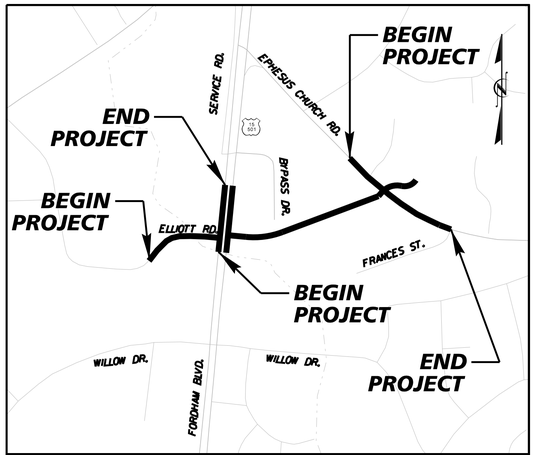
ELLIOTT ROAD EXTENSION
UTILITY CONSTRUCTION

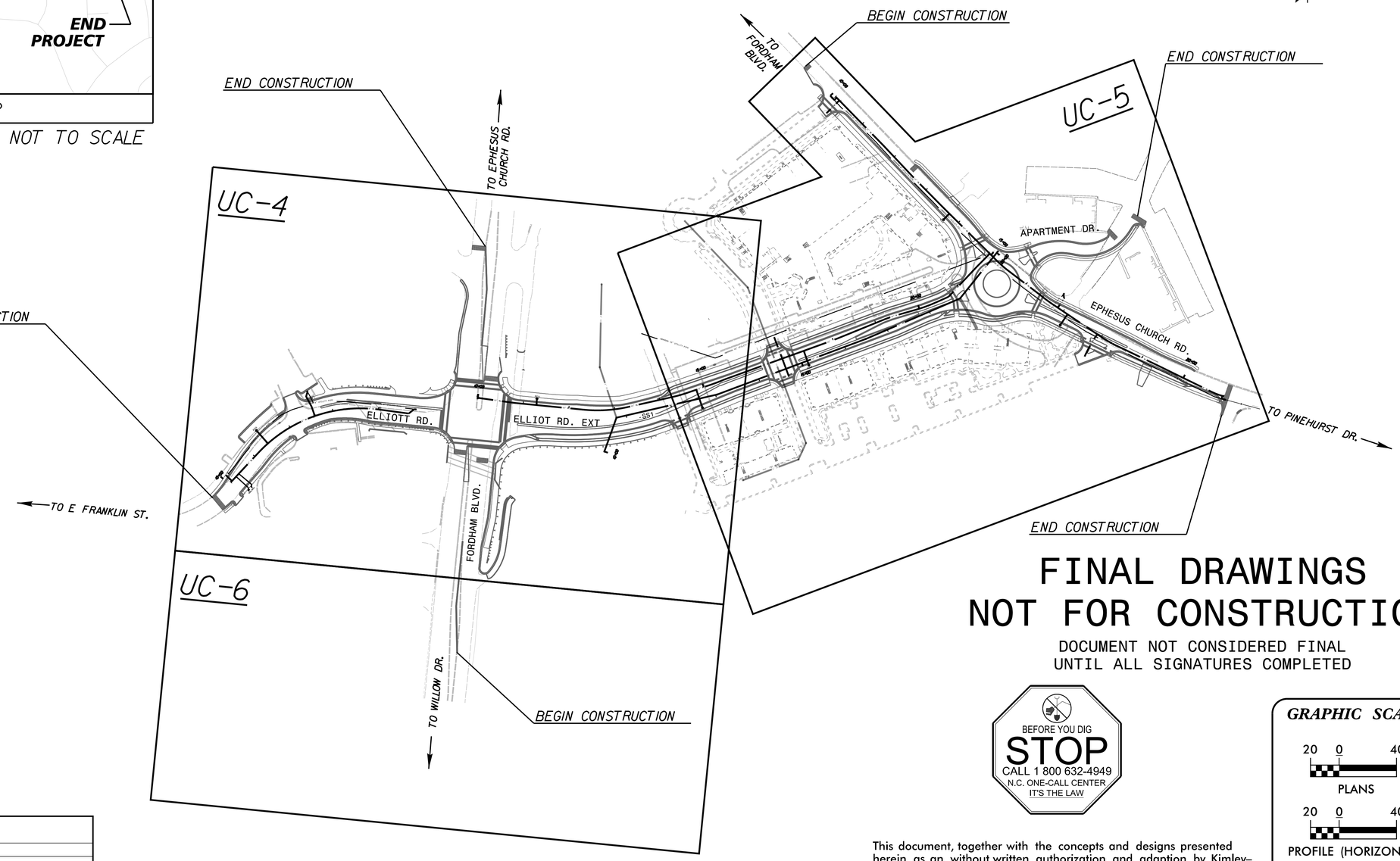
LOCATION: ELLIOTT ROAD FROM APPROX. 650′ WEST OF FORDHAM BOULEVARD TO EPHESUS CHURCH ROAD; FORDHAM BOULEVARD FROM APPROX. 400′ SOUTH OF ELLIOTT ROAD TO APPROX. 430′ NORTH OF ELLIOTT ROAD

NAD 83 (2011)



VICINITY MAP

NOT TO SCALE



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GRAPHIC SCALE

20 0 40
PLANS

20 0 40
PROFILE (HORIZONTAL)

2 0 4
PROFILE (VERTICAL)

INDEX OF SHEETS

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No.	REVISIONS	DATE	BY

Kimley»Horn
© 2020 KIMLEY-HORN AND ASSOCIATES, INC.
300 MORRIS STREET, SUITE 200, DURHAM, NC, 27701
PHONE: 919-677-2000
WWW.KIMLEY-HORN.COM
NC LICENSE #: F-0102

FINAL DRAWINGS FOR REVIEW PURPOSES ONLY

KHA PROJECT 011159020
DATE 7/6/2020
SCALE AS SHOWN
DESIGNED BY: NLH
DRAWN BY: SGP
CHECKED BY: NDR

UTILITY TITLE SHEET

ELLIOTT ROAD EXTENSION
PREPARED FOR
TOWN OF CHAPEL HILL, NC
CHAPEL HILL NORTH CAROLINA

SHEET NUMBER
UC-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

PROPOSED WATER SYMBOLS

- Water Line (Sized as Shown) — 12" WL
- 11¼ Degree Bend
- 22½ Degree Bend
- 45 Degree Bend
- 90 Degree Bend
- Plug
- Tee
- Cross
- Reducer
- Gate Valve — GV
- Butterfly Valve — BV
- Tapping Valve — TGV
- Line Stop — LS
- Line Stop with Bypass — LS/BP
- Blow Off — BO
- Fire Hydrant — PFH
- Relocate Fire Hydrant — RFH
- Remove Fire Hydrant — REM FH
- Water Meter — PWM
- Relocate Water Meter — RWM
- Remove Water Meter — REM WM
- Water Pump Station — PS(W)
- RPZ Backflow Preventer — PBPZ
- DCV Backflow Preventer — PBFP
- Relocate RPZ Backflow Preventer — RBPZ
- Relocate DCV Backflow Preventer — RBFP

PROPOSED SEWER SYMBOLS

- Gravity Sewer Line (Sized as Shown) — 12" SS
- Force Main Sewer Line (Sized as Shown) — 12" FSS
- Manhole (Sized per Note)
- Sewer Pump Station — PS(SS)

PROPOSED MISCELLANOUS UTILITIES SYMBOLS

- Joint Use Pole
- Telephone Pedestal — TEL PED
- Utility Line by Others (Type as Shown) — PROP O/H POW LINES
- Trenchless Installation — 12" TL INSTALL
- Encasement by Open Cut — 24" ENCAS BY OC
- Encasement — 24" ENCASEMENT
- AR
- Utility Vault — UV
- Concrete Pier — CP
- Steel Pier — SP
- Plan Note — NOTE
- Pay Item Note — PAY ITEM

EXISTING UTILITIES SYMBOLS

- Power Pole
- Telephone Pole
- Joint Use Pole
- Utility Pole
- Utility Pole with Base
- H-Frame Pole
- Power Transmission Line Tower
- Water Manhole
- Power Manhole
- Telephone Manhole
- Sanitary Sewer Manhole
- Hand Hole for Cable
- Power Transformer
- Telephone Pedestal
- CATV Pedestal
- Gas Valve
- Gas Meter
- Located Miscellaneous Utility Object
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.
- *Underground Power Line — P
- *Underground Telephone Cable — T
- *Underground Telephone Conduit — TC
- *Underground Fiber Optics Telephone Cable — T FO
- *Underground TV Cable — TV
- *Underground Fiber Optics TV Cable — TV FO
- *Underground Gas Pipeline — G
- Aboveground Gas Pipeline — A/G Gas
- *Underground Water Line — W
- Aboveground Water Line — A/G Water
- *Underground Gravity Sanitary Sewer Line — SS
- Aboveground Gravity Sanitary Sewer Line — A/G Sanitary Sewer
- *Underground SS Forced Main Line — FSS
- Underground Unknown Utility Line — ?UTL
- SUE Test Hole
- Water Meter
- Water Valve
- Fire Hydrant
- Sanitary Sewer Cleanout

*For Existing Utilities
- Utility Line Drawn from Record (Type as Shown) — W
- Designated Utility Line (Type as Shown) — W

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Kimley»Horn
© 2020 KIMLEY-HORN AND ASSOCIATES, INC.
300 MORRIS STREET, SUITE 200, DURHAM, NC, 27701
PHONE: 919-677-2000
WWW.KIMLEY-HORN.COM
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UTILITY SYMBOLOGY

ELLIOTT ROAD EXTENSION
PREPARED FOR
TOWN OF CHAPEL HILL, NC
CHAPEL HILL NORTH CAROLINA

SHEET NUMBER
UC-2

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GENERAL NOTES:

1. ALL WORK SHALL COMPLY WITH APPLICABLE STATE, FEDERAL, AND LOCAL CODES, AND ORANGE WATER AND SEWER AUTHORITY (OWNER) REQUIREMENTS. ALL NECESSARY LICENSES AND PERMITS SHALL BE OBTAINED BY THE CONTRACTOR AT ITS EXPENSE, UNLESS PREVIOUSLY OBTAINED BY THE OWNER AND PROVIDED AT THE PRECONSTRUCTION CONFERENCE.

2. DEVIATION FROM THESE PLANS AND NOTES WITHOUT THE PRIOR WRITTEN CONSENT OF THE UTILITY OWNER OR THEIR REPRESENTATIVE OR THE ENGINEER MAY BE CAUSE FOR THE WORK TO BE UNACCEPTABLE.

3. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY SHOULD ANY FIELD CONDITIONS BE ENCOUNTERED THAT VARY FROM THE INFORMATION PROVIDED IN THE CONTRACT DOCUMENTS. ANY NECESSARY FIELD REVISIONS ARE SUBJECT TO REVIEW & APPROVAL OF AN AMENDED PLAN &/OR PROFILE BY THE UTILITY OWNER PRIOR TO CONSTRUCTION.

4. CONTRACTOR SHALL PLAN AND CONSTRUCT WORK SO AS TO CAUSE MINIMUM INCONVENIENCE TO THE UTILITY OWNER AND PUBLIC. THE CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL AND ERECT AND MAINTAIN AT ALL TIMES DURING THE PROGRESS OR TEMPORARY SUSPENSION OF WORK, SUITABLE BARRIERS, FENCES, SIGNS OR OTHER ADEQUATE PROTECTION, INCLUDING FLAG MEN AND WATCHMEN AS NECESSARY TO ENSURE THE SAFETY OF THE PUBLIC AS WELL AS THOSE ENGAGED IN THE CONSTRUCTION WORK. CONSTRUCTION SIGNAGE SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "CONSTRUCTION AND MAINTENANCE OPERATIONS SUPPLEMENT TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" BY THE NCDOT.

5. ALL WATER AND SEWER CONSTRUCTION SHALL CONFORM TO NCDEQ REGULATIONS, AND TO CURRENT UTILITY OWNER REGULATIONS, STANDARDS, AND SPECIFICATIONS. CONTRACTOR SHALL OBTAIN FROM EACH UTILITY OWNER AND ENGINEER APPROVED SUBMITTALS FOR ALL MATERIALS PROPOSED TO BE INCORPORATED IN THE WORK PRIOR TO ORDERING ANY MATERIALS OR COMMENCING UTILITY CONSTRUCTION.

6. CONTRACTOR SHALL COORDINATE ALL WORK WITH UTILITY OWNER LEAST 48 HOURS PRIOR TO THE START OF CONSTRUCTION, OR AS OTHERWISE SPECIFIED HEREIN.

7. ALL PIPE LENGTHS ARE MEASURED ALONG A HORIZONTAL PLANE. SANITARY SEWER LINES ARE MEASURED TO CENTER OF MANHOLE.

8. THE CONTRACTOR SHALL PROVIDE ALL STAKEOUT SURVEY. ANY EXISTING STAKEOUT OR BENCHMARKS SHALL NOT BE RELIED UPON BY THE CONTRACTOR.

9. COORDINATES SHOWN ON THE DRAWINGS ARE BASED ON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM (NAD 83).

11. LOCATIONS OF EXISTING SHOWN UTILITIES ARE APPROXIMATE. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE SIZE, DEPTH, MATERIAL AND LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION AND TO TAKE WHATEVER STEPS ARE NECESSARY TO PROVIDE FOR THEIR PROTECTION. THE ENGINEER HAS ATTEMPTED TO LOCATE AND INDICATE ALL EXISTING FACILITIES ON THE PLANS; HOWEVER, THIS INFORMATION IS SHOWN FOR THE CONTRACTOR'S CONVENIENCE ONLY. THE ENGINEER AND THE OWNER(S) ASSUME NO RESPONSIBILITY FOR THE LOCATIONS OF UTILITIES SHOWN OR NOT SHOWN. PRIOR TO DIGGING ON AND OFF SITE, THE CONTRACTOR SHALL HAVE ALL UTILITIES LOCATED BY "NC 811" 1-800-632-4949. THE CONTRACTOR SHALL CONTACT ANY UTILITY OWNER WHOSE UTILITIES ARE NOT LOCATED BY "NC 811" FOR EXACT LOCATION OF THEIR UTILITIES PRIOR TO STARTING CONSTRUCTION. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR AND/OR REPLACE ANY AND ALL DAMAGE MADE TO UTILITIES BY THE CONTRACTOR TO PRECONSTRUCTION CONDITION OR BETTER AT THE CONTRACTOR'S EXPENSE.

12. DEPTH AND LOCATION OF BURIED DATA AND TELECOMMUNICATIONS CABLES (FIBER OPTICS AND CONVENTIONAL) ARE KNOWN TO VARY DUE TO INSTALLATION TECHNIQUES. CONTRACTOR SHALL COORDINATE ITS WORK WITH CONFLICTING CABLES AS NECESSARY FOR INSTALLATION OF THE PROPOSED WATER AND SEWER. COORDINATION WITH EXISTING UTILITIES SHALL BE INCLUDED IN THE PROJECT SCHEDULE. COORDINATION AND PHASING RELATED TO EXISTING UTILITIES ARE INCLUSIVE TO THE PROJECT AND NO SPECIFIC OR ADDITIONAL PAYMENT SHALL BE MADE.

13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH UTILITY PROVIDERS ANY SUPPORT OF EXISTING UTILITY POLES OR OTHER ITEMS AS REQUIRED FOR TRENCH EXCAVATION. ALL COSTS OF SUCH WORK SHALL BE PAID BY THE CONTRACTOR.

14. THE CONTRACTOR SHALL VERIFY THE VOLTAGES OF ALL ELECTRICAL UTILITIES AND FOLLOW THE APPROPRIATE OSHA STANDARDS WHEN WORKING IN THEIR VICINITY.

15. UNLESS OTHERWISE INDICATED, ALL GRADE ELEVATIONS SHOWN ARE ALONG THE PIPE CENTERLINE.

17. ALL PAVEMENT CUTS SHALL BE SAWCUT OR MILLED ALONG A CONTINUOUS STRAIGHT LINE AND REPAVED PER NCDOT REQUIREMENTS AND AS SPECIFIED HEREIN.

18. TRAFFIC ISLANDS, CURBS, CONCRETE DRIVEWAYS, AND OTHER CONCRETE SURFACINGS SHALL BE REPLACED TO THE FIRST EXPANSION JOINT BEYOND THE TRENCH EXCAVATION LIMITS AND TO THE FULL WIDTH. ALL CONCRETE WORK SHALL MATCH EXISTING.

19. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL SHEETING AND/OR ACTIVE SHORING REQUIRED FOR THE INSTALLATION OF THE UTILITY. ALL EXCAVATIONS SHALL BE KEPT WITHIN THE DESIGNATED EASEMENT WIDTHS. EXCAVATION WITHIN PAVED AREAS SHALL BE KEPT TO A MINIMUM. SHEETING AND/OR ACTIVE SHORING SHALL BE INSTALLED AS REQUIRED TO PROTECT EXISTING UTILITIES.

21. ALL MATERIAL CLEARED AND GRUBBED BY THE CONTRACTOR IN ORDER TO CONSTRUCT THE WORK, SUCH AS TREES, VEGETATION, ETC., SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE PROPERLY DISPOSED OF OFF-SITE AT A STATE APPROVED DISPOSAL SITE.

22.IMMEDIATELY PRIOR TO DISTURBANCE, CONTRACTOR SHALL OBTAIN DIGITALLY RECORDED VIDEO OF THE UTILITY ALIGNMENTS INCLUDING EACH DRIVEWAY, SIDEWALK, SIGN, LANDSCAPING, ETC., THAT MAY BE DISTURBED BY CAUSES RELATED TO THE WORK. EACH SHALL BE RESTORED TO ITS PRECONSTRUCTION CONDITION OR BETTER. VIDEO SHALL BE SUBMITTED TO THE UTILITY OWNER AND THE ENGINEER PRIOR TO WORK.

23.CONTRACTOR SHALL MAINTAIN A MEANS FOR ACCESS TO EACH PROPERTY, RESIDENCE, AND BUSINESS AT ALL TIMES.

24.DURING CONSTRUCTION, EMERGENCY VEHICLE AND PERSONNEL ACCESS TO PROPERTIES, BUILDINGS, PERSONS, AND EMERGENCY APPARATUS, INCLUDING BUT NOT LIMITED TO FIRE HYDRANTS AND FIRE DEPARTMENT CONNECTIONS SHALL BE MAINTAINED AT ALL TIMES.

25. ALL CONSTRUCTION SHALL BE LIMITED TO STREET RIGHTS-OF-WAY AND OBTAINED EASEMENTS. UTILITY OWNERS WILL FURNISH DESCRIPTIONS OF EASEMENTS UPON REQUEST. WHERE THE CONTRACTOR DETERMINES THAT ENCROACHMENT ONTO PRIVATE PROPERTY IS NECESSARY AND AN EASEMENT HAS NOT BEEN PROVIDED, THE CONTRACTOR SHALL CONTACT INDIVIDUAL PROPERTY OWNERS AND OBTAIN WRITTEN APPROVAL FOR THAT ENCROACHMENT. SUCH APPROVALS SHALL BE PROVIDED TO THE UTILITY OWNER, NCDOT, AND THE ENGINEER.

26. CONTRACTOR SHALL NOTIFY PROPERTY OWNERS AND TENNANTS AT LEAST 7 DAYS PRIOR TO CONSTRUCTION THAT CONSTRUCTION ACTIVITY WILL TAKE PLACE IN THEIR AREA.

27. CONTRACTOR SHALL REMOVE, STORE, AND REPLACE ALL CONFLICTING MAIL BOXES, CULVERTS, HEADWALLS, ORNAMENTAL STRUCTURES, SIGNS, HARDSCAPING, ETC. WITHIN THE RIGHT OF WAY OR PERMANENT EASEMENT UNLESS OTHERWISE SHOWN ON THE PLANS OR IN THE CONTRACT DOCUMENTS. CONFLICTING TREES WITHIN THE RIGHT OF WAY SHALL BE REMOVED AND NOT REPLANTED.

28. THE CONTRACTOR SHALL INSTALL ALL SIGNS AS REQUIRED BY NCDOT ALONG STATE ROADWAYS AND AS REQUIRED BY TOWN OF CHAPEL HILL ALONG TOWN STREETS AND PUBLIC PARKING AREAS.

29. LANE AND SHOULDER CLOSURES SHALL BE IN ACCORDANCE WITH NCDOT REQUIREMENTS.

30. TRENCHES AND EXCAVATIONS SHALL BE BACKFILLED OR COVERED WITH ROAD PLATES AT THE END OF EACH WORK DAY. OPEN ENDS OF INSTALLED LINE SHALL BE CAPPED WITH A WATERTIGHT CAP DESIGNED FOR THE INTENDED USE.

31. CONTRACTOR SHALL PATCH ALL ROADWAY PAVEMENT DISTURBANCES TO RECEIVE TRAFFIC BY THE END OF EACH WEEK. TEMPORARY PATCHES OF COMPACTED AGGREGATE BASE COURSE (ABC) OR COMPACTED ASPHALT MILLINGS SHALL BE PROVIDED DAILY AND MAINTAINED FLUSH WITH ADJACENT PAVEMENT UNTIL PAVEMENT PATCH IS PROVIDED. EROSION CONTROL SHALL BE PROVIDED AS NECESSARY FOR TEMPORARY PATCH AREAS.

32. AT THE COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE FROM THE SITE ALL TOOLS, APPLIANCES, CONSTRUCTION EQUIPMENT AND MACHINERY, SURPLUS MATERIALS, AND DEBRIS AND SHALL RESTORE TO ORIGINAL CONDITION OR BETTER ALL PROPERTY NOT DESIGNATED FOR ALTERATION BY THE CONTRACT DOCUMENTS.

33. CONTRACTOR SHALL PROVIDE AS-BUILT DRAWINGS FOR ALL UTILITY CONSTRUCTION PRIOR TO PLACING THE PIPELINE(S) IN SERVICE.

UTILITY NOTES:

1. UTILITY SEPARATION REQUIREMENTS:
   A. DISTANCE OF 100' SHALL BE MAINTAINED BETWEEN SANITARY SEWER & ANY PRIVATE OR PUBLIC WATER SUPPLY SOURCE SUCH AS AN IMPOUNDED RESERVOIR USED AS A SOURCE OF DRINKING WATER. IF ADEQUATE LATERAL SEPARATION CANNOT BE ACHIEVED, FERROUS SANITARY SEWER PIPE SHALL BE SPECIFIED & INSTALLED TO WATERLINE SPECIFICATIONS. HOWEVER, THE MINIMUM SEPARATION SHALL NOT BE LESS THAN 25' FROM A PRIVATE WELL OR 50' FROM A PUBLIC WELL.
   B. WHEN INSTALLING WATER &/OR SEWER MAINS, THE HORIZONTAL SEPARATION BETWEEN UTILITIES SHALL BE 10'. IF THIS SEPARATION CANNOT BE MAINTAINED DUE TO EXISTING CONDITIONS, THE VARIATION ALLOWED IS THE WATER MAIN IN A SEPARATE TRENCH WITH THE ELEVATION OF THE WATER MAIN AT LEAST 18" ABOVE THE TOP OF THE SEWER & MUST BE APPROVED BY THE OWNER. ALL DISTANCES ARE MEASURED FROM OUTSIDE DIAMETER TO OUTSIDE DIAMETER.
   C. WHERE IT IS IMPOSSIBLE TO OBTAIN PROPER SEPARATION, OR ANYTIME A SANITARY SEWER PASSES OVER A WATERMAIN, DIP MATERIALS OR STEEL ENCASEMENT EXTENDED 10' ON EACH SIDE OF CROSSING MUST BE SPECIFIED & INSTALLED TO WATERLINE SPECIFICATIONS.
   D. 5.0' MINIMUM HORIZONTAL SEPARATION IS REQUIRED BETWEEN ALL SANITARY SEWER & STORM SEWER FACILITIES, UNLESS DIP MATERIAL IS SPECIFIED FOR SANITARY SEWER.
   E. MAINTAIN 18" MIN. VERTICAL SEPARATION AT ALL WATERMAIN & RCP STORM DRAIN CROSSINGS; MAINTAIN 18" MIN. VERTICAL SEPARATION AT ALL SANITARY SEWER & RCP STORM DRAIN CROSSINGS. WHERE ADEQUATE SEPARATIONS CANNOT BE ACHIEVED, DIP MATERIALS & A CONCRETE CRADLE IN ACCORDANCE WITH DETAIL 5/UC-3A SHALL BE INSTALLED.
   F. ALL OTHER UNDERGROUND UTILITIES SHALL CROSS WATER & SEWER FACILITIES WITH 18" MIN. VERTICAL SEPARATION REQUIRED.

2. MINIMUM PIPE COVER FOR DISTRIBUTION WATER MAINS SHALL BE 3 FEET AND TRANSMISSION WATER MAINS SHALL BE 5 FEET, UNLESS DUCTILE IRON PIPE IS USED AND LESS COVER IS SPECIFICALLY SHOWN ON DRAWINGS OR AS APPROVED BY THE UTILITY OWNER OR ENGINEER.

3. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, WATER LINE BEDDING AND BACKFILL SHALL BE IN STRICT ACCORDANCE WITH BEDDING TYPE E (SEE DETAIL 2/UC-3A).

4. CONTRACTOR SHALL MAINTAIN CONTINUOUS WATER & SEWER SERVICE TO EXISTING CUSTOMERS THROUGHOUT CONSTRUCTION OF PROJECT. ANY NECESSARY SERVICE INTERRUPTIONS SHALL BE COORDINATION WITH AND TAKE PLACE AT A TIME AND DATE ACCEPTABLE TO THE UTILITY OWNER. A 72 HOUR ADVANCE NOTICE SHALL BE PROVIDED TO AFFECTED CUSTOMERS.

5. ALL WATER LINE FOR THIS PROJECT SHALL BE SIZE AND MATERIAL AS NOTED ON THE PROFILE DRAWINGS. RESTRAINED JOINT PIPING SHALL BE INSTALLED TO THE NEXT FULL JOINT BEYOND THE STATIONS SHOWN ON THE PROFILE DRAWINGS AT MINIMUM.

6. ALL PRESSURIZED FITTINGS SHALL BE DUCTILE IRON RESTRAINED MECHANICAL JOINT WITH PRESSURE RATING EQUAL TO OR HIGHER THAN HOST PIPE, UNLESS OTHERWISE SHOWN ON THE DRAWINGS.

7. ALL MECHANICAL JOINTS SHALL BE FITTED WITH WEDGE-TYPE MECHANICAL RESTRAINT ACCESSORY KITS DESIGNED FOR THE INTENDED USE AND MATERIAL, AS APPROVED BY UTILITY OWNER.

8. PIPE ALIGNMENT SHOWN IS BASED ON STANDARD DUCTILE IRON MECHANICAL JOINT FITTINGS. JOINT DEFLECTIONS SHALL NOT EXCEED 75 PERCENT OF MANUFACTURER'S RECOMMENDED DEFLECTION. CONTRACTOR SHALL ADJUST PIPELINE ALIGNMENT AND DEFLECT JOINTS AS NECESSARY TO ACCOMMODATE THE STANDARD BENDS SHOWN.

9. DETECTABLE WARNING TAPE AND TRACER WIRE IS REQUIRED FOR ALL BURIED PIPE AND SHALL BEAR THE APPROPRIATE AWPA COLORING AND TEXT FOR THE APPLICABLE UTILITY. INSULATED 12GA TRACER WIRE SHALL BE INSTALLED ALONG ALL PIPELINES AND SHALL BE ACCESSIBLE FROM THE FINISHED GRADE WITHIN ALL VALVE BOXES, MANHOLES, AND OTHER END POINTS OF TRACER WIRE. SPLICES IN TRACER WIRE SHALL BE MADE WITH SPLICE CONNECTORS DESIGNED FOR THE INTENDED PURPOSE AND IN ACCORDANCE WITH TRACER WIRE MANUFACTURER'S RECOMMENDATIONS.

10. ALL MANHOLE COVERS AND VALVE BOX LIDS FOR WATER SHALL READ "WATER", ALL MANHOLE COVERS AND VALVE BOX LIDS FOR SEWER SHALL READ "SEWER", AND ALL SHALL BE IN ACCORDANCE WITH NCDOT AND APPLICABLE UTILITY OWNER STANDARDS AND DETAILS.

11. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO FABRICATION AND ERECTION OF ANY MATERIAL. ANY UNUSUAL CONDITIONS SHALL BE REPORTED TO THE ATTENTION OF THE OWNER(S) AND ENGINEER.

12. EXISTING WATER SERVICES SHALL REMAIN IN SERVICE AT ALL TIMES UNTIL THE PROPOSED MAIN IS TESTED AND PHASED INTO SERVICE.

13. ALL SANITARY SEWER PIPING SHALL BE PROTECTO 401 LINED PC 350 DUCTILE IRON PIPE. ALL EXPOSED METALLIC COMPONENTS OF THE SEWER SYSTEM SHALL BE TYPE 316 STAINLESS STEEL.

GENERAL SEQUENCE:

1. FOR EACH WATER LINE AND SEWER LINE RELOCATION, THE CONTRACTOR SHALL PROVIDE THE OWNER WITH A DETAILED INSTALLATION, CONNECTION, AND SERVICE INTERRUPRTION PLAN FOR APPROVAL AT LEAST SEVEN (7) DAYS PRIOR TO THE RELOCATION. AT A MINIMUM, EACH PLAN SHALL ADDRESS THE FOLLOWING:

   A. SEQUENCE OF CONSTRUCTION OPERATIONS.

   B. PROCEDURE FOR FLUSHING, TESTING, AND DISINFECTION OF ALL AFFECTED PIPING AND VALVES, AS REQUIRED BY THE OWNER.

   C. PHASING AND SCHEDULE FOR ALL CONNECTIONS, INCLUDING PLANNED SERVICE OUTAGES, DURATION, AND CONTINGENCY PLAN.

2. NO INTERRUPTION OF SERVICE WILL BE PERMITTED UNTIL THE FOREGOING PLAN HAS BEEN APPROVED BY THE OWNER. THE OWNER'S PERSONNEL SHALL OPERATE THE OWNER'S EXISTING FACITLITIES INVOLVED IN THE INTERRUPTIONS OF SERVICE.

3. PLANNED SERVICE CONNECTION INTERRUPTIONS SHALL LAST NO LONGER THAN 8 HOURS UNLESS OTHERWISE APPROVED BY THE OWNER. ALL INTERRUPTIONS OF SERVICES SHALL BE COORDINATED WITH AND SCHEDULED AT TIMES ACCEPTABLE TO THE OWNER.

4. WRITTEN WATER SERVICE INTERRUPTION NOTICES SHALL BE PROVIDED TO ALL AFFECTED CUSTOMERS AT LEAST 72 HOURS PRIOR TO EACH PLANNED INTERRUPTION.

ASBESTOS CEMENT PIPE NOTES:

1. CONTRACTOR SHALL FOLLOW ALL FEDERAL, STATE, AND LOCAL RULES AND REGULATIONS FOR CUTTING, DEMOLISHING, AND DISPOSING OF ASBESTOS CEMENT PIPE, INCLUDING BUT NOT LIMITED TO THE REQUIREMENTS OF THE NORTH CAROLINA DEPARTMENT OF HEALTH AND HUMAN SERVICES, OSHA, TOWN OF CHAPEL HILL, AND OWASA.

2. CONTRACTOR SHALL PREVENT EXPOSURE OF WORKERS AND THE PUBLIC TO ASBESTOS FIBERS.

3. CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FOR CUTTING, DEMOLISHING, AND DISPOSING OF ASBESTOS CEMENT PIPE.

4. ASBESTOS CEMENT PIPE ABANDONED IN PLACE SHALL BE FILLED WITH FLOWABLE FILL.

No.	REVISIONS	DATE	BY

Kimley»Horn
© 2020 KIMLEY-HORN AND ASSOCIATES, INC.
300 MORRIS STREET, SUITE 200, DURHAM, NC, 27701
PHONE: 919-682-3583
WWW.KIMLEY-HORN.COM
NC LICENSE #: F-0102

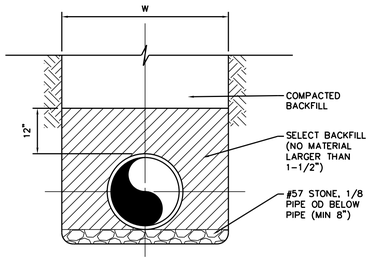
FINAL DRAWINGS FOR REVIEW PURPOSES ONLY

KHA PROJECT	011159020
DATE	7/6/2020
SCALE	1" = 40'
DESIGNED BY:	NLH
DRAWN BY:	SOP
CHECKED BY:	NDR

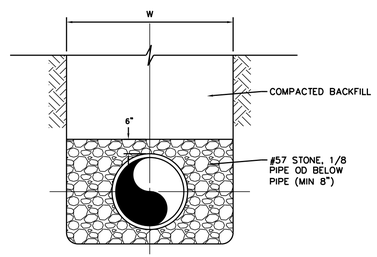
UTILITY NOTES

ELLIOTT ROAD EXTENSION
PREPARED FOR
TOWN OF CHAPEL HILL, NC
CHAPEL HILL NORTH CAROLINA

SHEET NUMBER
UC-3



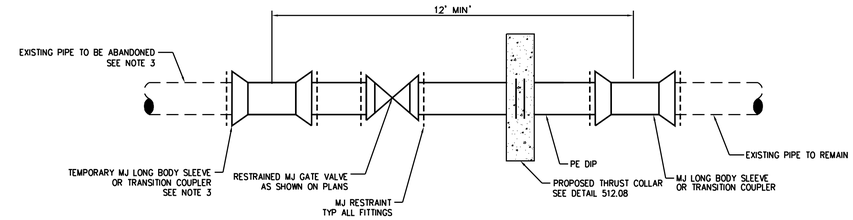
1 | UC-3A
BEDDING TYPE B
SCALE: N.T.S.



2 | UC-3A
BEDDING TYPE E
SCALE: N.T.S.

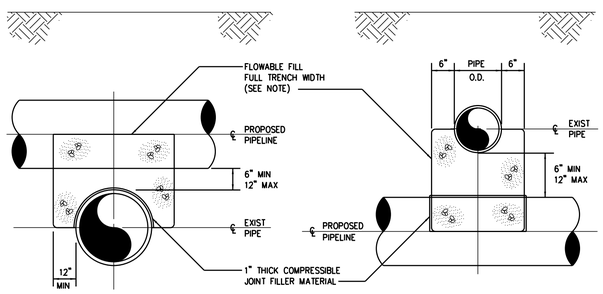
TRENCH EXCAVATION LIMITS		
INTERNAL DIAMETER OF PIPE	W WIDTH OF TRENCH	
	MAX	W=MIN
4"-6"	3'-9"	2'-0"
8"-10"	3'-9"	2'-2"
12"	3'-9"	O.D.+2'
DEPTH OF CUT	S MAXIMUM PAVEMENT REPLACEMENT WIDTH	
0-6'	S=W+4'	
>6-8'	S=W+8'	
>8-10'	S=W+12'	
>10-12'	S=W+16'	
>12-14'	S=W+20'	
W = TRENCH WIDTH AT BOTTOM OF PIPE. TRENCH SIDE SLOPES SHALL BE IN ACCORDANCE WITH OSHA REQUIREMENTS.		

3 | UC-3A
TRENCH EXCAVATION LIMITS
SCALE: N.T.S.



NOTES:
1. CONTRACTOR SHALL CONSTRUCT THE VALVE AND PIPE ASSEMBLY PRIOR TO DISRUPTING WATER SERVICE AND BEFORE CUTTING THE EXISTING PIPE. SHUT DOWN TIME OF THE EXISTING LINES SHALL BE MINIMIZED.
2. THE THRUST COLLAR SHALL BE ALLOWED TO CURE A MINIMUM OF 3 DAYS BEFORE GATE VALVE IS CLOSED.
3. AFTER THRUST COLLAR HAS CURED, VALVE MAY BE CLOSED, PIPE TO BE ABANDONED CUT AND REMOVED, AND TEMPORARY SLEEVE REPLACED WITH BEND FITTING SHOWN IN RELOCATION SEGMENT PLAN/PROFILE.

4 | UC-3A
THRUST COLLAR CUT-IN
SCALE: N.T.S.

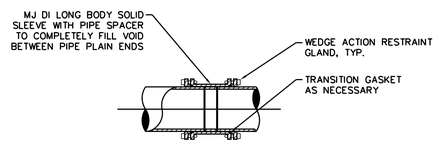


PROPOSED PIPELINE OVER EXIST PIPE

PROPOSED PIPELINE UNDER EXIST PIPE

NOTE: NO ENCASEMENT REQUIRED FOR VERTICAL SEPARATION GREATER THAN 12"

5 | UC-3A
PIPE CROSSING DETAIL
SCALE: N.T.S.



6 | UC-3A
RESTRAINED MJ SOLID SLEEVE
SCALE: N.T.S.

No.	REVISIONS	DATE	BY

Kimley»Horn

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PHONE: 919-682-3583
WWW.KIMLEY-HORN.COM
NC LICENSE #: F-0102

FINAL DRAWINGS FOR REVIEW PURPOSES ONLY

KHA PROJECT 011159020
DATE 7/6/2020
SCALE 1" = 40'
DESIGNED BY: NLH
DRAWN BY: SOP
CHECKED BY: NDR

UTILITY DETAILS

ELLIOTT ROAD EXTENSION
PREPARED FOR
TOWN OF CHAPEL HILL, NC
CHAPEL HILL NORTH CAROLINA

SHEET NUMBER
UC-3A

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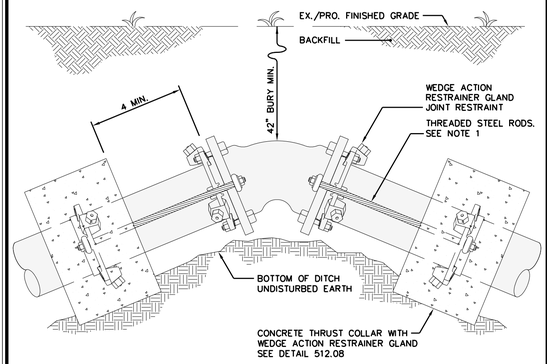

PROFILE VIEW

NOTES:

1. If 42" bury depth is not maintained or located in high pressure zone, a minimum of (2) 3/4" dia. rods to be used for pipe thru 24" dia. per joint – a minimum of (2) 1" dia. rods to be used for pipe 30" & 36" dia. per joint – a minimum of (2) 1 1/4" dia. rods to be used for pipe 42" & 48" dia. per joint. (See detail 512.09)

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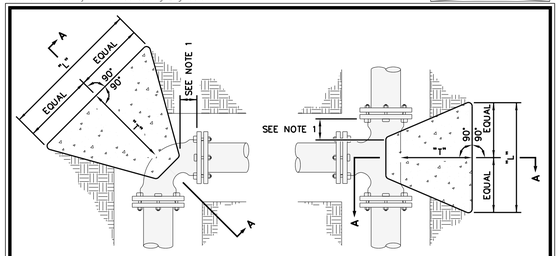
STANDARD VERTICAL BEND DETAIL

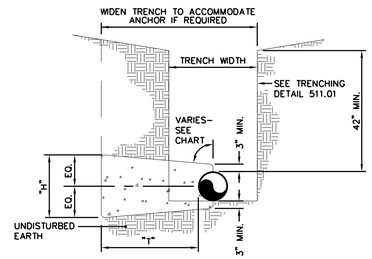
SCALE:	DETAIL #
Not To Scale	2 512.01
REVISION DATE: August 15, 2003	SHEET #: 1 of 1

Details Provided by APPIAN Consulting Engineers



FOR ALL BEND FITTINGS

FOR TEE FITTING



SECTION A-A

NOTES:

1. Concrete blocking is to be formed to ensure accessibility to fittings and poured against undisturbed earth.
2. Fittings are to be completely wrapped with plastic, prior to pouring concrete.
3. Concrete to be minimum 3,000 psi. @ 28 days.

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BLOCKING DETAIL for HORIZONTAL BENDS AND TEE

SCALE:	DETAIL #
Not To Scale	2 512.02
REVISION DATE: August 15, 2003	SHEET #: 1 of 4

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TEST PRESSURE = 200 P.S.I.

