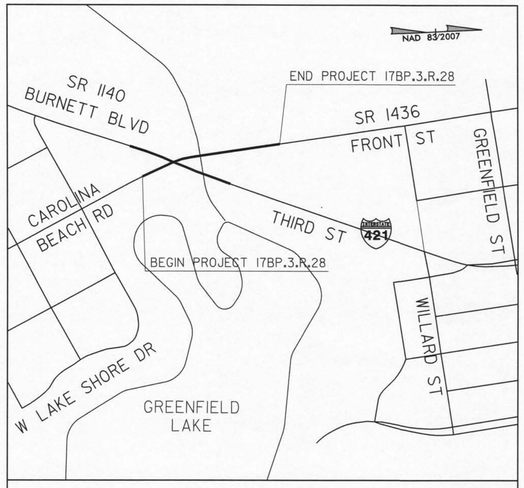
PROJECT: 17BP.3.R.28

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.3.R.28	EC-1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION



VICINITY MAP

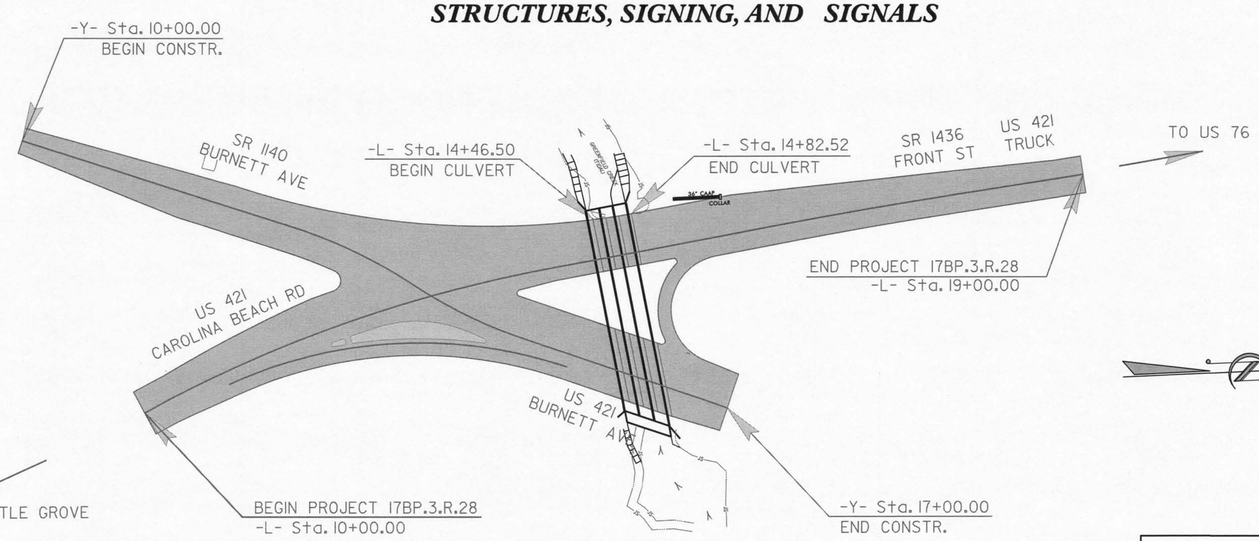
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

NEW HANOVER COUNTY

LOCATION: INTERSECTION OF SR 1436 /US 421 TRUCK (FRONT STREET) AND SR 1140 (BURNETT BOULEVARD) SOUTH OF WILLARD STREET

TYPE OF WORK: GRADING, DRAINAGE, PAVING, RESURFACING, STRUCTURES, SIGNING, AND SIGNALS



EROSION AND SEDIMENT CONTROL MEASURES

Std. #	Description	Symbol
1630.03	Temporary Silt Ditch	TSD
1630.05	Temporary Diversion	TD
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
1630.02	Silt Basin Type B	
1633.01	Temporary Rock Silt Check Type-A	
	Temporary Rock Silt Check Type-A with Matting and Polyacrylamide (PAM)	
1633.02	Temporary Rock Silt Check Type-B	
	Wattle / Coir Fiber Wattle	EW CFW
	Wattle / Coir Fiber Wattle with Polyacrylamide (PAM)	
1634.01	Temporary Rock Sediment Dam Type-A	
1634.02	Temporary Rock Sediment Dam Type-B	
1635.01	Rock Pipe Inlet Sediment Trap Type-A	
1635.02	Rock Pipe Inlet Sediment Trap Type-B	
1630.04	Stilling Basin	
1630.06	Special Stilling Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	A
1632.02	Type B	B
1632.03	Type C	C
	Skimmer Basin	
	Tiered Skimmer Basin	
	Infiltration Basin	

THIS PROJECT CONTAINS EROSION CONTROL PLANS FOR CLEARING AND GRUBBING PHASE OF CONSTRUCTION.

THIS PROJECT HAS BEEN DESIGNED TO SENSITIVE WATERSHED STANDARDS.

BRAD T. SMITH
LEVEL III NAME

3520
LEVEL III CERTIFICATION NO.

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II

THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF WILMINGTON

303(d) IMPAIRED WATER(S) EXIST ON THIS PROJECT

303(d) Impaired Water Zone(s) Exist
From Sta. 10+00 -L-
to Sta. 19+00 -L-
Refer To E. C. Special Provisions for Special Considerations.

ENVIRONMENTALLY SENSITIVE AREA(S) EXIST ON THIS PROJECT

Refer To E. C. Special Provisions for Special Considerations.

GRAPHIC SCALE

40 20 0 40 80
PLANS

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE REGULATIONS SET FORTH BY THE NCG-010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE AUGUST 3, 2011 ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES DIVISION OF WATER QUALITY.

Prepared In the Office of:

SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243 FAX (919) 859-6258
ENG FIRM LICENSE NO. C-890

2012 STANDARD SPECIFICATIONS

Roadway Standard Drawings

The following roadway english standards as appear in "Roadway Standard Drawings"– Roadway Design Unit – N. C. Department of Transportation – Raleigh, N. C., dated January 2012 and the latest revison thereto are applicable to this project and by reference hereby are considered a part of these plans.

1604.01	Railroad Erosion Control Detail	1632.01	Rock Inlet Sediment Trap Type A
1605.01	Temporary Silt Fence	1632.02	Rock Inlet Sediment Trap Type B
1606.01	Special Sediment Control Fence	1632.03	Rock Inlet Sediment Trap Type C
1607.01	Gravel Construction Entrance	1633.01	Temporary Rock Silt Check Type A
1622.01	Temporary Berms and Slope Drains	1633.02	Temporary Rock Silt Check Type B
1630.01	Riser Basin	1634.01	Temporary Rock Sediment Dam Type A
1630.02	Silt Basin Type B	1634.02	Temporary Rock Sediment Dam Type B
1630.03	Temporary Silt Ditch	1635.01	Rock Pipe Inlet Sediment Trap Type A
1630.04	Stilling Basin	1635.02	Rock Pipe Inlet Sediment Trap Type B
1630.05	Temporary Diversion	1640.01	Coir Fiber Baffle
1630.06	Special Stilling Basin	1645.01	Temporary Stream Crossing
1631.01	Matting Installation		

6/19/2014
17BP.3.R.28_EC_dan_psh_01.dgn
bsmith

PROJECT REFERENCE NO.	SHEET NO.
17BP.3.R.28	EC-2
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION TIMEFRAMES

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

EROSION CONTROL PLAN

NOTES: ANY DEVIATION FROM OPTIONS GIVEN WILL REQUIRE PRIOR APPROVAL BY ENGINEER.

