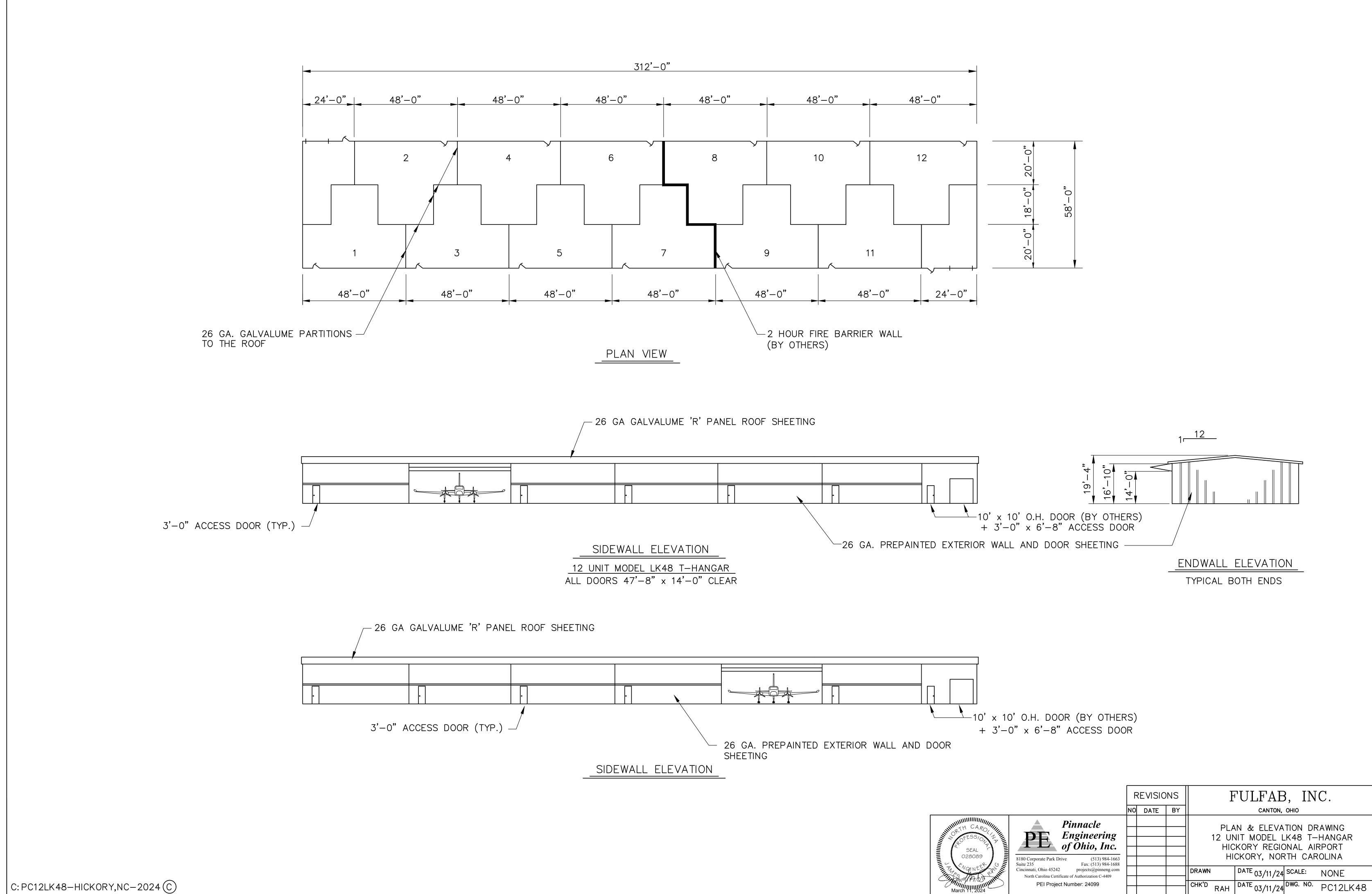
CANTON, OHIO

TITLESHEET

12 UNIT MODEL LK48 T-HANGAR
HICKORY REGIONAL AIRPORT
HICKORY, NORTH CAROLINA

DRAWN EMP DATE 03/11/24 SCALE NONE CHK'D RAH DATE 03/11/24 DWG. NO. TS

3/11/2024 1:23:01 PN



3/11/2024 1:21:17