PIPE SIZE	TYPE FITTING	DIMENSIONS (Ft.) "L"	"H"	"T"	VOLUME. CONCRETE CU. YD.
<4 INCHES	11 1/4°	1.00	1.00	1.00	0.04
	22 1/2°	1.00	1.00	1.50	0.06
	45°	1.00	1.00	1.50	0.06
	90°	1.50	1.50	2.50	0.15
	TEE / PLUG	1.50	1.50	2.00	0.12
4 INCHES	11 1/4°	1.00	1.00	2.50	0.09
	22 1/2°	1.00	1.00	2.50	0.09
	45°	1.50	1.50	2.50	0.15
	90°	1.50	1.50	2.50	0.15
	TEE / PLUG	1.50	1.50	2.00	0.12
6 INCHES	11 1/4°	1.50	1.50	2.50	0.15
	22 1/2°	1.50	1.50	2.50	0.15
	45°	1.50	1.50	2.50	0.15
	90°	2.50	2.00	3.00	0.33
	TEE / PLUG	2.50	2.00	2.50	0.28
8 INCHES	11 1/4°	2.00	2.00	2.50	0.23
	22 1/2°	2.00	2.00	2.50	0.23
	45°	2.00	2.00	2.50	0.23
	90°	4.00	2.00	3.00	0.50
	TEE / PLUG	4.00	2.00	2.50	0.42
12 INCHES	11 1/4°	2.00	2.00	3.00	0.28
	22 1/2°	3.00	2.00	3.00	0.39
	45°	4.00	2.50	3.00	0.61
	90°	5.50	3.00	3.50	1.13
	TEE / PLUG	5.50	3.00	3.00	0.97
16 INCHES	11 1/4°	2.00	2.00	3.00	0.28
	22 1/2°	4.00	2.00	3.00	0.50
	45°	5.50	3.00	3.50	1.13
	90°	7.50	4.00	3.50	2.01
	TEE / PLUG	7.50	4.00	3.00	1.72

CHART NOTES:

1. If blocking excavation is in lightly compacted fill areas, or in areas where boulders or stumps have been removed, blocking size must be re-sized for the specific location/circumstance by a NC licensed Professional Engineer.
2. Blocking sizes shown in these tables assume the following:
   a. Blocking is constructed in residual soils as shown in detail
   b. Soil bearing pressure = 2000 psf
   c. Velocity of flow = 15 fps
3. This detail not applicable to reducing bends.
4. Neither the weight of the concrete blocking nor friction between concrete blocking and soil was added into blocking sizes computation. Therefore, blocking size is conservative.

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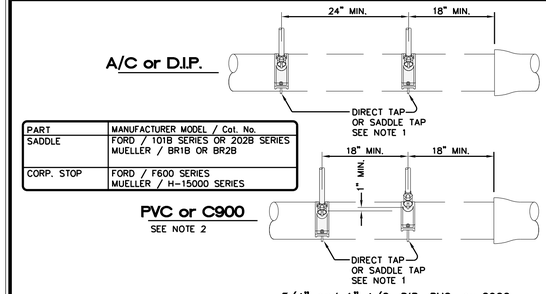
BLOCKING DETAIL for HORIZONTAL BENDS AND TEE

SCALE:	DETAIL #
Not To Scale	2 512.02
REVISION DATE: August 15, 2003	SHEET #: 3 of 4

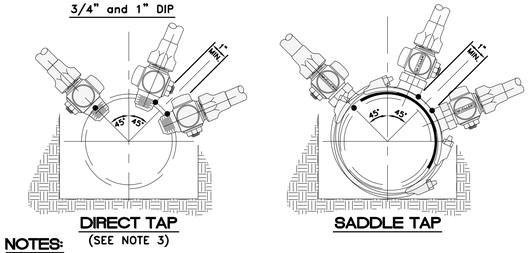
Details Provided by APPIAN Consulting Engineers – WWW.APPIANENGINEERS.COM



PART	MANUFACTURER MODEL / Cat. No.
SADDLE	FORD / 101B SERIES OR 202B SERIES MUELLER / BR1B OR BR2B
CORP. STOP	FORD / F600 SERIES MUELLER / H-15000 SERIES

3/4" and 1" A/C, DIP, PVC, or C900

3/4" and 1" DIP



DIRECT TAP
(SEE NOTE 3)

SADDLE TAP

NOTES:

1. All bronze saddle (Single or double strap for 3/4" and 1")
2. If 2 taps are made on each side of the main there shall be a minimum of 18" horizontal separation. Multiple taps on the same side shall have a minimum 18" horizontal separation and staggered a minimum of 1" vertically to prevent damage to the main.
3. Bronze service saddles shall be used on all service connections. Direct taps shall be made only as directed by an OWASA representative.

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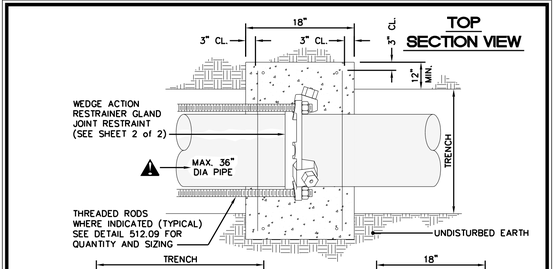
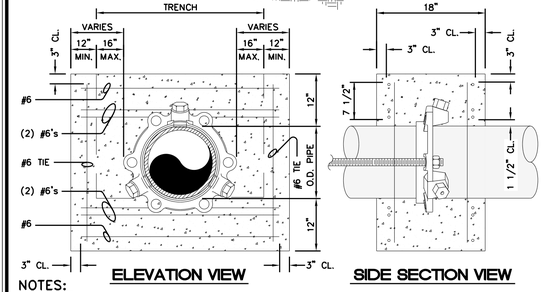
STANDARD 3/4" and 1" WATER TAPPING DETAIL

SCALE:	DETAIL #
Not To Scale	2 512.06
REVISION DATE: April 13, 2007	SHEET #: 1 of 1

Details Provided by APPIAN Consulting Engineers – WWW.APPIANENGINEERS.COM





NOTES:

1. Concrete shall 3000 P.S.I.
2. Reinforcing bars shall be deformed bars, and tied together.
3. Trench bottom width in vicinity of thrust block(s) installation shall be the minimum width for placement of pipe (Max trench width = pipe O.D.+2 Ft.)
4. Backfill and compact in 6" layers.
5. Place thrust collar on one full joint of pipe.
6. Last joint of pipe with thrust collar to be mechanical joint pipe.
7. Place wedge action restrainer gland joint restraint 4 feet from plug end of pipe.

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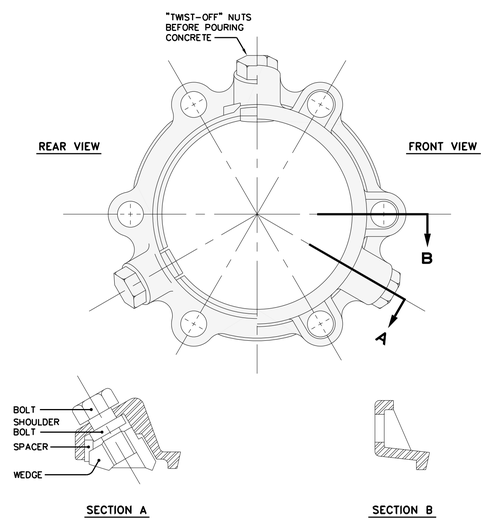
THRUST COLLAR & BLOCKING with WEDGE ACTION RESTRAINER GLAND

SCALE:	DETAIL #
Not To Scale	2 512.08
REVISION DATE: August 15, 2003	SHEET #: 1 of 2

Details Provided by APPIAN Consulting Engineers – WWW.APPIANENGINEERS.COM



A MEG-A-LUG SERIES 1100 or FORD WEDGE ACTION RESTRAINER GLAND UFR SERIES 1400 MECHANICAL JOINT RESTRAINT SHALL BE PLACED ON DIP. CONCRETE & REINFORCEMENT STEEL SHALL ALSO BE AS SHOWN ON SHEET 1 of 2.

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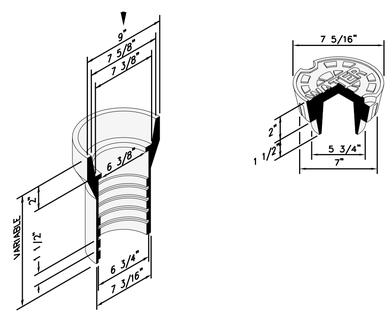
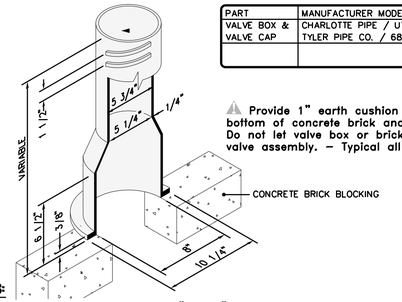
THRUST COLLAR & BLOCKING with WEDGE ACTION RESTRAINER GLAND

SCALE:	DETAIL #
Not To Scale	2 512.08
REVISION DATE: August 15, 2003	SHEET #: 2 of 2

Details Provided by APPIAN Consulting Engineers – WWW.APPIANENGINEERS.COM



PART	MANUFACTURER MODEL / Cat. No.
VALVE BOX & VALVE CAP	CHARLOTTE PIPE / UTL-273 TYLER PIPE CO. / 6850



Provide 1" earth cushion between bottom of concrete brick and valve. Do not let valve box or brick rest on valve assembly. – Typical all valves.

NOTES:

1. Use heavy duty traffic lid marked "WATER".

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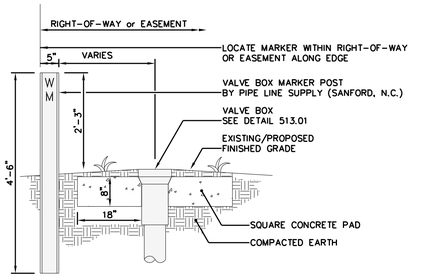
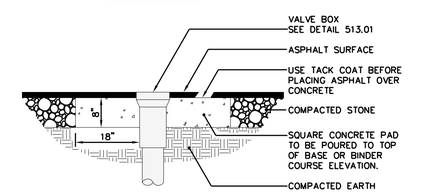
STANDARD SCREW VALVE BOX DETAIL

SCALE:	DETAIL #
Not To Scale	2 513.01
REVISION DATE: August 15, 2012	SHEET #: 1 of 1

Details Provided by APPIAN Consulting Engineers – WWW.APPIANENGINEERS.COM



FIELD AND EASEMENT OR SIDE OF ROAD LOCATION



IN STREET LOCATION

NOTES:

1. Concrete to be minimum 3,000 PSI @ 28 days.

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VALVE BOX STABILIZING PAD DETAILS

SCALE:	DETAIL #
Not To Scale	2 513.02
REVISION DATE: August 15, 2003	SHEET #: 1 of 1

No.	REVISIONS	DATE	BY

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NC LICENSE #: F-0102

STANDARD DETAILS DESIGNED BY OWASA

KHA PROJECT 011159020
DATE 6/2/2020
SCALE 1" = 40'
DESIGNED BY: NLH
DRAWN BY: SOP
CHECKED BY: NDR

UTILITY DETAILS

ELLIOTT ROAD EXTENSION
PREPARED FOR
TOWN OF CHAPEL HILL, NC
CHAPEL HILL NORTH CAROLINA

SHEET NUMBER
UC-3B

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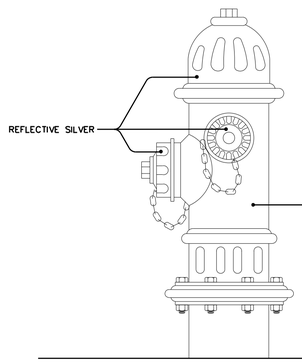

NOTES:

1. Use sherwin–williams industrial enamel or equal.
2. Paint colors are applicable to the following locations:
   a. Town of Carrboro
   b. Town of Chapel Hill
   c. Durham County
   d. Orange County
   e. University of North Carolina

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FIRE HYDRANT PAINTING SPECIFICATIONS

SCALE:	DETAIL #
Not To Scale	≥ 514.01
REVISION DATE: August 15, 2003	SHEET #: 1 of 1

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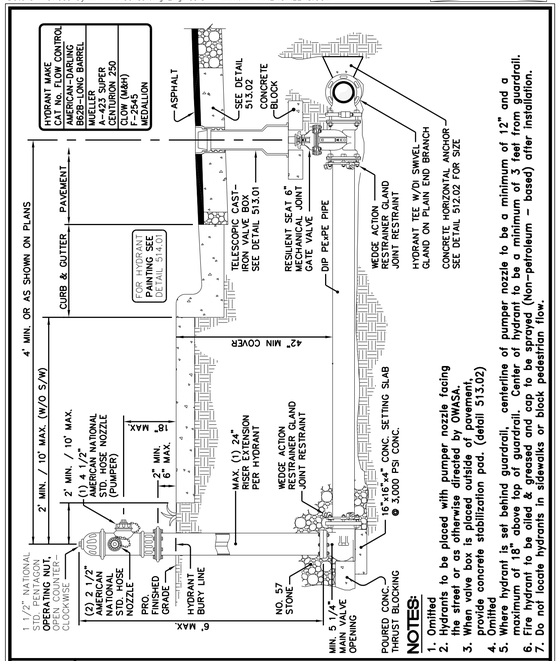

NOTES:

1. Omitted
2. Hydrants to be placed with pumper nozzle facing the street or as otherwise directed by OWASA.
3. Where concrete is poured outside of pavement, provide concrete stabilization pad. (detail 513.02)
4. Omitted
5. Where hydrant is set behind guardrail, centerline of pumper nozzle to be a minimum of 12" and a maximum of 18" above top of guardrail. Center of hydrant to be a minimum of 3 feet from guardrail.
6. Fire hydrant to be oiled & greased and cap to be sprayed (Non-petroleum – based) after installation.
7. Do not locate hydrants in sidewalks or block pedestrian flow.

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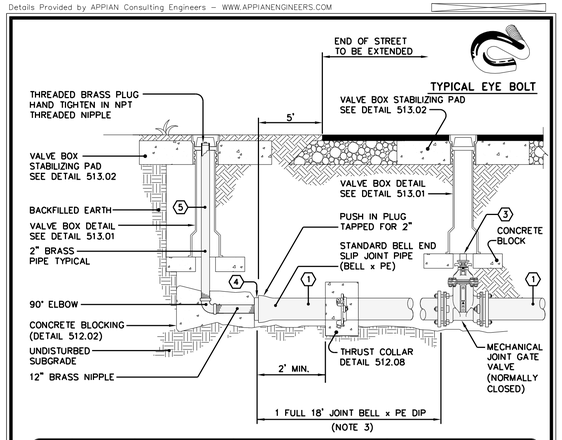
TYP. RESTRAINED JT. FIRE HYDRANT STREETS with CURB & GUTTER

SCALE:	DETAIL #
Not To Scale	≥ 514.03
REVISION DATE: December 3, 2009	SHEET #: 2 of 2

Details Provided by APPIAN Consulting Engineers – WWW.APPIANENGINEERS.COM



1 MAIN	2 REDUCER	3 GATE VALVE	4 PLUG	5 BLOW-OFF ASSEMBLY
4"	N/A	4"	4" TAPPED FOR 2"	2" BRASS
6"	N/A	6"	6" TAPPED FOR 2"	2" BRASS
8"	N/A	8"	8" TAPPED FOR 2"	2" BRASS
10"	N/A	10"	REFER TO OWASA DETAIL 514.06	REFER TO OWASA DETAIL 514.06
12"	N/A	12"	REFER TO OWASA DETAIL 514.06	REFER TO OWASA DETAIL 514.06
16"	N/A	16"	REFER TO OWASA DETAIL 514.06	REFER TO OWASA DETAIL 514.06
18"	N/A	18"	REFER TO OWASA DETAIL 514.06	REFER TO OWASA DETAIL 514.06
20"	N/A	20"	REFER TO OWASA DETAIL 514.06	REFER TO OWASA DETAIL 514.06
24"	N/A	24"	REFER TO OWASA DETAIL 514.06	REFER TO OWASA DETAIL 514.06

NOTES:

1. No discharge from blow–off should go directly into a creek. OWASA must declorinate discharge before it enters a body of water.
2. Provide erosion and sedementation control for discharge.
3. If pipe is PE, use MJ cap and rod to thrust collar (detail 512.08).

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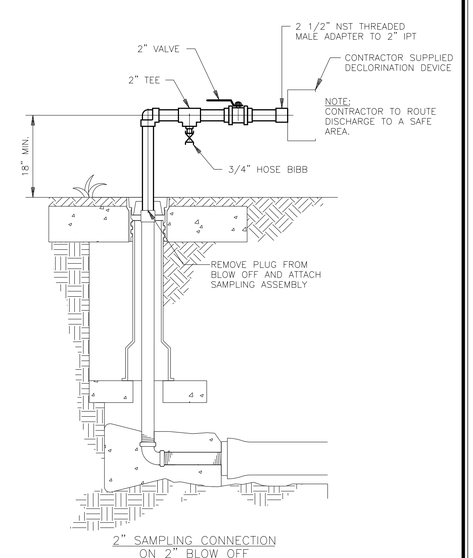
TEMPORARY 2" BLOW-OFF ASSEMBLY FOR MAINS UP TO 24"

SCALE:	DETAIL #
Not To Scale	≥ 514.05
REVISION DATE: August 15, 2003	SHEET #: 1 of 1

Details Provided by OWASA Engineers – WWW.OWASA.ORG



NOTE:

ALL PIPING, VALVES AND FITTINGS SHALL BE IN ACCORDANCE WITH OWASA SPECIFICATIONS.

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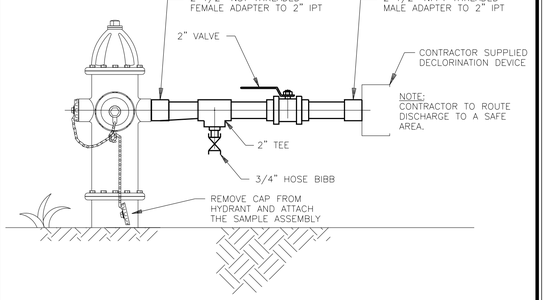
PURITY SAMPLING CONNECTION DETAILS - 2" BLOW OFF LINE

SCALE:	DETAIL #
Not To Scale	≥ 514.07
REVISION DATE: February 7, 2005	SHEET #: 1 of 1

Details Provided by OWASA Engineers – WWW.OWASA.ORG



NOTE:

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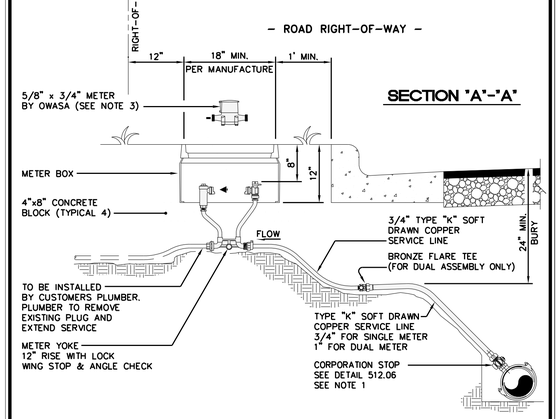
PURITY SAMPLING CONNECTION DETAILS - ON FIRE HYDRANT

SCALE:	DETAIL #
Not To Scale	≥ 514.08
REVISION DATE: February 7, 2005	SHEET #: 1 of 1

Details Provided by APPIAN Consulting Engineers – WWW.APPIANENGINEERS.COM

PART	MANUFACTURER MODEL / Cat. No.
METER BOX	OLDCASTLE / 1118-12 BCFXL BODY B-W O OR 2 MSHI PAVING
METER BOX LID	NICOR, INC. / B12
METER SETTER	FORD (3/4") / VBHH72-12W-11-33 FORD (1") / VBHH74-12W-11-44 MUELLER (3/4" & 1") / H-2404-2A & TWO H-14222 COUPLINGS SPECIFY SIZE OF YOKE WHEN ORDERING MUELLER SETTER
METER	INSTALLED BY OWASA UPON PAYMENT OF FEES
TAPPING	SEE DETAIL 512.06



NOTES:

1. Bronze service saddles shall be used on all service connections. Direct taps shall be made only as directed by an OWASA representative. See tapping detail 512.06.
2. Omitted
3. If installation is for stub–out meter, meter should be purchased from OWASA. (At applicants expense)
4. Meter must be level across meter connections.
5. Substitution requires approval by OWASA's Director of Engineering.

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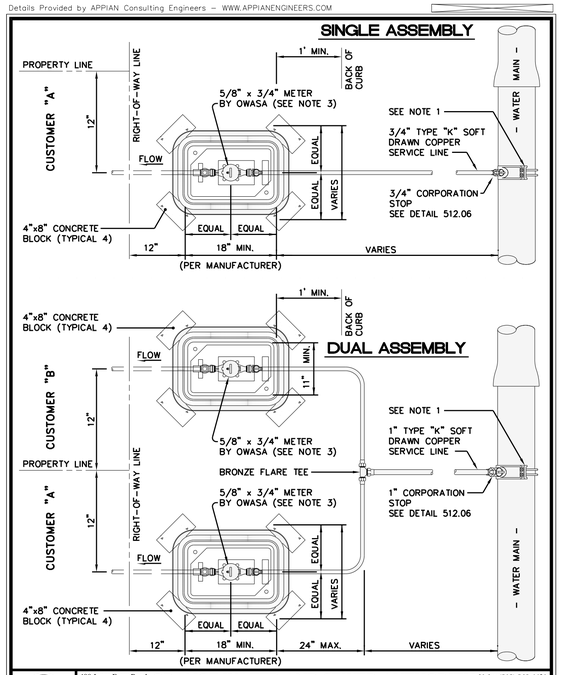
3/4" SINGLE & 1" DUAL SERVICE INSTALLATION

SCALE:	DETAIL #
Not To Scale	≥ 515.01
REVISION DATE: May 16, 2019	SHEET #: 1 of 2

Details Provided by APPIAN Consulting Engineers – WWW.APPIANENGINEERS.COM



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3/4" SINGLE & 1" DUAL SERVICE INSTALLATION

SCALE:	DETAIL #
Not To Scale	≥ 515.01
REVISION DATE: May 16, 2019	SHEET #: 2 of 2

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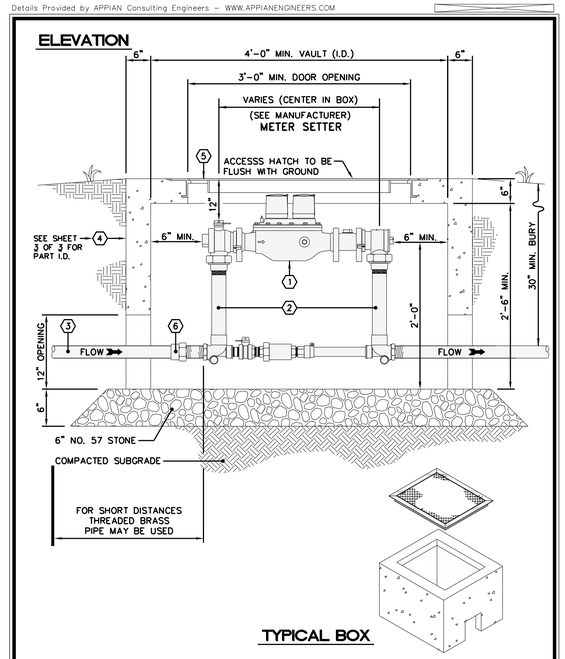

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STANDARD 2" METER VAULT

SCALE:	DETAIL #
Not To Scale	≥ 515.04
REVISION DATE: December, 2010	SHEET #: 1 of 3

No.	REVISIONS	DATE	BY

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PHONE: 919-677-2000
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NC LICENSE #: F-0102

STANDARD DETAILS DESIGNED BY OWASA

KHA PROJECT 011159020
DATE 6/2/2020
SCALE 1" = 40'
DESIGNED BY: NLH
DRAWN BY: SOP
CHECKED BY: NOR

UTILITY DETAILS

ELLIOTT ROAD EXTENSION
PREPARED FOR
TOWN OF CHAPEL HILL, NC
CHAPEL HILL NORTH CAROLINA

SHEET NUMBER
UC-3C

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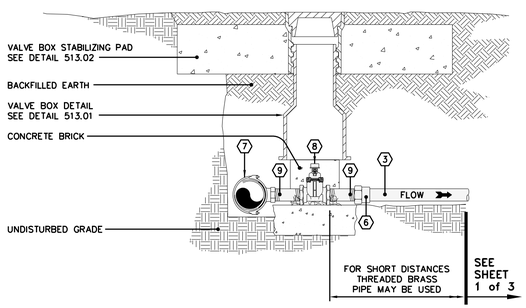

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STANDARD 2"
METER VAULT

SCALE:	DETAIL #
Not To Scale	2 S15.04
REVISION DATE: August 15, 2003	SHEET #: 2 of 3

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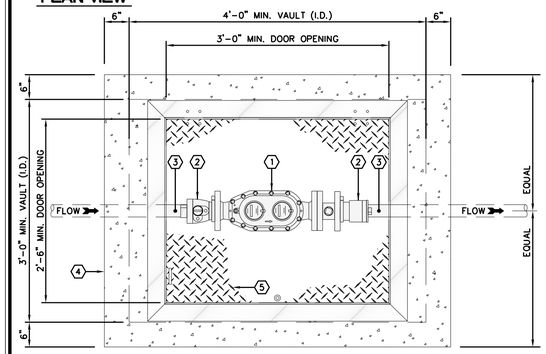
PLAN VIEW



#	PART	MANUFACTURER MODEL / Cat. No.
1	2" COMPOUND METER	FURNISHED BY OWASA
2	2" METER SETTER	(2") FORD STD. 18" RISE VBHH77-18BHC-11-77 MUELLER 15" RISE MUELLER DWG No. B2423-2
3	2" TYPE "K" HARD DRAWN COPPER SERVICE	---
4	4' x 5' PRECAST CONCRETE METER VAULT	See Section 02510 2.3.6 (OR APPROVED EQUIVALENT)
5	ACCESS HATCH NO EXPOSED HINGES OR LOCKS	See Section 02510 2.3.13
6	SILVER BRAZED JOINT	See Section 02510 2.1.2

NOTES:

1. Ensure positive surface grade away from vault.

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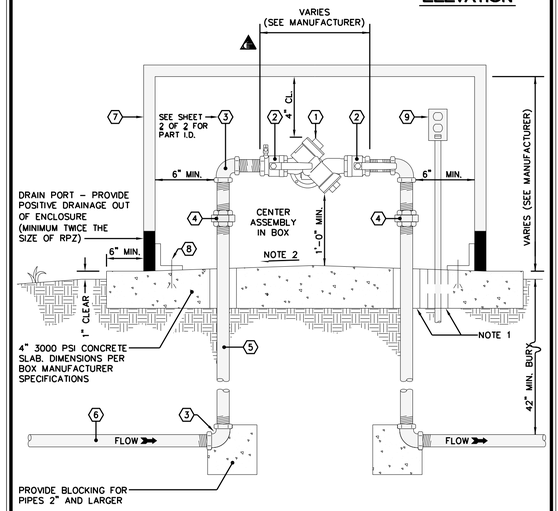
STANDARD 2"
METER VAULT

SCALE:	DETAIL #
Not To Scale	2 S15.04
REVISION DATE: December, 2010	SHEET #: 3 of 3

Details Provided by APPIAN Consulting Engineers – WWW.APPIANENGINEERS.COM

ELEVATION



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3/4" to 2" RPZ
ASSEMBLY (ABOVE GROUND)

SCALE:	DETAIL #
Not To Scale	2 S15.06
REVISION DATE: March 7, 2017	SHEET #: 1 of 3

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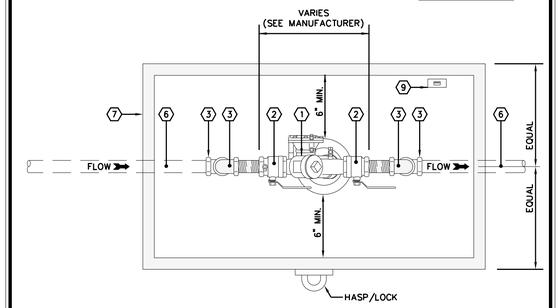
PLAN VIEW



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3/4" to 2" RPZ
ASSEMBLY (ABOVE GROUND)

SCALE:	DETAIL #
Not To Scale	2 S15.06
REVISION DATE: March 7, 2017	SHEET #: 2 of 3

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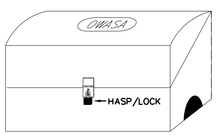
TYPICAL ENCLOSURE



#	PART	MANUFACTURER MODEL / Cat. No.
1	BACKFLOW PREVENTION ASSEMBLY, AS APPLICABLE	SEE SPECS. 02510 – PRODUCTS
2	1/4 TURN FULL PORT BRONZE BALL SHUT-OFF VALVE	---
3	90° BRASS ELBOW	---
4	THREADED UNION	---
5	3/4" THRU 2 1/2" STAINLESS STEEL OR BRASS THREADED PIPE	---
6	3/4" THRU 2 1/2" STAINLESS STEEL OR BRASS THREADED PIPE	---
7	INSULATED ENCLOSURE WITH LOCKING ACCESS AND HEATER (120 V, 1 PHASE 60 HZ) VERIFY FITTINGS WILL FIT INSIDE BOX BEFORE ORDERING	HOTBOX / HB.75 – HB3E (OR APPROVED EQUIVALENT)
8	STAINLESS STEEL ANCHOR BOLTS PER BOX MANUFACTURER RECOMMENDED SIZE AND SPACING	---
9	PROVIDE 120V RECEPTACLE ON GFCI NEAR PIPE RISER, SET MINIMUM 18" ABOVE FLOOR	UL STD. 943-NEMA 3R.

NOTES:

1. Provide minimum 1" annular clearance around all risers and electrical conduit.
2. Slope floor to drain to ports at both ends.
   Ensure positive surface grade away from enclosure.

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3/4" to 2" RPZ
ASSEMBLY (ABOVE GROUND)

SCALE:	DETAIL #
Not To Scale	2 S15.06
REVISION DATE: December 20, 2016	SHEET #: 3 of 3

No.	REVISIONS	DATE	BY

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NC LICENSE #: F-0102

STANDARD DETAILS DESIGNED BY OWASA

KHA PROJECT 011159020
DATE 6/2/2020
SCALE 1" = 40'
DESIGNED BY: NLH
DRAWN BY: SOP
CHECKED BY: NDR

UTILITY DETAILS

ELLIOTT ROAD EXTENSION
PREPARED FOR
TOWN OF CHAPEL HILL, NC
CHAPEL HILL NORTH CAROLINA

SHEET NUMBER
UC-3D

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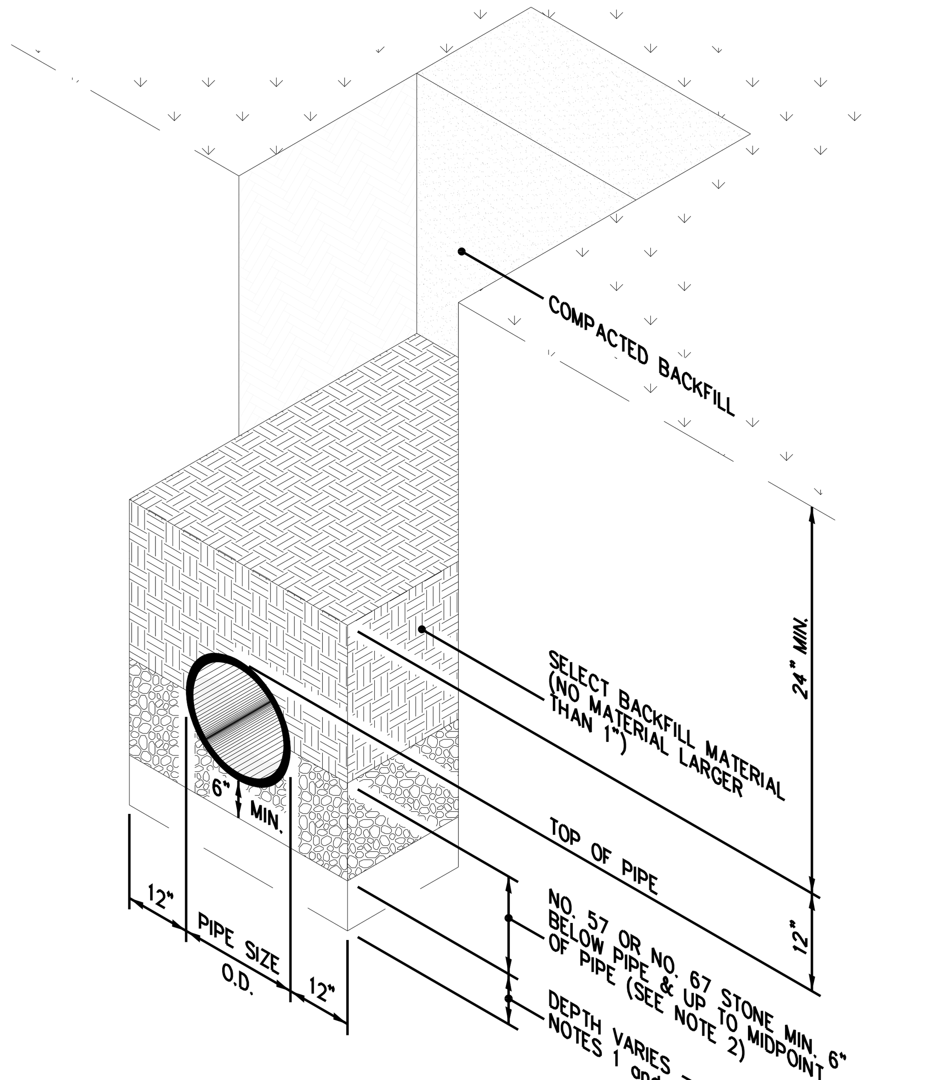

NOTES:

1. Foundation stone shall be required when soil conditions are unsuitable.
2. An additional 1 inch depth of cushioning material will be required for each additional 2 feet of trench depth in excess of 16 feet up to a maximum of 12 inches of cushioning material.

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SANITARY SEWER BEDDING DETAIL — SCALE: Not To Scale — DETAIL #: 531.01 — REVISION DATE: August 15, 2003 — SHEET #: 1 of 1

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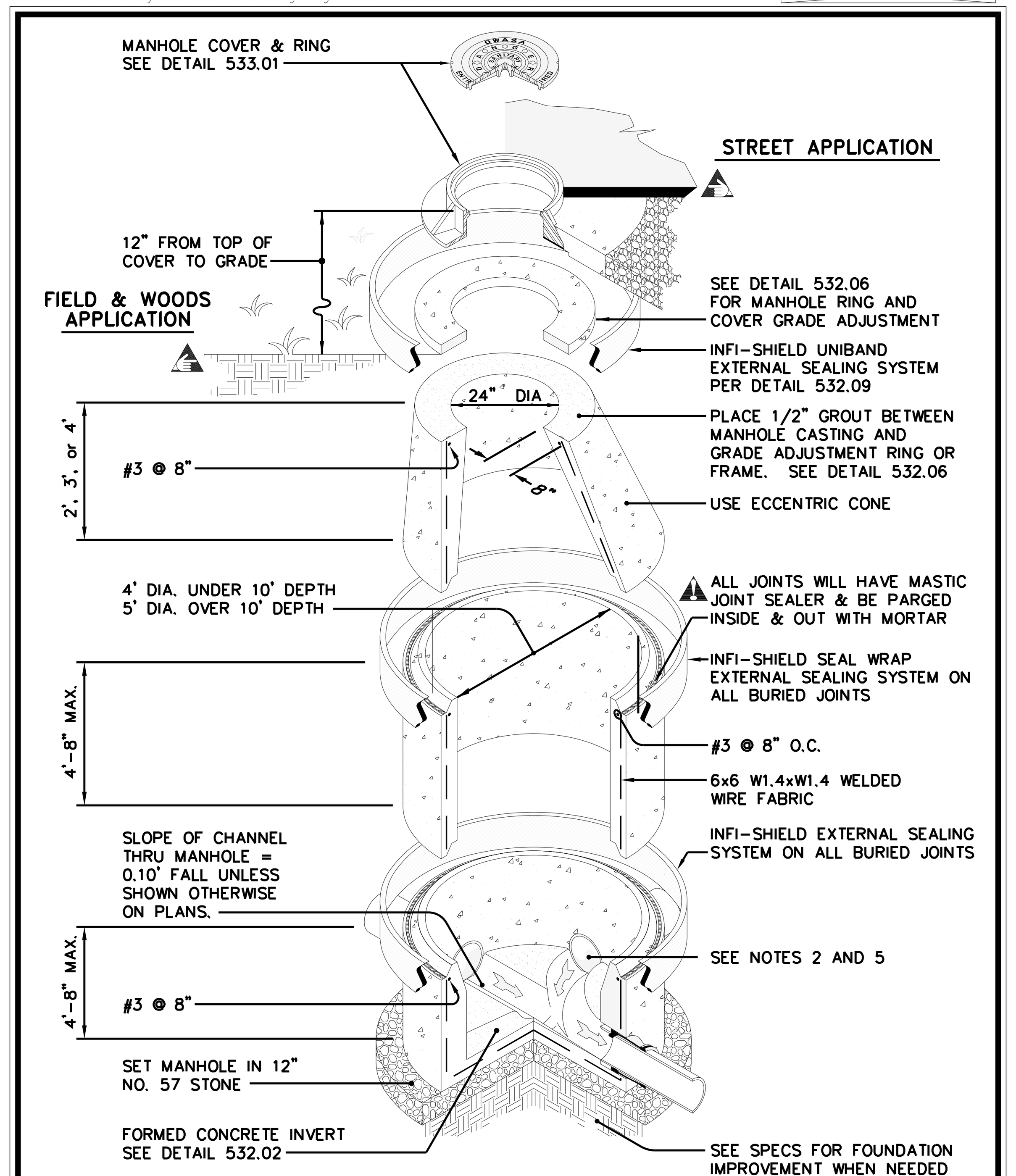

OWASA — ORANGE WATER AND SEWER AUTHORITY

STANDARD ECCENTRIC CONE MANHOLE DETAIL — SCALE: Not To Scale — DETAIL #: 532.01 — REVISION DATE: April 13, 2007 — SHEET #: 1 of 3

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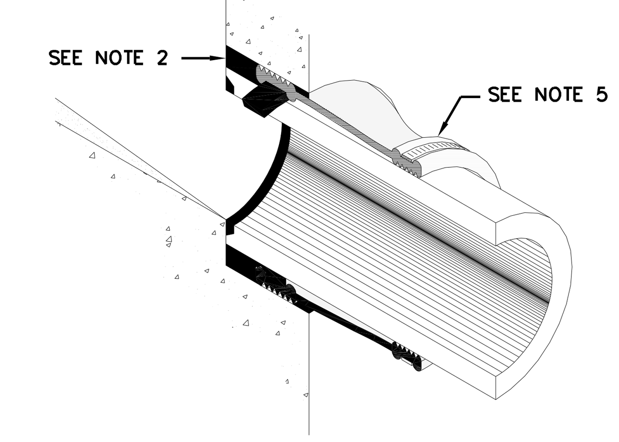
PART	MANUFACTURER MODEL / Cat. No.
SLEEVE BOOTS	KOR-N-SEAL or PSX



NOTES:

1. Concrete strength to be 4,000 PSI minimum.
2. Pipes will be grouted inside and out.
3. Joints will have mastic joint sealer and be parged inside and out with mortar.
4. Reinforcement design to conform to the requirements of ASTM C478.
5. Flexible sleeve boots cast in place or installed with stainless steel expander rings as manufactured by Kor-N-Seal or PSX shall be used for pipe connections. Boots shall be secured to pipe using (2) stainless steel bands. Precast inverts will not be accepted, unless otherwise directed by OWASA's inspectors.