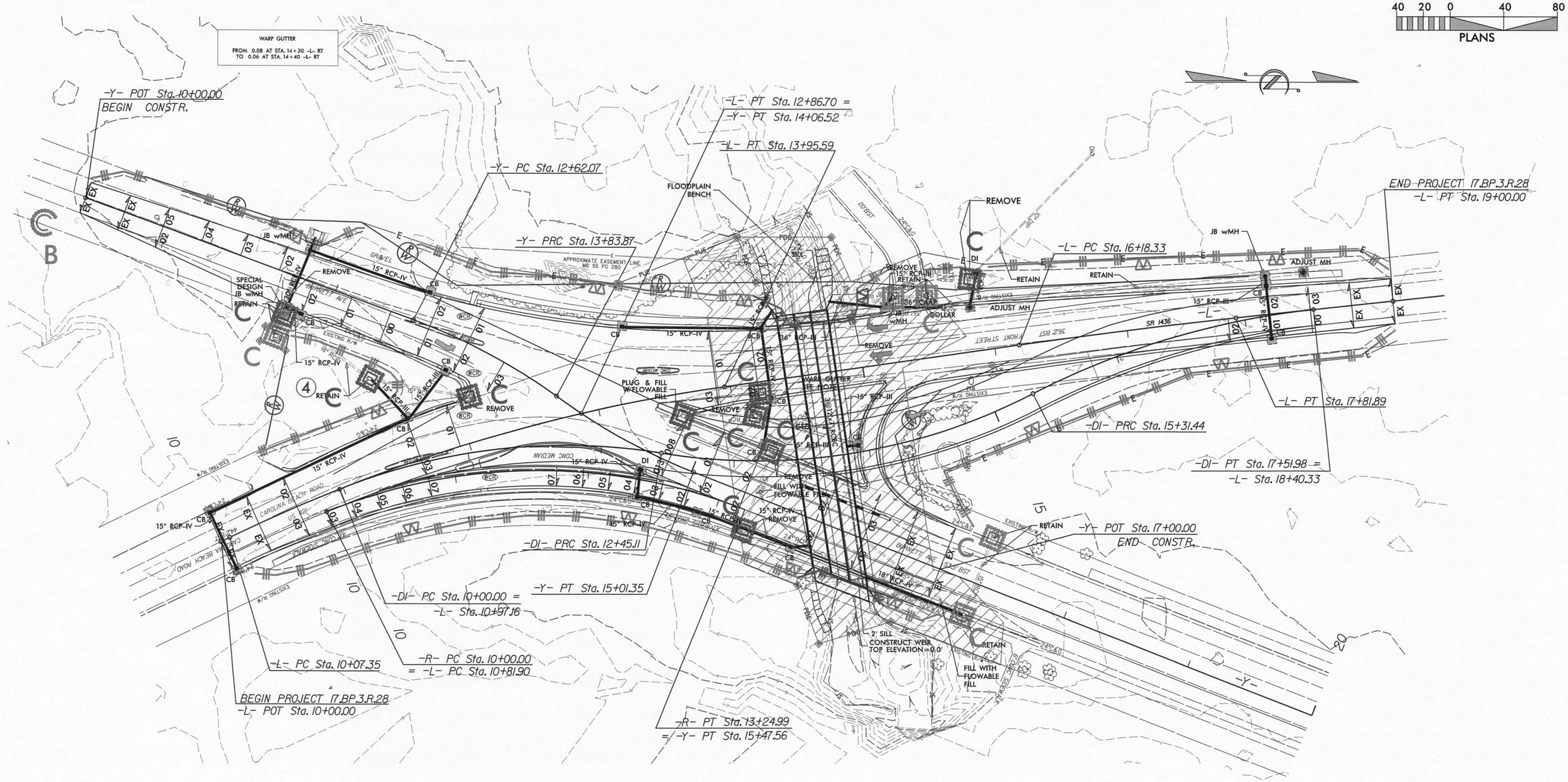
ADDITIONAL EROSION CONTROL DEVICES MAY NEED TO BE INSTALLED AS DIRECTED BY THE ENGINEER.

CLEARING AND GRUBBING EROSION CONTROL FOR CONSTRUCTION SHEET 04

PROJECT REFERENCE NO.	SHEET NO.
17BP.3.R.28	EC-03/CONST.04
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NOTE:
PERIMETER EROSION CONTROL MEASURES SHALL BE INSTALLED DURING CLEARING AND GRUBBING PHASE.

40 20 0 40 80
PLANS



ENVIRONMENTALLY SENSITIVE AREA
SEE PROJECT SPECIAL PROVISIONS

NOTES: ANY DEVIATION FROM OPTIONS GIVEN WILL REQUIRE PRIOR APPROVAL BY ENGINEER.

ADDITIONAL EROSION CONTROL DEVICES MAY NEED TO BE INSTALLED AS DIRECTED BY THE ENGINEER.

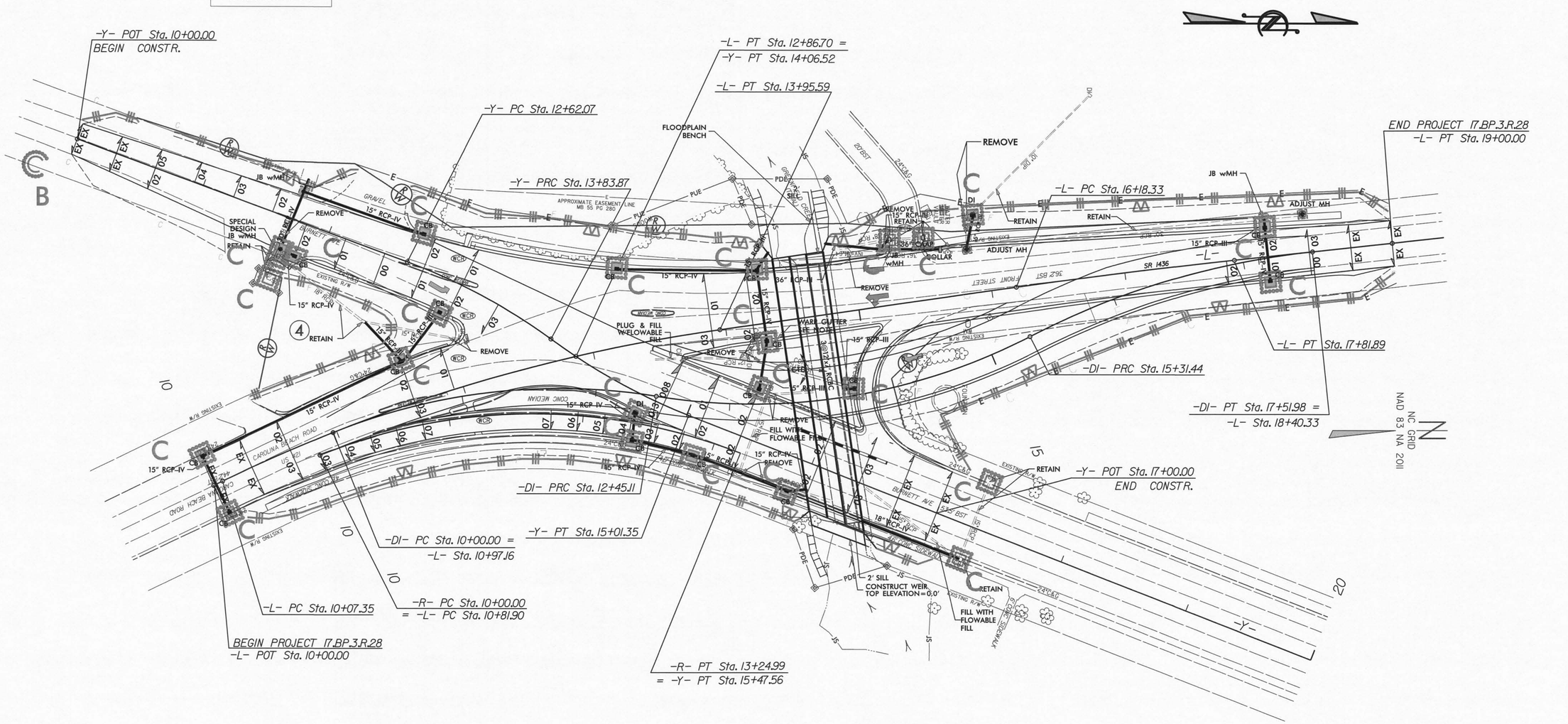
EROSION CONTROL PLAN

FINAL GRADE EROSION CONTROL FOR CONSTRUCTION SHEET 04

PROJECT REFERENCE NO.	SHEET NO.
17BP.3.R.28	EC-04/CONST.04
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