OWASA — ORANGE WATER AND SEWER AUTHORITY

STANDARD ECCENTRIC MANHOLE DETAIL — SCALE: Not To Scale — DETAIL #: 532.01 — REVISION DATE: April 13, 2007 — SHEET #: 3 of 3

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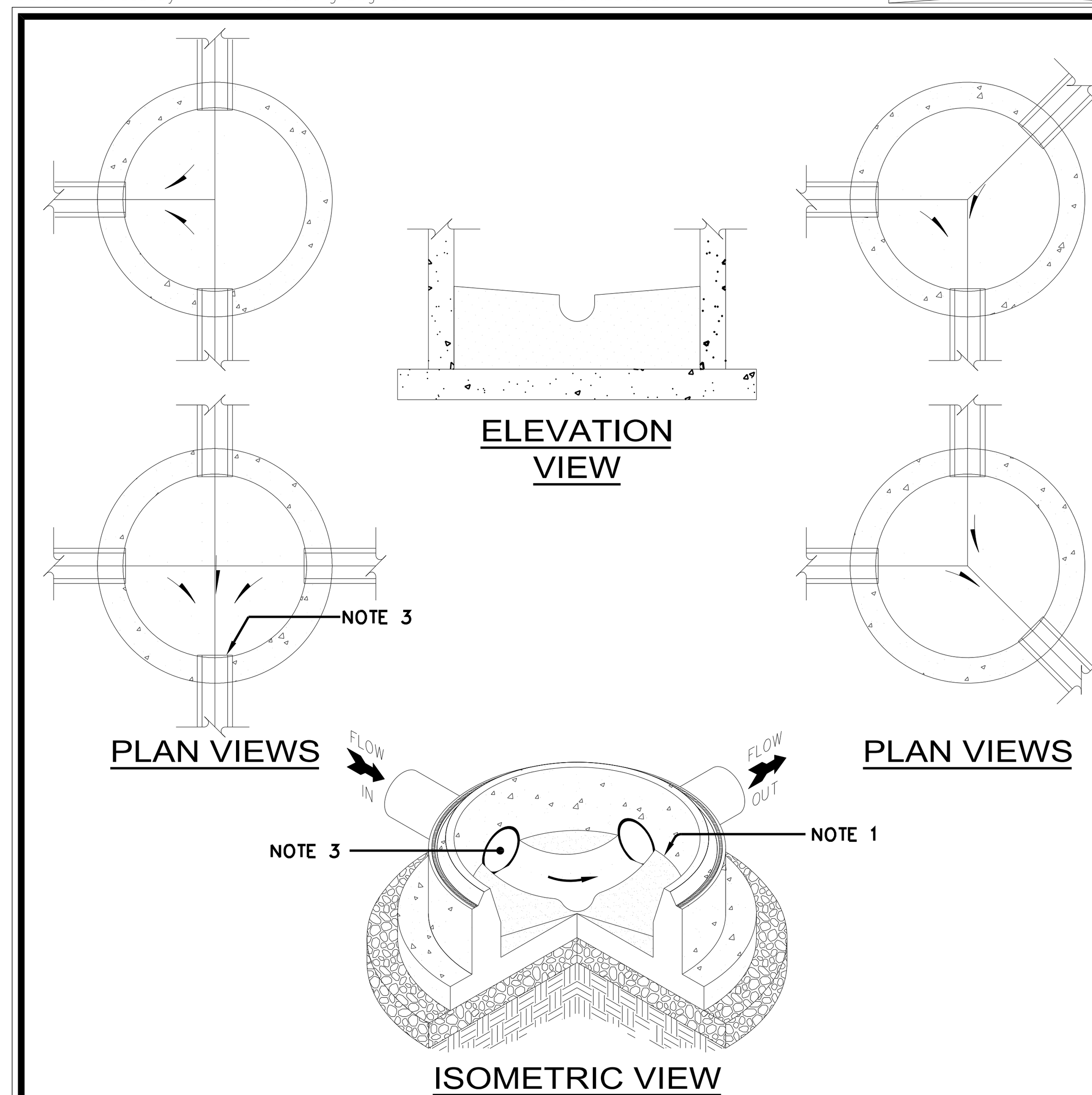


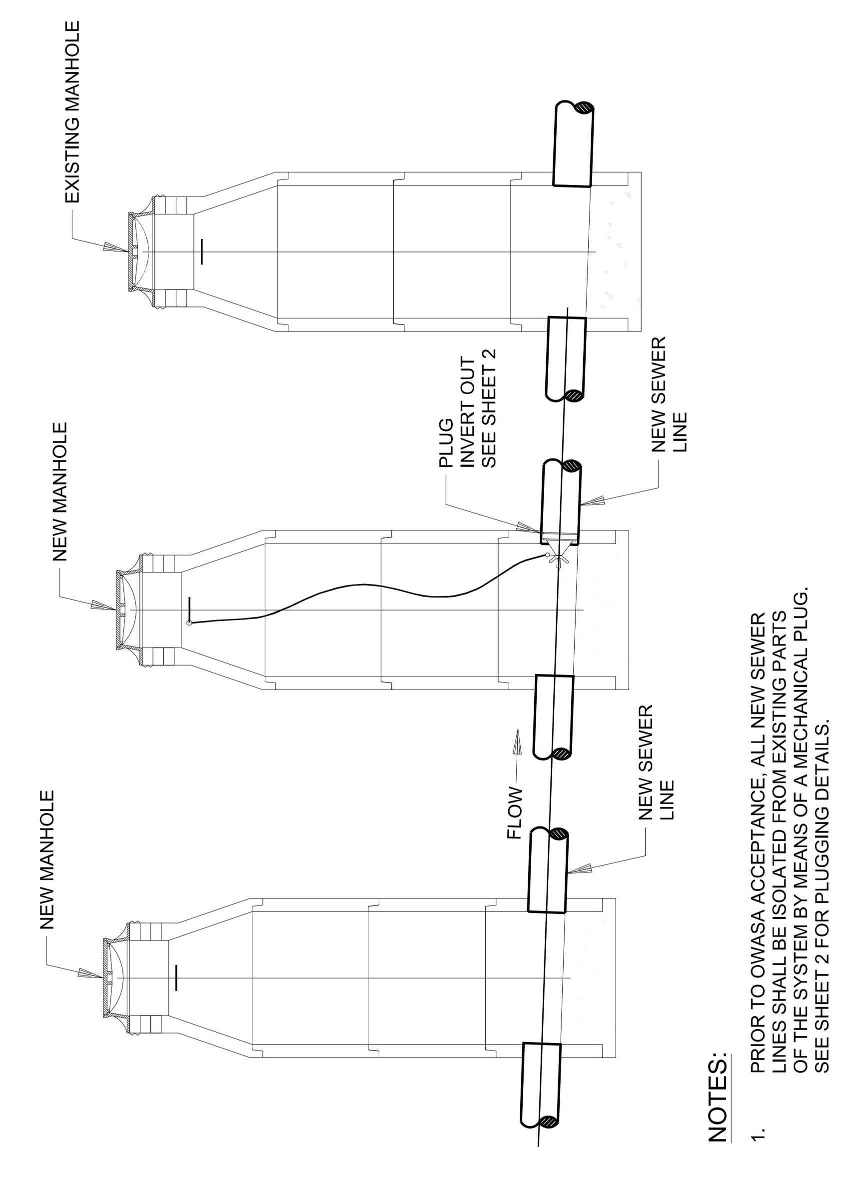
NOTES:

1. Benches shall be sloped at 1/2 inch per foot (4 percent). Inverts shall be 3/4 the height of crown for outlet pipe and uniformly shaped to match outlet pipe.
2. Precast inverts are not permitted.
3. Radius of invert must have enough room to be able to insert air plugs and TV equipment.

OWASA — ORANGE WATER AND SEWER AUTHORITY

STANDARD SEWER INVERT PLANS FOR MANHOLE — SCALE: Not To Scale — DETAIL #: 532.02 — REVISION DATE: December 4, 2009 — SHEET #: 1 of 1

Details Provided by OWASA Engineers ~ WWW.OWASA.ORG



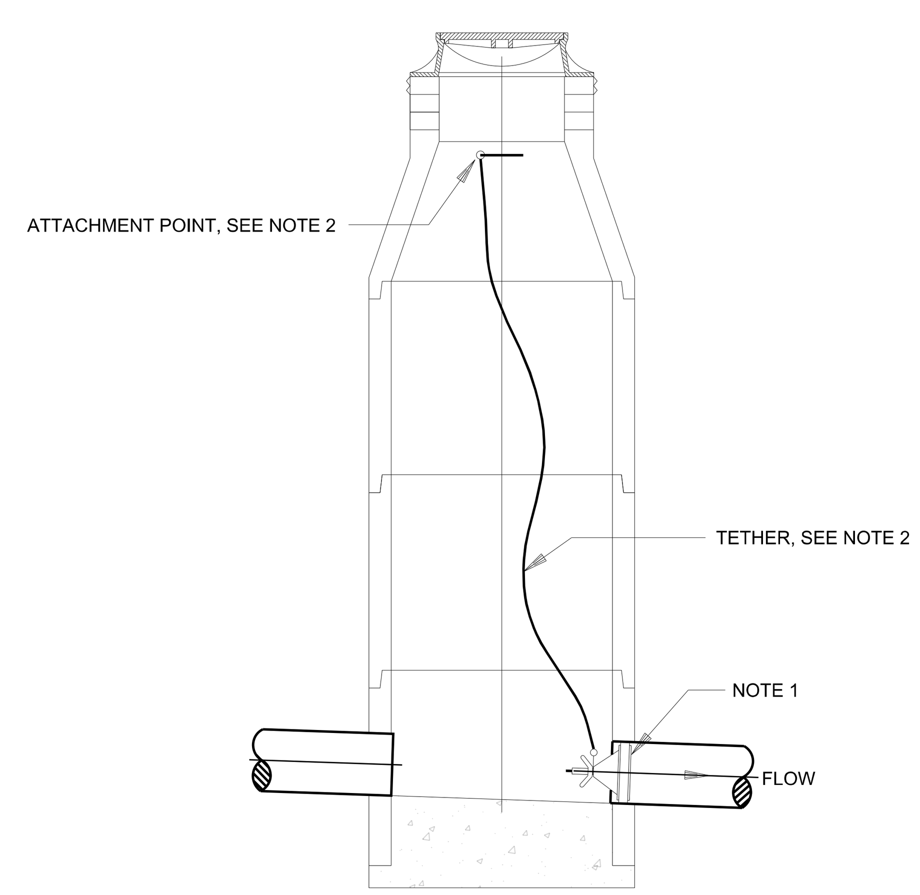
NOTES:

1. PRIOR TO OWASA ACCEPTANCE, ALL NEW SEWER LINES SHALL BE ISOLATED FROM EXISTING PARTS OF THE SYSTEM BY MEANS OF A MECHANICAL PLUG. SEE SHEET 2 FOR PLUGGING DETAILS.

OWASA — ORANGE WATER AND SEWER AUTHORITY

SANITARY SEWER MANHOLE PLUGGING DETAIL — SCALE: Not To Scale — DETAIL #: 532.04 — REVISION DATE: February 28, 2005 — SHEET #: 1 of 2

Details Provided by OWASA Engineers ~ WWW.OWASA.ORG



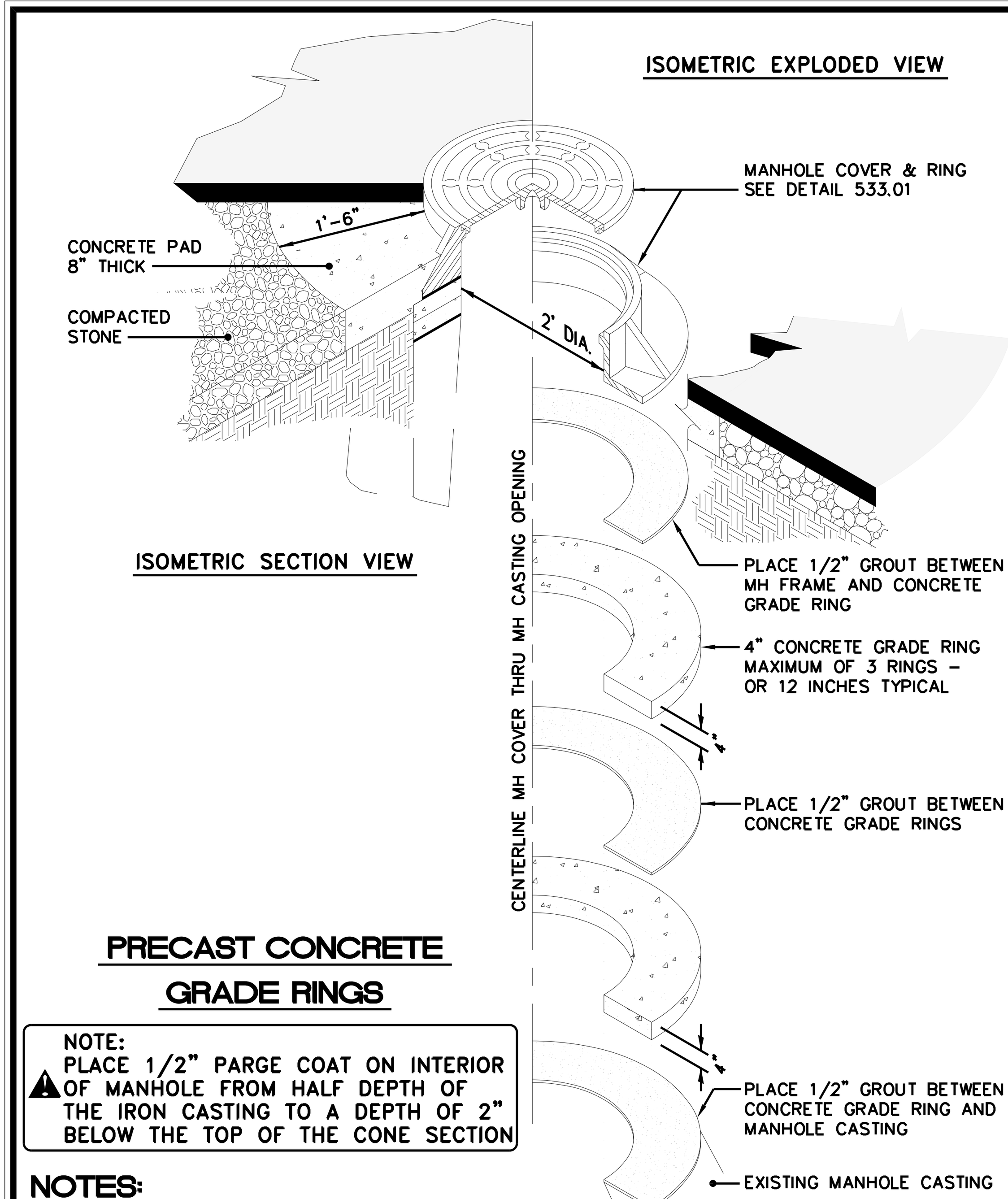
NOTES:

1. PIPE PLUG SHALL BE A "CHERNE" IRON-GRIP BY-PASS STYLE MECHANICAL PLUG OR APPROVED EQUAL.
2. PIPE PLUG SHALL BE TETHERED TO THE MANHOLE TOP STEP OR OTHER PERMANENT ANCHOR POINT WITH A CORROSION AND ABRASION RESISTANT STAINLESS STEEL CABLE. ATTACHED TO THE CABLE SHALL BE A CORROSION RESISTANT METAL TAG WITH THE PLUG OWNERS NAME, ADDRESS AND 24-HOUR CONTACT INFORMATION.

OWASA — ORANGE WATER AND SEWER AUTHORITY

SANITARY SEWER MANHOLE PLUGGING DETAIL — SCALE: Not To Scale — DETAIL #: 532.04 — REVISION DATE: February 28, 2005 — SHEET #: 2 of 2

Details Provided by APPIAN Consulting Engineers ~ WWW.APPIANENGINEERS.COM



PRECAST CONCRETE GRADE RINGS

NOTE: PLACE 1/2" PARGE COAT ON INTERIOR OF MANHOLE FROM HALF DEPTH OF THE IRON CASTING TO A DEPTH OF 2" BELOW THE TOP OF THE CONE SECTION

NOTES:

1. Install Infi-Shield Uni-Band as manufactured by Sealing Systems, Inc. per detail 532.09.

OWASA — ORANGE WATER AND SEWER AUTHORITY

MANHOLE RING AND COVER GRADE ADJUSTMENT — SCALE: Not To Scale — DETAIL #: 532.06 — REVISION DATE: December 12, 2012 — SHEET #: 3 of 3

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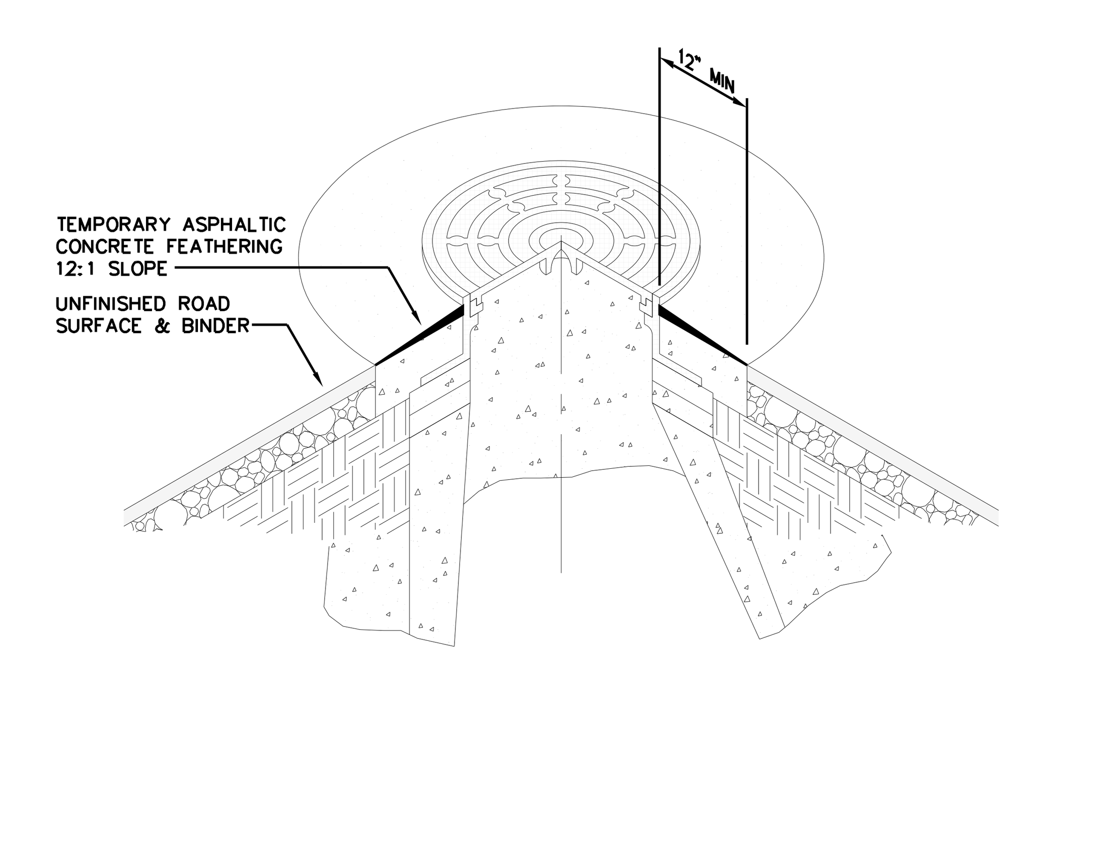

NOTES:

1. When the rim & cover of a manhole or a valve box extends more than 1" above an unfinished road surface, a temporary layer of asphaltic concrete feathering shall be required to provide a smooth transition from 1" below the edge of the rim & cover to the unfinished road surface. A 12 to 1 slope ratio shall be used. The exposed sides of the valve box and/or manhole cover shall be painted bright orange or as specified by OWASA inspector.
2. Prior to final paving contractor shall remove feathering, completely, & apply asphalt tack coat to binder to insure proper asphalt adhesion.

OWASA — ORANGE WATER AND SEWER AUTHORITY

STRUCTURE PROTECTION UNFINISHED ROAD GRADE — SCALE: Not To Scale — DETAIL #: 532.07 — REVISION DATE: August 15, 2003 — SHEET #: 1 of 1

No.	REVISIONS	DATE	BY

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STANDARD DETAILS DESIGNED BY OWASA

KHA PROJECT 011159020 — DATE 6/2/2020 — SCALE 1" = 40' — DESIGNED BY: NLH — DRAWN BY: SOP — CHECKED BY: NDR

UTILITY DETAILS

ELLIOTT ROAD EXTENSION

PREPARED FOR TOWN OF CHAPEL HILL, NC

CHAPEL HILL — NORTH CAROLINA

SHEET NUMBER UC-3E

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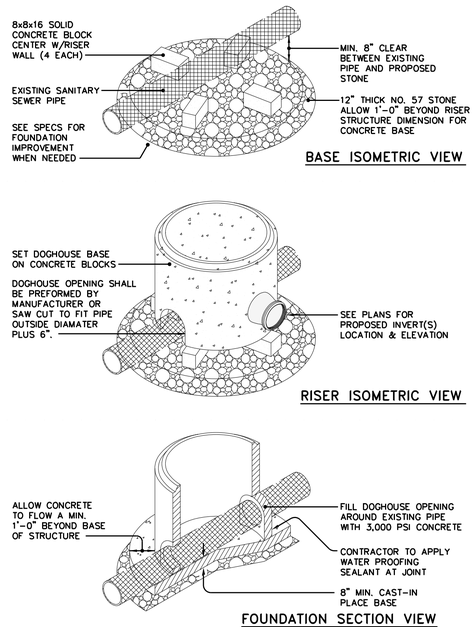

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PRECAST CONCRETE DOGHOUSE MANHOLE

SCALE: Not To Scale | DETAIL # 2 S32.08 | REVISION DATE: April 13, 2007 | SHEET # 1 of 2

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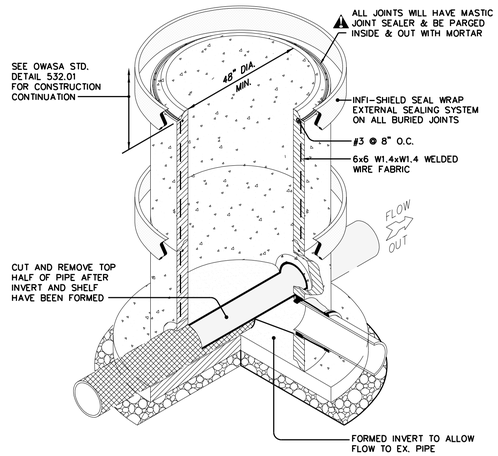

NOTES:
1. All service laterals into manhole to be core drilled and booted.
2. Maximum depth 4' dia. manhole = 10' (see specifications). Use 5' dia. manhole for depth greater than 10'.

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PRECAST CONCRETE DOGHOUSE MANHOLE

SCALE: Not To Scale | DETAIL # 2 S32.08 | REVISION DATE: April 13, 2007 | SHEET # 2 of 2

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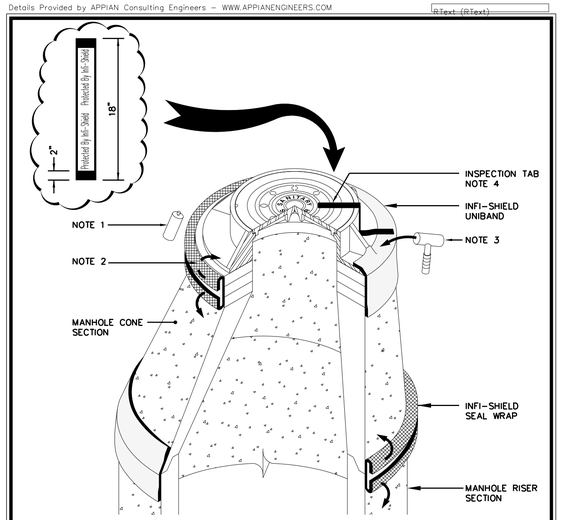

INSTALLATION NOTES:
1. Clean casting frame, riser rings and cone section. Spray primer to areas where attaching non-hardening butyl mastic.
2 Install the Infi-shield External Seal on the outside surface of the adjustment ring area covering all grade rings. Remove protective tape and fold back on to the structure.
3. Useing a rubber hammer, tap the sealing surface area.
4. Ensure lid and casting is clean. Attach inspection tab to manhole lid and backfill.
5. Contact Sealing Systems Inc. for additional installation instructions @ 800-478-2054.

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INFI-SHIELD EXTERNAL SEALING DETAIL

SCALE: Not To Scale | DETAIL # 2 S32.09 | REVISION DATE: April 13, 2007 | SHEET # 1 of 1

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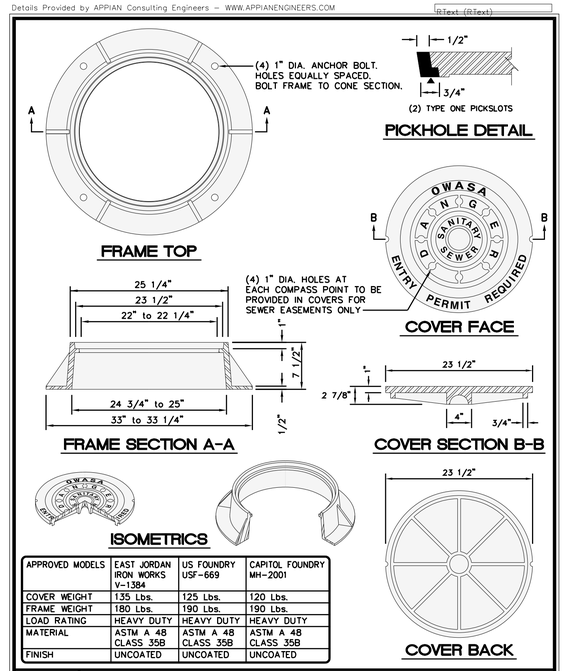

APPROVED MODELS	EAST JORDAN IRON WORKS V-1384	US FOUNDRY USF-669	CAPITOL FOUNDRY MH-2001
COVER WEIGHT	135 Lbs.	125 Lbs.	120 Lbs.
FRAME WEIGHT	180 Lbs.	190 Lbs.	190 Lbs.
LOAD RATING	HEAVY DUTY	HEAVY DUTY	HEAVY DUTY
MATERIAL	ASTM A 48 CLASS 35B	ASTM A 48 CLASS 35B	ASTM A 48 CLASS 35B
FINISH	UNCOATED	UNCOATED	UNCOATED

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SANITARY SEWER MANHOLE FRAME and COVER

SCALE: Not To Scale | DETAIL # 2 S33.01 | REVISION DATE: April 13, 2007 | SHEET # 1 of 1

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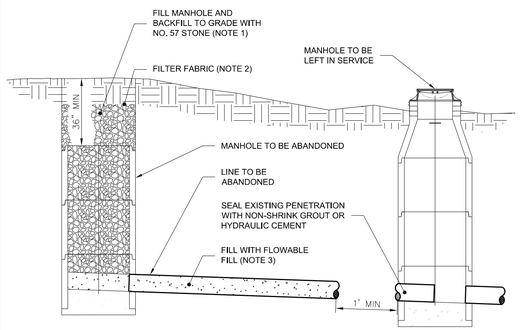

NOTES:
1. BACKFILL WITH NO. 57 STONE COMPACTED IN PLACE OR WITH FLOWABLE FILL CONCRETE (50 PSI MINIMUM/ 150 PSI MAXIMUM).
2. OUTSIDE ROADWAY RIGHT OF WAYS, FILTER FABRIC SHALL BE PLACED OVER THE STONE AND SUITABLE MATERIAL OF A COMPACTABLE NATURE PLACED OVER CONCRETE MANHOLE PAD. FILTER FABRIC SHALL BE EXTENDED 1' BEYOND THE DIAMETER OF THE MANHOLE TO BE ABANDONED.
3. REMOVE OR FILL PIPES WITH FLOWABLE FILL CONCRETE (50 PSI MINIMUM/ 150 PSI MAXIMUM) IN ACCORDANCE WITH THE FOLLOWING CRITERIA:
   a. PIPES LARGER THAN 24-INCHES DIAMETER.
   b. PIPES LOCATED WITHIN ROADWAY SECTION AND MEETING ONE OF THE FOLLOWING CONDITIONS:
      I. PIPES THAT ARE 12-INCHES DIAMETER UP TO AND INCLUDING PIPES THAT ARE 24-INCHES DIAMETER AND ARE BURIED LESS THAN 20 FEET BELOW FINISHED GRADE.
      II. PIPES THAT ARE 6-INCHES DIAMETER UP TO 12-INCHES DIAMETER THAT ARE NOT CAST IRON, DUCTILE IRON, PVC, OR HDPE AND ARE BURIED LESS THAN 12 FEET BELOW FINISHED GRADE.
   c. PIPES LOCATED BELOW GROUNDWATER TABLE THAT COULD BECOME

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SANITARY SEWER LINE AND MANHOLE ABANDONMENT DETAIL

SCALE: Not To Scale | DETAIL # 2 S36.05 | REVISION DATE: June 12, 2012 | SHEET # 1 of 1

No.	REVISIONS	DATE	BY

Kimley»Horn

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NC LICENSE #: F-0102

STANDARD DETAILS DESIGNED BY OWASA

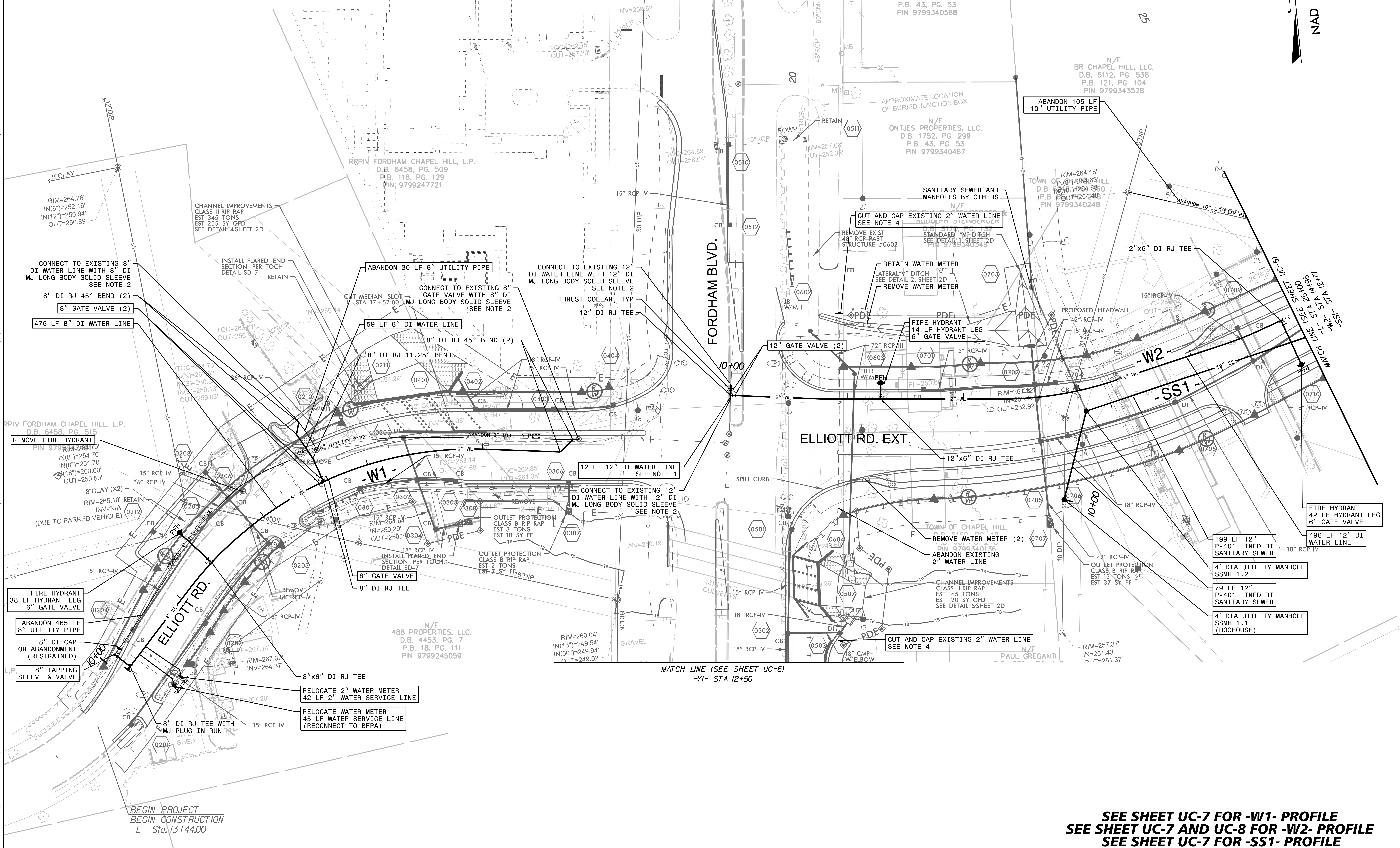
KHA PROJECT 011159020
DATE 6/2/2020
SCALE 1" = 40'
DESIGNED BY: NLH
DRAWN BY: SOP
CHECKED BY: NDR

UTILITY DETAILS

ELLIOTT ROAD EXTENSION
PREPARED FOR
TOWN OF CHAPEL HILL, NC
CHAPEL HILL NORTH CAROLINA

SHEET NUMBER
UC-3F

NOTES:
1. CUT-IN PROPOSED GATE VALVE, PIPING, AND THRUST COLLAR PER DETAIL 4/UC-3A.
2. CONTRACTOR SHALL VERIFY AND PROVIDE FOR RESTRAINT OF EXISTING ADJACENT VALVES USED FOR SHUTDOWNS.
3. CONCRETE USED IN THRUST RESTRAINT SHALL CURE A MINIMUM OF 3 DAYS PRIOR TO OPERATION OF VALVE(S) BEING RESTRAINED OR CUTTING OF PIPE.
4. EXISTING 2" WATER LINE SHALL BE CUT AND CAPPED WITH A MECHANICALLY RESTRAINED CAP, ACCPETABLE TO THE OWNER. WATER SERVICE INTERUPTION FOR METERS BEING RETAINED SHALL NOT EXCEED 8-HOURS.
5. WATER LINES SHALL BE RESTRAINED BETWEEN THE STATIONS SHOWN IN THE PROFILE AT MINIMUM. ALL BRANCH LINES, FIRE HYDRANT LEGS, AND CONNECTIONS 6-INCHES AND LARGER SHALL BE CONSTRUCTED OF RESTRAINED JOINT PIPE.
6. WATER LINE BETWEEN -W1- STA 13+45 AND 14+25 SHALL BE CL 53 RJ DIP AS SHOWN IN THE PROFILE AND SHALL BE BACKFILLED WITH EXCAVATABLE FLOWABLE FILL. PIPE SHALL BE ISOLATED FROM FLOWABLE FILL WITH POLYETHYLENE PIPE WRAP, DESIGNED FOR THE INTENDED PURPOSE AND INSTALLED ACCORDING TO MANUFACTURER INSTRUCTIONS.



SEE SHEET UC-7 FOR -W1- PROFILE
SEE SHEET UC-7 AND UC-8 FOR -W2- PROFILE
SEE SHEET UC-7 FOR -SS1- PROFILE

No.	REVISIONS	DATE	BY

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FINAL DRAWINGS FOR REVIEW PURPOSES ONLY

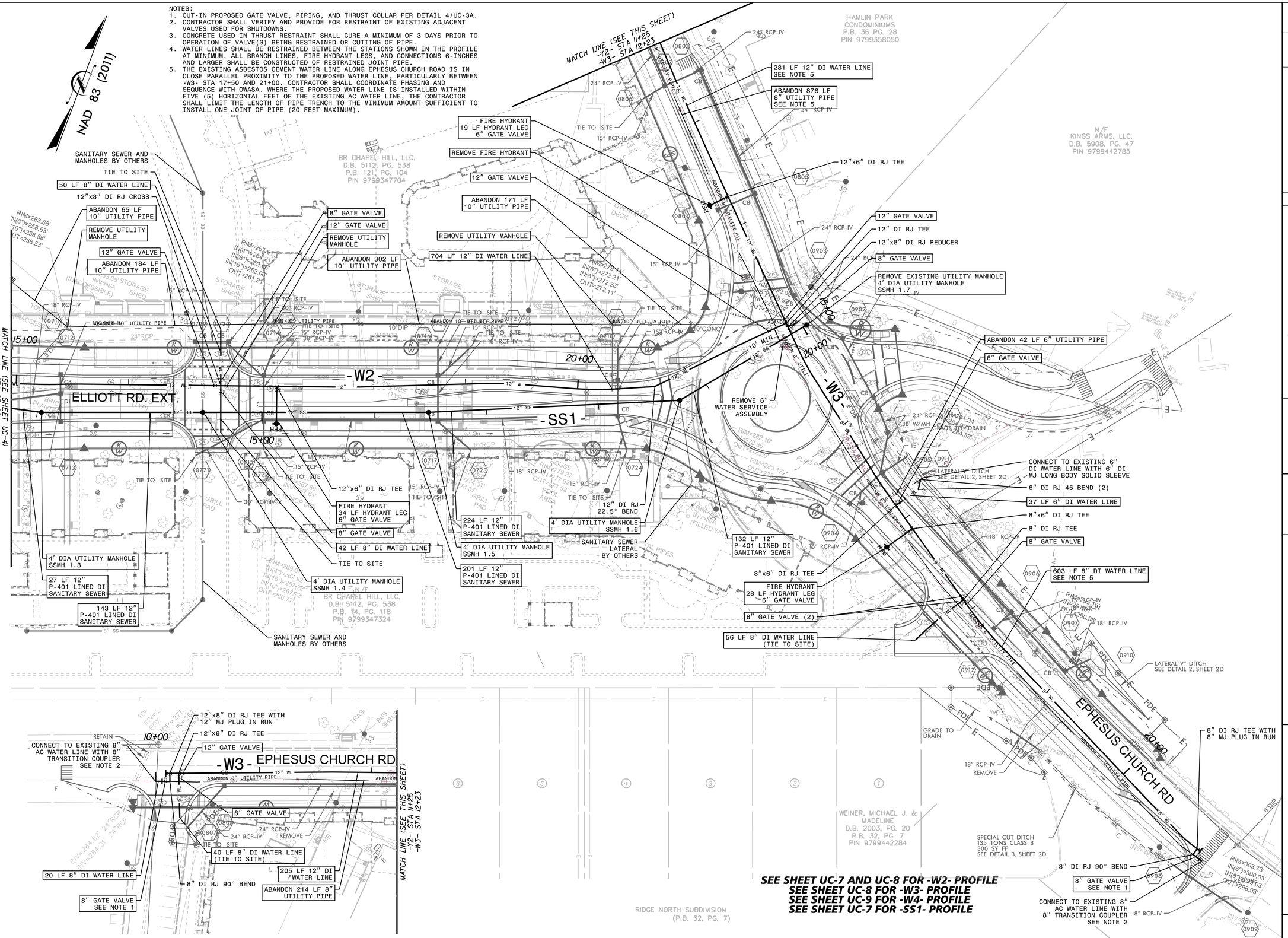
KHA PROJECT	011159020
DATE	7/6/2020
SCALE	1" = 40'
DESIGNED BY:	NLH
DRAWN BY:	SOP
CHECKED BY:	NDR

PLAN VIEW

ELLIOTT ROAD EXTENSION
PREPARED FOR
TOWN OF CHAPEL HILL, NC
CHAPEL HILL — NORTH CAROLINA

SHEET NUMBER
UC-4

NOTES:
1. CUT-IN PROPOSED GATE VALVE, PIPING, AND THRUST COLLAR PER DETAIL 4/UC-3A.
2. CONTRACTOR SHALL VERIFY AND PROVIDE FOR RESTRAINT OF EXISTING ADJACENT VALVES USED FOR SHUTDOWNS.
3. CONCRETE USED IN THRUST RESTRAINT SHALL CURE A MINIMUM OF 3 DAYS PRIOR TO OPERATION OF VALVE(S) BEING RESTRAINED OR CUTTING OF PIPE.
4. WATER LINES SHALL BE RESTRAINED BETWEEN THE STATIONS SHOWN IN THE PROFILE AT MINIMUM. ALL BRANCH LINES, FIRE HYDRANT LEGS, AND CONNECTIONS 6-INCHES AND LARGER SHALL BE CONSTRUCTED OF RESTRAINED JOINT PIPE.
5. THE EXISTING ASBESTOS CEMENT WATER LINE ALONG EPHESUS CHURCH ROAD IS IN CLOSE PARALLEL PROXIMITY TO THE PROPOSED WATER LINE, PARTICULARLY BETWEEN -W3- STA 17+50 AND 21+00. CONTRACTOR SHALL COORDINATE PHASING AND SEQUENCE WITH OWASA. WHERE THE PROPOSED WATER LINE IS INSTALLED WITHIN FIVE (5) HORIZONTAL FEET OF THE EXISTING AC WATER LINE, THE CONTRACTOR SHALL LIMIT THE LENGTH OF PIPE TRENCH TO THE MINIMUM AMOUNT SUFFICIENT TO INSTALL ONE JOINT OF PIPE (20 FEET MAXIMUM).



No.	REVISIONS	DATE	BY

Kimley»Horn

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FINAL DRAWINGS FOR REVIEW PURPOSES ONLY

KHA PROJECT 011159020
DATE 7/6/2020
SCALE 1" = 40'
DESIGNED BY: NLH
DRAWN BY: SOP
CHECKED BY: NOR

PLAN VIEW

ELLIOTT ROAD EXTENSION

PREPARED FOR
TOWN OF CHAPEL HILL, NC
CHAPEL HILL NORTH CAROLINA

SHEET NUMBER
UC-5

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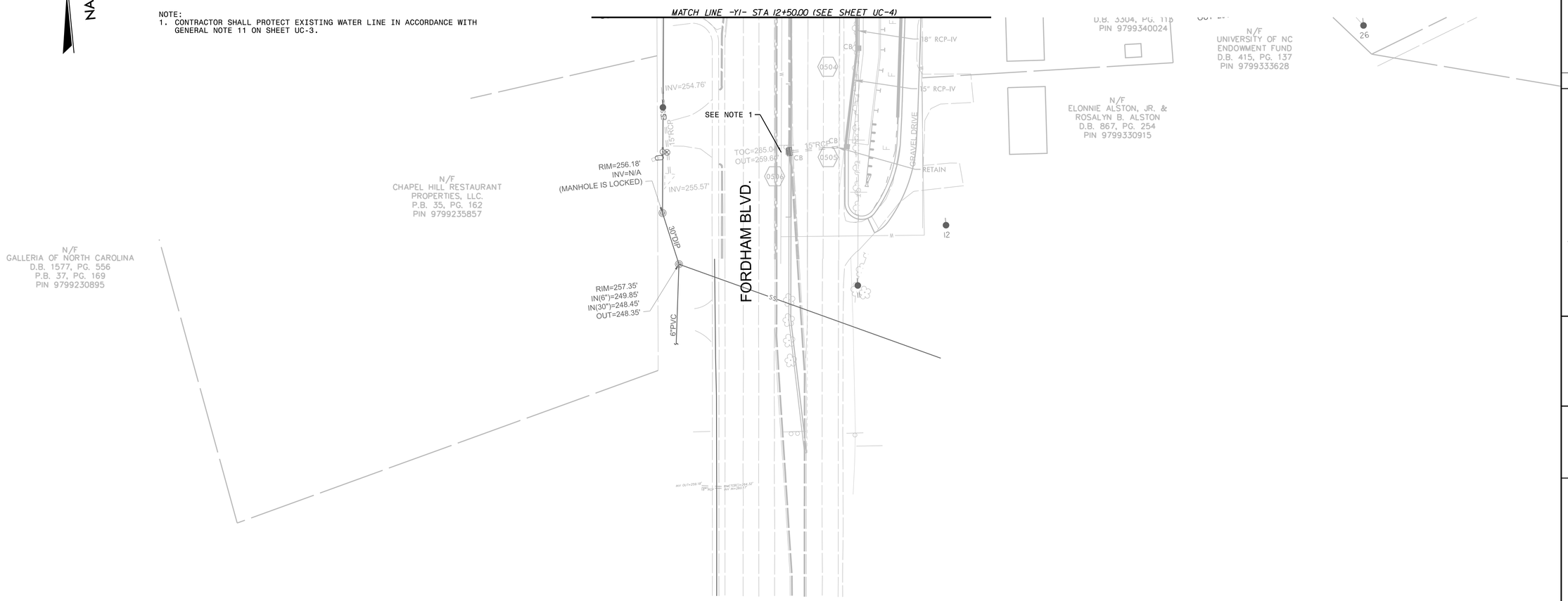
NAD 83 (2011)

NOTE:
1. CONTRACTOR SHALL PROTECT EXISTING WATER LINE IN ACCORDANCE WITH GENERAL NOTE 11 ON SHEET UC-3.



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FINAL DRAWINGS FOR REVIEW PURPOSES ONLY

KHA PROJECT 011159020
DATE 7/6/2020
SCALE 1" = 40'
DESIGNED BY: NLH
DRAWN BY: SOP
CHECKED BY: NDR

PLAN VIEW

ELLIOTT ROAD EXTENSION
PREPARED FOR
TOWN OF CHAPEL HILL, NC
CHAPEL HILL NORTH CAROLINA

SHEET NUMBER
UC-6

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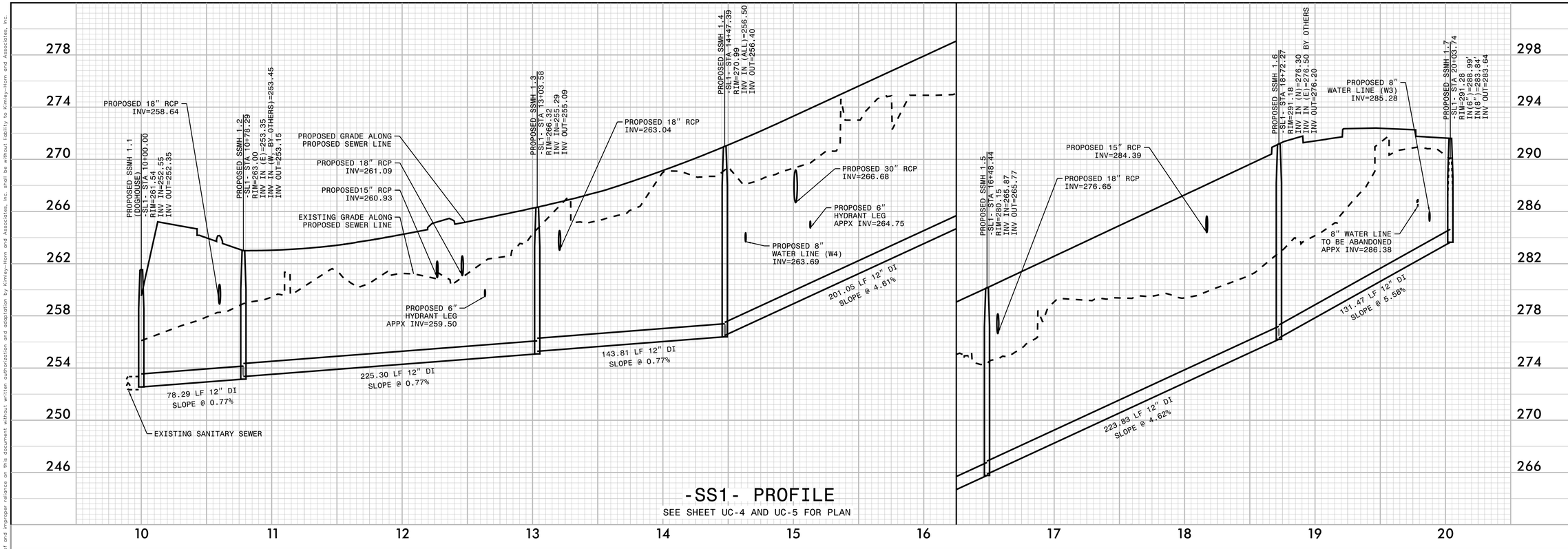
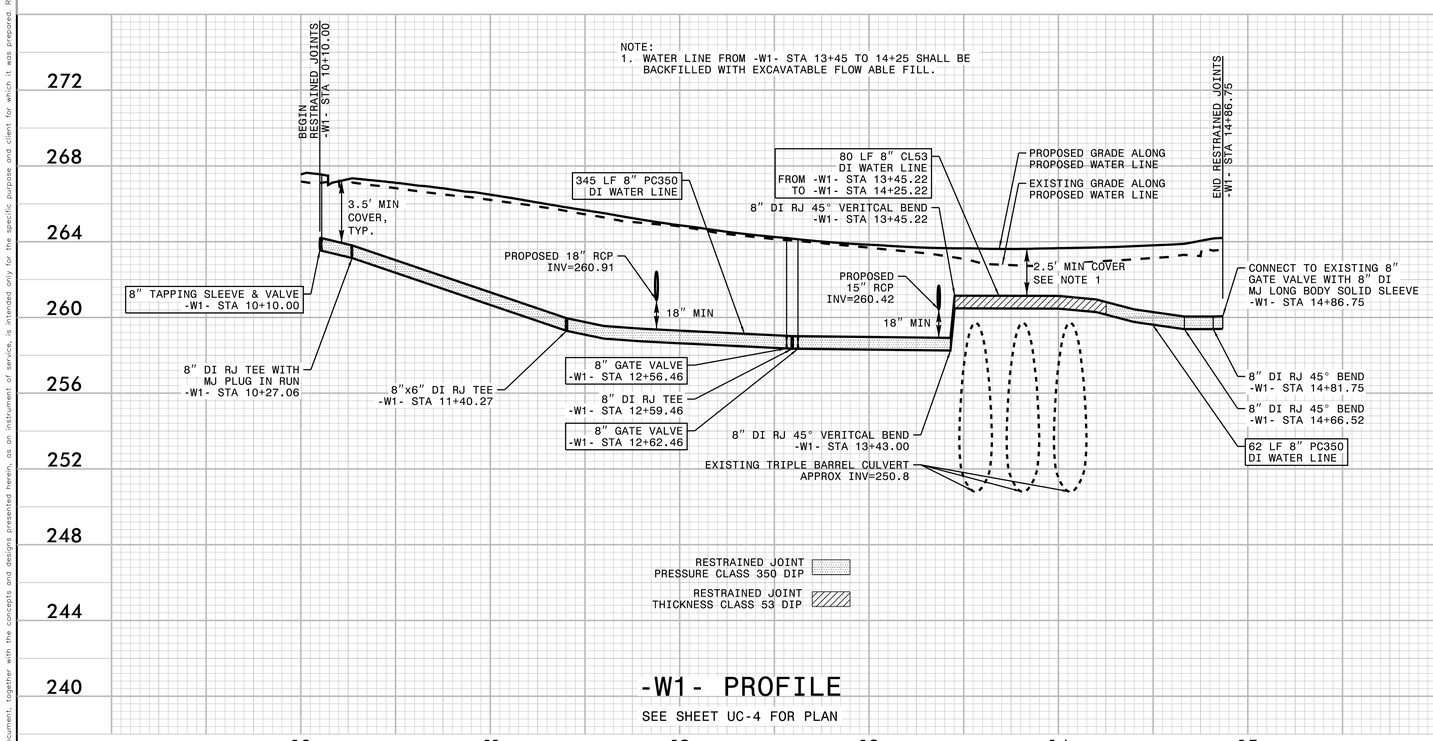


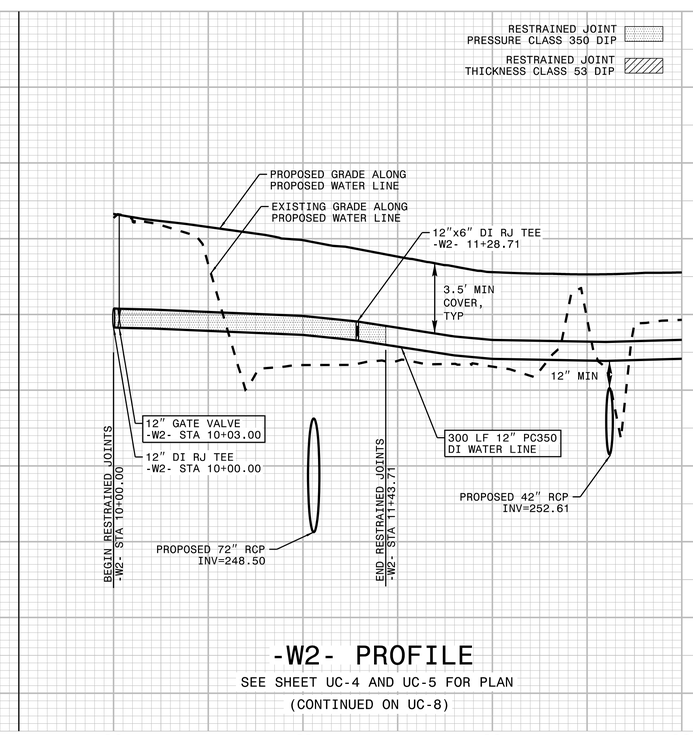
-SS1- PROFILE

SEE SHEET UC-4 AND UC-5 FOR PLAN



-W1- PROFILE

SEE SHEET UC-4 FOR PLAN



-W2- PROFILE

SEE SHEET UC-4 AND UC-5 FOR PLAN

(CONTINUED ON UC-8)

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FINAL DRAWINGS FOR REVIEW PURPOSES ONLY

KHA PROJECT 011159020
DATE 7/6/2020
SCALE 1" = 40'
DESIGNED BY: NLH
DRAWN BY: SOP
CHECKED BY: NLH

UTILITY PROFILE

ELLIOTT ROAD EXTENSION

PREPARED FOR
TOWN OF CHAPEL HILL, NC
CHAPEL HILL NORTH CAROLINA

SHEET NUMBER
UC-7

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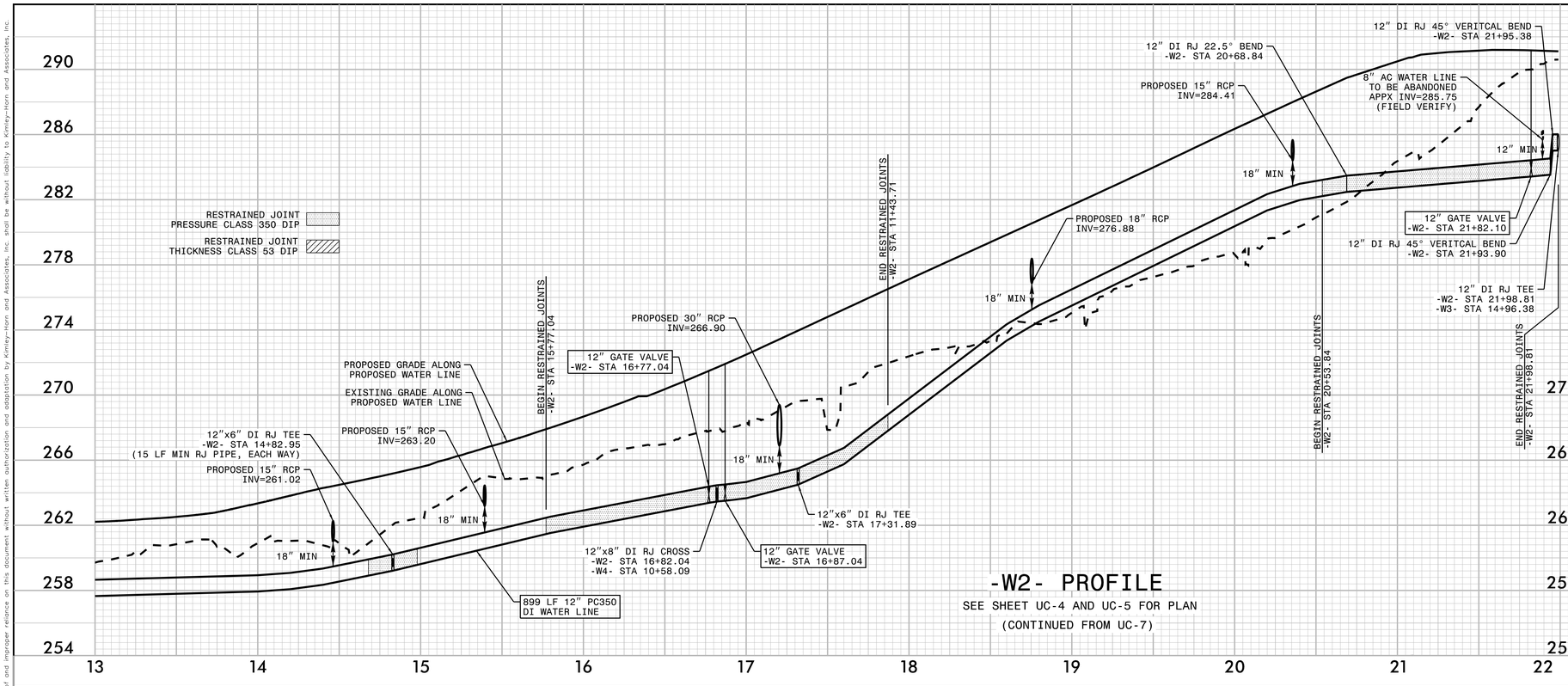
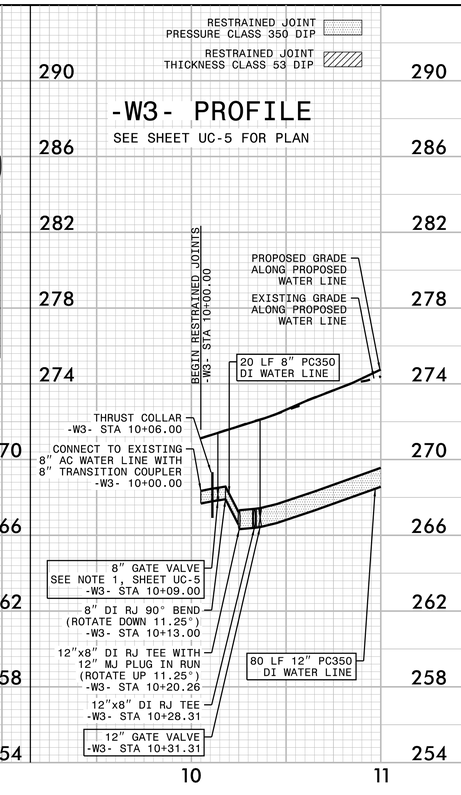


-W2- PROFILE

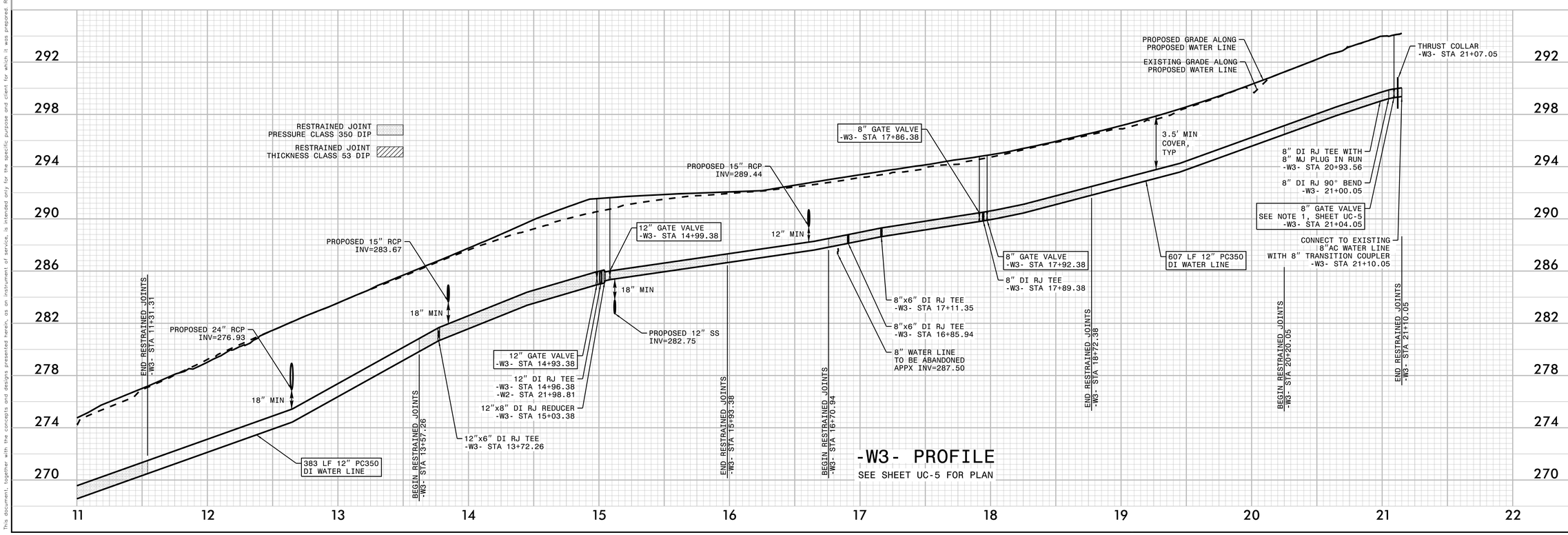
SEE SHEET UC-4 AND UC-5 FOR PLAN

(CONTINUED FROM UC-7)



-W3- PROFILE

SEE SHEET UC-5 FOR PLAN



-W3- PROFILE

SEE SHEET UC-5 FOR PLAN

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FINAL DRAWINGS FOR REVIEW PURPOSES ONLY

KHA PROJECT 011159020	
DATE	7/6/2020
SCALE	1" = 40'
DESIGNED BY:	NLH
DRAWN BY:	SOP
CHECKED BY:	NLH

UTILITY PROFILE

ELLIOTT ROAD EXTENSION

PREPARED FOR

TOWN OF CHAPEL HILL, NC

CHAPEL HILL NORTH CAROLINA

SHEET NUMBER

UC-8

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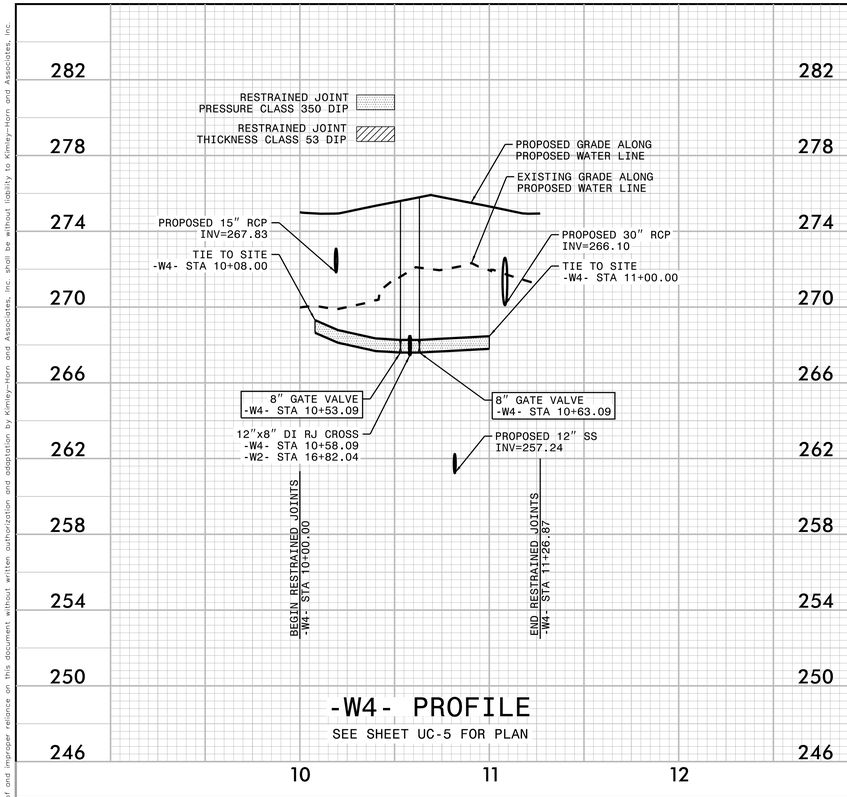

-W4- PROFILE

SEE SHEET UC-5 FOR PLAN

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FINAL DRAWINGS FOR REVIEW PURPOSES ONLY

KHA PROJECT 011159020
DATE 7/6/2020
SCALE 1" = 40'
DESIGNED BY: NLH
DRAWN BY: SOP
CHECKED BY: NLH

UTILITY PROFILE

ELLIOTT ROAD EXTENSION
PREPARED FOR
TOWN OF CHAPEL HILL, NC
CHAPEL HILL NORTH CAROLINA

SHEET NUMBER
UC-9

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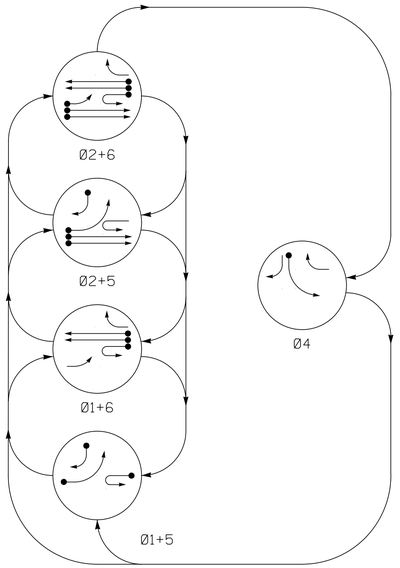
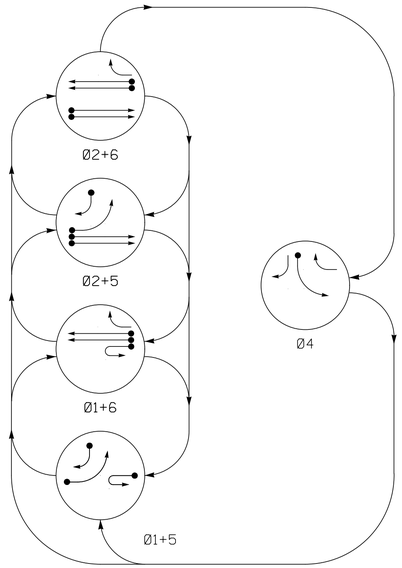
PROJECT REFERENCE NO.	SHEET NO.
4th Leg	Sig. 1.0

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4	FLASH
11	G	G	G	G	R	Y
21, 22	R	R	G	G	R	Y
41,43	R	R	R	R	G	R
42	R	R	R	R	G	R
51	~~G~~	~~F Y~~	~~G~~	~~F Y~~	~~R~~	~~Y~~
61	R	G	R	G	R	Y
62	R	G	R	G	R	Y

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4	FLASH
11	G	G	R	R	R	Y
21, 22	R	R	G	G	R	Y
41,43	R	R	R	R	G	R
42	R	R	R	R	G	R
51	~~G~~	~~R~~	~~G~~	~~R~~	~~R~~	~~Y~~
61	R	G	R	G	R	Y
62	R	G	R	G	R	Y

2070L LOOP & DETECTOR INSTALLATION

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X60	+5	2-4-2	-	1	Y	Y	-	-	15*	-	Y
					6#	Y	Y	Y	-	3	-	Y
2A	6X6	310	6	Y	2	Y	Y	-	-	-	-	Y
2B	6X6	310	6	Y	2	Y	Y	-	-	-	-	Y
4A	6X40	16	2-4-2	-	4	Y	Y	-	-	-	-	Y
4B @	6X6	0	2-4-2 Diagonal	-	4	Y	Y	-	-	3	-	Y
5A	6X60	0	2-4-2	-	5	Y	Y	-	-	15*	-	Y
					2#	Y	Y	Y	-	3	-	Y
5B	6X40	16	2-4-2	-	5	Y	Y	-	-	15	-	Y
5C @	6X6	0	2-4-2 Diagonal	-	5	Y	Y	-	-	15	-	Y
6A	6X6	360	6	Y	6	Y	Y	-	-	-	-	Y
6B	6X6	360	6	Y	6	Y	Y	-	-	-	-	Y

* Disable Delay during Alternate Phasing operation.
\# Disable Phase Call for loop during Alternate Phasing operation.
@ Set Sensitivity to appropiate level to detect a bicycle.

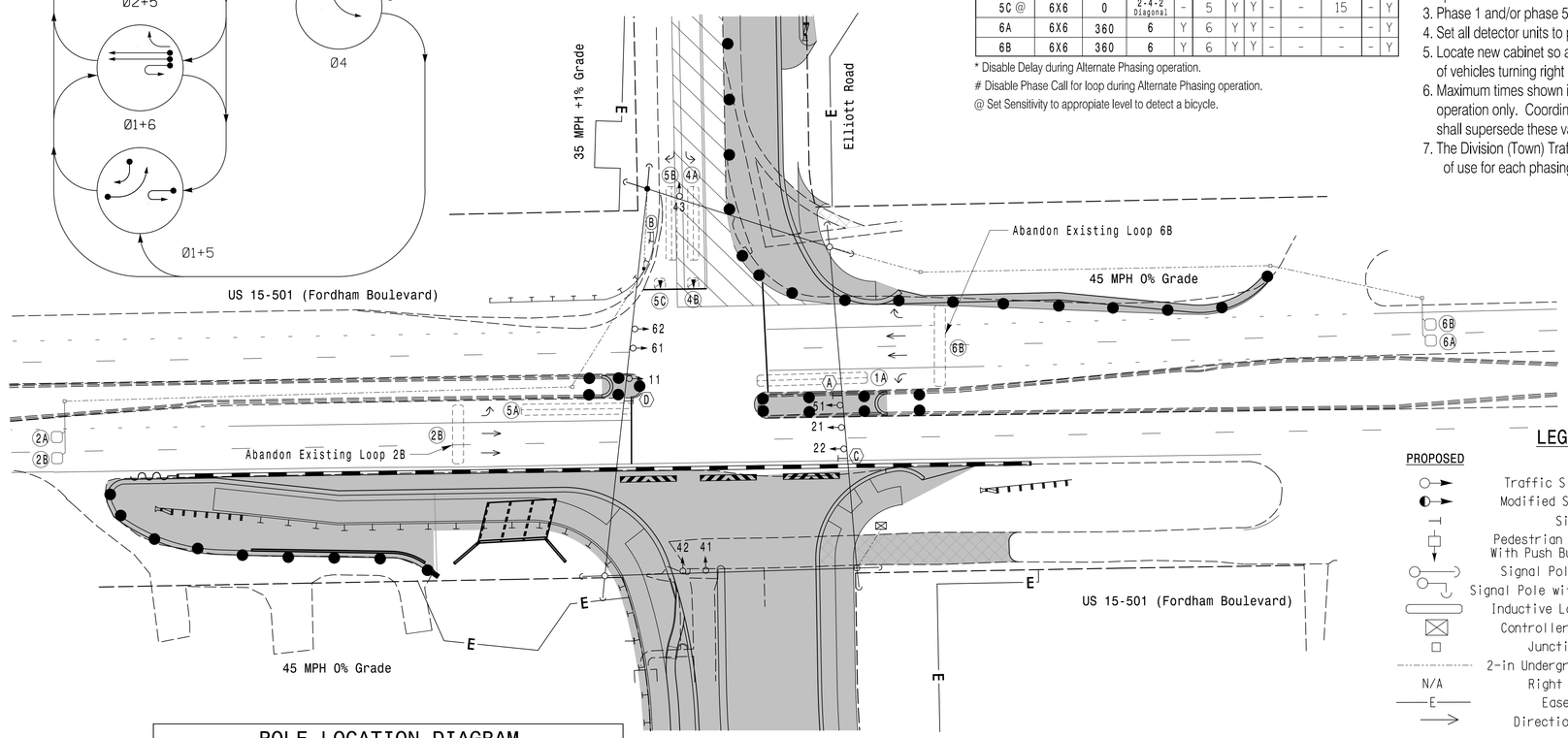
5 Phase
Fully Actuated
(Chapel Hill-Carrboro Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018 and "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
7. The Division (Town) Traffic Engineer will determine the hours of use for each phasing plan.

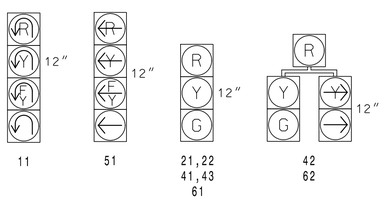
PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT



SIGNAL FACE I.D.

All Heads L.E.D.



LEGEND

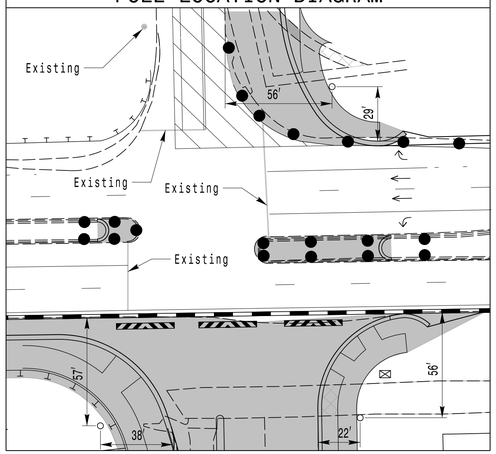
PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
E	Easement	E
	Directional Arrow	
	Bicycle Markings	
	Construction Zone Drums	
	Construction Zone	
A	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	A
B	"TO REQUEST GREEN WAIT ON LINE" Sign (R10-22)	B
C	No Right Turn Sign (R3-1)	C
D	No Left Turn Sign (R3-2)	D

OASIS 2070 TIMING CHART

FEATURE	PHASE 1	2	4	5	6
Min Green 1 *	7	12	7	7	12
Extension 1 *	1.0	6.0	2.0	2.0	6.0
Max Green 1 *	25	55	30	25	55
Yellow Clearance	3.0	4.5	3.8	3.0	4.5
Red Clearance	2.4	1.3	1.7	2.8	1.3
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	1.5
Max Variable Initial *	-	35	-	-	40
Time Before Reduction *	-	15	-	-	15
Time To Reduce *	-	45	-	-	45
Minimum Gap	-	3.2	-	-	4.1
Recall Mode	-	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

POLE LOCATION DIAGRAM



NC Dept of Transportation
Division of Highways
Final Drawing Date: 2/18/2020
DocuSigned by: Changsuk Baek
ITS & Signals Unit

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Signal Upgrade - Temporary Design 1
Construction Phase 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for: Transportation Mobility and Safety Division, State of North Carolina Department of Transportation, Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 15-501 (Fordham Boulevard) at Elliott Road

Division 7 Orange County Chapel Hill

PLAN DATE: August 2019 REVIEWED BY: SL Phillips
PREPARED BY: CR Wong REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACIE L. PHILLIPS
DocuSigned by: 2/14/2020
SIGNATURE DATE
SIG. INVENTORY NO. 07-0547TI

K:\RAL_TPTO_SIGNALS\01159028 Elliott Road Extension\S4 - Signal Design\1.0 07-0547TI.dgn Chanlin.Wong 3:10:23 PM 2/13/2020

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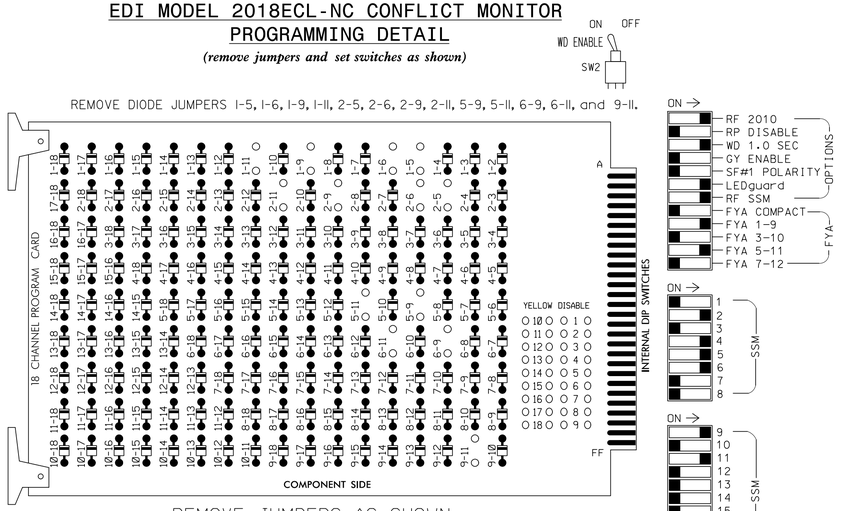
PROJECT REFERENCE NO.	SHEET NO.
4th Leg	Sig. 1.1

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all Phases.
3. Program phases 2 and 6 for Variable Initial and Gap Reduction.
4. Program phases 2 and 6 for Startup In Green.
5. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
6. The cabinet and controller are part of the Chapel Hill-Carrboro System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5		S6	S7		S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4		14	5		6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4		4 PED	5		6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11 ★	21,22	NU	NU	41,42, 43	62	NU	42	51 ★	61,62	NU	NU	NU	NU	11 ★	NU	NU	51 ★	NU	NU
RED		128			101			*		134										
YELLOW	*	129			102					135										
GREEN		130			103					136										
RED ARROW															A121			A114		
YELLOW ARROW						102		132							A122			A115		
FLASHING YELLOW ARROW															A123			A116		
GREEN ARROW	127					103		133	133											

NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.

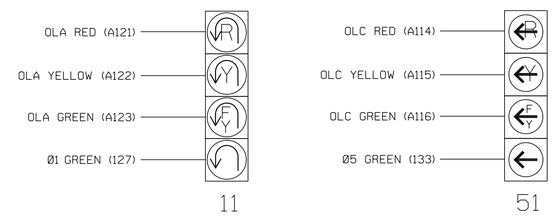
★ See pictorial of head wiring in detail this sheet.

EQUIPMENT INFORMATION

CONTROLLER.....2070
CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S5,S7,S8,AUX S1,AUX S4
PHASES USED.....1,2,4,5,6
OVERLAP "A".....1+2
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

The sequence display for signal heads 11 and 51 requires special logic programming. See sheet 2 for programming instructions.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	Ø4 4A	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø2 2B				Ø4 4B								ST DC ISOLATOR
FILE "J"	U	Ø5 5A	Ø5 5B	Ø6 6A	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED	Ø5 5C	Ø6 6B											

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10 ★	26	6	Y	Y	Y		3
	-	I1U	56	18 ★	51	1	Y	Y			
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			3
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9 ★	22	2	Y	Y	Y		3
	-	J1U	55	17 ★	55	5	Y	Y			
5B	TB3-5,6	J2U	40	2	6	5	Y	Y			15
5C	TB3-7,8	J2L	44	6	16	5	Y	Y			15
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			

[1] Add jumper from I1-W to J4-W, on rear of input file.

[2] Add jumper from J1-W to I4-W, on rear of input file.

★ See Input Page Assignment programming details on sheets 3 and 4.

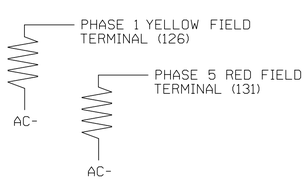
INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

ACCEPTABLE VALUES

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



NC Dept of Transportation
Division of Highways
Final Drawing Date: 2/18/2020
DocuSigned by: Changsuck Baek
ITS & Signals Unit

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0547T1
DESIGNED: AUGUST 2019
SEALED: 2/14/2020
REVISED: N/A

Electrical Detail - Temporary Design 1 - Sheet 1 of 5
Construction Phase 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for: Transportation Mobility and Safety Division, Department of Transportation, State of North Carolina, ITS & Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 15-501 (Fordham Boulevard)
at
Elliott Road

Division 7 Orange County Chapel Hill

PLAN DATE: August 2019	REVIEWED BY: SL Phillips
PREPARED BY: CR Wong	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACIE L. PHILLIPS
DocuSigned by: 2/14/2020
DATE

SIG. INVENTORY NO. 07-0547T1

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

K:\RAL_TPTD_SIGNALS\01159028 Elliott Road Extension\54 - Signal Design\1 07-0547T1e1.dgn 3:10:25 PM Chanlin.Wong 2/13/2020

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PROJECT REFERENCE NO.	SHEET NO.
4th Leg	Sig. 1.2

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5 AND 6.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON
AND RED CLEAR ON PHASE #1  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #50 ON
SET OUTPUT  ASSIGNMENT #51 OFF
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #1  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #4  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON
AND RED CLEAR ON PHASE #5  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #42 ON
SET OUTPUT  ASSIGNMENT #43 OFF
```

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #5  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #6  (+/-COMMAND#)
IF  YELLOW ON PHASE    #5  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #43 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

```
PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE:          |123456789101112131415 16
VEH OVL PARENTS:|XX
VEH OVL NOT VEH:|
VEH OVL NOT PED:|
VEH OVL GRN EXT:|
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

← NOTICE GREEN FLASH

PRESS '+' TWICE

```
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE:          |123456789101112131415 16
VEH OVL PARENTS:|   XX
VEH OVL NOT VEH:|
VEH OVL NOT PED:|
VEH OVL GRN EXT:|
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS). PRESS 'NEXT' TO ADVANCE TO PAGE 2.

NOTICE PAGE 2 →

```
PAGE 2: VEHICLE OVERLAP 'A' SETTINGS
PHASE:          |123456789101112131415 16
VEH OVL PARENTS:|X
VEH OVL NOT VEH:|
VEH OVL NOT PED:|
VEH OVL GRN EXT:|
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  _ GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

PRESS '+' TWICE

NOTICE PAGE 2 →

```
PAGE 2: VEHICLE OVERLAP 'C' SETTINGS
PHASE:          |123456789101112131415 16
VEH OVL PARENTS:|   X
VEH OVL NOT VEH:|
VEH OVL NOT PED:|
VEH OVL GRN EXT:|
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  _ GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

OVERLAP PROGRAMMING COMPLETE

NC Dept of Transportation
Division of Highways
Final Drawing Date: 2/18/2020
DocuSigned by: Changsek Baek
ITS & Signals Unit

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0547T1
DESIGNED: AUGUST 2019
SEALED: 2/14/2020
REVISED: N/A

Electrical Detail - Temporary Design 1 - Sheet 2 of 5
Construction Phase 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 15-501 (Fordham Boulevard) at Elliott Road

Division 7 | Orange County | Chapel Hill

PLAN DATE:	August 2019	REVIEWED BY:	SL Phillips
PREPARED BY:	CR Wong	REVIEWED BY:	

REVISIONS	INIT.	DATE

Prepared for: Mobility and Safety Division, Traffic Engineering Branch, Signal Section, Department of Transportation, 750 N.Greenfield Pkwy,Garner,NC 27529

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACIE L. PHILLIPS
DocuSigned by: SLPh 2/14/2020
DCB7A59E0808437...
DATE

SIG. INVENTORY NO. 07-0547T1

2/13/2020 3:10:27 PM Chanlin.Wong K:\HAL_TPTG_SIGNALS\011159028 Elliott Road Extension\S4 - Signal Design\1.2 07-0547T1e2.dgn

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PROJECT REFERENCE NO.	SHEET NO.
4th Leg	Sig. 1.3

INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 1A

(program controller as shown below)

NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION.

2. THE FIRST TASK THIS PROGRAMMING ACCOMPLISHES IS THE DISABLING OF INPUT #10 (DETECTOR 26) SO THAT A VEHICLE CALL WILL NOT BE PLACED TO PHASE 6 DURING ALTERNATE PHASING OPERATION. THE SECOND TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 51 TO INPUT #18 SO THAT THE DELAY ON LOOP 1A CAN BE REDUCED FROM 15 SECONDS TO 0 SECONDS.

FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 10 IS REACHED.