40 20 0 40 80
PLANS

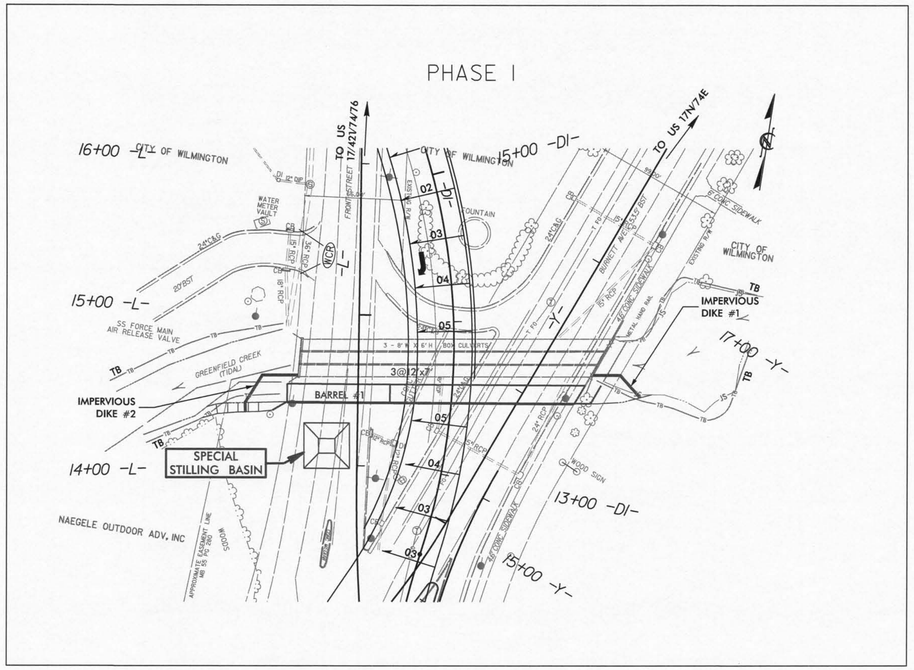
WARP GUTTER
FROM 0.08 AT STA. 14+30 -L- RT
TO 0.06 AT STA. 14+40 -L- RT

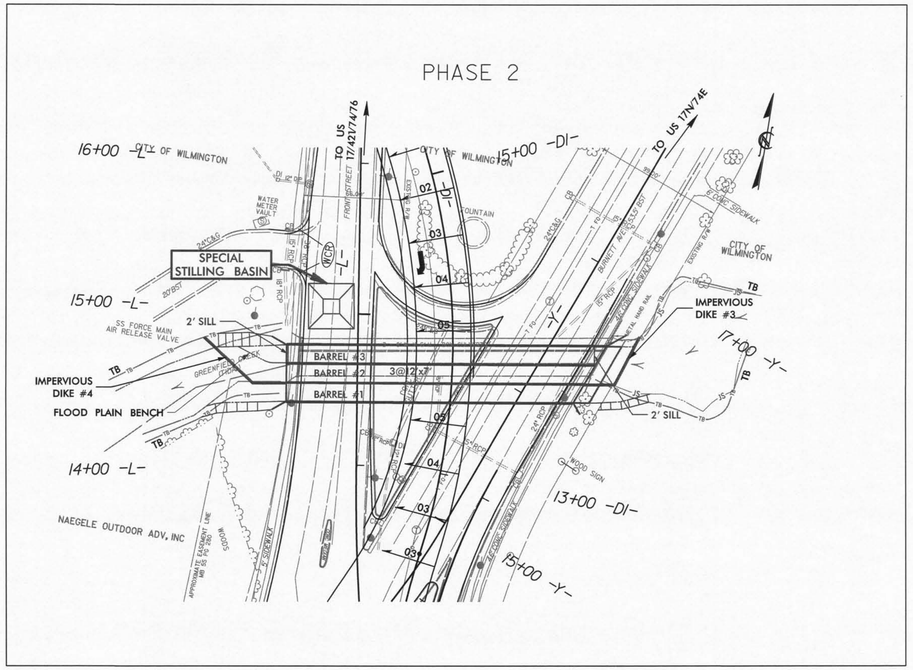


PROJECT REFERENCE NO.	SHEET NO.
17BP.3.R.28	EC-05
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

50 25 0 50 100

PLANS





SF-640028
NEW HANOVER COUNTY

CONSTRUCTION SEQUENCE FOR 3 @ 12' X 7' RCBC
14+60.6 –L-
GREENFIELD CREEK

PHASE I

1. INSTALL SPECIAL STILLING BASIN
2. CONSTRUCT IMPERVIOUS DIKE #1 AND #2
3. DEWATER CONSTRUCTION AREA, TREAT EFFLUENT WATER USING SPECIAL STILLING BASIN
4. CONSTRUCT INLET SECTION OF BARREL #1
5. CONSTRUCT TEMPORARY DETOUR
6. CONSTRUCT OUTLET SECTION OF BARREL #1
7. REMOVE IMPERVIOUS DIKE #1 AND #2
8. REMOVE SPECIAL STILLING BASIN

PHASE 2

1. CONSTRUCT IMPERVIOUS DIKE #3 AND #4 AND DIVERT FLOW INTO BARREL #1 OF PROPOSED CULVERT
2. INSTALL SPECIAL STILLING BASIN
3. DEWATER CONSTRUCTION AREA
4. REMOVE OUTLET SECTIONS OF EXISTING CULVERT TO TEMPORARY DETOUR
5. CONSTRUCT OUTLET SECTIONS OF BARRELS #2 AND #3 WITH SILLS AND FLOOD PLAIN BENCH
6. CONSTRUCT NEW ROADWAY SECTION OF -L- OVER OUTLET SECTIONS OF PROPOSED CULVERT
7. REMOVE TEMPORARY DETOUR
8. CONSTRUCT INLET SECTIONS OF BARRELS #2 AND #3 WITH SILLS
9. REMOVE IMPERVIOUS DIKES #3 AND #4
10. REMOVE SPECIAL STILLING BASIN
11. CONSTRUCT NEW ROADWAY SECTION OF -Y-

REVISIONS

8/17/99

$$$$$$SYSTIME$$$$$$
$$$$$$USERNAME$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$

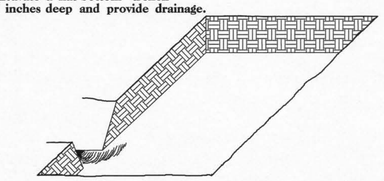
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.9.R.34	RF-1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	

PLANTING DETAILS

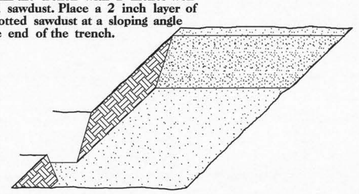
SEEDLING / LINER BAREROOT PLANTING DETAIL

HEALING IN

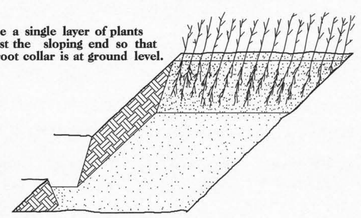
1. Locate a healing-in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



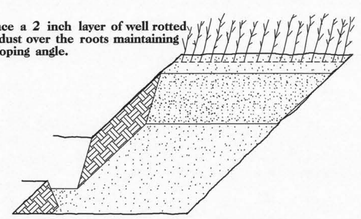
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



4. Place a single layer of plants against the sloping end so that the root collar is at ground level.

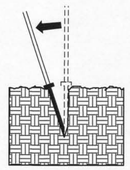


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

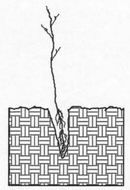


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

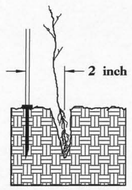
DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR



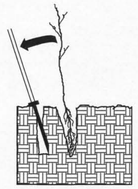
1. Insert planting bar as shown and pull handle toward planter.



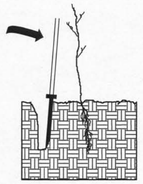
2. Remove planting bar and place seedling at correct depth.



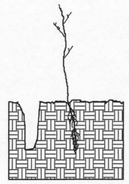
3. Insert planting bar 2 inches toward planter from seedling.



4. Pull handle of bar toward planter, firming soil at bottom.



5. Push handle forward firming soil at top.



6. Leave compaction hole open. Water thoroughly.

PLANTING NOTES:

PLANTING BAG
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.