```
PAGE: 2 C1 PIN:48  VEHICLE DETECTOR
INPUT ASSIGNMENT #.................10
DEBOUNCE TIME (0-25.5 SEC).........0.5
DELAY TIME (0-25.5 SEC)............0.0
HOLD-OVER TIME (0-25.5 SEC)........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)..................Y
VEHICLE DETECTOR (1-64)............26
PEDESTRIAN DETECTOR (1-16).........
ALTERNATE PED DETECTOR (1-16)......
PREEMPT (1-10).....................
INVERTED PREEMPT (1-10)............
STOP TIME (Y/N)....................
FLASH SENSE (Y/N)..................
DOOR OPEN (Y/N)....................
MANUAL CONTROL ENABLE (Y/N)........
MANUAL CONTROL ADVANCE (Y/N)       .
SPECIAL FUNCTION ALARM (1-8)       .
TOD HOUR SYCHRONIZATION (0-23)     .
FORCE OFF RING (1-4)               .
HOLD PHASES (1-16)                 .
PLAN (65=FLSH,66=FREE)..   OFFSET#..
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4)     .
CHANGE PHASE CONTROL PAGE (1-4)    .
CHANGE OVERLAP CONTROL PAGE (1-4)...
CHANGE INPUT PAGE (1-4)            .
CHANGE OUTPUT PAGE (1-4)           .
OVERRIDE PHASE CONTROL FUNCTION (Y).
```

ENTER A 'Y' FOR NOT ENABLED

DEFAULT DETECTOR NUMBER WILL REMAIN UNTIL 'NOT ENABLED' IS ENTERED.

(LOOP 1A - PHASE 6)

```
PAGE: 2 C1 PIN:48  NOT ENABLED
INPUT ASSIGNMENT #.................10
DEBOUNCE TIME (0-25.5 SEC).........0.5
DELAY TIME (0-25.5 SEC)............0.0
HOLD-OVER TIME (0-25.5 SEC)........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)..................Y
VEHICLE DETECTOR (1-64)............
PEDESTRIAN DETECTOR (1-16)         .
ALTERNATE PED DETECTOR (1-16)      .
PREEMPT (1-10)                     .
INVERTED PREEMPT (1-10)            .
STOP TIME (Y/N)                    .
FLASH SENSE (Y/N)                  .
DOOR OPEN (Y/N)                    .
MANUAL CONTROL ENABLE (Y/N)        .
MANUAL CONTROL ADVANCE (Y/N)       .
SPECIAL FUNCTION ALARM (1-8)       .
TOD HOUR SYCHRONIZATION (0-23)     .
FORCE OFF RING (1-4)               .
HOLD PHASES (1-16)                 .
PLAN (65=FLSH,66=FREE)..   OFFSET#..
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4)     .
CHANGE PHASE CONTROL PAGE (1-4)    .
CHANGE OVERLAP CONTROL PAGE (1-4)...
CHANGE INPUT PAGE (1-4)            .
CHANGE OUTPUT PAGE (1-4)           .
OVERRIDE PHASE CONTROL FUNCTION (Y).
```

PRESS '+' TO ADVANCE TO INPUT 18

```
PAGE: 2 C1 PIN:56  VEHICLE DETECTOR
INPUT ASSIGNMENT #.................18
DEBOUNCE TIME (0-25.5 SEC).........0.5
DELAY TIME (0-25.5 SEC)............0.0
HOLD-OVER TIME (0-25.5 SEC)........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)                  .
VEHICLE DETECTOR (1-64)............1
PEDESTRIAN DETECTOR (1-16)         .
ALTERNATE PED DETECTOR (1-16)      .
PREEMPT (1-10)                     .
INVERTED PREEMPT (1-10)            .
STOP TIME (Y/N)                    .
FLASH SENSE (Y/N)                  .
DOOR OPEN (Y/N)                    .
MANUAL CONTROL ENABLE (Y/N)        .
MANUAL CONTROL ADVANCE (Y/N)       .
SPECIAL FUNCTION ALARM (1-8)       .
TOD HOUR SYCHRONIZATION (0-23)     .
FORCE OFF RING (1-4)               .
HOLD PHASES (1-16)                 .
PLAN (65=FLSH,66=FREE)..   OFFSET#..
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4)     .
CHANGE PHASE CONTROL PAGE (1-4)    .
CHANGE OVERLAP CONTROL PAGE (1-4)...
CHANGE INPUT PAGE (1-4)            .
CHANGE OUTPUT PAGE (1-4)           .
OVERRIDE PHASE CONTROL FUNCTION (Y).
```

ENTER '51' TO REASSIGN THE VEHICLE DETECTOR FOR THIS INPUT

(LOOP 1A - PHASE 1)

```
PAGE: 2 C1 PIN:56  VEHICLE DETECTOR
INPUT ASSIGNMENT #.................18
DEBOUNCE TIME (0-25.5 SEC).........0.5
DELAY TIME (0-25.5 SEC)............0.0
HOLD-OVER TIME (0-25.5 SEC)........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)                  .
VEHICLE DETECTOR (1-64)............51
PEDESTRIAN DETECTOR (1-16)         .
ALTERNATE PED DETECTOR (1-16)      .
PREEMPT (1-10)                     .
INVERTED PREEMPT (1-10)            .
STOP TIME (Y/N)                    .
FLASH SENSE (Y/N)                  .
DOOR OPEN (Y/N)                    .
MANUAL CONTROL ENABLE (Y/N)        .
MANUAL CONTROL ADVANCE (Y/N)       .
SPECIAL FUNCTION ALARM (1-8)       .
TOD HOUR SYCHRONIZATION (0-23)     .
FORCE OFF RING (1-4)               .
HOLD PHASES (1-16)                 .
PLAN (65=FLSH,66=FREE)..   OFFSET#..
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4)     .
CHANGE PHASE CONTROL PAGE (1-4)    .
CHANGE OVERLAP CONTROL PAGE (1-4)...
CHANGE INPUT PAGE (1-4)            .
CHANGE OUTPUT PAGE (1-4)           .
OVERRIDE PHASE CONTROL FUNCTION (Y).
```

PROGRAMMING COMPLETE

SPECIAL DETECTOR PROGRAMMING DETAIL - LOOP 1A (ALT.)

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS), THEN PRESS '1' FOR VEHICLE DETECTORS. PRESS THE '-' KEY TO GET TO VEHICLE DETECTOR #51.

```
VEHICLE DETECTOR #51  SETTINGS (+-,1-64)
SETTING:                          (Y/N)
ENABLE DETECTOR....................N
ENABLE LOGGING.....................N
ENABLE DIAGNOSTICS.................N
SPEED TRAP.........................N
CALL DETECTOR......................Y
EXTENSION DETECTOR.................Y
MODE 2 STOP BAR....................N
SWITCHING DETECTOR.................N
DUPLICATING DETECTOR...............N
ENABLE FULL TIME DELAY.............N
IF FAILED, SET MIN RECALL?.........N
IF FAILED, SET MAX1 RECALL?........N
IF FAILED, SET MAX2 RECALL?........N
PHASE#          ¦123456789101112131415 16
PHASES ASSIGNED ¦
SWITCH/DUPLICATE¦
LOOP SIZE (0-255 FT)...............6
SPEED TRAP DISTANCE (0-255 FT)......0
STOP BAR TIME (0-255 SEC)...........0
STRETCH (0-25.5 SEC)................0.0
DELAY (0-255 SEC)...................0
MAX CALLS/MIN (0-255)...............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%)..............100
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....0
QUEUE GAP RESET TIME (0-25.5)......0.0
PREEMPTION INDEX FOR QUEUE (0-10)...0
```

ENTER 'Y' FOR ENABLE DETECTOR

ENTER '1' FOR PHASES ASSIGNED

ENSURE DELAY IS '0'

```
VEHICLE DETECTOR #51  SETTINGS (+-,1-64)
SETTING:                          (Y/N)
ENABLE DETECTOR....................Y
ENABLE LOGGING.....................N
ENABLE DIAGNOSTICS.................N
SPEED TRAP.........................N
CALL DETECTOR......................Y
EXTENSION DETECTOR.................Y
MODE 2 STOP BAR....................N
SWITCHING DETECTOR.................N
DUPLICATING DETECTOR...............N
ENABLE FULL TIME DELAY.............N
IF FAILED, SET MIN RECALL?.........N
IF FAILED, SET MAX1 RECALL?........N
IF FAILED, SET MAX2 RECALL?........N
PHASE#          ¦123456789101112131415 16
PHASES ASSIGNED ¦X
SWITCH/DUPLICATE¦
LOOP SIZE (0-255 FT)...............6
SPEED TRAP DISTANCE (0-255 FT)......0
STOP BAR TIME (0-255 SEC)...........0
STRETCH (0-25.5 SEC)................0.0
DELAY (0-255 SEC)...................0
MAX CALLS/MIN (0-255)...............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%)..............100
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....0
QUEUE GAP RESET TIME (0-25.5)......0.0
PREEMPTION INDEX FOR QUEUE (0-10)...0
```

DETECTOR PROGRAMMING COMPLETE

NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.

NC Dept of Transportation
Division of Highways
Final Drawing Date: 2/18/2020
DocuSigned by: Changsuk Baek
ITS & Signals Unit

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0547T1
DESIGNED: AUGUST 2019
SEALED: 2/14/2020
REVISED: N/A

Electrical Detail - Temporary Design 1 - Sheet 3 of 5
Construction Phase 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for: SLL Transportation Mobility and Safety Division, Signals Management Section, State of North Carolina Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

US 15-501 (Fordham Boulevard) at Elliott Road

Division 7 | Orange County | Chapel Hill

PLAN DATE:	August 2019	REVIEWED BY:	SL Phillips
PREPARED BY:	CR Wong	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACY L. PHILLIPS
DocuSigned by: 2/14/2020
DATE
SIG. INVENTORY NO. 07-0547T1

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

2/13/2020 3:10:28 PM Chanlin.Wong K:\RAL_TPTO_SIGNALS\0111159028 Elliott Road Extension\S4 - Signal Design\1.3 07-0547T1a3.dgn

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PROJECT REFERENCE NO.	SHEET NO.
4th Leg	Sig. 1.4

INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 5A

(program controller as shown below)

NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION.

2. THE FIRST TASK THIS PROGRAMMING ACCOMPLISHES IS THE DISABLING OF INPUT #9 (DETECTOR 22) SO THAT A VEHICLE CALL WILL NOT BE PLACED TO PHASE 2 DURING ALTERNATE PHASING OPERATION. THE SECOND TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 55 TO INPUT #17 SO THAT THE DELAY ON LOOP 5A CAN BE REDUCED FROM 15 SECONDS TO 0 SECONDS.

FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 9 IS REACHED.

```
PAGE: 2 C1 PIN:47  VEHICLE DETECTOR
INPUT ASSIGNMENT #.................9
DEBOUNCE TIME (0-25.5 SEC)..........0.5
DELAY TIME (0-25.5 SEC).............0.0
HOLD-OVER TIME (0-25.5 SEC).........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)...................Y
VEHICLE DETECTOR (1-64).............22
PEDESTRIAN DETECTOR (1-16).........._
ALTERNATE PED DETECTOR (1-16)......._
PREEMPT (1-10)......................_
INVERTED PREEMPT (1-10)............._
STOP TIME (Y/N)....................._
FLASH SENSE (Y/N)..................._
DOOR OPEN (Y/N)....................._
MANUAL CONTROL ENABLE (Y/N)........._
MANUAL CONTROL ADVANCE (Y/N)........_
SPECIAL FUNCTION ALARM (1-8)........_
TOD HOUR SYCHRONIZATION (0-23)......_
FORCE OFF RING (1-4)................_
HOLD PHASES (1-16).................._
PLAN (65=FLSH,66=FREE)..._  OFFSET#.._
CHANGE PHASE SEQUENCE PAGE (1-12)...._
CHANGE PHASE TIMING PAGE (1-4)......._
CHANGE PHASE CONTROL PAGE (1-4)......_
CHANGE OVERLAP CONTROL PAGE (1-4)...._
CHANGE INPUT PAGE (1-4).............._
CHANGE OUTPUT PAGE (1-4)............._
OVERRIDE PHASE CONTROL FUNCTION (Y)._
```

DEFAULT DETECTOR NUMBER WILL REMAIN UNTIL 'NOT ENABLED' IS ENTERED.

ENTER A 'Y' FOR NOT ENABLED →

(LOOP 5A - PHASE 2)

```
PAGE: 2 C1 PIN:47  NOT ENABLED
INPUT ASSIGNMENT #.................9
DEBOUNCE TIME (0-25.5 SEC)..........0.5
DELAY TIME (0-25.5 SEC).............0.0
HOLD-OVER TIME (0-25.5 SEC).........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)...................Y
VEHICLE DETECTOR (1-64).............._
PEDESTRIAN DETECTOR (1-16)..........._
ALTERNATE PED DETECTOR (1-16)......._
PREEMPT (1-10)......................._
INVERTED PREEMPT (1-10)............._
STOP TIME (Y/N)....................._
FLASH SENSE (Y/N)..................._
DOOR OPEN (Y/N)....................._
MANUAL CONTROL ENABLE (Y/N)........._
MANUAL CONTROL ADVANCE (Y/N)......._
SPECIAL FUNCTION ALARM (1-8)......._
TOD HOUR SYCHRONIZATION (0-23)....._
FORCE OFF RING (1-4)..............._
HOLD PHASES (1-16)................._
PLAN (65=FLSH,66=FREE)..._  OFFSET#.._
CHANGE PHASE SEQUENCE PAGE (1-12)...._
CHANGE PHASE TIMING PAGE (1-4)......._
CHANGE PHASE CONTROL PAGE (1-4)......_
CHANGE OVERLAP CONTROL PAGE (1-4)...._
CHANGE INPUT PAGE (1-4)............._
CHANGE OUTPUT PAGE (1-4)............_
OVERRIDE PHASE CONTROL FUNCTION (Y)._
```

PRESS '+' TO ADVANCE TO INPUT 17

```
PAGE: 2 C1 PIN:55  VEHICLE DETECTOR
INPUT ASSIGNMENT #.................17
DEBOUNCE TIME (0-25.5 SEC)..........0.5
DELAY TIME (0-25.5 SEC).............0.0
HOLD-OVER TIME (0-25.5 SEC).........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)...................._
VEHICLE DETECTOR (1-64).............5
PEDESTRIAN DETECTOR (1-16)..........._
ALTERNATE PED DETECTOR (1-16)......._
PREEMPT (1-10)......................._
INVERTED PREEMPT (1-10)............._
STOP TIME (Y/N)....................._
FLASH SENSE (Y/N)..................._
DOOR OPEN (Y/N)....................._
MANUAL CONTROL ENABLE (Y/N)........._
MANUAL CONTROL ADVANCE (Y/N)......._
SPECIAL FUNCTION ALARM (1-8)......._
TOD HOUR SYCHRONIZATION (0-23)....._
FORCE OFF RING (1-4)..............._
HOLD PHASES (1-16)................._
PLAN (65=FLSH,66=FREE)..._  OFFSET#.._
CHANGE PHASE SEQUENCE PAGE (1-12)...._
CHANGE PHASE TIMING PAGE (1-4)......._
CHANGE PHASE CONTROL PAGE (1-4)......_
CHANGE OVERLAP CONTROL PAGE (1-4)...._
CHANGE INPUT PAGE (1-4)............._
CHANGE OUTPUT PAGE (1-4)............_
OVERRIDE PHASE CONTROL FUNCTION (Y)._
```

ENTER '55' TO REASSIGN THE VEHICLE DETECTOR FOR THIS INPUT →

(LOOP 5A - PHASE 5)

```
PAGE: 2 C1 PIN:55  VEHICLE DETECTOR
INPUT ASSIGNMENT #.................17
DEBOUNCE TIME (0-25.5 SEC)..........0.5
DELAY TIME (0-25.5 SEC).............0.0
HOLD-OVER TIME (0-25.5 SEC).........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)...................._
VEHICLE DETECTOR (1-64).............55
PEDESTRIAN DETECTOR (1-16)..........._
ALTERNATE PED DETECTOR (1-16)......._
PREEMPT (1-10)......................._
INVERTED PREEMPT (1-10)............._
STOP TIME (Y/N)....................._
FLASH SENSE (Y/N)..................._
DOOR OPEN (Y/N)....................._
MANUAL CONTROL ENABLE (Y/N)........._
MANUAL CONTROL ADVANCE (Y/N)......._
SPECIAL FUNCTION ALARM (1-8)......._
TOD HOUR SYCHRONIZATION (0-23)....._
FORCE OFF RING (1-4)..............._
HOLD PHASES (1-16)................._
PLAN (65=FLSH,66=FREE)..._  OFFSET#.._
CHANGE PHASE SEQUENCE PAGE (1-12)...._
CHANGE PHASE TIMING PAGE (1-4)......._
CHANGE PHASE CONTROL PAGE (1-4)......_
CHANGE OVERLAP CONTROL PAGE (1-4)...._
CHANGE INPUT PAGE (1-4)............._
CHANGE OUTPUT PAGE (1-4)............_
OVERRIDE PHASE CONTROL FUNCTION (Y)._
```

PROGRAMMING COMPLETE

SPECIAL DETECTOR PROGRAMMING DETAIL - LOOP 5A (ALT.)

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS), THEN PRESS '1' FOR VEHICLE DETECTORS. PRESS THE '-' KEY TO GET TO VEHICLE DETECTOR #55.

```
VEHICLE DETECTOR #55  SETTINGS (+-,1-64)
SETTING:                            (Y/N)
ENABLE DETECTOR....................N
ENABLE LOGGING.....................N
ENABLE DIAGNOSTICS.................N
SPEED TRAP.........................N
CALL DETECTOR......................Y
EXTENSION DETECTOR.................Y
MODE 2 STOP BAR....................N
SWITCHING DETECTOR.................N
DUPLICATING DETECTOR...............N
ENABLE FULL TIME DELAY.............N
IF FAILED, SET MIN RECALL?.........N
IF FAILED, SET MAX1 RECALL?........N
IF FAILED, SET MAX2 RECALL?........N
PHASE#          ¦12345678910111213141516
PHASES ASSIGNED ¦
SWITCH/DUPLICATE¦
LOOP SIZE (0-255 FT)...............6
SPEED TRAP DISTANCE (0-255 FT)......0
STOP BAR TIME (0-255 SEC)...........0
STRETCH (0-25.5 SEC)................0.0
DELAY (0-255 SEC)...................0
MAX CALLS/MIN (0-255)..............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%).............100
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....0
QUEUE GAP RESET TIME (0-25.5).......0.0
PREEMPTION INDEX FOR QUEUE (0-10)...0
```

ENTER 'Y' FOR ENABLE DETECTOR →

ENTER '5' FOR PHASES ASSIGNED →

ENSURE DELAY IS '0' →

```
VEHICLE DETECTOR #55  SETTINGS (+-,1-64)
SETTING:                            (Y/N)
ENABLE DETECTOR....................Y
ENABLE LOGGING.....................N
ENABLE DIAGNOSTICS.................N
SPEED TRAP.........................N
CALL DETECTOR......................Y
EXTENSION DETECTOR.................Y
MODE 2 STOP BAR....................N
SWITCHING DETECTOR.................N
DUPLICATING DETECTOR...............N
ENABLE FULL TIME DELAY.............N
IF FAILED, SET MIN RECALL?.........N
IF FAILED, SET MAX1 RECALL?........N
IF FAILED, SET MAX2 RECALL?........N
PHASE#          ¦12345678910111213141516
PHASES ASSIGNED ¦    X
SWITCH/DUPLICATE¦
LOOP SIZE (0-255 FT)...............6
SPEED TRAP DISTANCE (0-255 FT)......0
STOP BAR TIME (0-255 SEC)...........0
STRETCH (0-25.5 SEC)................0.0
DELAY (0-255 SEC)...................0
MAX CALLS/MIN (0-255)..............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%).............100
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....0
QUEUE GAP RESET TIME (0-25.5).......0.0
PREEMPTION INDEX FOR QUEUE (0-10)...0
```

DETECTOR PROGRAMMING COMPLETE

NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.

NC Dept of Transportation
Division of Highways
Final Drawing Date: 2/18/2020
DocuSigned by: Changsuk Baek
ITS & Signals Unit

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0547T1
DESIGNED: AUGUST 2019
SEALED: 2/14/2020
REVISED: N/A

Electrical Detail - Temporary Design 1 - Sheet 4 of 5
Construction Phase 1

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 15-501 (Fordham Boulevard)
at
Elliott Road

Division 7 Orange County Chapel Hill

PLAN DATE:	August 2019	REVIEWED BY:	SL Phillips
PREPARED BY:	CR Wong	REVIEWED BY:	

REVISIONS	INIT.	DATE

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Prepared for: Mobility and Safety Division, Traffic Engineering Branch, Signals Management Section, NC Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACY L. PHILLIPS
DocuSigned by: 2/14/2020
DC87A59ED6D6437
DATE

SIG. INVENTORY NO. 07-0547T1

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PROJECT REFERENCE NO.	SHEET NO.
4th Leg	Sig. 1.5

ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING COORDINATION - SELECT ALL PAGE CHANGES (AS SHOWN BELOW) WITHIN COORDINATION PLAN PROGRAMMING.

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM PAGE CHANGES (SHOWN BELOW) IN SEPARATE TIME OF DAY EVENTS. IF PAGE 1 IS USED, NO EVENT PROGRAMMING IS NECESSARY FOR THAT PARTICULAR PAGE.

PHASING	INPUTS PAGE	OVERLAPS PAGE
ACTIVE PAGES REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PAGES REQUIRED TO RUN ALTERNATE PHASING	2	2

NOTE: PAGES NOT SHOWN (i.e. sequence, phase control, etc.) SHOULD REMAIN AS '1', OR AS DEFINED BY TIMING ENGINEER.

IMPORTANT: IF ALT. PHASING IS USED DURING FREE RUN AND COORDINATION, DO NOT OPERATE TIME OF DAY PAGE CHANGE EVENTS CONCURRENTLY WITH COORDINATION PLAN EVENTS IN THE EVENT SCHEDULER. (EX. FREE RUN PAGE CHANGE EVENT SHOULD END BEFORE COORDINATION PLAN EVENT STARTS AND VICE-VERSA).

ALTERNATE PHASING PAGE CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN THESE OVERLAP/INPUT PAGE CHANGES ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAPS PAGE 2: Modifies overlap parent phases for heads 11 and 51 to run protected turns only.

INPUTS PAGE 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 0 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

NC Dept of Transportation
Division of Highways
Final Drawing Date: 2/18/2020
DocuSigned by: Changsuk Baek
ITS & Signals Unit

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0547T1
DESIGNED: AUGUST 2019
SEALED: 2/14/2020
REVISED: N/A

Electrical Detail - Temporary Design 1 - Sheet 5 of 5
Construction Phase 1

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ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for: Traffic Engineering Mobility and Safety Division, Signals Management Section, NC Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

US 15-501 (Fordham Boulevard)
at
Elliott Road

Division 7 Orange County Chapel Hill

PLAN DATE:	August 2019	REVIEWED BY:	SL Phillips
PREPARED BY:	CR Wong	REVIEWED BY:	

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PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
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(919) 677-2000

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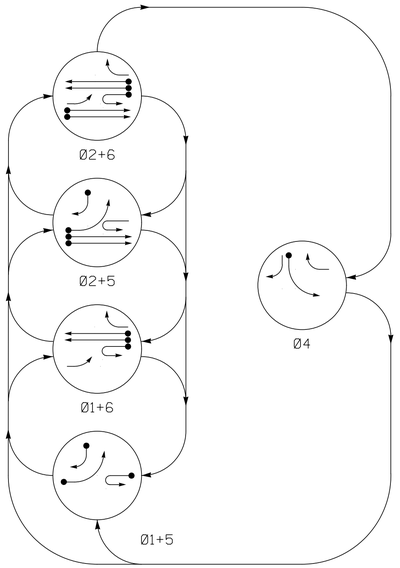
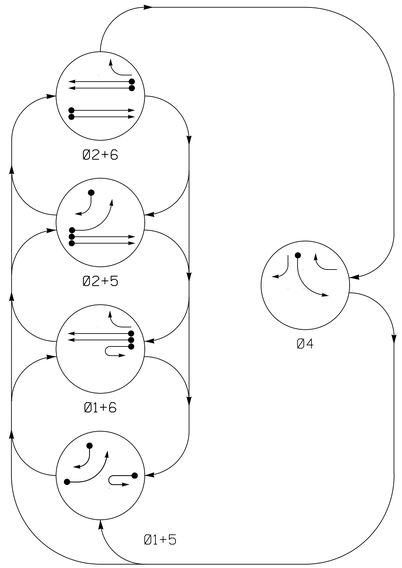
PROJECT REFERENCE NO.	SHEET NO.
4th Leg	Sig. 2.0

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4	FLASH
11	G	G	~~F~~	~~F~~	R	~~Y~~
21, 22	R	R	G	G	R	Y
41,43	R	R	R	R	G	R
42	R	R	R	R	G	R
51	~~←~~	~~F~~	~~←~~	~~F~~	~~R~~	~~Y~~
61	R	G	R	G	R	Y
62	R	G	R	G	R	Y

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4	FLASH
11	G	G	R	R	R	Y
21, 22	R	R	G	R	R	Y
41,43	R	R	R	R	G	R
42	R	R	R	R	G	R
51	~~←~~	~~R~~	~~←~~	~~R~~	~~R~~	~~Y~~
61	R	G	R	G	R	Y
62	R	G	R	G	R	Y

2070L LOOP & DETECTOR INSTALLATION

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP / ZONE	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	15*	-	-
					6#	Y	Y	Y	-	3	-	-
2A	6X6	310	EXIST	-	2	Y	Y	-	-	-	-	-
2B	6X6	310	EXIST	-	2	Y	Y	-	-	-	-	-
4A	6X40	0	@	Y	4	Y	Y	-	-	-	-	-
5A	6X60	0	2-4-2	-	5	Y	Y	-	-	15*	-	-
					2#	Y	Y	Y	-	3	-	-
5B	6X40	0	@	Y	5	Y	Y	-	-	15	-	-
6A	6X6	325	EXIST	-	6	Y	Y	-	-	-	-	-
6B	6X6	325	EXIST	-	6	Y	Y	-	-	-	-	-

* Disable Delay during Alternate Phasing operation.
\# Disable Phase Call for loop during Alternate Phasing operation.
@ Video Detection Zone.

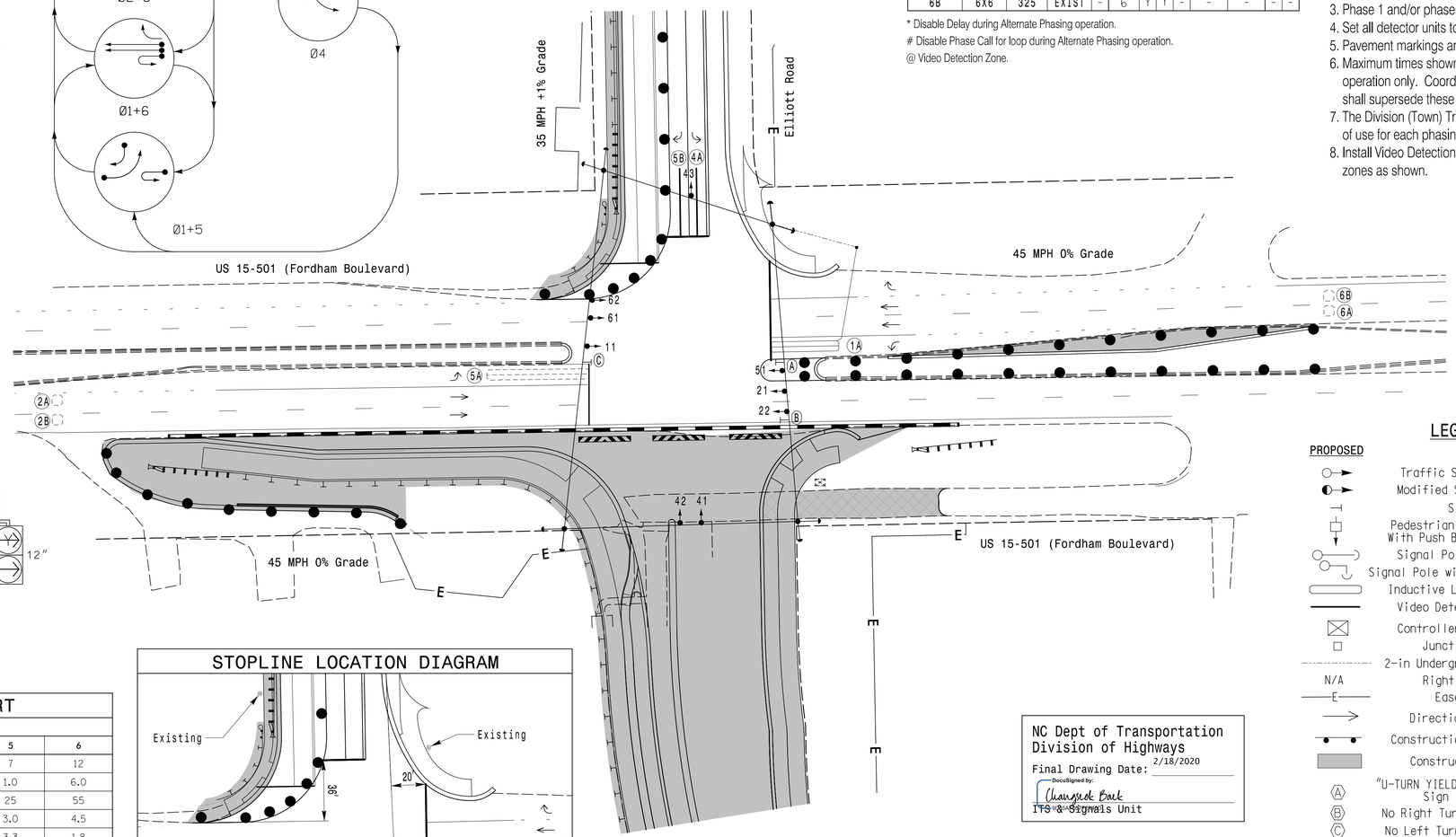
5 Phase
Fully Actuated
(Chapel Hill-Carrboro Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018, "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Pavement markings are existing, unless otherwise noted.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
7. The Division (Town) Traffic Engineer will determine the hours of use for each phasing plan.
8. Install Video Detection System to achieve detection zones as shown.

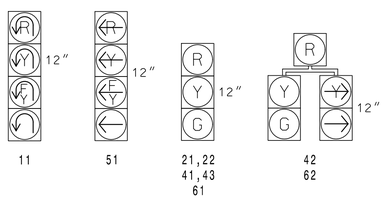
PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

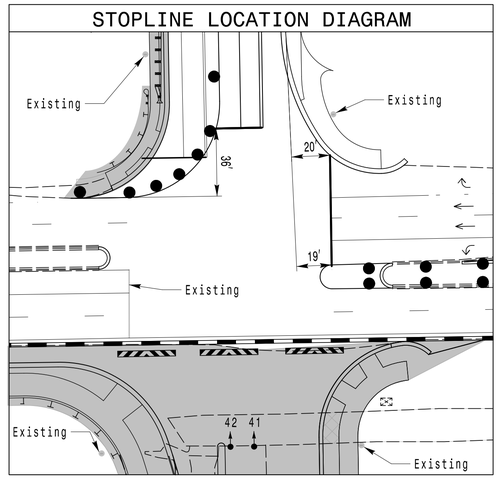


SIGNAL FACE I.D.

All Heads L.E.D.



STOPLINE LOCATION DIAGRAM



OASIS 2070 TIMING CHART

FEATURE	PHASE 1	2	4	5	6
Min Green 1 *	7	12	7	7	12
Extension 1 *	2.0	6.0	2.0	1.0	6.0
Max Green 1 *	25	55	30	25	55
Yellow Clearance	3.0	4.5	3.8	3.0	4.5
Red Clearance	2.4	1.8	1.9	3.3	1.8
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	1.5
Max Variable Initial *	-	35	-	-	37
Time Before Reduction *	-	15	-	-	15
Time To Reduce *	-	45	-	-	45
Minimum Gap	-	3.2	-	-	3.5
Recall Mode	-	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Video Detection Area	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
E	Easement	E
	Directional Arrow	
	Construction Zone Drums	
	Construction Zone	
A	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	A
B	No Right Turn Sign (R3-1)	B
C	No Left Turn Sign (R3-2)	C

NC Dept of Transportation
Division of Highways
Final Drawing Date: 2/18/2020
DocuSigned by: Changsuk Baek
ITS & Signals Unit

Signal Upgrade - Temporary Design 2
Construction Phase 2

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Prepared for: Transportation Mobility and Safety Division, Signal Design Section, State of North Carolina, Department of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

US 15-501 (Fordham Boulevard)
at
Elliott Road

Division 7 Orange County Chapel Hill

PLAN DATE:	August 2019	REVIEWED BY:	SL Phillips
PREPARED BY:	CR Wong	REVIEWED BY:	

SCALE 0 40 1''=40'

REVISIONS	INIT.	DATE

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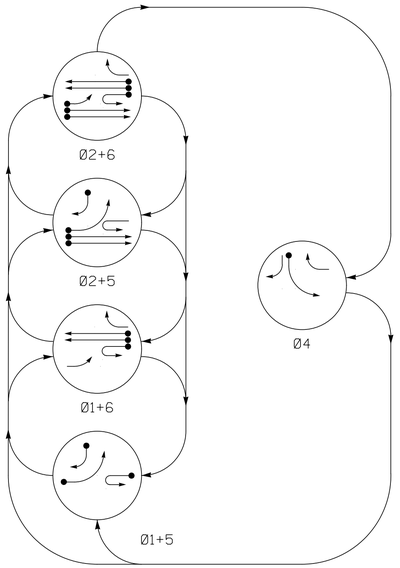
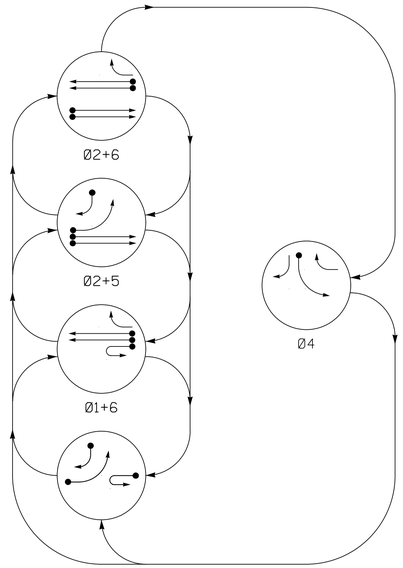
PROJECT REFERENCE NO.	SHEET NO.
4th Leg	Sig. 3.0

DEFAULT PHASING DIAGRAM



ALTERNATE PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4	FLASH
11			F Y	F Y	R	Y
21, 22	R	R	G	G	R	Y
41,43	R	R	R	R	G	R
42	R	R	R	R	G	R
51	~~F Y~~	~~F Y~~	~~F Y~~	~~F Y~~	~~R~~	~~Y~~
61	R	G	R	G	R	Y
62	R	G	R	G	R	Y

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø4	FLASH
11			R	R	R	Y
21, 22	R	R	G	G	R	Y
41,43	R	R	R	R	G	R
42	R	R	R	R	G	R
51	~~F Y~~	~~R~~	~~F Y~~	~~R~~	~~R~~	~~Y~~
61	R	G	R	G	R	Y
62	R	G	R	G	R	Y

2070L LOOP & DETECTOR INSTALLATION

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP ZONE	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Y	Y	-	-	15*	-	-
					6#	Y	Y	Y	-	3	-	-
2A	6X6	310	EXIST	-	2	Y	Y	-	-	-	-	-
2B	6X6	310	EXIST	-	2	Y	Y	-	-	-	-	-
4A	6X40	0	@	Y	4	Y	Y	-	-	-	-	-
5A	6X60	0	2-4-2	-	5	Y	Y	-	-	15*	-	-
					2#	Y	Y	Y	-	3	-	-
5B	6X40	0	@	Y	5	Y	Y	-	-	15	-	-
6A	6X6	325	EXIST	-	6	Y	Y	-	-	-	-	-
6B	6X6	325	EXIST	-	6	Y	Y	-	-	-	-	-

* Disable Delay during Alternate Phasing operation.
\# Disable Phase Call for loop during Alternate Phasing operation.
@ Video Detection Zone.

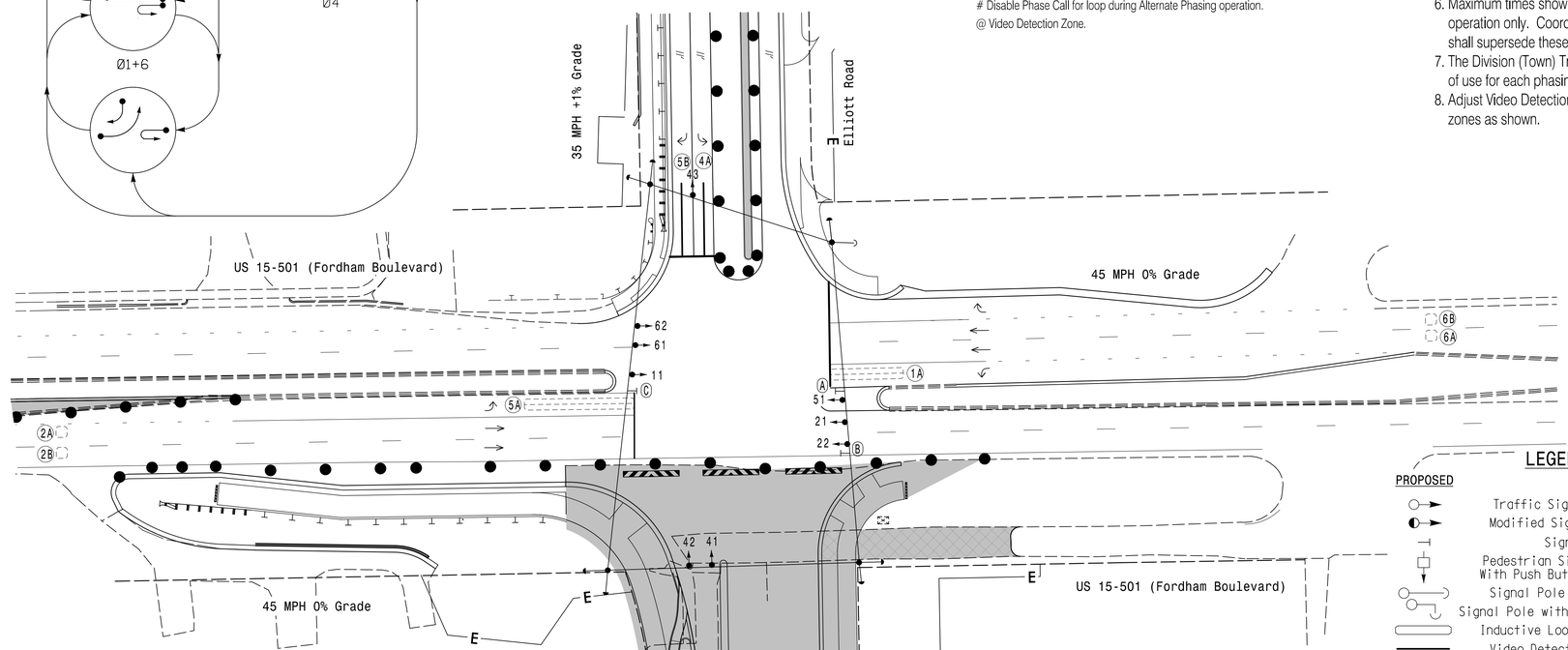
5 Phase Fully Actuated (Chapel Hill-Carrboro Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018, "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Pavement markings are existing, unless otherwise noted.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
7. The Division (Town) Traffic Engineer will determine the hours of use for each phasing plan.
8. Adjust Video Detection System to achieve detection zones as shown.

PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

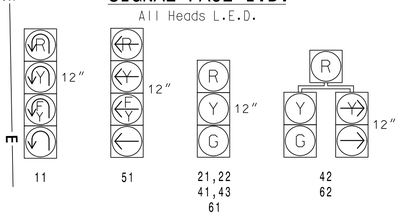


LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Video Detection Area	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
E	Easement	E
	Directional Arrow	
	Construction Zone Drums	
	Construction Zone	
A	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	A
B	No Right Turn Sign (R3-1)	B
C	No Left Turn Sign (R3-2)	C

SIGNAL FACE I.D.

All Heads L.E.D.

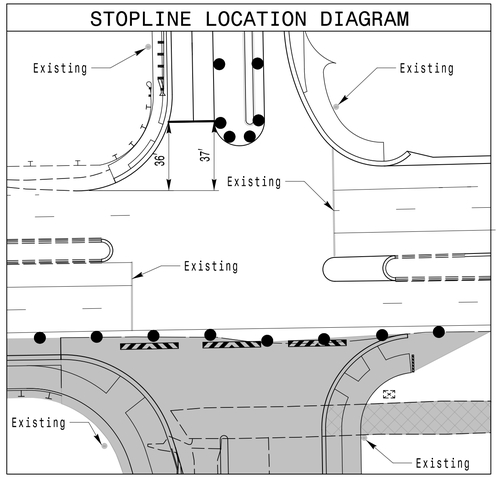


OASIS 2070 TIMING CHART

FEATURE	PHASE 1	2	4	5	6
Min Green 1 *	7	12	7	7	12
Extension 1 *	2.0	6.0	2.0	1.0	6.0
Max Green 1 *	25	55	30	25	55
Yellow Clearance	3.0	4.5	3.8	3.0	4.5
Red Clearance	3.3	2.1	2.8	3.2	2.1
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	1.5
Max Variable Initial *	-	35	-	-	37
Time Before Reduction *	-	15	-	-	15
Time To Reduce *	-	45	-	-	45
Minimum Gap	-	3.2	-	-	3.5
Recall Mode	-	MIN RECALL	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	YELLOW
Dual Entry	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

STOPLINE LOCATION DIAGRAM



NC Dept of Transportation
Division of Highways
Final Drawing Date: 2/18/2020
DocuSigned by: Changsuk Park
ITS & Signals Unit

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Signal Upgrade - Temporary Design 3
Construction Phase 3

Prepared for: Transportation Mobility and Safety Division, State of North Carolina, Department of Transportation, Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 40 1"=40'

US 15-501 (Fordham Boulevard) at Elliott Road

Division 7 Orange County Chapel Hill

PLAN DATE:	August 2019	REVIEWED BY:	SL Phillips
PREPARED BY:	CR Wong	REVIEWED BY:	

REVISIONS	INIT.	DATE

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SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACE L. PHILLIPS

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SIGNATURE 2/14/2020 DATE
SIGNATURE REQUIRED 07-0547T3

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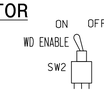
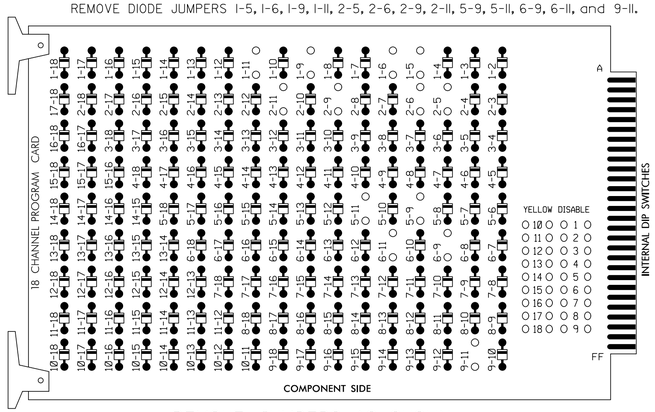
PROJECT REFERENCE NO.	SHEET NO.
4th Leg	Sig. 3.1

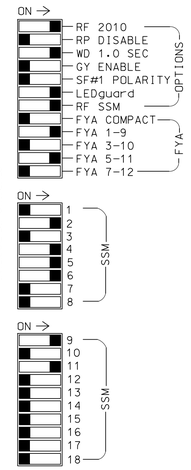
EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)



REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 2-5, 2-6, 2-9, 2-11, 5-9, 5-11, 6-9, 6-11, and 9-11.





REMOVE JUMPERS AS SHOWN

■ = DENOTES POSITION OF SWITCH

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

NOTES

1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all Phases.
3. Program phases 2 and 6 for Variable Initial and Gap Reduction.
4. Program phases 2 and 6 for Startup In Green.
5. Program phases 2 and 6 for Yellow Flash, and overlap 1 as Wag Overlaps.
6. The cabinet and controller are part of the Chapel Hill-Carrboro System.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1	S2	S3	S4	S5		S6	S7		S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4		14	5		6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4		4 PED	5		6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	21,22	NU	NU	41,42, 43	62	NU	42	51★	61,62	NU	NU	NU	NU	11★	NU	NU	51★	NU	NU
RED		128			101			*		134										
YELLOW	*	129			102					135										
GREEN		130			103					136										
RED ARROW															A121			A114		
YELLOW ARROW						102		132							A122			A115		
FLASHING YELLOW ARROW															A123			A116		
GREEN ARROW	127					103		133	133											

NU = Not Used

* Denotes install load resistor. See load resistor installation detail this sheet.

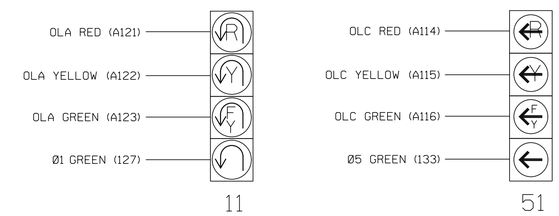
★ See pictorial of head wiring in detail this sheet.

EQUIPMENT INFORMATION

CONTROLLER.....2070
CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S5,S7,S8,AUX S1,AUX S4
PHASES USED.....1,2,4,5,6
OVERLAP "A".....1+2
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

The sequence display for signal heads 11 and 51 requires special logic programming. See sheet 2 for programming instructions.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1 1A	Ø2 2A	SLOT EMPTY	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	FS DC ISOLATOR
	L	NOT USED	Ø2 2B												ST DC ISOLATOR
FILE "J"	U	Ø5 5A	SLOT EMPTY	Ø6 6A	WIRED INPUT ⊗	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	NOT USED		Ø6 6B											

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10★	26	6	Y	Y	Y		3
	-	I1U	56	18★	51	1	Y	Y			
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9★	22	2	Y	Y	Y		3
	-	J1U	55	17★	55	5	Y	Y			
6A	TB3-9,10	J3U	64	26	36	6	Y	Y			
6B	TB3-11,12	J3L	77	39	46	6	Y	Y			

[1] Add jumper from I1-W to J4-W, on rear of input file.

[2] Add jumper from J1-W to I4-W, on rear of input file.

★ See Input Page Assignment programming details on sheets 3 and 4.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

NC Dept of Transportation
Division of Highways
Final Drawing Date: 2/18/2020
DocuSigned by: Changsuck Park
ITS & Signals Unit

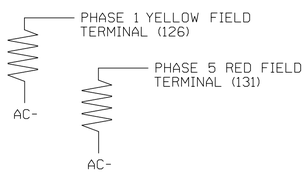
THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0547T2&T3
DESIGNED: AUGUST 2019
SEALED: 2/14/2020
REVISED: N/A

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

ACCEPTABLE VALUES

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



DETECTOR NOTES

1. Install inductive loops for loops 1A, 2A, 2B, 5A, 6A, and 6B. Populate detector card slots as illustrated in the "INPUT FILE POSITION LAYOUT".
2. For all other zones install a video detection system for vehicle detection. Perform installation according to manufacturer's directions and NCDOT engineer-approved mounting locations to accomplish the detection schemes shown on Signal Design Plans
3. For zones 1A and 5A detector card placement and slots reserved for wired inputs are typical for a NCDOT installation. Inputs associated with these slots are compatible with the time of day instructions located on sheets 3 and 4 of this electrical detail.

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Electrical Detail - Temporary Design 2 and 3 - Sheet 1 of 5
Construction Phases 2 and 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for: Transportation Mobility and Safety Division, Traffic Engineering & Signals Management Section, Department of Transportation, State of North Carolina
750 N.Greenfield Pkwy,Garner,NC 27529

US 15-501 (Fordham Boulevard)
at
Elliott Road

Division 7 | Orange County | Chapel Hill

PLAN DATE: August 2019	REVIEWED BY: SL Phillips
PREPARED BY: CR Wong	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACIE L. PHILLIPS
DocuSigned by: 2/14/2020
DATE
SIG. INVENTORY NO 07-0547T2&T3

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PROJECT REFERENCE NO.	SHEET NO.
4th Leg	Sig. 3.2

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5 AND 6.
2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON
AND RED CLEAR ON PHASE #1  IS ON
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

SCROLL DOWN

```
THEN:
SET OUTPUT  ASSIGNMENT #50 ON
SET OUTPUT  ASSIGNMENT #51 OFF
```

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #1  IS ON
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

SCROLL DOWN

```
THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #1  IS ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

SCROLL DOWN

```
THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

PRESS '+'

```
LOGICAL I/O COMMAND #4  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON
AND RED CLEAR ON PHASE #5  IS ON
```

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

SCROLL DOWN

```
THEN:
SET OUTPUT  ASSIGNMENT #42 ON
SET OUTPUT  ASSIGNMENT #43 OFF
```

PRESS '+'

```
LOGICAL I/O COMMAND #5  (+/-COMMAND#)
IF  ACTIVE PHASE       #5  IS ON
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

SCROLL DOWN

```
THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
```

PRESS '+'

```
LOGICAL I/O COMMAND #6  (+/-COMMAND#)
IF  YELLOW ON PHASE    #5  IS ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

SCROLL DOWN

```
THEN:
SET OUTPUT  ASSIGNMENT #43 ON
```

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

```
PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE:          ¦123456789101112131415 16
VEH OVL PARENTS:¦XX
VEH OVL NOT VEH:¦
VEH OVL NOT PED:¦
VEH OVL GRN EXT:¦
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

← NOTICE GREEN FLASH

PRESS '+' TWICE

```
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE:          ¦123456789101112131415 16
VEH OVL PARENTS:¦   XX
VEH OVL NOT VEH:¦
VEH OVL NOT PED:¦
VEH OVL GRN EXT:¦
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS). PRESS 'NEXT' TO ADVANCE TO PAGE 2.

NOTICE PAGE 2 →

```
PAGE 2: VEHICLE OVERLAP 'A' SETTINGS
PHASE:          ¦123456789101112131415 16
VEH OVL PARENTS:¦X
VEH OVL NOT VEH:¦
VEH OVL NOT PED:¦
VEH OVL GRN EXT:¦
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  _ GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

PRESS '+' TWICE

NOTICE PAGE 2 →

```
PAGE 2: VEHICLE OVERLAP 'C' SETTINGS
PHASE:          ¦123456789101112131415 16
VEH OVL PARENTS:¦   X
VEH OVL NOT VEH:¦
VEH OVL NOT PED:¦
VEH OVL GRN EXT:¦
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  _ GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

OVERLAP PROGRAMMING COMPLETE

NC Dept of Transportation
Division of Highways
Final Drawing Date: 2/18/2020
DocuSigned by: Changsuk Park
ITS & Signals Unit

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0547T2&T3
DESIGNED: AUGUST 2019
SEALED: 2/14/2020
REVISED: N/A

Electrical Detail - Temporary Design 2 and 3 - Sheet 2 of 5
Construction Phases 2 and 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for: NC Department of Transportation Mobility and Safety Division, ITS & Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 15-501 (Fordham Boulevard)
at
Elliott Road

Division 7 | Orange County | Chapel Hill

PLAN DATE:	August 2019	REVIEWED BY:	SL Phillips
PREPARED BY:	CR Wong	REVIEWED BY:	

REVISIONS	INIT.	DATE

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DATE
SIG. INVENTORY NO 07-0547T2&T3

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PROJECT REFERENCE NO.	SHEET NO.
4th Leg	Sig. 3.3

INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 1A

(program controller as shown below)

NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION.

2. THE FIRST TASK THIS PROGRAMMING ACCOMPLISHES IS THE DISABLING OF INPUT #10 (DETECTOR 26) SO THAT A VEHICLE CALL WILL NOT BE PLACED TO PHASE 6 DURING ALTERNATE PHASING OPERATION. THE SECOND TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 51 TO INPUT #18 SO THAT THE DELAY ON LOOP 1A CAN BE REDUCED FROM 15 SECONDS TO 0 SECONDS.

FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 10 IS REACHED.

```
PAGE: 2 C1 PIN:48  VEHICLE DETECTOR
INPUT ASSIGNMENT #.................10
DEBOUNCE TIME (0-25.5 SEC).........0.5
DELAY TIME (0-25.5 SEC)............0.0
HOLD-OVER TIME (0-25.5 SEC)........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)..................Y
VEHICLE DETECTOR (1-64)............26
PEDESTRIAN DETECTOR (1-16).........
ALTERNATE PED DETECTOR (1-16)......
PREEMPT (1-10).....................
INVERTED PREEMPT (1-10)............
STOP TIME (Y/N)....................
FLASH SENSE (Y/N)..................
DOOR OPEN (Y/N)....................
MANUAL CONTROL ENABLE (Y/N)........
MANUAL CONTROL ADVANCE (Y/N)       .
SPECIAL FUNCTION ALARM (1-8)       .
TOD HOUR SYCHRONIZATION (0-23)     .
FORCE OFF RING (1-4)               .
HOLD PHASES (1-16)                 .
PLAN (65=FLSH,66=FREE)..  OFFSET#..
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4)     .
CHANGE PHASE CONTROL PAGE (1-4)    .
CHANGE OVERLAP CONTROL PAGE (1-4)...
CHANGE INPUT PAGE (1-4)            .
CHANGE OUTPUT PAGE (1-4)           .
OVERRIDE PHASE CONTROL FUNCTION (Y).
```

ENTER A 'Y' FOR NOT ENABLED

DEFAULT DETECTOR NUMBER WILL REMAIN UNTIL 'NOT ENABLED' IS ENTERED.

(LOOP 1A - PHASE 6)

```
PAGE: 2 C1 PIN:48  NOT ENABLED
INPUT ASSIGNMENT #.................10
DEBOUNCE TIME (0-25.5 SEC).........0.5
DELAY TIME (0-25.5 SEC)............0.0
HOLD-OVER TIME (0-25.5 SEC)........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)..................Y
VEHICLE DETECTOR (1-64)............
PEDESTRIAN DETECTOR (1-16)         .
ALTERNATE PED DETECTOR (1-16)      .
PREEMPT (1-10)                     .
INVERTED PREEMPT (1-10)            .
STOP TIME (Y/N)                    .
FLASH SENSE (Y/N)                  .
DOOR OPEN (Y/N)                    .
MANUAL CONTROL ENABLE (Y/N)        .
MANUAL CONTROL ADVANCE (Y/N)       .
SPECIAL FUNCTION ALARM (1-8)       .
TOD HOUR SYCHRONIZATION (0-23)     .
FORCE OFF RING (1-4)               .
HOLD PHASES (1-16)                 .
PLAN (65=FLSH,66=FREE)..  OFFSET#..
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4)     .
CHANGE PHASE CONTROL PAGE (1-4)    .
CHANGE OVERLAP CONTROL PAGE (1-4)...
CHANGE INPUT PAGE (1-4)            .
CHANGE OUTPUT PAGE (1-4)           .
OVERRIDE PHASE CONTROL FUNCTION (Y).
```

PRESS '+' TO ADVANCE TO INPUT 18

```
PAGE: 2 C1 PIN:56  VEHICLE DETECTOR
INPUT ASSIGNMENT #.................18
DEBOUNCE TIME (0-25.5 SEC).........0.5
DELAY TIME (0-25.5 SEC)............0.0
HOLD-OVER TIME (0-25.5 SEC)........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)                  .
VEHICLE DETECTOR (1-64)............1
PEDESTRIAN DETECTOR (1-16)         .
ALTERNATE PED DETECTOR (1-16)      .
PREEMPT (1-10)                     .
INVERTED PREEMPT (1-10)            .
STOP TIME (Y/N)                    .
FLASH SENSE (Y/N)                  .
DOOR OPEN (Y/N)                    .
MANUAL CONTROL ENABLE (Y/N)        .
MANUAL CONTROL ADVANCE (Y/N)       .
SPECIAL FUNCTION ALARM (1-8)       .
TOD HOUR SYCHRONIZATION (0-23)     .
FORCE OFF RING (1-4)               .
HOLD PHASES (1-16)                 .
PLAN (65=FLSH,66=FREE)..  OFFSET#..
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4)     .
CHANGE PHASE CONTROL PAGE (1-4)    .
CHANGE OVERLAP CONTROL PAGE (1-4)...
CHANGE INPUT PAGE (1-4)            .
CHANGE OUTPUT PAGE (1-4)           .
OVERRIDE PHASE CONTROL FUNCTION (Y).
```

ENTER '51' TO REASSIGN THE VEHICLE DETECTOR FOR THIS INPUT

(LOOP 1A - PHASE 1)

```
PAGE: 2 C1 PIN:56  VEHICLE DETECTOR
INPUT ASSIGNMENT #.................18
DEBOUNCE TIME (0-25.5 SEC).........0.5
DELAY TIME (0-25.5 SEC)............0.0
HOLD-OVER TIME (0-25.5 SEC)........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)                  .
VEHICLE DETECTOR (1-64)............51
PEDESTRIAN DETECTOR (1-16)         .
ALTERNATE PED DETECTOR (1-16)      .
PREEMPT (1-10)                     .
INVERTED PREEMPT (1-10)            .
STOP TIME (Y/N)                    .
FLASH SENSE (Y/N)                  .
DOOR OPEN (Y/N)                    .
MANUAL CONTROL ENABLE (Y/N)        .
MANUAL CONTROL ADVANCE (Y/N)       .
SPECIAL FUNCTION ALARM (1-8)       .
TOD HOUR SYCHRONIZATION (0-23)     .
FORCE OFF RING (1-4)               .
HOLD PHASES (1-16)                 .
PLAN (65=FLSH,66=FREE)..  OFFSET#..
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4)     .
CHANGE PHASE CONTROL PAGE (1-4)    .
CHANGE OVERLAP CONTROL PAGE (1-4)...
CHANGE INPUT PAGE (1-4)            .
CHANGE OUTPUT PAGE (1-4)           .
OVERRIDE PHASE CONTROL FUNCTION (Y).
```

PROGRAMMING COMPLETE

SPECIAL DETECTOR PROGRAMMING DETAIL - LOOP 1A (ALT.)

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS), THEN PRESS '1' FOR VEHICLE DETECTORS. PRESS THE '-' KEY TO GET TO VEHICLE DETECTOR #51.

```
VEHICLE DETECTOR #51  SETTINGS (+-,1-64)
SETTING:                          (Y/N)
ENABLE DETECTOR....................N
ENABLE LOGGING.....................N
ENABLE DIAGNOSTICS.................N
SPEED TRAP.........................N
CALL DETECTOR......................Y
EXTENSION DETECTOR.................Y
MODE 2 STOP BAR....................N
SWITCHING DETECTOR.................N
DUPLICATING DETECTOR...............N
ENABLE FULL TIME DELAY.............N
IF FAILED, SET MIN RECALL?.........N
IF FAILED, SET MAX1 RECALL?........N
IF FAILED, SET MAX2 RECALL?........N
PHASE#          ¦12345678910111213141516
PHASES ASSIGNED ¦
SWITCH/DUPLICATE¦
LOOP SIZE (0-255 FT)...............6
SPEED TRAP DISTANCE (0-255 FT)......0
STOP BAR TIME (0-255 SEC)...........0
STRETCH (0-25.5 SEC)................0.0
DELAY (0-255 SEC)...................0
MAX CALLS/MIN (0-255)...............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%)..............100
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....0
QUEUE GAP RESET TIME (0-25.5).......0.0
PREEMPTION INDEX FOR QUEUE (0-10)...0
```

ENTER 'Y' FOR ENABLE DETECTOR

ENTER '1' FOR PHASES ASSIGNED

ENSURE DELAY IS '0'

```
VEHICLE DETECTOR #51  SETTINGS (+-,1-64)
SETTING:                          (Y/N)
ENABLE DETECTOR....................Y
ENABLE LOGGING.....................N
ENABLE DIAGNOSTICS.................N
SPEED TRAP.........................N
CALL DETECTOR......................Y
EXTENSION DETECTOR.................Y
MODE 2 STOP BAR....................N
SWITCHING DETECTOR.................N
DUPLICATING DETECTOR...............N
ENABLE FULL TIME DELAY.............N
IF FAILED, SET MIN RECALL?.........N
IF FAILED, SET MAX1 RECALL?........N
IF FAILED, SET MAX2 RECALL?........N
PHASE#          ¦12345678910111213141516
PHASES ASSIGNED ¦X
SWITCH/DUPLICATE¦
LOOP SIZE (0-255 FT)...............6
SPEED TRAP DISTANCE (0-255 FT)......0
STOP BAR TIME (0-255 SEC)...........0
STRETCH (0-25.5 SEC)................0.0
DELAY (0-255 SEC)...................0
MAX CALLS/MIN (0-255)...............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%)..............100
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....0
QUEUE GAP RESET TIME (0-25.5).......0.0
PREEMPTION INDEX FOR QUEUE (0-10)...0
```

DETECTOR PROGRAMMING COMPLETE

NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.

NC Dept of Transportation
Division of Highways
Final Drawing Date: 2/18/2020
DocuSigned by: Changsek Baek
ITS & Signals Unit

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0547T2&T3
DESIGNED: AUGUST 2019
SEALED: 2/14/2020
REVISED: N/A

Electrical Detail - Temporary Design 2 and 3 - Sheet 3 of 5
Construction Phases 2 and 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 15-501 (Fordham Boulevard)
at
Elliott Road

Division 7 Orange County Chapel Hill

PLAN DATE:	August 2019	REVIEWED BY:	SL Phillips
PREPARED BY:	CR Wong	REVIEWED BY:	

REVISIONS	INIT.	DATE

Prepared for: NC Department of Transportation Mobility and Safety Division Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACY L. PHILLIPS
DocuSigned by: 2/14/2020
DATE
SIG. INVENTORY NO 07-0547T2&T3

K:\RAL_TPTO_SIGNALS\07115902B Elliott Road Extension\S4 - Signal Design\3.3 07-0547T2&T3s3.dgn 3:10:40 PM Chanlin.Wong 2/13/2020

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PROJECT REFERENCE NO.	SHEET NO.
4th Leg	Sig. 3.4

INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 5A

(program controller as shown below)

NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION.

2. THE FIRST TASK THIS PROGRAMMING ACCOMPLISHES IS THE DISABLING OF INPUT #9 (DETECTOR 22) SO THAT A VEHICLE CALL WILL NOT BE PLACED TO PHASE 2 DURING ALTERNATE PHASING OPERATION. THE SECOND TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 55 TO INPUT #17 SO THAT THE DELAY ON LOOP 5A CAN BE REDUCED FROM 15 SECONDS TO 0 SECONDS.

FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 9 IS REACHED.

```
PAGE: 2 C1 PIN:47  VEHICLE DETECTOR
INPUT ASSIGNMENT #.................9
DEBOUNCE TIME (0-25.5 SEC)..........0.5
DELAY TIME (0-25.5 SEC).............0.0
HOLD-OVER TIME (0-25.5 SEC).........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)...................Y
VEHICLE DETECTOR (1-64).............22
PEDESTRIAN DETECTOR (1-16)..........
ALTERNATE PED DETECTOR (1-16).......
PREEMPT (1-10)......................
INVERTED PREEMPT (1-10).............
STOP TIME (Y/N).....................
FLASH SENSE (Y/N)...................
DOOR OPEN (Y/N).....................
MANUAL CONTROL ENABLE (Y/N).........
MANUAL CONTROL ADVANCE (Y/N)........
SPECIAL FUNCTION ALARM (1-8)........
TOD HOUR SYCHRONIZATION (0-23)......
FORCE OFF RING (1-4)................
HOLD PHASES (1-16)..................
PLAN (65=FLSH,66=FREE)..   OFFSET#..
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4)......
CHANGE PHASE CONTROL PAGE (1-4).....
CHANGE OVERLAP CONTROL PAGE (1-4)...
CHANGE INPUT PAGE (1-4).............
CHANGE OUTPUT PAGE (1-4)............
OVERRIDE PHASE CONTROL FUNCTION (Y).
```

ENTER A 'Y' FOR NOT ENABLED

DEFAULT DETECTOR NUMBER WILL REMAIN UNTIL 'NOT ENABLED' IS ENTERED.

(LOOP 5A - PHASE 2)

```
PAGE: 2 C1 PIN:47  NOT ENABLED
INPUT ASSIGNMENT #.................9
DEBOUNCE TIME (0-25.5 SEC)..........0.5
DELAY TIME (0-25.5 SEC).............0.0
HOLD-OVER TIME (0-25.5 SEC).........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)...................Y
VEHICLE DETECTOR (1-64).............
PEDESTRIAN DETECTOR (1-16)..........
ALTERNATE PED DETECTOR (1-16).......
PREEMPT (1-10)......................
INVERTED PREEMPT (1-10).............
STOP TIME (Y/N).....................
FLASH SENSE (Y/N)...................
DOOR OPEN (Y/N).....................
MANUAL CONTROL ENABLE (Y/N).........
MANUAL CONTROL ADVANCE (Y/N)........
SPECIAL FUNCTION ALARM (1-8)........
TOD HOUR SYCHRONIZATION (0-23)......
FORCE OFF RING (1-4)................
HOLD PHASES (1-16)..................
PLAN (65=FLSH,66=FREE)..   OFFSET#..
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4)......
CHANGE PHASE CONTROL PAGE (1-4).....
CHANGE OVERLAP CONTROL PAGE (1-4)...
CHANGE INPUT PAGE (1-4).............
CHANGE OUTPUT PAGE (1-4)............
OVERRIDE PHASE CONTROL FUNCTION (Y).
```

PRESS '+' TO ADVANCE TO INPUT 17

```
PAGE: 2 C1 PIN:55  VEHICLE DETECTOR
INPUT ASSIGNMENT #.................17
DEBOUNCE TIME (0-25.5 SEC)..........0.5
DELAY TIME (0-25.5 SEC).............0.0
HOLD-OVER TIME (0-25.5 SEC).........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)...................
VEHICLE DETECTOR (1-64).............5
PEDESTRIAN DETECTOR (1-16)..........
ALTERNATE PED DETECTOR (1-16).......
PREEMPT (1-10)......................
INVERTED PREEMPT (1-10).............
STOP TIME (Y/N).....................
FLASH SENSE (Y/N)...................
DOOR OPEN (Y/N).....................
MANUAL CONTROL ENABLE (Y/N).........
MANUAL CONTROL ADVANCE (Y/N)........
SPECIAL FUNCTION ALARM (1-8)........
TOD HOUR SYCHRONIZATION (0-23)......
FORCE OFF RING (1-4)................
HOLD PHASES (1-16)..................
PLAN (65=FLSH,66=FREE)..   OFFSET#..
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4)......
CHANGE PHASE CONTROL PAGE (1-4).....
CHANGE OVERLAP CONTROL PAGE (1-4)...
CHANGE INPUT PAGE (1-4).............
CHANGE OUTPUT PAGE (1-4)............
OVERRIDE PHASE CONTROL FUNCTION (Y).
```

ENTER '55' TO REASSIGN THE VEHICLE DETECTOR FOR THIS INPUT

(LOOP 5A - PHASE 5)

```
PAGE: 2 C1 PIN:55  VEHICLE DETECTOR
INPUT ASSIGNMENT #.................17
DEBOUNCE TIME (0-25.5 SEC)..........0.5
DELAY TIME (0-25.5 SEC).............0.0
HOLD-OVER TIME (0-25.5 SEC).........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)...................
VEHICLE DETECTOR (1-64).............55
PEDESTRIAN DETECTOR (1-16)..........
ALTERNATE PED DETECTOR (1-16).......
PREEMPT (1-10)......................
INVERTED PREEMPT (1-10).............
STOP TIME (Y/N).....................
FLASH SENSE (Y/N)...................
DOOR OPEN (Y/N).....................
MANUAL CONTROL ENABLE (Y/N).........
MANUAL CONTROL ADVANCE (Y/N)........
SPECIAL FUNCTION ALARM (1-8)........
TOD HOUR SYCHRONIZATION (0-23)......
FORCE OFF RING (1-4)................
HOLD PHASES (1-16)..................
PLAN (65=FLSH,66=FREE)..   OFFSET#..
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4)......
CHANGE PHASE CONTROL PAGE (1-4).....
CHANGE OVERLAP CONTROL PAGE (1-4)...
CHANGE INPUT PAGE (1-4).............
CHANGE OUTPUT PAGE (1-4)............
OVERRIDE PHASE CONTROL FUNCTION (Y).
```

PROGRAMMING COMPLETE

SPECIAL DETECTOR PROGRAMMING DETAIL - LOOP 5A (ALT.)

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS), THEN PRESS '1' FOR VEHICLE DETECTORS. PRESS THE '-' KEY TO GET TO VEHICLE DETECTOR #55.

```
VEHICLE DETECTOR #55  SETTINGS (+-,1-64)
SETTING:                          (Y/N)
ENABLE DETECTOR....................N
ENABLE LOGGING.....................N
ENABLE DIAGNOSTICS.................N
SPEED TRAP.........................N
CALL DETECTOR......................Y
EXTENSION DETECTOR.................Y
MODE 2 STOP BAR....................N
SWITCHING DETECTOR.................N
DUPLICATING DETECTOR...............N
ENABLE FULL TIME DELAY.............N
IF FAILED, SET MIN RECALL?.........N
IF FAILED, SET MAX1 RECALL?........N
IF FAILED, SET MAX2 RECALL?........N
PHASE#          |12345678910111213141516
PHASES ASSIGNED |
SWITCH/DUPLICATE|
LOOP SIZE (0-255 FT)...............6
SPEED TRAP DISTANCE (0-255 FT)......0
STOP BAR TIME (0-255 SEC)...........0
STRETCH (0-25.5 SEC)................0.0
DELAY (0-255 SEC)...................0
MAX CALLS/MIN (0-255)...............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%)..............100
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....0
QUEUE GAP RESET TIME (0-25.5).......0.0
PREEMPTION INDEX FOR QUEUE (0-10)...0
```

ENTER 'Y' FOR ENABLE DETECTOR

ENTER '5' FOR PHASES ASSIGNED

ENSURE DELAY IS '0'