KBC PLANTING BAR
Planting bar shall have a blade with a triangular cross section, and shall be 12 inches long, 4 inches wide and 1 inch thick at center.

ROOT PRUNING
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches below the root collar.

REFORESTATION

☐ TREE REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

REFORESTATION

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

25%	LIRIODENDRON TULIPIFERA	TULIP POPLAR	12 in – 18 in BR
25%	PLATANUS OCCIDENTALIS	SYCAMORE	12 in – 18 in BR
25%	FRAXINUS PENNSYLVANICA	GREEN ASH	12 in – 18 in BR
25%	BETULA NIGRA	RIVER BIRCH	12 in – 18 in BR

REFORESTATION DETAIL SHEET

N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT

T.I.P.: 17BP.3.R.28

CONTRACT:

TIP NO.	SHEET NO.
17BP.3.R.28	SIGN-1

APPROVED: Melissa B Toth

DATE: 6/18/2014

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

SIGNING PLAN
NEW HANOVER COUNTY

LOCATION: INTERSECTION OF SR 1436 (FRONT STREET) /US 421 TRUCK (CAROLINA BEACH ROAD) AND SR 1140 (BURNETT BOULEVARD)

INDEX

SHEET NO.	DESCRIPTION
SIGN-1	TITLE SHEET
SIGN-2	E AND F SHEET
SIGN-3	SIGNING PLAN SHEET

ROADWAY STANDARD DRAWING

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
901.70	SIGN STRINGERS AND SUPPORT SPACING
904.10	ORIENTATION OF GROUND MOUNTED SIGNS
904.50	MOUNTING OF TYPE 'D', 'E' AND 'F' SIGNS ON 'U' CHANNEL POSTS

GENERAL NOTES

. SIGNS FURNISHED BY STATE
. ALL TYPE 'D' SIGNS SHALL BE MOUNTED ON TWO U-CHANNEL POSTS UNLESS OTHERWISE INDICATED ON THE PLANS.
. IF REMOVAL OR RELOCATION OF SIGNS ON PRIVATE STREET (NON-STATE MAINTAINED) IS REQUIRED DUE TO CONSTRUCTION, THE CONTRACTOR SHALL INFORM THE ENGINEER. THE WORK WILL BE COMPLETED BY OTHERS.
. WHEN NOT STATIONED OR DIMENSIONED ON PLANS, ALL 'E' AND 'F' SIGNS SHALL BE FIELD LOCATED BY THE ENGINEER
. ALL EXISTING SIGNS ON "U" CHANNEL POST WITHIN THE PROJECT LIMITS SHALL BE REMOVED AND DISPOSED OF UNLESS OTHERWISE NOTED ON PLANS.
. WHEN EXISTING SIGNS ARE REMOVED AND INSTALLED ON NEW SUPPORTS, THE RE-ERECTION SHALL IMMEDIATELY FOLLOW THE REMOVAL.
. THE BACKGROUND FOR TYPE E & F SIGNS SHALL BE TYPE C REFLECTIVE SHEETING.
. SEE ROADWAY PLANS FOR GUARD/GUIDE RAIL DETAILS.
. SIGNING PLANS DO NOT INCLUDE TEMPORARY CONSTRUCTION SIGNING. SEE TRAFFIC CONTROL PLANS.

SUMMARY OF QUANTITIES

ITEM NO. DESC. NO.	ITEM NO. SECT. NO.	ITEM DESCRIPTION	QUANTITY	UNIT
4072000000	903	SUPPORTS, 3 LB STEEL U-CHANNEL	219	L.F.
4102000000	904	SIGN ERECTION, TYPE E	3	EA.
4108000000	904	SIGN ERECTION, TYPE F	6	EA.
4116100000	904	SIGN ERECTION, RELOCATE SIGN TYPE D	2	EA.
4116100000	904	SIGN ERECTION, RELOCATE SIGN TYPE E	1	EA.
4155000000	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	6	EA.
4192000000	907	DISPOSAL OF SUPPORT, U-CHANNEL	3	EA.

PAY ITEM NOTES

1. DISPOSAL OF SIGN SYSTEM, U-CHANNEL
2. RETAIN SIGN SYSTEM, U-CHANNEL
3. SIGN ERECTION, RELOCATE SIGN TYPE D
4. SIGN ERECTION, RELOCATE SIGN TYPE E
5. DISPOSAL OF SUPPORT, U-CHANNEL

PLAN REVIEWED BY: N.C.D.O.T. SIGNING AND DELINEATION UNIT

AYMAN ALQUDWAH, PE	SIGNING & DELINEATION REGIONAL ENGINEER
MITCH EATON	SIGNING & DELINEATION PROJECT DESIGN ENGINEER

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PLAN PREPARED BY:

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326

MELISSA TOTH, PE	SIGNING PROJECT ENGINEER
MATTHEW THIGPEN, PE	SIGNING PROJECT DESIGN ENGINEER

18-JUN-2014 16:22
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kwilson
ATTACHMENT 1 DUS290140

TIP NO.	SHEET NO.
17BP.3.R.28	SIGN-2

APPROVED: Melissa B. Toth

DATE: 6/18/2014

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

(401) QUANTITY REQ'D 1

36 X 36
R5-1

INSTALLED BEHIND SIGN 402
IN ONE INSTALLATION

(402) QUANTITY REQ'D 1

36 X 36 X 36
R1-2

ONE "U" POST PER SIGN

(403) QUANTITY REQ'D 1

36 X 36
R3-7

ONE "U" POST PER SIGN

(501) QUANTITY REQ'D 2

24 X 12
M4-5

24 X 24
M1-1

21 X 15
M6-2

ONE "U" POST PER SIGN

(502) QUANTITY REQ'D 1

24 X 12
M4-6

24 X 12
M4-4

30 X 24
M1-4

ONE "U" POST PER SIGN

(503) QUANTITY REQ'D 1

12 X 18
M1-8

12 X 18
M1-8

12 X 9
M6-1

ONE "U" POST PER SIGN

(504) QUANTITY REQ'D 1

12 X 18
M1-8

12 X 18
M1-8

12 X 9
M6-1

ONE "U" POST PER SIGN

(505) QUANTITY REQ'D 1

21 X 15
M6-2

MOUNTED IN ONE INSTALLATION
BELOW EXISTING SIGNS

TYPE "E" & "F" SIGNS

18-JUN-2014 16:22
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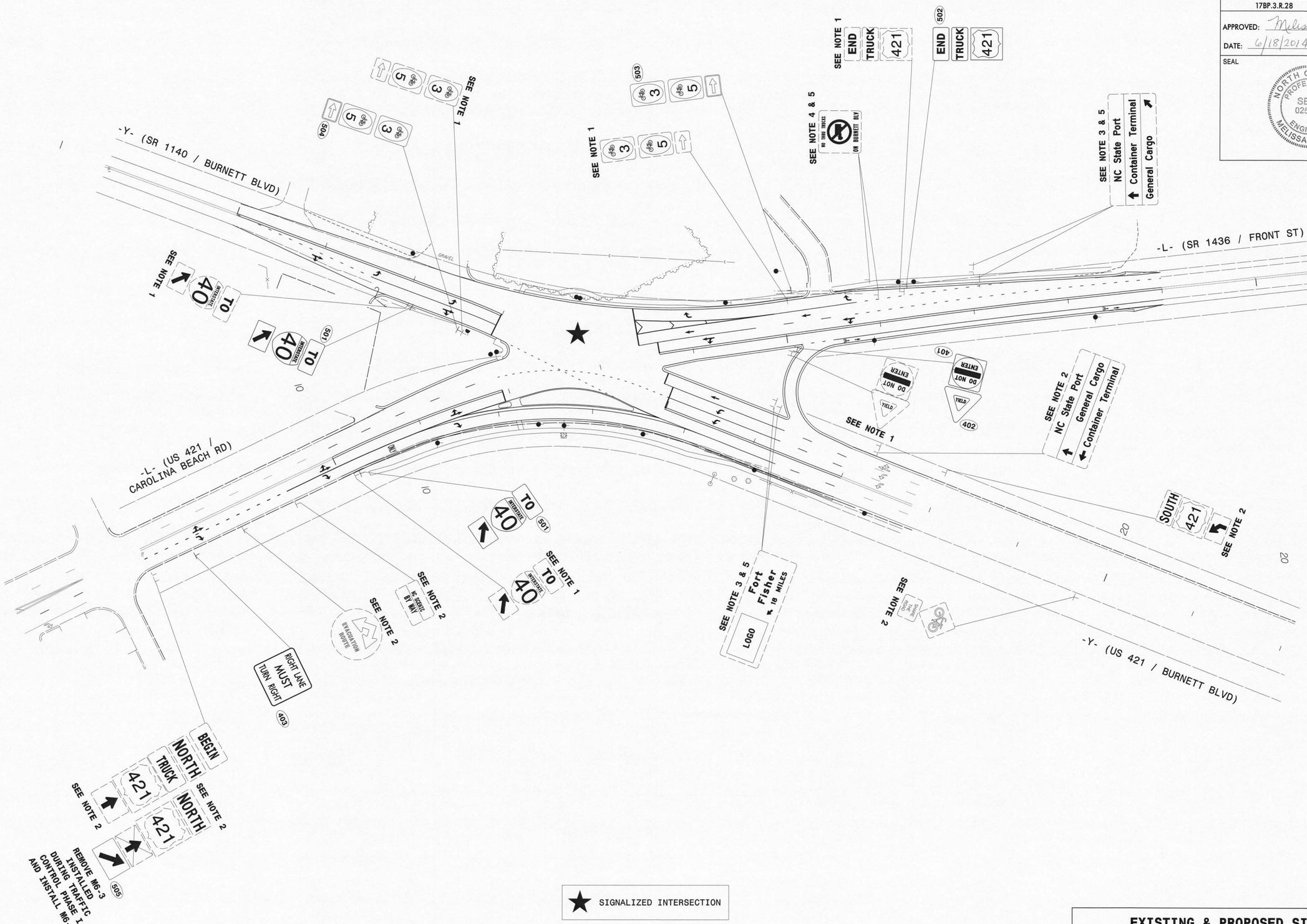
TIP NO.	SHEET NO.
17BP.3.R.28	SIGN-3

APPROVED: Melissa B. Toth

DATE: 6/18/2014

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH



★ SIGNALIZED INTERSECTION

EXISTING & PROPOSED SIGNS

-L- STA. 10+00 TO STA. 18+40

-Y- STA. 11+20 TO STA. 17+00

18-JUN-2014 16:22
\\Ilrapp01a\Production\Trans\NCDOT\Division03\Greenfield Lake\Traffic\Signing\CADD\Signing Layout Plans\Greenfield_signing_psh01.dgn
wile2054 A1 DUS290140

Project No.	Sheet No.
17BP.3.R.28	Sig. 1

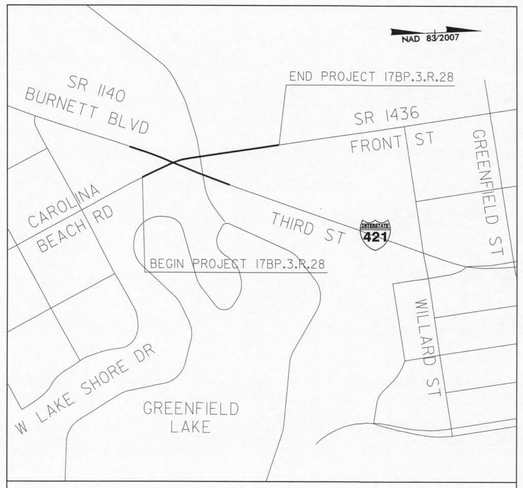
TIP PROJECT: 17BP.3.R.28

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

NEW HANOVER COUNTY

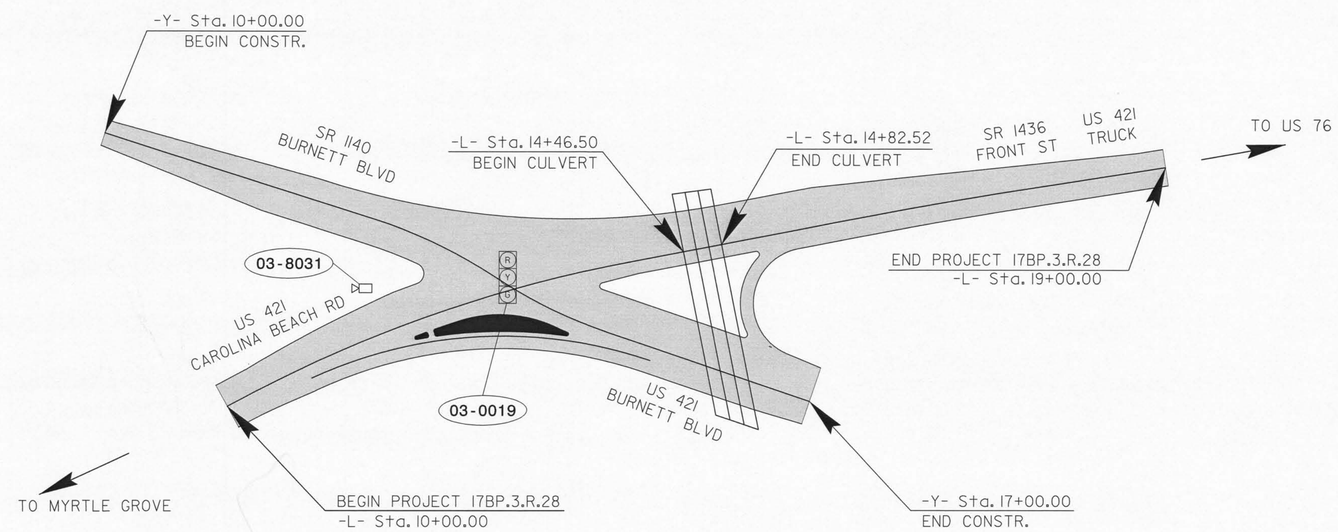
LOCATION: INTERSECTION OF SR 1436 /US 421 TRUCK (FRONT STREET) AND SR 1140 (BURNETT BOULEVARD) SOUTH OF WILLARD STREET

TYPE OF WORK: TRAFFIC SIGNALS



VICINITY MAP

NAD 83 NSRS 2007



NORTH CAROLINA PROFESSIONAL SEAL 022519 ENGINEER LISA M. MOON

Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.

Index of Plans

Sheet #	Reference #	Location/Description
Sig. 1	--------	Title Sheet
Sig. 2 – Sig. 4	03-0019T1	US 421 (Carolina Beach Road) /US 421 Truck – SR 1436 (Front Street) at SR 1140 (Burnett Boulevard)
Sig. 5 – Sig. 7	03-0019T2	US 421 (Carolina Beach Road) /US 421 Truck – SR 1436 (Front Street) at SR 1140 (Burnett Boulevard)
Sig. 8 – Sig. 10	03-0019T3	US 421 (Carolina Beach Road) /US 421 Truck – SR 1436 (Front Street) at SR 1140 (Burnett Boulevard)
Sig. 11 – Sig. 13	03-0019 Final	US 421 (Carolina Beach Road) /US 421 Truck – SR 1436 (Front Street) at US 421/SR 1140 (Burnett Boulevard)

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Lisa M. Moon, P.E. – Project Manager
Melissa B. Toth, P.E. – Senior Design Engineer

Contacts:

Amanda Glynn, PE – Division Bridge Program Manager
Pam Alexander, PE – Eastern Region Signals Engineer
George Brown, P.E. – Signal Equipment Design Engineer

Prepared for the Office of:
DIVISION OF HIGHWAYS
HIGHWAY DIVISION 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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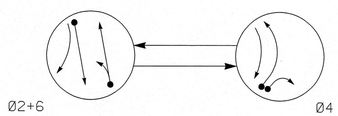
moon3833 AT DUS290142

PROJECT REFERENCE NO.	SHEET NO.
17.BP.3.R.28	Sig. 2

2 Phase
Fully Actuated
(Wilmington Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

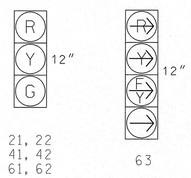
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