```
VEHICLE DETECTOR #55  SETTINGS (+-,1-64)
SETTING:                          (Y/N)
ENABLE DETECTOR....................Y
ENABLE LOGGING.....................N
ENABLE DIAGNOSTICS.................N
SPEED TRAP.........................N
CALL DETECTOR......................Y
EXTENSION DETECTOR.................Y
MODE 2 STOP BAR....................N
SWITCHING DETECTOR.................N
DUPLICATING DETECTOR...............N
ENABLE FULL TIME DELAY.............N
IF FAILED, SET MIN RECALL?.........N
IF FAILED, SET MAX1 RECALL?........N
IF FAILED, SET MAX2 RECALL?........N
PHASE#          |12345678910111213141516
PHASES ASSIGNED |    X
SWITCH/DUPLICATE|
LOOP SIZE (0-255 FT)...............6
SPEED TRAP DISTANCE (0-255 FT)......0
STOP BAR TIME (0-255 SEC)...........0
STRETCH (0-25.5 SEC)................0.0
DELAY (0-255 SEC)...................0
MAX CALLS/MIN (0-255)...............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%)..............100
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....0
QUEUE GAP RESET TIME (0-25.5).......0.0
PREEMPTION INDEX FOR QUEUE (0-10)...0
```

DETECTOR PROGRAMMING COMPLETE

NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.

NC Dept of Transportation
Division of Highways
Final Drawing Date: 2/18/2020
DocuSigned by: Changsuk Baek
ITS & Signals Unit

THIS ELECTRICAL DETAIL IS FOR THE SIGNAL DESIGN: 07-0547T2&T3
DESIGNED: AUGUST 2019
SEALED: 2/14/2020
REVISED: N/A

Electrical Detail - Temporary Design 2 and 3 - Sheet 4 of 5
Construction Phases 2 and 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for: Mobility and Safety Division, Signals Management Section, Traffic Engineering Branch, Department of Transportation, State of North Carolina
750 N.Greenfield Pkwy,Garner,NC 27529

US 15-501 (Fordham Boulevard)
at
Elliott Road

Division 7 Orange County Chapel Hill

PLAN DATE:	August 2019	REVIEWED BY:	SL Phillips
PREPARED BY:	CR Wong	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACY L. PHILLIPS
DocuSigned by: 2/14/2020
DATE
SIG. INVENTORY NO 07-0547T2&T3

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

2/13/2020 3:10:41 PM Chanlin.Wong K:\RAL_TPTO_SIGNALS\011159028 Elliott Road Extension\54 - Signal Design\3.4 07-0547T2&T3e4.dgn

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PROJECT REFERENCE NO.	SHEET NO.
4th Leg	Sig. 3.5

ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING COORDINATION - SELECT ALL PAGE CHANGES (AS SHOWN BELOW) WITHIN COORDINATION PLAN PROGRAMMING.

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM PAGE CHANGES (SHOWN BELOW) IN SEPARATE TIME OF DAY EVENTS. IF PAGE 1 IS USED, NO EVENT PROGRAMMING IS NECESSARY FOR THAT PARTICULAR PAGE.

PHASING	INPUTS PAGE	OVERLAPS PAGE
ACTIVE PAGES REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PAGES REQUIRED TO RUN ALTERNATE PHASING	2	2

NOTE: PAGES NOT SHOWN (i.e. sequence, phase control, etc.) SHOULD REMAIN AS '1', OR AS DEFINED BY TIMING ENGINEER.

IMPORTANT: IF ALT. PHASING IS USED DURING FREE RUN AND COORDINATION, DO NOT OPERATE TIME OF DAY PAGE CHANGE EVENTS CONCURRENTLY WITH COORDINATION PLAN EVENTS IN THE EVENT SCHEDULER. (EX. FREE RUN PAGE CHANGE EVENT SHOULD END BEFORE COORDINATION PLAN EVENT STARTS AND VICE-VERSA).

ALTERNATE PHASING PAGE CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN THESE OVERLAP/INPUT PAGE CHANGES ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAPS PAGE 2: Modifies overlap parent phases for heads 11 and 51 to run protected turns only.

INPUTS PAGE 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 0 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

NC Dept of Transportation
Division of Highways
Final Drawing Date: 2/18/2020
DocuSigned by: Changsek Baek
ITS & Signals Unit

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0547T2&T3
DESIGNED: AUGUST 2019
SEALED: 2/14/2020
REVISED: N/A

Electrical Detail - Temporary Design 2 and 3 - Sheet 5 of 5
Construction Phases 2 and 3

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

ELECTRICAL AND PROGRAMMING DETAILS FOR:
Prepared for:
Utl Transportation Mobility and Safety Division
Department of Transportation State of North Carolina
Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 15-501 (Fordham Boulevard)
at
Elliott Road

Division 7 Orange County Chapel Hill

PLAN DATE:	August 2019	REVIEWED BY:	SL Phillips
PREPARED BY:	CR Wong	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACY L. PHILLIPS
DocuSigned by: 2/14/2020
DATE
SIG. INVENTORY NO 07-0547T2&T3

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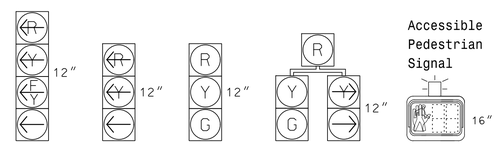
PROJECT REFERENCE NO.	SHEET NO.
4th Leg	Sig. 4.0

SIGNAL FACE I.D.

All Heads L.E.D.



ACCESSIBLE PEDESTRIAN SIGNAL OPERATION

SIGNAL FACE	VOICE	TONES	INTERVAL	SPEECH MESSAGE
P21,P22	-	X	Walk	(Rapid Ticks)
			Flashing Don't Walk / Don't Walk	-
P41,P42	-	X	Walk	(Rapid Ticks)
			Flashing Don't Walk / Don't Walk	-
P61,P62	-	X	Walk	(Rapid Ticks)
			Flashing Don't Walk / Don't Walk	-
P81,P82	-	X	Walk	(Rapid Ticks)
			Flashing Don't Walk / Don't Walk	-

* Volume should be set to 5dB over ambient noise level.

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING						
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	15*	-	-
					6#	Y	Y	Y	-	3	-	-
1B	6X40	0	2-4-2	Y	1	Y	Y	-	-	15	-	-
2A	6X6	300	EXIST	-	2	Y	Y	-	-	-	-	-
2B	6X6	300	EXIST	-	2	Y	Y	-	-	-	-	-
3A	6X40	0	2-4-2	Y	3	Y	Y	-	-	3	-	-
3B	6X40	0	2-4-2	Y	3	Y	Y	-	-	-	-	-
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	-	-
4B @	5X5	0	2-4-2 Diagonal	Y	4	Y	Y	-	-	-	-	-
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	15*	-	-
					2#	Y	Y	Y	-	3	-	-
5B	6X40	0	2-4-2	Y	5	Y	Y	-	-	15	-	-
6A	6X6	300	EXIST	-	6	Y	Y	-	-	-	-	-
6B	6X6	300	EXIST	-	6	Y	Y	-	-	-	-	-
7A	6X40	0	2-4-2	Y	7	Y	Y	-	-	-	-	-
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	-	-	-
8B @	5X5	0	2-4-2 Diagonal	Y	8	Y	Y	-	-	-	-	-

* Disable Delay during Alternate Phasing operation.

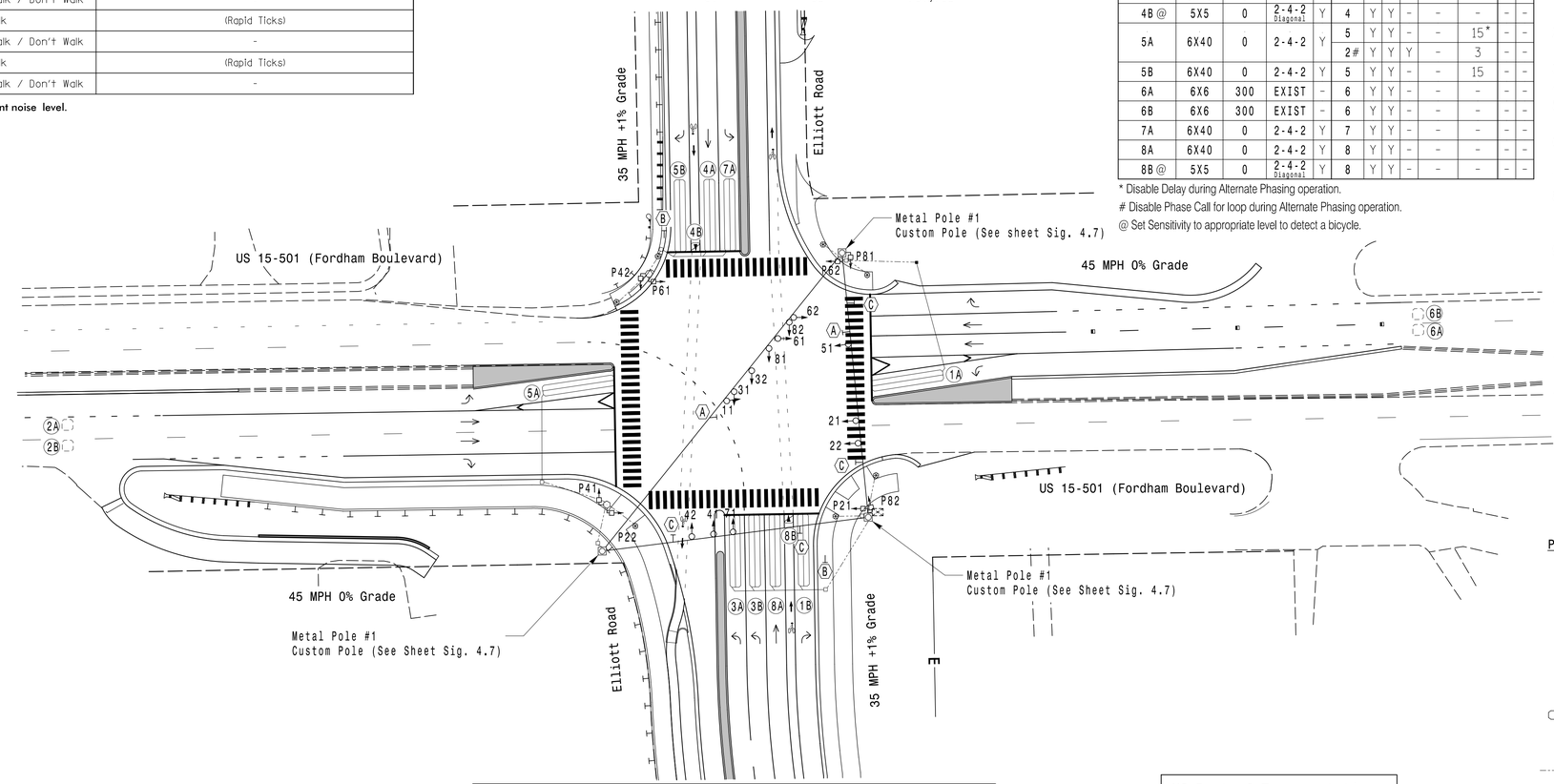
\# Disable Phase Call for loop during Alternate Phasing operation.

@ Set Sensitivity to appropriate level to detect a bicycle.

8 Phase Fully Actuated (Chapel Hill-Carrboro Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018, "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
4. Set all detector units to presence mode.
5. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
6. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
7. Pavement markings are existing, unless otherwise noted.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
9. This intersection features accessible pedestrian signals utilizing a percussive tone walk indication. Refer to section 4E.11 of the 2009 MUTCD for tone rate and frequency requirements.
10. Pedestrian pedestals are conceptual and shown for reference only. See Roadway Standard Drawing 1705.04 for pushbuttons locations details.
11. The Division (Town) Traffic Engineer will determine the hours of use for each phasing plan.
12. Paint new bicycle markings (as shown on page 9C.05 of the 2009 edition of the MUTCD) in the center of new loops 4B and 8B.



LEGEND

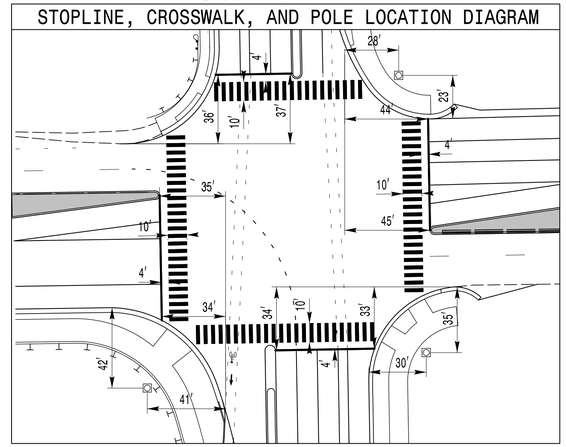
PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Type I Pushbutton Post	
	Type II Signal Pedestal	
	Metal Strain Pole	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
—E—	Easement	—E—
	Directional Arrow	
	Bicycle Markings	
Ⓐ	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	Ⓐ
Ⓑ	"TO REQUEST GREEN WAIT ON LINE" Sign (R10-22)	Ⓑ
Ⓒ	Street Sign (D3-1)	Ⓒ

OASIS 2070 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	12	7	7	7	12	7	7
Extension 1 *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max Green 1 *	25	60	20	40	25	60	20	40
Yellow Clearance	3.0	4.5	3.0	3.8	3.0	4.5	3.0	3.8
Red Clearance	3.4	2.0	3.6	2.7	3.3	2.0	3.4	2.7
Walk 1 *	-	7	-	7	-	7	-	7
Don't Walk 1	-	29	-	30	-	23	-	27
Seconds Per Actuation *	-	1.5	-	-	-	1.5	-	-
Max Variable Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	45	-	-	-	45	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

STOPLINE, CROSSWALK, AND POLE LOCATION DIAGRAM



NC Dept of Transportation
Division of Highways
Final Drawing Date: 2/18/2020
DocuSigned by: Changsek Baek
ITS & Signals Unit

Signal Upgrade - Final Design
Sheet 1 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared In the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 15-501 (Fordham Boulevard) at Elliott Road

Division 7 Orange County Chapel Hill

PLAN DATE: August 2019 REVIEWED BY: SL Phillips
PREPARED BY: CR Wong REVIEWED BY:

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACIE L. PHILLIPS
DocuSigned by: 2/14/2020
DOCTORING SIGNATURE DATE
SIG. INVENTORY NO. 07-0547

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

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2/13/2020 3:10:47 PM Chanlin.Wong

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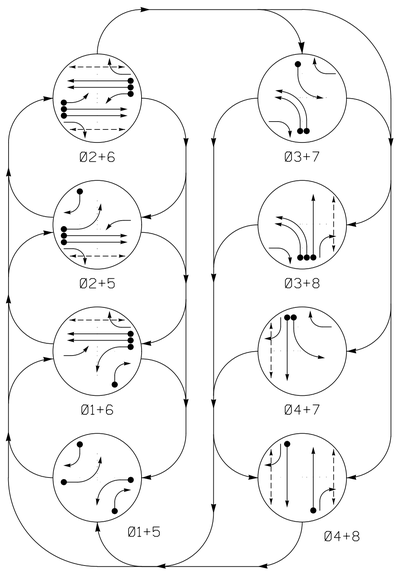
PROJECT REFERENCE NO.	SHEET NO.
4th Leg	Sig 4.1

DEFAULT PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

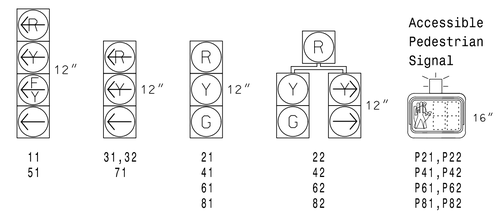
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

DEFAULT TABLE OF OPERATION

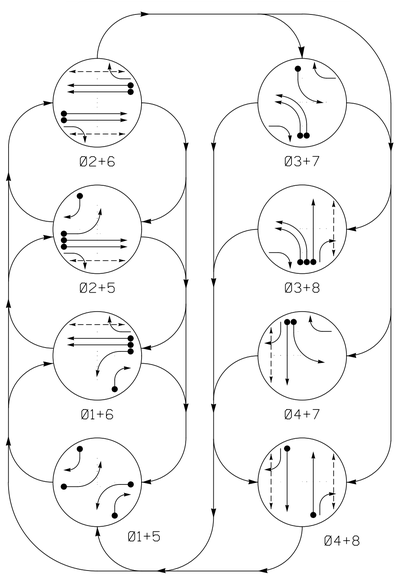
SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	FLASH
11	↚	↚	F̸Y	F̸Y	R̸	R̸	R̸	R̸	Y̸
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R̸/→	R̸/→	R	R	Y
31,32	R̸	R̸	R̸	R̸	↚	↚	R̸	R̸	R̸
41	R	R	R	R	R	R	G	G	R
42	R̸/→	R	R̸/→	R	R	R	G	G	R
51	↚	F̸Y	↚	F̸Y	R̸	R̸	R̸	R̸	Y̸
61	R	G	R	G	R	R	R	R	Y
62	R	G	R	G	R̸/→	R	R̸/→	R	Y
71	R̸	R̸	R̸	R̸	↚	R̸	↚	R̸	R̸
81	R	R	R	R	R	G	R	G	R
82	R̸/→	R̸/→	R	R	R	G	R	G	R
P21,P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41,P42	DW	DW	DW	DW	DW	DW	W	W	DRK
P61,P62	DW	W	DW	W	DW	DW	DW	DW	DRK
P81,P82	DW	DW	DW	DW	DW	W	DW	W	DRK

SIGNAL FACE I.D.

All Heads L.E.D.



ALTERNATE PHASING DIAGRAM



ALTERNATE TABLE OF OPERATION

SIGNAL FACE	PHASE Ø1+5	Ø1+6	Ø2+5	Ø2+6	Ø3+7	Ø3+8	Ø4+7	Ø4+8	FLASH
11	↚	↚	R̸	R̸	R̸	R̸	R̸	R̸	Y̸
21	R	R	G	G	R	R	R	R	Y
22	R	R	G	G	R̸/→	R̸/→	R	R	Y
31,32	R̸	R̸	R̸	R̸	↚	↚	R̸	R̸	R̸
41	R	R	R	R	R	R	G	G	R
42	R̸/→	R	R̸/→	R	R	R	G	G	R
51	↚	R̸	↚	R̸	R̸	R̸	R̸	R̸	Y̸
61	R	G	R	G	R	R	R	R	Y
62	R	G	R	G	R̸/→	R	R̸/→	R	Y
71	R̸	R̸	R̸	R̸	↚	R̸	↚	R̸	R̸
81	R	R	R	R	R	G	R	G	R
82	R̸/→	R̸/→	R	R	R	G	R	G	R
P21,P22	DW	DW	W	W	DW	DW	DW	DW	DRK
P41,P42	DW	DW	DW	DW	DW	DW	W	W	DRK
P61,P62	DW	W	DW	W	DW	DW	DW	DW	DRK
P81,P82	DW	DW	DW	DW	DW	W	DW	W	DRK

8 Phase
Fully Actuated
(Chapel Hill-Carrboro Signal System)

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018, "Standard Specifications for Roads and Structures" dated January 2018.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or phase 5 may be lagged.
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8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values shall supersede these values.
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10. Pedestrian pedestals are conceptual and shown for reference only. See Roadway Standard Drawing 1705.04 for pushbuttons locations details.
11. The Division (Town) Traffic Engineer will determine the hours of use for each phasing plan.
12. Paint new bicycle markings (as shown on page 9C.05 of the 2009 edition of the MUTCD) in the center of new loops 4B and 8B.

NC Dept of Transportation
Division of Highways
Final Drawing Date: 2/18/2020
DocuSigned by:
Changsek Park
ITS & Signals Unit

Signal Upgrade - Final Design
Sheet 2 of 2

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Prepared In the Offices of:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

SCALE 0 40 1"=40'

US 15-501 (Fordham Boulevard)
at
Elliott Road

Division 7 Orange County Chapel Hill

PLAN DATE: August 2019	REVIEWED BY: SL Phillips
PREPARED BY: CR Wong	REVIEWED BY:

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACIE L. PHILLIPS

DocuSigned by:
2/14/2020
DOCTAPE4D0A0F4... SIGNATURE DATE

SIG. INVENTORY NO. 07-0547

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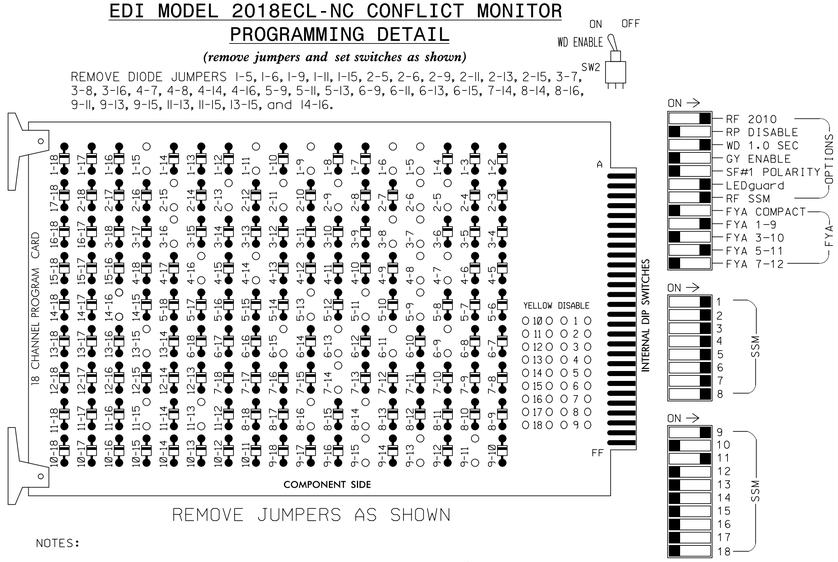
PROJECT REFERENCE NO.	SHEET NO.
4th Leg	Sig. 4.2

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 1-5, 1-6, 1-9, 1-11, 1-15, 2-5, 2-6, 2-9, 2-11, 2-13, 2-15, 3-7, 3-8, 3-16, 4-7, 4-8, 4-14, 4-16, 5-9, 5-11, 5-13, 6-9, 6-11, 6-13, 6-15, 7-14, 8-14, 8-16, 9-11, 9-13, 9-15, 11-13, 11-15, 13-15, and 14-16.



REMOVE JUMPERS AS SHOWN

NOTES:

1. Card is provided with all diode jumpers in place. Removal of any jumper allows its channels to run concurrently.
2. Ensure jumpers SEL2-SEL5 and SEL9 are present on the monitor board.
3. Ensure that Red Enable is active at all times during normal operation.
4. Connect serial cable from conflict monitor to comm. port 1 of 2070 controller. Ensure conflict monitor communicates with 2070.

SIGNAL HEAD HOOK-UP CHART

LOAD SWITCH NO.	S1		S2	S3	S4		S5	S6	S7		S8	S9	S10		S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1		2	13	3		4	14	5		6	15	7		8	16	9	10	17	11	12	18
PHASE	1		2	2 PED	3		4	4 PED	5		6	6 PED	7		8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	11★	82	21,22	P21, P22	22	31,32	41,42	P41, P42	42	51★	61,62	P61, P62	62	71	81,82	P81, P82	11★	NU	NU	51★	NU	NU
RED		✳	128				101		✳		134				107							
YELLOW			129				102				135				108							
GREEN			130				103				136				109							
RED ARROW						116								122			A121			A114		
YELLOW ARROW		126			117	117			132				123	123			A122			A115		
FLASHING YELLOW ARROW																	A123			A116		
GREEN ARROW	127	127			118	118			133	133			124	124								
✋				113				104				119				110						
🚶				115				106				121				112						

NU = Not Used

✳ Denotes install load resistor. See load resistor installation detail this sheet.

★ See pictorial of head wiring in detail below.

NOTES

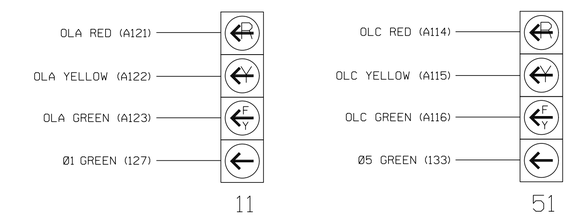
1. To prevent "flash-conflict" problems, insert red flash program blocks for all unused vehicle load switches in the output file. The installer shall verify that signal heads flash in accordance with the Signal Plans.
2. Enable Simultaneous Gap-Out for all Phases.
3. Program phases 2 and 6 for Variable Initial and Gap Reduction.
4. Program phases 2 and 6 for Startup In Green.
5. Program phases 2, 4, 6, and 8 for Startup Ped Call.
6. Program phases 2 and 6 for Yellow Flash, and overlaps 1 and 2 as Wag Overlaps.
7. The cabinet and controller are part of the Chapel Hill - Carrboro Signal System.

EQUIPMENT INFORMATION

CONTROLLER.....2070
CABINET.....332 W/ AUX
SOFTWARE.....ECONOLITE OASIS
CABINET MOUNT.....BASE
OUTPUT FILE POSITIONS...18 WITH AUX. OUTPUT FILE
LOAD SWITCHES USED.....S1,S2,S3,S4,S5,S6,S7,S8,S9,S10, S11,S12,AUX S1,AUX S4
PHASES USED.....1,2,2PED,3,4,4PED,5,6,6PED,7,8,8PED
OVERLAP "A".....1+2
OVERLAP "B".....NOT USED
OVERLAP "C".....5+6
OVERLAP "D".....NOT USED

FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

The sequence display for signal heads 11 and 51 require special logic programming. See sheet 2 for programming instructions.

INPUT FILE POSITION LAYOUT

(front view)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FILE "I"	U	Ø1	Ø2	SLOT EMPTY	WIRED INPUT ⊗	Ø3	Ø4	Ø1	SLOT EMPTY	Ø3	SLOT EMPTY	SLOT EMPTY	Ø2 PED DC ISOLATOR	Ø6 PED DC ISOLATOR	FS DC ISOLATOR
	L	1A NOT USED	2A Ø2 2B			3A NOT USED	4A Ø4 4B	1B NOT USED		3B NOT USED			Ø4 PED DC ISOLATOR	Ø8 PED DC ISOLATOR	ST DC ISOLATOR
FILE "J"	U	Ø5	Ø6	SLOT EMPTY	WIRED INPUT ⊗	Ø7	Ø8	Ø5	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY	SLOT EMPTY
	L	5A NOT USED	6A Ø6 6B			7A NOT USED	8A Ø8 8B	5B NOT USED							

EX.: 1A, 2A, ETC. = LOOP NO.'S

FS = FLASH SENSE
ST = STOP TIME

INPUT FILE CONNECTION & PROGRAMMING CHART

LOOP NO.	LOOP TERMINAL	INPUT FILE POS.	PIN NO.	INPUT ASSIGNMENT NO.	DETECTOR NO.	NEMA PHASE	CALL	EXTEND	FULL TIME DELAY	STRETCH TIME	DELAY TIME
1A[1]	TB2-1,2	I1U	56	18	1	1	Y	Y			15
	-	J4U	48	10★	26	6	Y	Y	Y		3
	-	I1U	56	18★	51	1	Y	Y			
1B	TB6-1,2	I7U	65	27	34	1	Y	Y			15
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
2B	TB2-7,8	I2L	43	5	12	2	Y	Y			
3A	TB4-5,6	I5U	58	20	3	3	Y	Y			3
3B	TB6-9,10	I9U	60	22	11	3	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
5A[2]	TB3-1,2	J1U	55	17	5	5	Y	Y			15
	-	I4U	47	9★	22	2	Y	Y	Y		3
	-	J1U	55	17★	55	5	Y	Y			
5B	TB7-1,2	J7U	66	28	38	5	Y	Y			15
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
7A	TB5-5,6	J5U	57	19	7	7	Y	Y			
8A	TB5-9,10	J6U	42	4	8	8	Y	Y			
8B	TB5-11,12	J6L	46	8	18	8	Y	Y			

[1] Add jumper from I1-W to J4-W, on rear of input file.
[2] Add jumper from J1-W to I4-W, on rear of input file.
★ See Input Page Assignment programming details on sheets 3 and 4.

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

NC Dept of Transportation
Division of Highways
Final Drawing Date: 2/18/2020
DocuSigned by: Changsek Baik
ITS & Signals Unit

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0547
DESIGNED: AUGUST 2019
SEALED: 2/14/2020
REVISED: N/A

REMOVE!! LOAD RESISTOR INSTALLATION DETAIL

(install resistor as shown below)

ACCEPTABLE VALUES

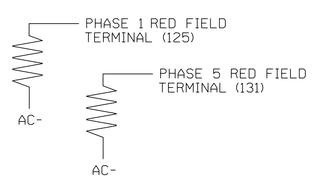
VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)

LOAD RESISTOR INSTALLATION DETAIL

(install resistors as shown below)

ACCEPTABLE VALUES

VALUE (ohms)	WATTAGE
1.5K - 1.9K	25W (min)
2.0K - 3.0K	10W (min)



COUNTDOWN PEDESTRIAN SIGNAL OPERATION

Countdown Ped Signals are required to display timing only during Ped Clearance Interval. Consult Ped Signal Module user's manual for instructions on selecting this feature.

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Electrical Detail - Sheet 1 of 5
Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for: Traffic Engineering Mobility and Safety Division, Traffic Signal Management Section, Department of Transportation, State of North Carolina
750 N.Greenfield Pkwy,Garner,NC 27529

US 15-501 (Fordham Boulevard) at Elliott Road

Division 7 | Orange County | Chapel Hill

PLAN DATE: August 2019	REVIEWED BY: SL Phillips		
PREPARED BY: CR Wong	REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACE L. PHILLIPS
DocuSigned by: 2/14/2020
DOT ENGINEER SIGNATURE DATE
SIG. INVENTORY NO. 07-0547

K:\RAL_TPTO_SIGNALS\01159028 Elliott Road Extension\S4 - Signal Design\4.2 07-0547el.dgn 3:10:50 PM Chanlin.Wong 2/13/2020

DocuSign Envelope ID: 2DEF9DEA-D5E6-4869-8B55-A17CFD2A3FD7

PROJECT REFERENCE NO.	SHEET NO.
4th Leg	Sig. 4.3

LOGICAL I/O PROCESSOR PROGRAMMING DETAIL TO PRODUCE SPECIAL FYA-PPLT SIGNAL SEQUENCE

(program controller as shown below)

1. FROM MAIN MENU PRESS '2' (PHASE CONTROL), THEN '1' (PHASE CONTROL FUNCTIONS). SCROLL TO THE BOTTOM OF THE MENU AND ENABLE ACT LOGIC COMMANDS 1, 2, 3, 4, 5, AND 6.

2. FROM MAIN MENU PRESS '6' (OUTPUTS), THEN '3' (LOGICAL I/O PROCESSOR).

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE        #1  IS ON
AND RED CLEAR ON PHASE  #1  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #50 ON
SET OUTPUT  ASSIGNMENT #51 OFF
```

NOTE: LOGIC FOR PHASE 1 RED CLEAR WHEN TRANSITIONING FROM PHASE 1 TO PHASE 2 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE        #1  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 1 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE     #1  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 1 (HEAD 11).

PRESS '+'

```
LOGICAL I/O COMMAND #4  (+/-COMMAND#)
IF  ACTIVE PHASE        #5  IS ON
AND RED CLEAR ON PHASE  #5  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #42 ON
SET OUTPUT  ASSIGNMENT #43 OFF
```

NOTE: LOGIC FOR PHASE 5 RED CLEAR WHEN TRANSITIONING FROM PHASE 5 TO PHASE 6 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #5  (+/-COMMAND#)
IF  ACTIVE PHASE        #5  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #44 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 5 (HEAD 51).

PRESS '+'

```
LOGICAL I/O COMMAND #6  (+/-COMMAND#)
IF  YELLOW ON PHASE     #5  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #43 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 5 (HEAD 51).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

USE TO INTERPRET LOGIC PROCESSOR

OUTPUT 42 = Overlap C Red
OUTPUT 43 = Overlap C Yellow
OUTPUT 44 = Overlap C Green
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

ACCESSIBLE PEDESTRIAN SIGNAL (APS) INSTALLATION NOTES

1. Install push buttons and APS equipment per manufacturer's instructions.
2. Provide a dedicated cable to each push button per manufacturer's instructions.
3. If APS equipment is mounted in cabinet, use filtered power (i.e., Controller Receptacle) to power APS equipment. Do not use Equipment Receptacle, which is a GFCI outlet.
4. Never attempt to operate a standard contact closure push button with the APS system unless cabinet is re-wired for standard button operation or unless explicitly allowed by the manufacturer.
5. Place manufacturer's instructions in cabinet with cabinet prints, signal plans, and electrical details.

OVERLAP PROGRAMMING DETAIL FOR DEFAULT PHASING

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS).

```
PAGE 1: VEHICLE OVERLAP 'A' SETTINGS
PHASE:          |123456789101112131415 16
VEH OVL PARENTS:|XX
VEH OVL NOT VEH:|
VEH OVL NOT PED:|
VEH OVL GRN EXT:|
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

← NOTICE GREEN FLASH

PRESS '+' TWICE

```
PAGE 1: VEHICLE OVERLAP 'C' SETTINGS
PHASE:          |123456789101112131415 16
VEH OVL PARENTS:|   XX
VEH OVL NOT VEH:|
VEH OVL NOT PED:|
VEH OVL GRN EXT:|
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  X GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

← NOTICE GREEN FLASH

OVERLAP PROGRAMMING COMPLETE

OVERLAP PROGRAMMING DETAIL FOR ALTERNATE PHASING

(program controller as shown below)

FROM MAIN MENU PRESS '8' (OVERLAPS), THEN '1' (VEHICLE OVERLAP SETTINGS). PRESS 'NEXT' TO ADVANCE TO PAGE 2.

NOTICE PAGE 2 →

```
PAGE 2: VEHICLE OVERLAP 'A' SETTINGS
PHASE:          |123456789101112131415 16
VEH OVL PARENTS:|X
VEH OVL NOT VEH:|
VEH OVL NOT PED:|
VEH OVL GRN EXT:|
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  _ GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

PRESS '+' TWICE

NOTICE PAGE 2 →

```
PAGE 2: VEHICLE OVERLAP 'C' SETTINGS
PHASE:          |123456789101112131415 16
VEH OVL PARENTS:|    X
VEH OVL NOT VEH:|
VEH OVL NOT PED:|
VEH OVL GRN EXT:|
STARTUP COLOR: _ RED  _ YELLOW  _ GREEN
FLASH COLORS:  _ RED  _ YELLOW  _ GREEN
SELECT VEHICLE OVERLAP OPTIONS:   (Y/N)
FLASH YELLOW IN CONTROLLER FLASH?...Y
GREEN EXTENSION (0-255 SEC).........0
YELLOW CLEAR (0=PARENT,3-25.5 SEC)..0.0
RED CLEAR (0=PARENT,0.1-25.5 SEC)...0.0
OUTPUT AS PHASE # (0=NONE, 1-16)....0
```

OVERLAP PROGRAMMING COMPLETE

NC Dept of Transportation
Division of Highways
Final Drawing Date: 2/18/2020
DocuSigned by: Changseok Baek
ITS & Signals Unit

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0547
DESIGNED: AUGUST 2019
SEALED: 2/14/2020
REVISED: N/A

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Electrical Detail - Sheet 2 of 5
Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for: N.C. Transportation Mobility and Safety Division, Department of North Carolina, Department of Transportation, ITS & Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 15-501 (Fordham Boulevard) at Elliott Road

Division 7	Orange County	Chapel Hill
PLAN DATE: August 2019	REVIEWED BY: SL Phillips	
PREPARED BY: CR Wong	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACIE L. PHILLIPS

DocuSigned by: 2/14/2020
DC87A3GEDC0B43T...
SIGNATURE DATE

SIG. INVENTORY NO. 07-0547

DocuSign Envelope ID: 2DEF9DEA-D5E6-4869-8B55-A17CFD2A3FD7

PROJECT REFERENCE NO.	SHEET NO.
4th Leg	Sig. 4.4

INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 1A

(program controller as shown below)

NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION.

2. THE FIRST TASK THIS PROGRAMMING ACCOMPLISHES IS THE DISABLING OF INPUT #10 (DETECTOR 26) SO THAT A VEHICLE CALL WILL NOT BE PLACED TO PHASE 6 DURING ALTERNATE PHASING OPERATION. THE SECOND TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 51 TO INPUT #18 SO THAT THE DELAY ON LOOP 1A CAN BE REDUCED FROM 15 SECONDS TO 0 SECONDS.

FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 10 IS REACHED.

```
PAGE: 2 C1 PIN:48  VEHICLE DETECTOR
INPUT ASSIGNMENT #.................10
DEBOUNCE TIME (0-25.5 SEC).........0.5
DELAY TIME (0-25.5 SEC)............0.0
HOLD-OVER TIME (0-25.5 SEC)........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)..................Y
VEHICLE DETECTOR (1-64)............26
PEDESTRIAN DETECTOR (1-16).........
ALTERNATE PED DETECTOR (1-16)......
PREEMPT (1-10).....................
INVERTED PREEMPT (1-10)............
STOP TIME (Y/N)....................
FLASH SENSE (Y/N)..................
DOOR OPEN (Y/N)....................
MANUAL CONTROL ENABLE (Y/N)........
MANUAL CONTROL ADVANCE (Y/N)       .
SPECIAL FUNCTION ALARM (1-8)       .
TOD HOUR SYCHRONIZATION (0-23)     .
FORCE OFF RING (1-4)              .
HOLD PHASES (1-16)                .
PLAN (65=FLSH,66=FREE)..  OFFSET#..
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4)     .
CHANGE PHASE CONTROL PAGE (1-4)    .
CHANGE OVERLAP CONTROL PAGE (1-4)  .
CHANGE INPUT PAGE (1-4)           .
CHANGE OUTPUT PAGE (1-4)          .
OVERRIDE PHASE CONTROL FUNCTION (Y).
```

ENTER A 'Y' FOR NOT ENABLED

DEFAULT DETECTOR NUMBER WILL REMAIN UNTIL 'NOT ENABLED' IS ENTERED.

(LOOP 1A - PHASE 6)

```
PAGE: 2 C1 PIN:48  NOT ENABLED
INPUT ASSIGNMENT #.................10
DEBOUNCE TIME (0-25.5 SEC).........0.5
DELAY TIME (0-25.5 SEC)............0.0
HOLD-OVER TIME (0-25.5 SEC)........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)..................Y
VEHICLE DETECTOR (1-64)............
PEDESTRIAN DETECTOR (1-16)         .
ALTERNATE PED DETECTOR (1-16)      .
PREEMPT (1-10)                     .
INVERTED PREEMPT (1-10)            .
STOP TIME (Y/N)                    .
FLASH SENSE (Y/N)                  .
DOOR OPEN (Y/N)                    .
MANUAL CONTROL ENABLE (Y/N)        .
MANUAL CONTROL ADVANCE (Y/N)       .
SPECIAL FUNCTION ALARM (1-8)       .
TOD HOUR SYCHRONIZATION (0-23)     .
FORCE OFF RING (1-4)              .
HOLD PHASES (1-16)                .
PLAN (65=FLSH,66=FREE)..  OFFSET#..
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4)     .
CHANGE PHASE CONTROL PAGE (1-4)    .
CHANGE OVERLAP CONTROL PAGE (1-4)  .
CHANGE INPUT PAGE (1-4)           .
CHANGE OUTPUT PAGE (1-4)          .
OVERRIDE PHASE CONTROL FUNCTION (Y).
```

PRESS '+' TO ADVANCE TO INPUT 18

```
PAGE: 2 C1 PIN:56  VEHICLE DETECTOR
INPUT ASSIGNMENT #.................18
DEBOUNCE TIME (0-25.5 SEC).........0.5
DELAY TIME (0-25.5 SEC)............0.0
HOLD-OVER TIME (0-25.5 SEC)........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)                  .
VEHICLE DETECTOR (1-64)............1
PEDESTRIAN DETECTOR (1-16)         .
ALTERNATE PED DETECTOR (1-16)      .
PREEMPT (1-10)                     .
INVERTED PREEMPT (1-10)            .
STOP TIME (Y/N)                    .
FLASH SENSE (Y/N)                  .
DOOR OPEN (Y/N)                    .
MANUAL CONTROL ENABLE (Y/N)        .
MANUAL CONTROL ADVANCE (Y/N)       .
SPECIAL FUNCTION ALARM (1-8)       .
TOD HOUR SYCHRONIZATION (0-23)     .
FORCE OFF RING (1-4)              .
HOLD PHASES (1-16)                .
PLAN (65=FLSH,66=FREE)..  OFFSET#..
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4)     .
CHANGE PHASE CONTROL PAGE (1-4)    .
CHANGE OVERLAP CONTROL PAGE (1-4)  .
CHANGE INPUT PAGE (1-4)           .
CHANGE OUTPUT PAGE (1-4)          .
OVERRIDE PHASE CONTROL FUNCTION (Y).
```

ENTER '51' TO REASSIGN THE VEHICLE DETECTOR FOR THIS INPUT

(LOOP 1A - PHASE 1)

```
PAGE: 2 C1 PIN:56  VEHICLE DETECTOR
INPUT ASSIGNMENT #.................18
DEBOUNCE TIME (0-25.5 SEC).........0.5
DELAY TIME (0-25.5 SEC)............0.0
HOLD-OVER TIME (0-25.5 SEC)........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)                  .
VEHICLE DETECTOR (1-64)............51
PEDESTRIAN DETECTOR (1-16)         .
ALTERNATE PED DETECTOR (1-16)      .
PREEMPT (1-10)                     .
INVERTED PREEMPT (1-10)            .
STOP TIME (Y/N)                    .
FLASH SENSE (Y/N)                  .
DOOR OPEN (Y/N)                    .
MANUAL CONTROL ENABLE (Y/N)        .
MANUAL CONTROL ADVANCE (Y/N)       .
SPECIAL FUNCTION ALARM (1-8)       .
TOD HOUR SYCHRONIZATION (0-23)     .
FORCE OFF RING (1-4)              .
HOLD PHASES (1-16)                .
PLAN (65=FLSH,66=FREE)..  OFFSET#..
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4)     .
CHANGE PHASE CONTROL PAGE (1-4)    .
CHANGE OVERLAP CONTROL PAGE (1-4)  .
CHANGE INPUT PAGE (1-4)           .
CHANGE OUTPUT PAGE (1-4)          .
OVERRIDE PHASE CONTROL FUNCTION (Y).
```

PROGRAMMING COMPLETE

SPECIAL DETECTOR PROGRAMMING DETAIL - LOOP 1A (ALT.)

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS), THEN PRESS '1' FOR VEHICLE DETECTORS. PRESS THE '-' KEY TO GET TO VEHICLE DETECTOR #51.

```
VEHICLE DETECTOR #51  SETTINGS (+-,1-64)
SETTING:                          (Y/N)
ENABLE DETECTOR....................N
ENABLE LOGGING.....................N
ENABLE DIAGNOSTICS.................N
SPEED TRAP.........................N
CALL DETECTOR......................Y
EXTENSION DETECTOR.................Y
MODE 2 STOP BAR....................N
SWITCHING DETECTOR.................N
DUPLICATING DETECTOR...............N
ENABLE FULL TIME DELAY.............N
IF FAILED, SET MIN RECALL?.........N
IF FAILED, SET MAX1 RECALL?........N
IF FAILED, SET MAX2 RECALL?........N
PHASE#            ¦123456789101112131415 16
PHASES ASSIGNED   ¦
SWITCH/DUPLICATE  ¦
LOOP SIZE (0-255 FT)...............6
SPEED TRAP DISTANCE (0-255 FT)......0
STOP BAR TIME (0-255 SEC)...........0
STRETCH (0-25.5 SEC)................0.0
DELAY (0-255 SEC)...................0
MAX CALLS/MIN (0-255)..............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%).............100
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....0
QUEUE GAP RESET TIME (0-25.5)......0.0
PREEMPTION INDEX FOR QUEUE (0-10)...0
```

ENTER 'Y' FOR ENABLE DETECTOR

ENTER '1' FOR PHASES ASSIGNED

ENSURE DELAY IS '0'

```
VEHICLE DETECTOR #51  SETTINGS (+-,1-64)
SETTING:                          (Y/N)
ENABLE DETECTOR....................Y
ENABLE LOGGING.....................N
ENABLE DIAGNOSTICS.................N
SPEED TRAP.........................N
CALL DETECTOR......................Y
EXTENSION DETECTOR.................Y
MODE 2 STOP BAR....................N
SWITCHING DETECTOR.................N
DUPLICATING DETECTOR...............N
ENABLE FULL TIME DELAY.............N
IF FAILED, SET MIN RECALL?.........N
IF FAILED, SET MAX1 RECALL?........N
IF FAILED, SET MAX2 RECALL?........N
PHASE#            ¦123456789101112131415 16
PHASES ASSIGNED   ¦X
SWITCH/DUPLICATE  ¦
LOOP SIZE (0-255 FT)...............6
SPEED TRAP DISTANCE (0-255 FT)......0
STOP BAR TIME (0-255 SEC)...........0
STRETCH (0-25.5 SEC)................0.0
DELAY (0-255 SEC)...................0
MAX CALLS/MIN (0-255)..............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%).............100
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....0
QUEUE GAP RESET TIME (0-25.5)......0.0
PREEMPTION INDEX FOR QUEUE (0-10)...0
```

DETECTOR PROGRAMMING COMPLETE

NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.

NC Dept of Transportation
Division of Highways
Final Drawing Date: 2/18/2020
DocuSigned by:
Chanseok Park
ITS & Signals Unit

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0547
DESIGNED: AUGUST 2019
SEALED: 2/14/2020
REVISED: N/A

Electrical Detail - Sheet 3 of 5
Final Design

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for:
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION Mobility and Safety Division ITS & Signals Management Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 15-501 (Fordham Boulevard)
at
Elliott Road

Division 7 | Orange County | Chapel Hill

PLAN DATE:	August 2019	REVIEWED BY:	SL Phillips
PREPARED BY:	CR Wong	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACIE L. PHILLIPS
DocuSigned by:
2/14/2020
0CB7A58ED0B437...
SIGNATURE DATE
SIG. INVENTORY NO. 07-0547

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

2/13/2020 3:10:54 PM Chanlin.Wong K:\MAL_TPTO_SIGNALS\07115\9028 Elliott Road Extension\S4 - Signal Design\4.4 07-0547e3.dgn

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PROJECT REFERENCE NO.	SHEET NO.
4th Leg	Sig. 4.5

INPUT PAGE 2 ASSIGNMENT PROGRAMMING DETAIL FOR ALTERNATE PHASING - LOOP 5A

(program controller as shown below)

NOTES: 1. THIS PROGRAMMING APPLIES FOR INPUT PAGE 2 ONLY. INPUT PAGE 1 WILL USE STANDARD DEFAULT SETTINGS. THIS PROGRAMMING IS NECESSARY FOR PROPER DETECTOR OPERATION DURING ALTERNATE PHASING OPERATION.

2. THE FIRST TASK THIS PROGRAMMING ACCOMPLISHES IS THE DISABLING OF INPUT #9 (DETECTOR 22) SO THAT A VEHICLE CALL WILL NOT BE PLACED TO PHASE 2 DURING ALTERNATE PHASING OPERATION. THE SECOND TASK THIS PROGRAMMING ACCOMPLISHES IS THAT IT REASSIGNS DETECTOR 55 TO INPUT #17 SO THAT THE DELAY ON LOOP 5A CAN BE REDUCED FROM 15 SECONDS TO 0 SECONDS.

FROM MAIN MENU PRESS '5' (INPUTS), THEN PRESS 'NEXT' TO GET TO INPUT PAGE '2'. PRESS THE '+' KEY UNTIL INPUT 9 IS REACHED.

```
PAGE: 2 C1 PIN:47  VEHICLE DETECTOR
INPUT ASSIGNMENT #.................9
DEBOUNCE TIME (0-25.5 SEC).........0.5
DELAY TIME (0-25.5 SEC)............0.0
HOLD-OVER TIME (0-25.5 SEC)........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)..................Y
VEHICLE DETECTOR (1-64)............22
PEDESTRIAN DETECTOR (1-16).........
ALTERNATE PED DETECTOR (1-16)......
PREEMPT (1-10).....................
INVERTED PREEMPT (1-10)............
STOP TIME (Y/N)....................
FLASH SENSE (Y/N)..................
DOOR OPEN (Y/N)....................
MANUAL CONTROL ENABLE (Y/N)........
MANUAL CONTROL ADVANCE (Y/N)......
SPECIAL FUNCTION ALARM (1-8).......
TOD HOUR SYCHRONIZATION (0-23).....
FORCE OFF RING (1-4)...............
HOLD PHASES (1-16).................
PLAN (65=FLSH,66=FREE)..  OFFSET#..
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4).....
CHANGE PHASE CONTROL PAGE (1-4)....
CHANGE OVERLAP CONTROL PAGE (1-4)...
CHANGE INPUT PAGE (1-4)............
CHANGE OUTPUT PAGE (1-4)...........
OVERRIDE PHASE CONTROL FUNCTION (Y).
```

ENTER A 'Y' FOR NOT ENABLED

DEFAULT DETECTOR NUMBER WILL REMAIN UNTIL 'NOT ENABLED' IS ENTERED.

(LOOP 5A - PHASE 2)

```
PAGE: 2 C1 PIN:47  NOT ENABLED
INPUT ASSIGNMENT #.................9
DEBOUNCE TIME (0-25.5 SEC).........0.5
DELAY TIME (0-25.5 SEC)............0.0
HOLD-OVER TIME (0-25.5 SEC)........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)..................Y
VEHICLE DETECTOR (1-64)............
PEDESTRIAN DETECTOR (1-16).........
ALTERNATE PED DETECTOR (1-16)......
PREEMPT (1-10).....................
INVERTED PREEMPT (1-10)............
STOP TIME (Y/N)....................
FLASH SENSE (Y/N)..................
DOOR OPEN (Y/N)....................
MANUAL CONTROL ENABLE (Y/N)........
MANUAL CONTROL ADVANCE (Y/N)......
SPECIAL FUNCTION ALARM (1-8).......
TOD HOUR SYCHRONIZATION (0-23).....
FORCE OFF RING (1-4)...............
HOLD PHASES (1-16).................
PLAN (65=FLSH,66=FREE)..  OFFSET#..
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4).....
CHANGE PHASE CONTROL PAGE (1-4)....
CHANGE OVERLAP CONTROL PAGE (1-4)...
CHANGE INPUT PAGE (1-4)............
CHANGE OUTPUT PAGE (1-4)...........
OVERRIDE PHASE CONTROL FUNCTION (Y).
```

PRESS '+' TO ADVANCE TO INPUT 17

```
PAGE: 2 C1 PIN:55  VEHICLE DETECTOR
INPUT ASSIGNMENT #.................17
DEBOUNCE TIME (0-25.5 SEC).........0.5
DELAY TIME (0-25.5 SEC)............0.0
HOLD-OVER TIME (0-25.5 SEC)........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)..................
VEHICLE DETECTOR (1-64)............5
PEDESTRIAN DETECTOR (1-16).........
ALTERNATE PED DETECTOR (1-16)......
PREEMPT (1-10).....................
INVERTED PREEMPT (1-10)............
STOP TIME (Y/N)....................
FLASH SENSE (Y/N)..................
DOOR OPEN (Y/N)....................
MANUAL CONTROL ENABLE (Y/N)........
MANUAL CONTROL ADVANCE (Y/N)......
SPECIAL FUNCTION ALARM (1-8).......
TOD HOUR SYCHRONIZATION (0-23).....
FORCE OFF RING (1-4)...............
HOLD PHASES (1-16).................
PLAN (65=FLSH,66=FREE)..  OFFSET#..
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4).....
CHANGE PHASE CONTROL PAGE (1-4)....
CHANGE OVERLAP CONTROL PAGE (1-4)...
CHANGE INPUT PAGE (1-4)............
CHANGE OUTPUT PAGE (1-4)...........
OVERRIDE PHASE CONTROL FUNCTION (Y).
```

ENTER '55' TO REASSIGN THE VEHICLE DETECTOR FOR THIS INPUT

(LOOP 5A - PHASE 5)

```
PAGE: 2 C1 PIN:55  VEHICLE DETECTOR
INPUT ASSIGNMENT #.................17
DEBOUNCE TIME (0-25.5 SEC).........0.5
DELAY TIME (0-25.5 SEC)............0.0
HOLD-OVER TIME (0-25.5 SEC)........0.0
ASSIGNMENT SELECTION:
NOT ENABLED (Y/N)..................
VEHICLE DETECTOR (1-64)............55
PEDESTRIAN DETECTOR (1-16).........
ALTERNATE PED DETECTOR (1-16)......
PREEMPT (1-10).....................
INVERTED PREEMPT (1-10)............
STOP TIME (Y/N)....................
FLASH SENSE (Y/N)..................
DOOR OPEN (Y/N)....................
MANUAL CONTROL ENABLE (Y/N)........
MANUAL CONTROL ADVANCE (Y/N)......
SPECIAL FUNCTION ALARM (1-8).......
TOD HOUR SYCHRONIZATION (0-23).....
FORCE OFF RING (1-4)...............
HOLD PHASES (1-16).................
PLAN (65=FLSH,66=FREE)..  OFFSET#..
CHANGE PHASE SEQUENCE PAGE (1-12)...
CHANGE PHASE TIMING PAGE (1-4).....
CHANGE PHASE CONTROL PAGE (1-4)....
CHANGE OVERLAP CONTROL PAGE (1-4)...
CHANGE INPUT PAGE (1-4)............
CHANGE OUTPUT PAGE (1-4)...........
OVERRIDE PHASE CONTROL FUNCTION (Y).
```

PROGRAMMING COMPLETE

SPECIAL DETECTOR PROGRAMMING DETAIL - LOOP 5A (ALT.)

(program controller as shown below)

FROM MAIN MENU PRESS '7' (DETECTORS), THEN PRESS '1' FOR VEHICLE DETECTORS. PRESS THE '-' KEY TO GET TO VEHICLE DETECTOR #55.

```
VEHICLE DETECTOR #55  SETTINGS (+-,1-64)
SETTING:                          (Y/N)
ENABLE DETECTOR....................N
ENABLE LOGGING.....................N
ENABLE DIAGNOSTICS.................N
SPEED TRAP.........................N
CALL DETECTOR......................Y
EXTENSION DETECTOR.................Y
MODE 2 STOP BAR....................N
SWITCHING DETECTOR.................N
DUPLICATING DETECTOR...............N
ENABLE FULL TIME DELAY.............N
IF FAILED, SET MIN RECALL?.........N
IF FAILED, SET MAX1 RECALL?........N
IF FAILED, SET MAX2 RECALL?........N
PHASE#          ¦123456789101112131415 16
PHASES ASSIGNED ¦
SWITCH/DUPLICATE¦
LOOP SIZE (0-255 FT)...............6
SPEED TRAP DISTANCE (0-255 FT).....0
STOP BAR TIME (0-255 SEC)..........0
STRETCH (0-25.5 SEC)...............0.0
DELAY (0-255 SEC)..................0
MAX CALLS/MIN (0-255)..............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%).............100
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....0
QUEUE GAP RESET TIME (0-25.5).......0.0
PREEMPTION INDEX FOR QUEUE (0-10)...0
```

ENTER 'Y' FOR ENABLE DETECTOR

ENTER '5' FOR PHASES ASSIGNED

ENSURE DELAY IS '0'

```
VEHICLE DETECTOR #55  SETTINGS (+-,1-64)
SETTING:                          (Y/N)
ENABLE DETECTOR....................Y
ENABLE LOGGING.....................N
ENABLE DIAGNOSTICS.................N
SPEED TRAP.........................N
CALL DETECTOR......................Y
EXTENSION DETECTOR.................Y
MODE 2 STOP BAR....................N
SWITCHING DETECTOR.................N
DUPLICATING DETECTOR...............N
ENABLE FULL TIME DELAY.............N
IF FAILED, SET MIN RECALL?.........N
IF FAILED, SET MAX1 RECALL?........N
IF FAILED, SET MAX2 RECALL?........N
PHASE#          ¦123456789101112131415 16
PHASES ASSIGNED ¦    X
SWITCH/DUPLICATE¦
LOOP SIZE (0-255 FT)...............6
SPEED TRAP DISTANCE (0-255 FT).....0
STOP BAR TIME (0-255 SEC)..........0
STRETCH (0-25.5 SEC)...............0.0
DELAY (0-255 SEC)..................0
MAX CALLS/MIN (0-255)..............255
MIN CALLS/DIAGNOSTIC PERIOD (0-255).0
MAX OCCUPANCY (0-100%).............100
EXTENSION DISABLE TIME (0-255 SEC)..0
QUEUE MAX OCCUPANCY TIME (0-255)....0
QUEUE GAP RESET TIME (0-25.5).......0.0
PREEMPTION INDEX FOR QUEUE (0-10)...0
```

DETECTOR PROGRAMMING COMPLETE

NOTE: DETECTOR IS PROGRAMMED PER THE INPUT FILE CONNECTION AND PROGRAMMING CHART SHOWN ON SHEET 1.

NC Dept of Transportation
Division of Highways
Final Drawing Date: 2/18/2020
DocuSigned by: Changsuk Park
ITS & Signals Unit

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0547
DESIGNED: AUGUST 2019
SEALED: 2/14/2020
REVISED: N/A

Electrical Detail - Sheet 4 of 5
Final Design

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PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for: Mobility and Safety Division, Signals Management Section, NC DEPT. OF TRANSPORTATION
750 N.Greenfield Pkwy,Garner,NC 27529

US 15-501 (Fordham Boulevard) at Elliott Road

Division 7 Orange County Chapel Hill

PLAN DATE:	August 2019	REVIEWED BY:	SL Phillips
PREPARED BY:	CR Wong	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACIE L. PHILLIPS

DocuSigned by: SLPh 2/14/2020
SIGNATURE DATE

SIG. INVENTORY NO. 07-0547

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PROJECT REFERENCE NO.	SHEET NO.
4th Leg	Sig. 4.6

ALTERNATE PHASING ACTIVATION DETAIL

TO RUN ALT. PHASING DURING COORDINATION - SELECT ALL PAGE CHANGES (AS SHOWN BELOW) WITHIN COORDINATION PLAN PROGRAMMING.

TO RUN ALT. PHASING DURING FREE RUN - PROGRAM PAGE CHANGES (SHOWN BELOW) IN SEPARATE TIME OF DAY EVENTS. IF PAGE 1 IS USED, NO EVENT PROGRAMMING IS NECESSARY FOR THAT PARTICULAR PAGE.

PHASING	INPUTS PAGE	OVERLAPS PAGE
ACTIVE PAGES REQUIRED TO RUN DEFAULT PHASING	1	1
ACTIVE PAGES REQUIRED TO RUN ALTERNATE PHASING	2	2

NOTE: PAGES NOT SHOWN (i.e. sequence, phase control, etc.) SHOULD REMAIN AS '1', OR AS DEFINED BY TIMING ENGINEER.

IMPORTANT: IF ALT. PHASING IS USED DURING FREE RUN AND COORDINATION, DO NOT OPERATE TIME OF DAY PAGE CHANGE EVENTS CONCURRENTLY WITH COORDINATION PLAN EVENTS IN THE EVENT SCHEDULER. (EX. FREE RUN PAGE CHANGE EVENT SHOULD END BEFORE COORDINATION PLAN EVENT STARTS AND VICE-VERSA).

ALTERNATE PHASING PAGE CHANGE SUMMARY

THE FOLLOWING IS A SUMMARY OF WHAT TAKES PLACE WHEN THESE OVERLAP/INPUT PAGE CHANGES ACTIVATE TO CALL THE "ALTERNATE PHASING":

OVERLAPS PAGE 2: Modifies overlap parent phases for heads 11 and 51 to run protected turns only.

INPUTS PAGE 2: Disables phase 6 call on loop 1A and reduces delay time for phase 1 call on loop 1A to 0 seconds.

Disables phase 2 call on loop 5A and reduces delay time for phase 5 call on loop 5A to 0 seconds.

NC Dept of Transportation
Division of Highways
Final Drawing Date: 2/18/2020
DocuSigned by: Changsek Park
ITS & Signals Unit

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 07-0547
DESIGNED: AUGUST 2019
SEALED: 2/14/2020
REVISED: N/A

Electrical Detail - Sheet 5 of 5
Final Design

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PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

ELECTRICAL AND PROGRAMMING DETAILS FOR:

Prepared for: Mobility and Safety Division, Traffic Engineering Branch, Signals Management Section, State of North Carolina, Dept. of Transportation
750 N.Greenfield Pkwy,Garner,NC 27529

US 15-501 (Fordham Boulevard)
at
Elliott Road

Division 7 | Orange County | Chapel Hill

PLAN DATE:	August 2019	REVIEWED BY:	SL Phillips
PREPARED BY:	CR Wong	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACE L. PHILLIPS
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SIG. INVENTORY NO. 07-0547

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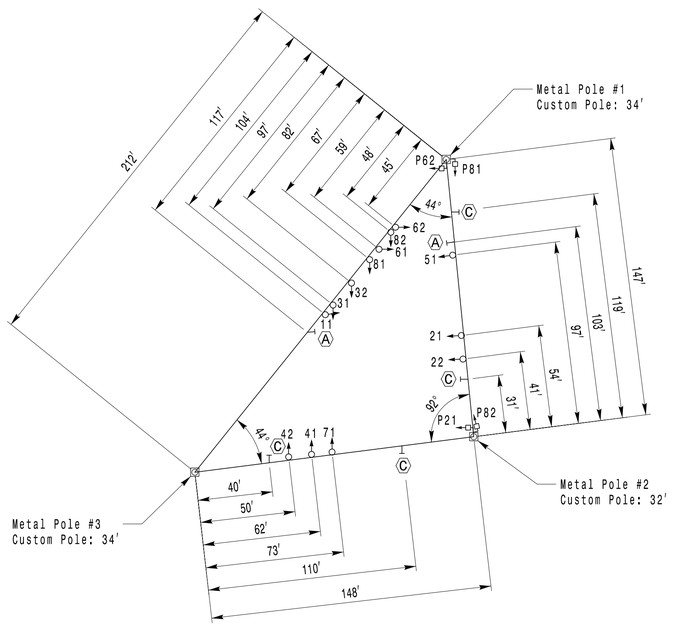
PROJECT REFERENCE NO.	SHEET NO.
4th Leg	Sig. 4.7

ESTIMATED POLE AND ATTACHMENT HEIGHTS

POLE NUMBER	SPAN		ATTACHMENT HEIGHT (H1) (FT)	POLE HEIGHT (H2) FT
	FROM POLE	TO POLE		
1	1	2	29.8	33.6
	1	3	32.1	
2	2	3	29.8	31.8
	2	1	30.3	
3	3	1	31.9	33.4
	3	2	29.1	

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2018, "Standard Specifications for Roads and Structures" dated January 2018, and all applicable sections of the latest version of the generic Project Special Provisions.



LOADING SCHEDULE

HEAD	DESCRIPTION	AREA (SQ. FT.)	SIZE (IN.)	WEIGHT (LB)
21 31,32 41 61,62 71 81	SIGNAL HEAD 12"-3 SECTION-WITH BACKPLATE, HANGER, AND BALANCE ADJUSTER	9.5	25.5 W X 52.0 L	56
11 51	SIGNAL HEAD 12"-4 SECTION -WITH BACKPLATE, HANGER, AND BALANCE ADJUSTER	11.8	25.5 W X 65.5 L	69
22 42 62 82	SIGNAL HEAD 12"-5 SECTION -WITH BACKPLATE, HANGER, AND BALANCE ADJUSTER	16.5	42.0 W X 56.0 L	89
P21 P62 P81,P82	PEDESTRIAN SIGNAL W/ PUSH BUTTONS 16"- 1 SECTION COUNT DOWN	2.2	18.5 W X 17.0 L	21
A	REGULATORY SIGN WITH HANGER ASSEMBLY	7.5	30.0 W X 36.0 L	14
C	OVERHEAD STREET NAME SIGN	16.0	24.0 W X 96.0 L	100

NC Dept of Transportation
Division of Highways
Final Drawing Date: 3/6/2020
DocuSigned by: Changsuk Baek
ITS & Signals Unit

Loading Diagram - Final Design

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PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Prepared For:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

N
0
N/A

US 15-501 (Fordham Boulevard)
at
Elliott Road

Division 7 Orange County Chapel Hill

PLAN DATE:	August 2019	REVIEWED BY:	SL Phillips
PREPARED BY:	CR Wong	REVIEWED BY:	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 032607 ENGINEER STACIE L. PHILLIPS
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SIG. INVENTORY NO. 07-0547

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PROJECT REFERENCE NO.	SHEET NO.
4TH LEG	SCP-1

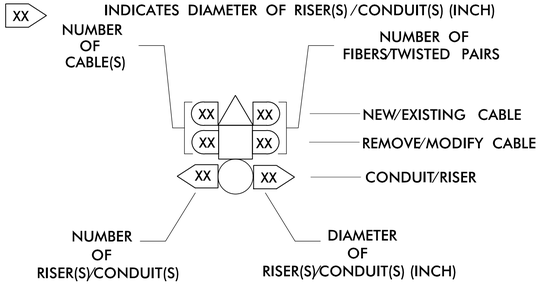
1. INSTALL REA, PE – 22, SHIELDED, TWISTED PAIR COMMUNICATIONS CABLE
2. INSTALL COAX CABLE
3. INSTALL ETHERNET CABLE
4. INSTALL SMFO CABLE
5. INSTALL MMFO CABLE
6. INSTALL FIBER OPTIC DROP CABLE ASSEMBLY
7. INSTALL TRACER WIRE
8. TRENCH
9. INSTALL PVC CONDUIT
10. INSTALL RIGID, GALVANIZED STEEL CONDUIT
11. INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
12. INSTALL RIGID, GALVANIZED STEEL RISER WITH FIBER OPTIC CABLE SEAL
13. INSTALL OUTER–DUCT POLYETHYLENE CONDUIT
14. INSTALL POLYETHYLENE CONDUIT
15. DIRECTIONAL DRILL CONDUIT
16. BORE AND JACK CONDUIT
17. INSTALL CABLE(S) IN EXISTING CONDUIT
18. INSTALL CABLE(S) IN NEW CONDUIT
19. INSTALL CABLE(S) IN EXISTING RISER
20. INSTALL CABLE(S) IN NEW RISER
21. INSTALL CABLE(S) IN EXISTING CONDUIT STUB–OUTS
22. INSTALL NEW CONDUIT INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB–OUTS WHEN AVAILABLE)
23. INSTALL NEW RISER INTO EXISTING CABINET BASE (USE EXISTING CONDUIT STUB–OUTS WHEN AVAILABLE)
24. INSTALL NEW CONDUIT INTO EXISTING POLE MOUNTED CABINET
25. INSTALL NEW RISER INTO EXISTING POLE MOUNTED CABINET
26. MODIFY EXISTING INTERCONNECT CENTER /SPLICE ENCLOSURE
27. INSTALL NEW FIBER OPTIC TRANSCEIVER
28. INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS AND FUSION SPLICE CABLE IN CABINET
29. INSTALL UNDERGROUND SPLICE ENCLOSURE
30. INSTALL AERIAL SPLICE ENCLOSURE
31. INSTALL POLE MOUNTED SPLICE CABINET
32. INSTALL BASE MOUNTED SPLICE CABINET
33. REMOVE EXISTING SPLICE CABINET
34. INSTALL CABINET FOUNDATION
35. INSTALL CCTV CAMERA POLE MOUNTED CABINET
36. INSTALL CCTV CAMERA ASSEMBLY
37. INSTALL CCTV CAMERA WOOD POLE
38. INSTALL CCTV CAMERA METAL POLE AND FOUNDATION
39. INSTALL JUNCTION BOX
40A. INSTALL OVERSIZED JUNCTION BOX
40B. INSTALL SPECIAL OVERSIZED JUNCTION BOX (36" x 36" x 24")
41. REMOVE EXISTING JUNCTION BOX
42. INSTALL WOOD POLE
43. REMOVE EXISTING WOOD POLE
44. INSTALL AERIAL GUY ASSEMBLY
45. INSTALL STANDARD GUY ASSEMBLY
46. INSTALL SIDEWALK GUY ASSEMBLY
47. INSTALL MESSENGER CABLE
48A. REMOVE EXISTING COMMUNICATIONS AND MESSENGER CABLE
48B. REMOVE EXISTING COMMUNICATIONS CABLE
49. BACK PULL EXISTING COMMUNICATIONS CABLE
50. INSTALL TELEPHONE SERVICE
51. INSTALL CABLE STORAGE RACKS (SNOW SHOES) AND STORE 100 FEET OF CABLE
52A. INSTALL DELINEATOR MARKER
52B. INSTALL JUNCTION BOX MARKER
53. STORE 20 FEET OF COMMUNICATIONS CABLE
54. LASH CABLE(S) TO EXISTING COMMUNICATIONS CABLE
55. LASH CABLE(S) TO EXISTING MESSENGER CABLE
56. LASH CABLE(S) TO NEW MESSENGER CABLE
57. MODIFY EXISTING ELECTRICAL SERVICE
58. INSTALL NEW ELECTRICAL SERVICE
59. INSTALL NEW ETHERNET EDGE SWITCH
60. BOND TRACER WIRE TO EQUIPMENT GROUND BUS
61. DO NOT BOND TRACER WIRE TO EQUIPMENT GROUND BUS
62. BOND RISER AND MESSENGER CABLE TO POLE GROUND
63. BOND RISER TO POLE GROUND
64. BOND MESSENGER CABLE TO POLE GROUND
65. INSTALL HEAT SHRINK TUBING RETROFIT KIT
66. INSTALL MOLDABLE DUCT SEAL
67. SLACK SPAN

LEGEND

- FO — NEW FIBER OPTIC COMMUNICATIONS CABLE
- TWIST PR — NEW TWISTED PAIR COMMUNICATIONS CABLE
- EXI — EXISTING COMMUNICATIONS CABLE
- REM — EXISTING COMMUNICATIONS CABLE TO BE REMOVED
- NEW AERIAL GUY ASSEMBLY
- NEW CONDUIT
- EXISTING CONDUIT
- DD — NEW DIRECTIONAL DRILLED CONDUIT
- B&J — NEW BORED AND JACKED CONDUIT
- NEW JUNCTION BOX
- EXISTING JUNCTION BOX
- NEW WOOD POLE
- EXISTING WOOD POLE
- S — AERIAL SPLICE ENCLOSURE
- S — EXISTING UNDERGROUND SPLICE ENCLOSURE
- S — UNDERGROUND SPLICE ENCLOSURE
- NEW METAL POLE
- EXISTING METAL POLE
- NEW CCTV ASSEMBLY
- NEW STANDARD GUY ASSEMBLY
- NEW SIDEWALK GUY ASSEMBLY
- XX–XXXX — SIGNAL INVENTORY NUMBER
- NEW CABLE STORAGE RACKS (SNOW SHOES)
- EXISTING CABLE STORAGE RACK (SNOW SHOE)
- EXISTING CONTROLLER AND CABINET
- NEW CCTV CABINET
- S — EXISTING SPLICE CABINET
- S — NEW SPLICE CABINET
- SP — SIGNAL POLE
- FLAT PANEL ANTENNA (SINGLE)
- YAGI ANTENNA (DOUBLE) FOR REPEATER OPERATION
- YAGI ANTENNA (SINGLE)
- OMNI ANTENNA

CONSTRUCTION NOTE SYMBOLOGY KEY

- XX — INDICATES NUMBER OF CABLES, LOOPS, ETC.
- XX — INDICATES NUMBER OF FIBERS PER CABLE, TWISTED PAIRS PER CABLE, ETC.
- XX — INDICATES NUMBER OF RISER(S)/CONDUIT(S)
- XX — INDICATES DIAMETER OF RISER(S)/CONDUIT(S) (INCH)



ATTACHMENT POINT:

- XX"/SS / YYY — DISTANCE ABOVE (IN)/ATTACHMENT POINT REFERENCE POINT
- YYY / XX"/SS — REFERENCE POINT DISTANCE BELOW (IN)/ATTACHMENT POINT

"SS"	REFERENCE LOCATION
FS =	FRONT SIDE OF POLE
BS =	BACK SIDE OF POLE

NC Dept of Transportation
Division of Highways
Final Drawing Date: 2/18/2020
DocuSigned by:
Changsuk Baek
ITS & Signals Unit

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PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Prepared For:
750 N. Greenfield Pkwy., Garner, NC 27529

Cable Routing
US 15-501 (Fordham Boulevard)
at
Elliott Road

Division 7 Orange County Chapel Hill

PLAN DATE:	August 2019	REVIEWED BY:	SP Pennington
PREPARED BY:	CR Wong	REVIEWED BY:	KW Smith

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH
DocuSigned by:
Kevin Smith
0686E04B3B0440F...
2/14/2020
SIGNATURE DATE
SIG. INVENTORY NO.

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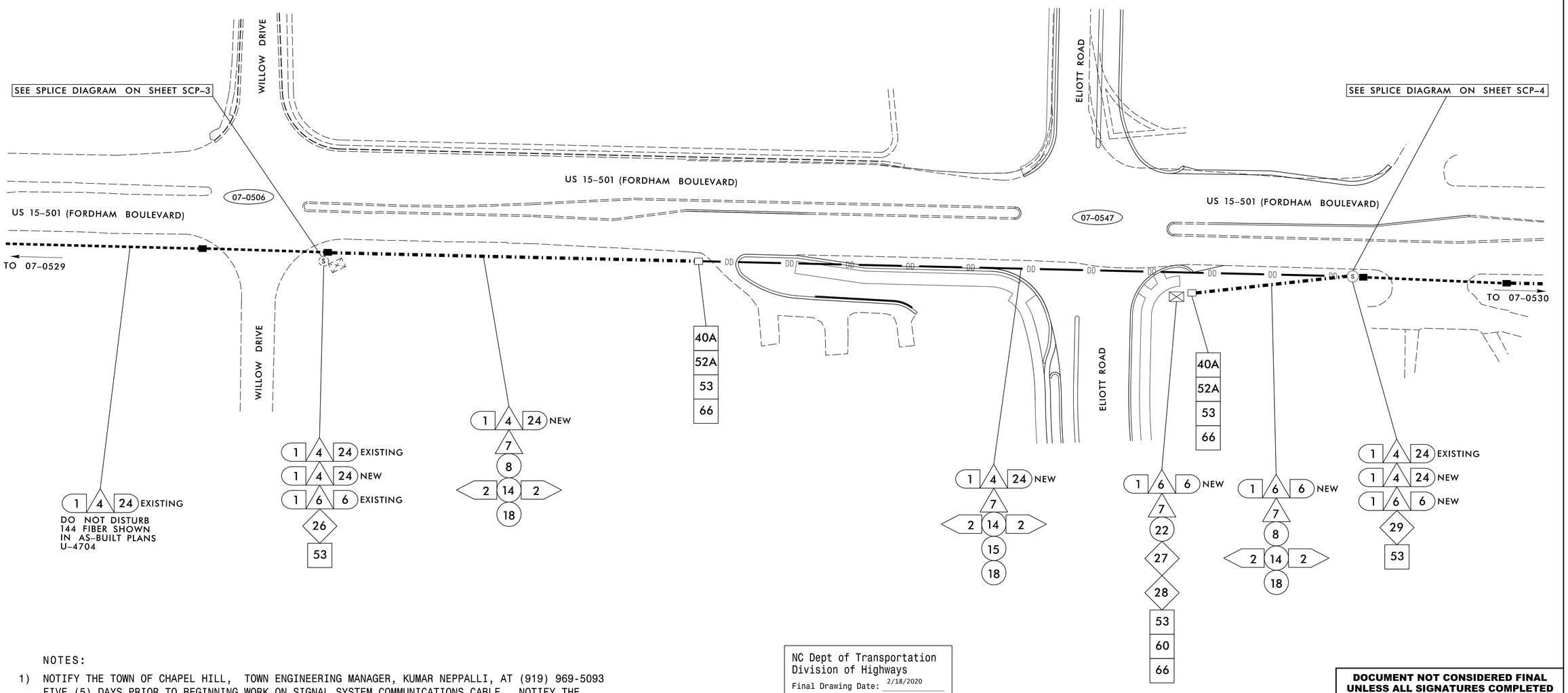
PROJECT REFERENCE NO.	SHEET NO.
4TH LEG	SCP-2



NOTES:

1) NOTIFY THE TOWN OF CHAPEL HILL, TOWN ENGINEERING MANAGER, KUMAR NEPPALLI, AT (919) 969-5093 FIVE (5) DAYS PRIOR TO BEGINNING WORK ON SIGNAL SYSTEM COMMUNICATIONS CABLE. NOTIFY THE TOWN ENGINEERING MANAGER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. ALL WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.

2) CONTRACTOR TO RECORD EXISTING SPLICE ARRANGEMENT FOR COMPARISON TO THE SUPPLIED SPLICE DETAILS. IF DISCREPANCIES EXIST, CONTACT THE ENGINEER TO DETERMINE HOW TO PROCEED WITH RESPLICING. PROVIDE AS-BUILT PLANS TO THE ENGINEER IF FINAL SPLICE ARRANGEMENT DIFFERS FROM THE SUPPLIED SPLICE DETAILS.

NC Dept of Transportation
Division of Highways
Final Drawing Date: 2/18/2020
DocuSigned by:
Changsek Baek
ITS & Signals Unit

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PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Prepared For:
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Transportation Mobility and Safety Division
Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

SCALE 0 50 1"=50'

Cable Routing
US 15-501 (Fordham Boulevard)
at
Elliott Road

Division 7 Orange County Chapel Hill

PLAN DATE:	August 2019	REVIEWED BY:	SP Pennington
PREPARED BY:	CR Wong	REVIEWED BY:	KW Smith

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH
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Kevin Smith
0686ED4B3B0440F...
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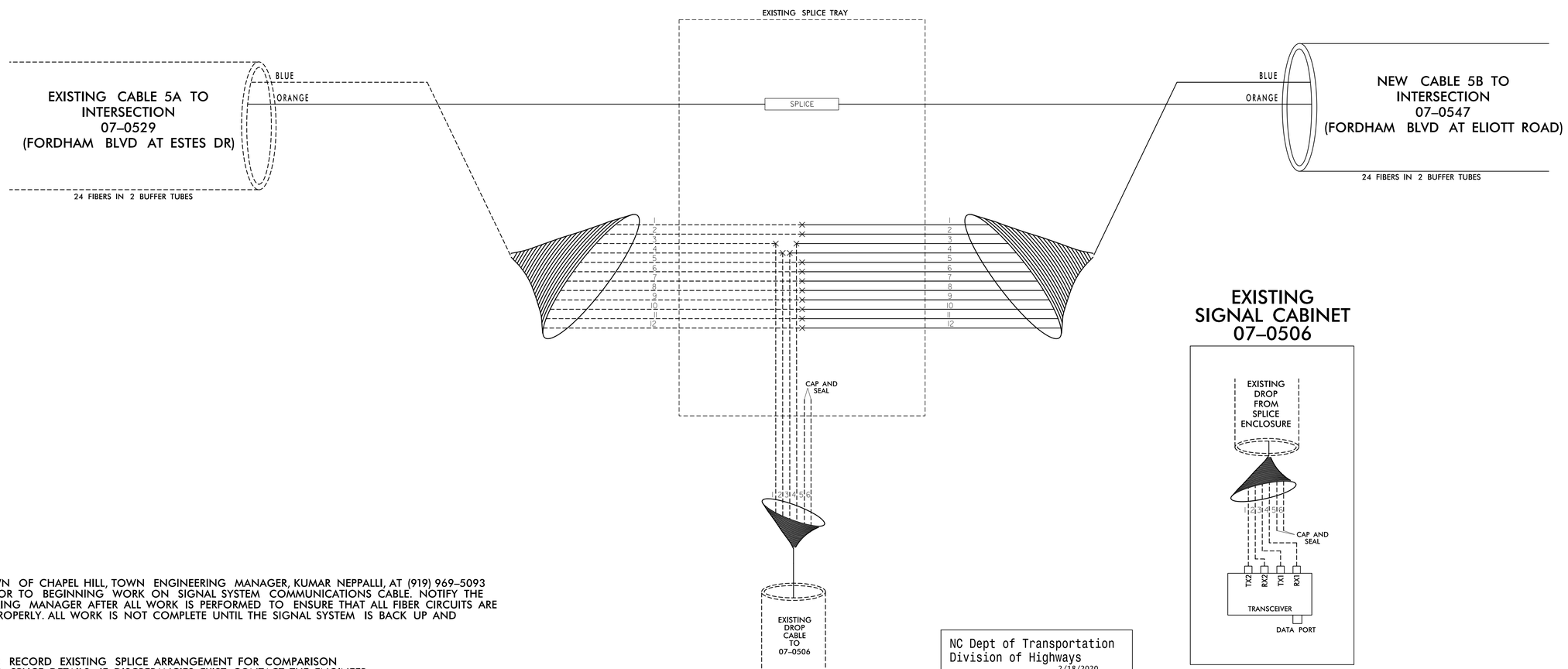
PROJECT REFERENCE NO.	SHEET NO.
4TH LEG	SCP-3

EXISTING SPLICE ENCLOSURE AT 07–0506 (FORDHAM BLVD AT WILLOW DR)

C = CAP AND SEAL
X = FUSION SPLICE

COLOR CODE
TIA/EIA 598–A

(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA



1) NOTIFY THE TOWN OF CHAPEL HILL, TOWN ENGINEERING MANAGER, KUMAR NEPPALLI, AT (919) 969–5093 FIVE (5) DAYS PRIOR TO BEGINNING WORK ON SIGNAL SYSTEM COMMUNICATIONS CABLE. NOTIFY THE TOWN ENGINEERING MANAGER AFTER ALL WORK IS PERFORMED TO ENSURE THAT ALL FIBER CIRCUITS ARE FUNCTIONING PROPERLY. ALL WORK IS NOT COMPLETE UNTIL THE SIGNAL SYSTEM IS BACK UP AND OPERATIONAL.

2) CONTRACTOR TO RECORD EXISTING SPLICE ARRANGEMENT FOR COMPARISON TO THE SUPPLIED SPLICE DETAILS. IF DISCREPANCIES EXIST, CONTACT THE ENGINEER TO DETERMINE HOW TO PROCEED WITH RESPLICING. PROVIDE AS–BUILT PLANS TO THE ENGINEER IF FINAL SPLICE ARRANGEMENT DIFFERS FROM THE SUPPLIED SPLICE DETAILS.

3) TRANSCEIVER TERMINATION CONFIGURATIONS ARE GENERIC. CONTRACTOR IS RESPONSIBLE FOR DETERMINING \ ENSURING PROPER TERMINATIONS.

4) INCLUDE ON THE COVER OF EACH SPLICE TRAY THE FOLLOWING:
REFERENCE SECTION 1731 "FIBER OPTIC SPLICE ENCLOSURE"

1) SPLICE LOCATION
2) DATE
3) COMPANY NAME
4) NAME OF INDIVIDUAL PERFORMING THE SPLICING

PRIOR TO INSTALLING THE COVER ON THE SPLICE TRAY TAKE A DIGITAL PHOTOGRAPH SHOWING THE SPLICE TRAY AND INFORMATION SHOWN ABOVE (1–4) AND SUBMIT PHOTOGRAPH ALONG WITH OTDR TEST RESULTS.

NC Dept of Transportation
Division of Highways
Final Drawing Date: 2/18/2020
DocuSigned by: Changsek Baek
ITS & Signals Unit

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Prepared For:
750 N. Greenfield Pkwy., Garner, NC 27529

Splice Detail
US 15-501 (Fordham Boulevard)
at
Elliott Road

Division 7 Orange County Chapel Hill

PLAN DATE:	August 2019	REVIEWED BY:	SP Pennington
PREPARED BY:	CR Wong	REVIEWED BY:	KW Smith

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 030472 ENGINEER KEVIN W. SMITH
DocuSigned by: Kevin Smith 0686E04B3B0440F... 2/14/2020
SIGNATURE DATE
SIG. INVENTORY NO.

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2/13/2020 3:43:15 PM Chanlin.Wong

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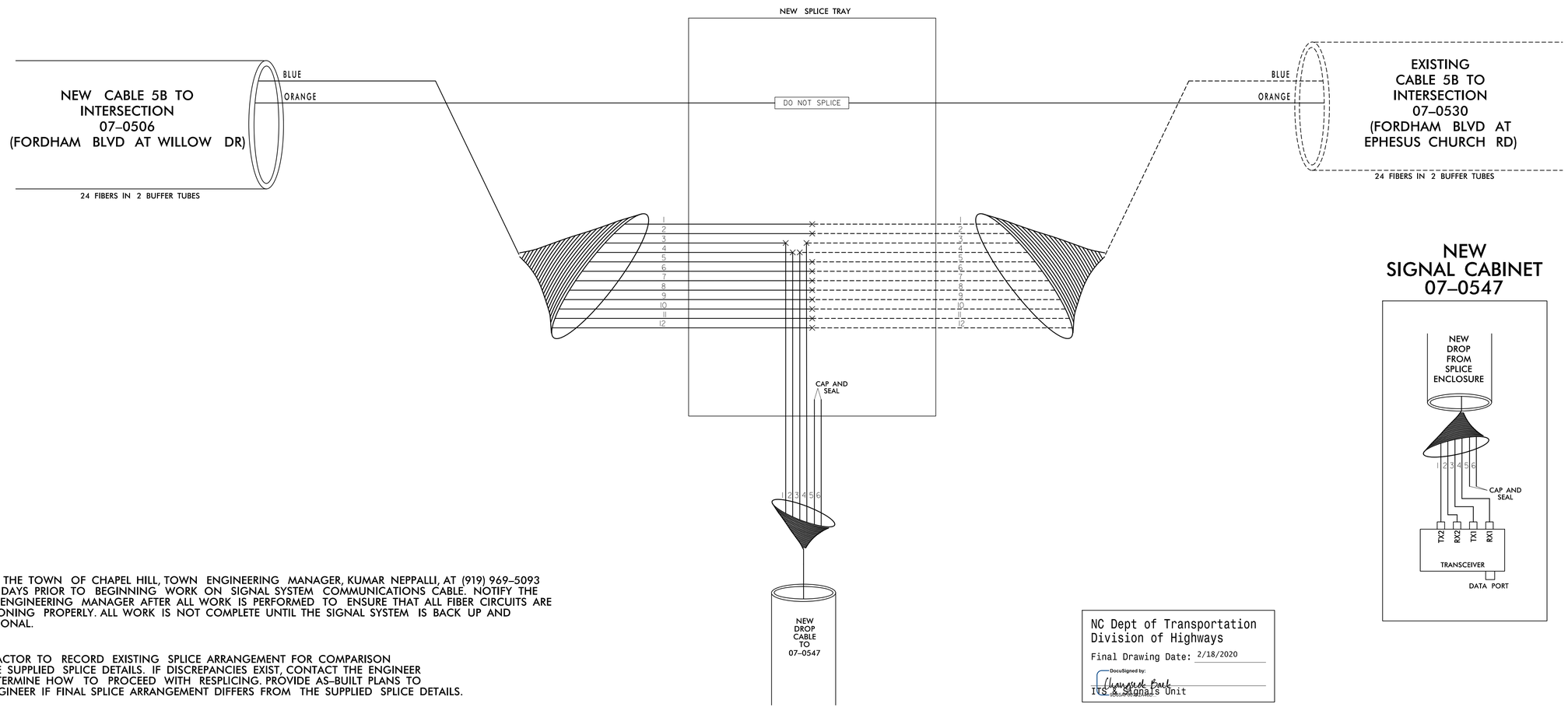
PROJECT REFERENCE NO.	SHEET NO.
4TH LEG	SCP-4

NEW SPLICE ENCLOSURE AT 07-0547 (FORDHAM BLVD AT ELLIOTT RD)

C = CAP AND SEAL
X = FUSION SPLICE

COLOR CODE
TIA/EIA 598-A

(1) BLUE	(7) RED
(2) ORANGE	(8) BLACK
(3) GREEN	(9) YELLOW
(4) BROWN	(10) VIOLET
(5) SLATE	(11) ROSE
(6) WHITE	(12) AQUA



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NC Dept of Transportation
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ITS & Signals Unit

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PLANS PREPARED IN THE OFFICE OF:
Kimley»Horn
NC License #F-0102
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000

Prepared For:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Intelligent Transportation Systems Section
750 N. Greenfield Pkwy., Garner, NC 27529

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