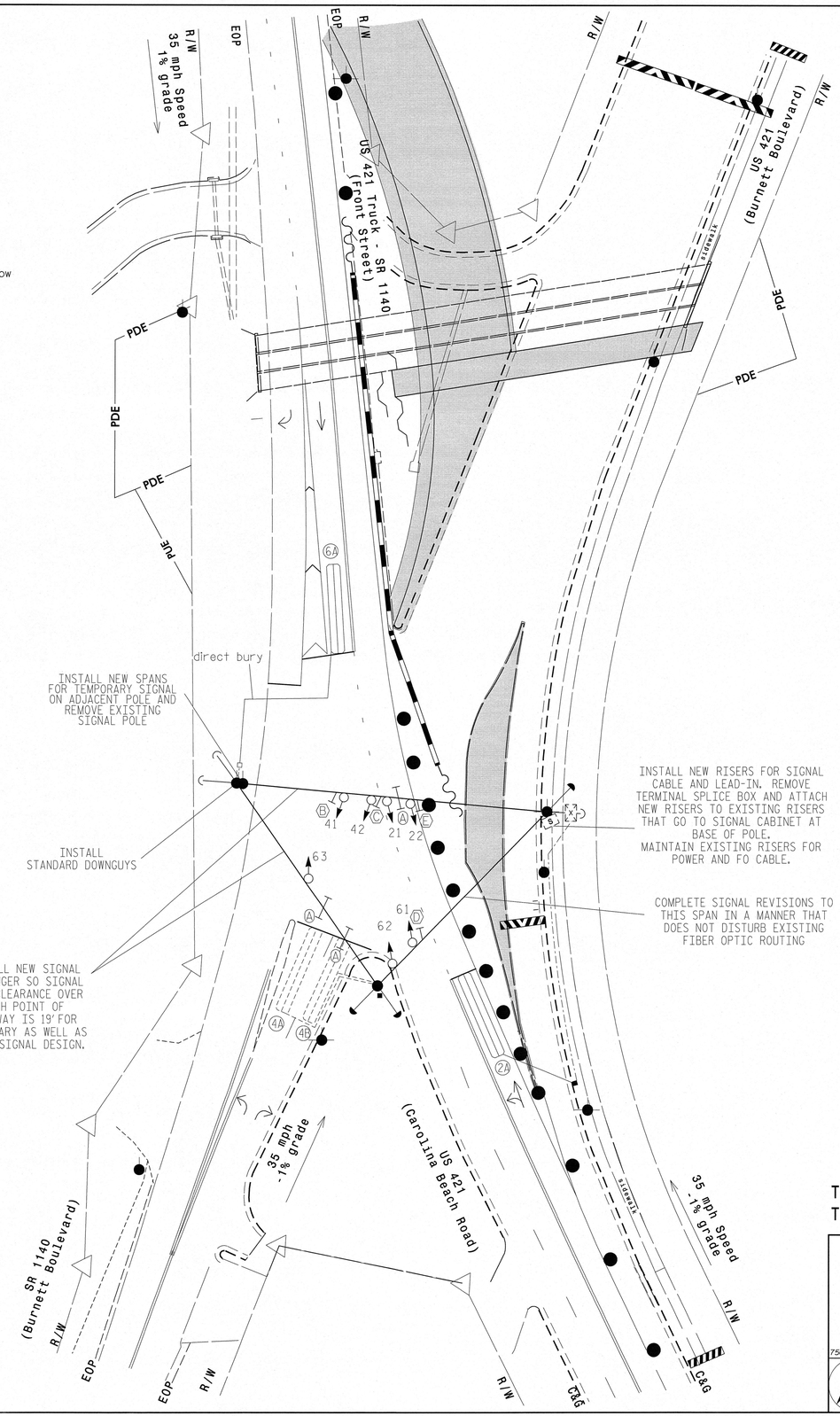
TABLE OF OPERATION			
SIGNAL FACE	PHASE		
	Ø2+6	Ø4	FLASH
21, 22	G	R	Y
41, 42	R	G	R
61, 62	G	R	Y
63	F Y	→	Y

F Y = Flashing Yellow Arrow

SIGNAL FACE I.D.

All Heads L.E.D.





OASIS 2070L 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
2A	6'x40'	0'	2-4-2	Y	2	Y	Y	-	-	-	-	-
4A	6'x40'	0'	2-4-2	-	4	Y	Y	-	-	-	-	-
4B	6'x40'	0'	2-4-2	-	4	Y	Y	-	-	-	-	-
6A	6'x40'	0'	2-4-2	Y	6	Y	Y	-	-	-	-	-

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Install new signal heads with enough signal cable to allow for the repositioning of signal heads as shown in the temporary and final signal designs.
5. Relocate street name signs to new spanwires.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

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	
	Directional Arrow	
S	Terminal Splice Box	S
N/A	Permanent Utility Easement	— PUE —
N/A	Permanent Drainage Easement	— PDE —
A	Street Name Sign (Double Sided)	A
B	Left Arrow "ONLY" Sign (R3-5L)	B
C	Right Arrow "ONLY" Sign (R3-5R)	C
D	No Left Turn Sign (R3-2)	D
E	No Right Turn Sign (R3-1)	E
	Construction Zone	
	Construction Zone Drums	
	Construction Barricade	
	Crash Cushion	
	Portable Concrete Barrier	

OASIS 2070L TIMING CHART			
FEATURE	PHASE 2	PHASE 4	PHASE 6
Min Green 1 *	10	7	10
Extension 1 *	2.0	3.0	2.0
Max Green 1 *	60	30	60
Yellow Clearance	3.9	3.0	3.8
Red Clearance	3.3	3.2	2.4
Red Revert	2.0	2.0	2.0
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	YELLOW
Dual Entry	-	-	-
Simultaneous Gap	ON	ON	ON

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

Temporary Design 1
Traffic Control Phase I

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 310
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(919) 876-6888 NCBEES #F-0326

Prepared for the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 421 (Carolina Beach Road)/
US 421 Truck-SR 1436 (Front St)
at
SR 1140 (Burnett Boulevard)

Division 03 New Hanover County Wilmington

PLAN DATE: May 2014	REVIEWED BY: MB Toth
PREPARED BY: LMM	REVIEWED BY:

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022516 ENGINEER LISA M. MOON

SIGNATURE DATE 6.13.14

SIG. INVENTORY NO. 03-0019TI

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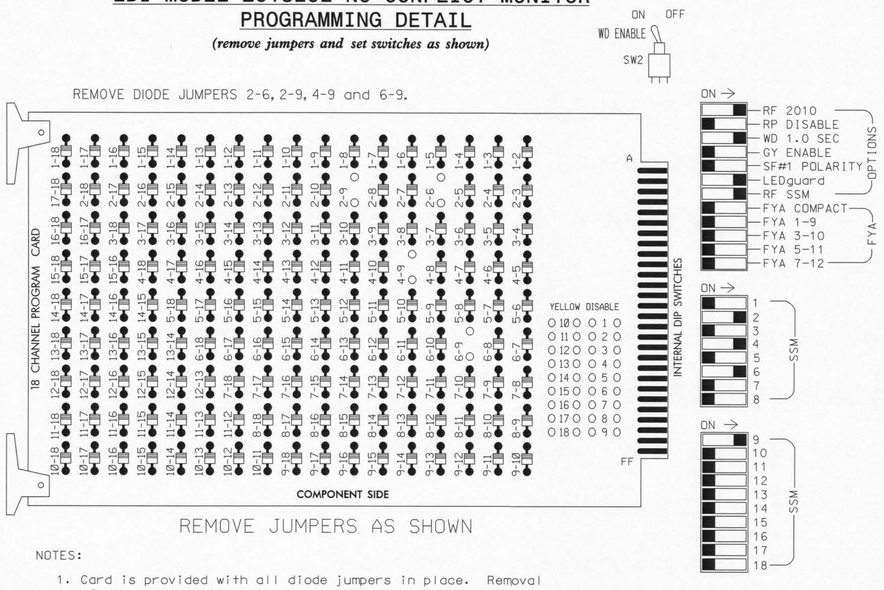
PROJECT REFERENCE NO.	SHEET NO.
17.BP.3.R.28	Sig. 3

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches 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 Start Up In Green.
4. Program phases 2 and 6 for Yellow Flash, and overlap 1 as wag overlap.
5. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

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

SIGNAL HEAD HOOK-UP CHART

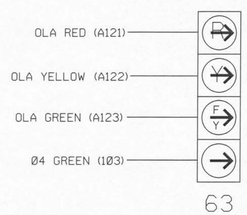
LOAD SWITCH NO.	S1	S2	S3	S4	S5		S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4		14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4		4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22	NU	NU	41,42	63★	NU	NU	61,62	NU	NU	NU	NU	63★	NU	NU	NU	NU	NU
RED		128			101				134										
YELLOW		129			102				135										
GREEN		130			103				136										
RED ARROW														A121					
YELLOW ARROW														A122					
FLASHING YELLOW ARROW														A123					
GREEN ARROW						103													

NU = Not Used

★ See pictorial of head wiring in detail below.

4 SECTION FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. The sequence display for this signal requires special logic programming. See sheet 2 of 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	SLOT	Ø2 2A	SLOT	SLOT	SLOT	Ø4 4A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	Ø4 4B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	SLOT	Ø6 6A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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

FS = FLASH SENSE
ST = STOP TIME

Reuse existing detector cards for temporary and final signal designs.

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
2A	TB2-5,6	I2U	39	1	2	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			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0019T1
DESIGNED: May 2014
SEALED: June 13, 2014
REVISED:

Signal Upgrade - Temporary Design 1 (Electrical Detail Sheet 1 of 2)

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 421 (Carolina Beach Road)/
US 421 Truck-SR 1436 (Front St)
at
SR 1140 (Burnett Boulevard)

Division 03 New Hanover County Wilmington

PLAN DATE: May 2014	REVIEWED BY: LM Moon
PREPARED BY: AM Encarnacion	REVIEWED BY: MB Toth

REVISIONS	INIT.	DATE

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

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

Melissa B Toth 6/13/14
SIGNATURE DATE

SIG. INVENTORY NO. 03-0019T1

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

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PROJECT REFERENCE NO.	SHEET NO.
17.BP.3.R.28	Sig. 4

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 AND 3.

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

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #4  IS ON
AND RED CLEAR ON PHASE #4  IS ON

                 SCROLL DOWN

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

NOTE: LOGIC FOR PHASE 4 RED CLEAR WHEN TRANSITIONING FROM PHASE 4 TO PHASE 6 ACROSS THE BARRIER (HEAD 63).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #4  IS ON

                 SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 4 (HEAD 63).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #4  IS ON

                 SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 4 (HEAD 63).

OUTPUT REFERENCE SCHEDULE

OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

OVERLAP PROGRAMMING DETAIL

(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:  |   X X
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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0019T1
DESIGNED: May 2014
SEALED: June 13, 2014
REVISED:

Signal Upgrade - Temporary Design 1 (Electrical Detail Sheet 2 of 2)

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 421 (Carolina Beach Road)/
US 421 Truck-SR 1436 (Front St)
at
SR 1140 (Burnett Boulevard)

Division 03 New Hanover County Wilmington

PLAN DATE:	May 2014	REVIEWED BY:	LM Moon
PREPARED BY:	AM Encarnacion	REVIEWED BY:	MB Toth

REVISIONS	INIT.	DATE

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

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

Melissa B. Toth 6/13/14
SIGNATURE DATE

SIG. INVENTORY NO. 03-0019T1

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

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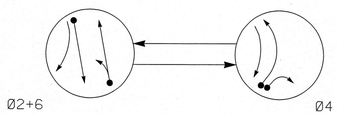
moon3833 AT DUS230142

PROJECT REFERENCE NO.	SHEET NO.
17.BP.3.R.28	Sig. 5

2 Phase
Fully Actuated
(Wilmington Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

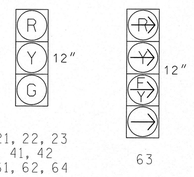
TABLE OF OPERATION

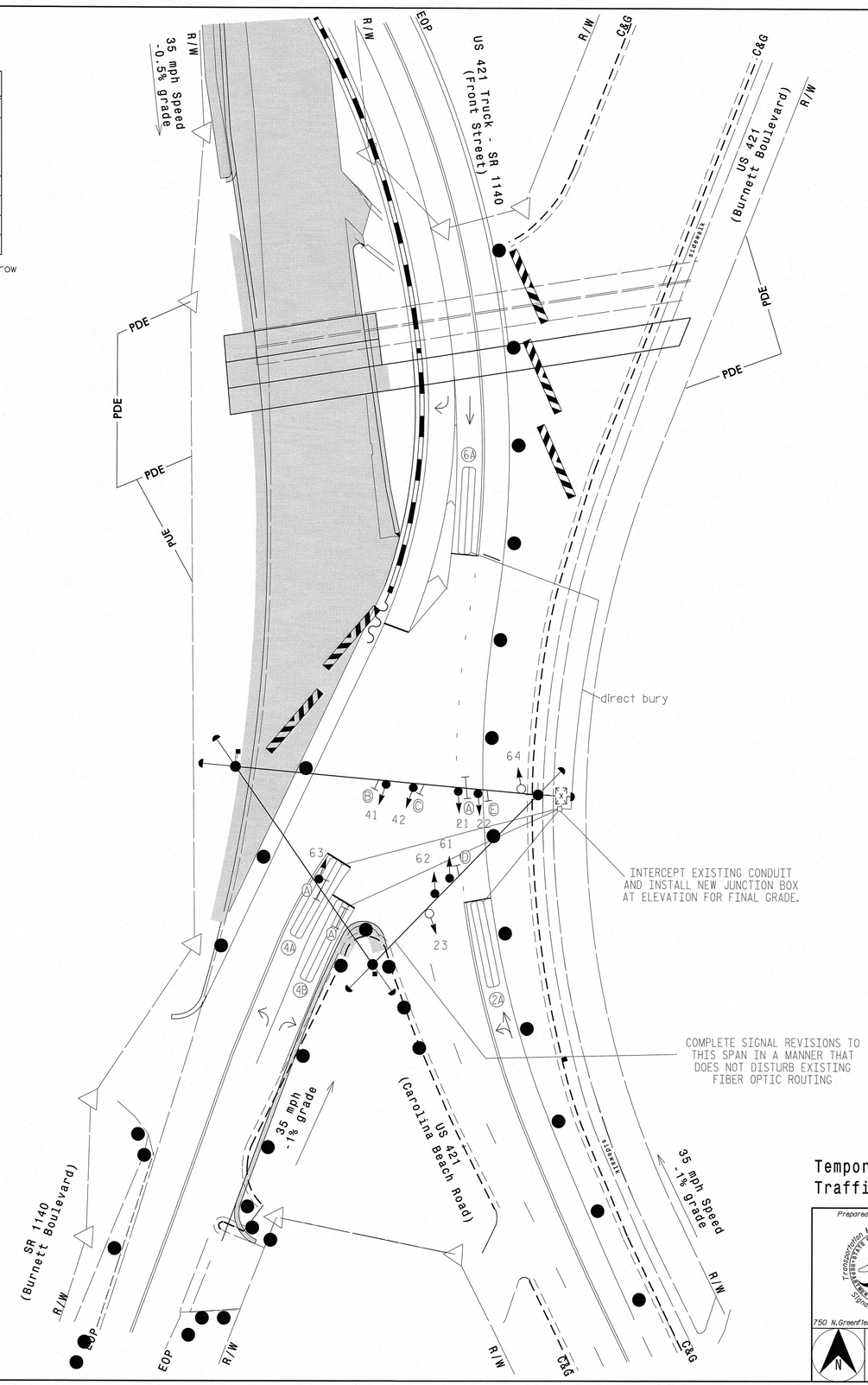
SIGNAL FACE	PHASE Ø2+6	PHASE Ø4	FLASH
21, 22, 23	G	R	Y
41, 42	R	G	R
61, 62, 64	G	R	Y
63	F Y	→	Y

F Y = Flashing Yellow Arrow

SIGNAL FACE I.D.

All Heads L.E.D.





OASIS 2070L 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
2A	6'x40'	0'	2-4-2	Y	2	Y	Y	-	-	-	-	-
4A	6'x40'	0'	2-4-2	Y	4	Y	Y	-	-	3	-	-
4B	6'x40'	0'	2-4-2	Y	4	Y	Y	-	-	-	-	-
6A	6'x40'	0'	2-4-2	Y	6	Y	Y	-	-	-	-	-

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Install new signal heads with enough signal cable to allow for the repositioning of signal heads as shown in the temporary and final signal designs.
5. Reposition all signal heads as shown.
6. Reposition all signs as shown.
7. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

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	
	Directional Arrow	
N/A	Permanent Utility Easement	— PUE —
N/A	Permanent Drainage Easement	— PDE —
A	Street Name Sign (Double Sided)	A
B	Left Arrow "ONLY" Sign (R3-5L)	B
C	Right Arrow "ONLY" Sign (R3-5R)	C
D	No Left Turn Sign (R3-2)	D
E	No Right Turn Sign (R3-1)	E
	Construction Zone	
	Construction Zone Drums	
	Construction Barricade	
	Crash Cushion	
	Portable Concrete Barrier	

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6
Min Green 1 *	10	7	10
Extension 1 *	2.0	3.0	2.0
Max Green 1 *	60	30	60
Yellow Clearance	3.9	3.0	3.9
Red Clearance	2.9	3.3	3.1
Red Revert	2.0	2.0	2.0
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	YELLOW
Dual Entry	-	-	-
Simultaneous Gap	ON	ON	ON

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

Temporary Design 2
Traffic Control Phase II

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Prepared for the Offices of:
Transportation Mobility and Safety Division
Signal Design Section
750 N.Greenfield Pkwy,Garner,NC 27529

US 421 (Carolina Beach Road)/ US 421 Truck-SR 1436 (Front St) at SR 1140 (Burnett Boulevard)

Division 03 New Hanover County Wilmington

PLAN DATE:	May 2014	REVIEWED BY:	MB Toth
PREPARED BY:	LMM	REVIEWED BY:	

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022516 ENGINEER LISA M. MOON

SIGNATURE Lisa M. Moon DATE 6-13-14

SIG. INVENTORY NO. 03-0019T2

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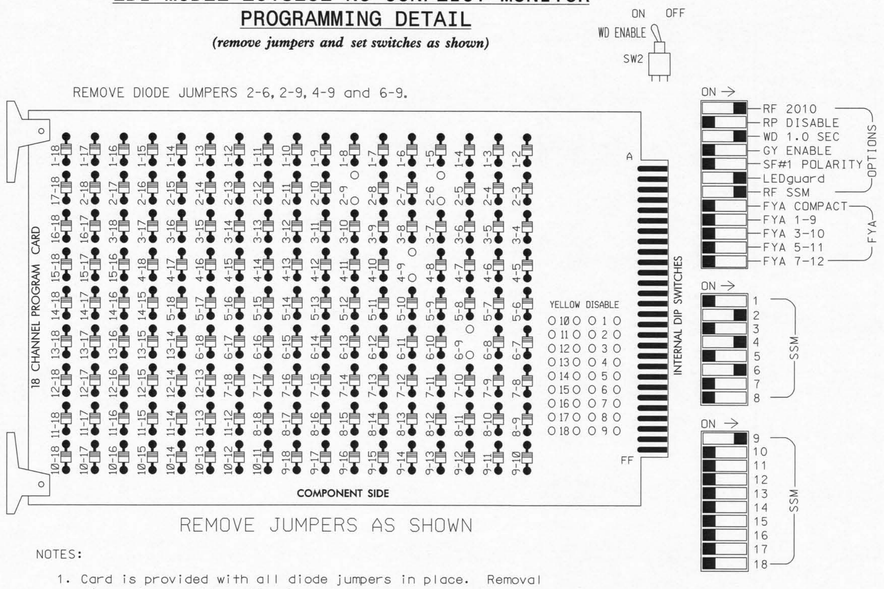
CHAPESON AT DUS290137

PROJECT REFERENCE NO.	SHEET NO.
17.BP.3.R.28	Sig. 6

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches 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 Start Up In Green.
4. Program phases 2 and 6 for Yellow Flash, and overlap 1 as wag overlap.
5. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

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

SIGNAL HEAD HOOK-UP CHART

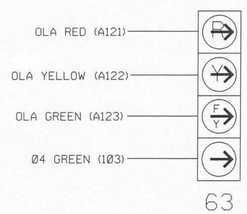
LOAD SWITCH NO.	S1	S2	S3	S4	S5		S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4		14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4		4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22, 23	NU	NU	41,42	63★	NU	NU	61,62, 64	NU	NU	NU	NU	63★	NU	NU	NU	NU	NU
RED		128			101				134										
YELLOW		129			102				135										
GREEN		130			103				136										
RED ARROW														A121					
YELLOW ARROW														A122					
FLASHING YELLOW ARROW														A123					
GREEN ARROW						103													

NU = Not Used

★ See pictorial of head wiring in detail below.

4 SECTION FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. The sequence display for this signal requires special logic programming. See sheet 2 of 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	SLOT	ø2 2A	SLOT	SLOT	SLOT	ø4 4A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS DC ISOLATOR
	L	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	ø4 4B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST DC ISOLATOR
FILE "J"	U	SLOT	ø6 6A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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

FS = FLASH SENSE
ST = STOP TIME

Reuse existing detector cards for temporary and final signal designs.

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
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
4A	TB4-9,10	I6U	41	3	4	4	Y	Y			3
4B	TB4-11,12	I6L	45	7	14	4	Y	Y			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0019T2
DESIGNED: May 2014
SEALED: June 13, 2014
REVISED:

Signal Upgrade - Temporary Design 2 (Electrical Detail Sheet 1 of 2)

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 421 (Carolina Beach Road)/
US 421 Truck-SR 1436 (Front St)
at
SR 1140 (Burnett Boulevard)

Division 03 New Hanover County Wilmington

PLAN DATE: May 2014 REVIEWED BY: LM Moon
PREPARED BY: AM Encarnacion REVIEWED BY: MB Toth

REVISIONS INIT. DATE

Prepared for the Offices of: Transportation Mobility and Safety Division, Signal Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

SEAL NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

Melissa Toth 6/13/14
SIGNATURE DATE

SIG. INVENTORY NO. 03-0019T2

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

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moon3833 AT DGS29142

PROJECT REFERENCE NO.	SHEET NO.
17.BP.3.R.28	Sig. 7

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 AND 3.

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

```
 LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE        #4  IS ON
AND RED CLEAR ON PHASE #4  IS ON

                 SCROLL DOWN

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

NOTE: LOGIC FOR PHASE 4 RED CLEAR WHEN TRANSITIONING FROM PHASE 4 TO PHASE 6 ACROSS THE BARRIER (HEAD 63).

PRESS '+'

```
 LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE        #4  IS ON

                 SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 4 (HEAD 63).

PRESS '+'

```
 LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE     #4  IS ON

                 SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 4 (HEAD 63).

OUTPUT REFERENCE SCHEDULE

OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

OVERLAP PROGRAMMING DETAIL

(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:  |   X X
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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0019T2
DESIGNED: May 2014
SEALED: June 13, 2014
REVISED:

Signal Upgrade - Temporary Design 2 (Electrical Detail Sheet 2 of 2)

ELECTRICAL AND PROGRAMMING DETAILS FOR:

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

US 421 (Carolina Beach Road)/
US 421 Truck-SR 1436 (Front St)
at
SR 1140 (Burnett Boulevard)

Division 03 New Hanover County Wilmington

PLAN DATE: May 2014		REVIEWED BY:	LM Moon
PREPARED BY: AM Encarnacion		REVIEWED BY:	MB Toth

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

Melissa B. Toth 6/13/14
SIGNATURE DATE

SIG. INVENTORY NO. 03-0019T2

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

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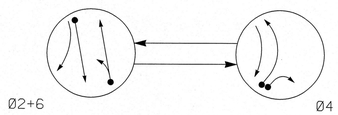
mcook903 AT1805010142

PROJECT REFERENCE NO.	SHEET NO.
17.BP.3.R.28	Sig. 8

2 Phase
Fully Actuated
(Wilmington Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

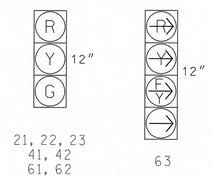
- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

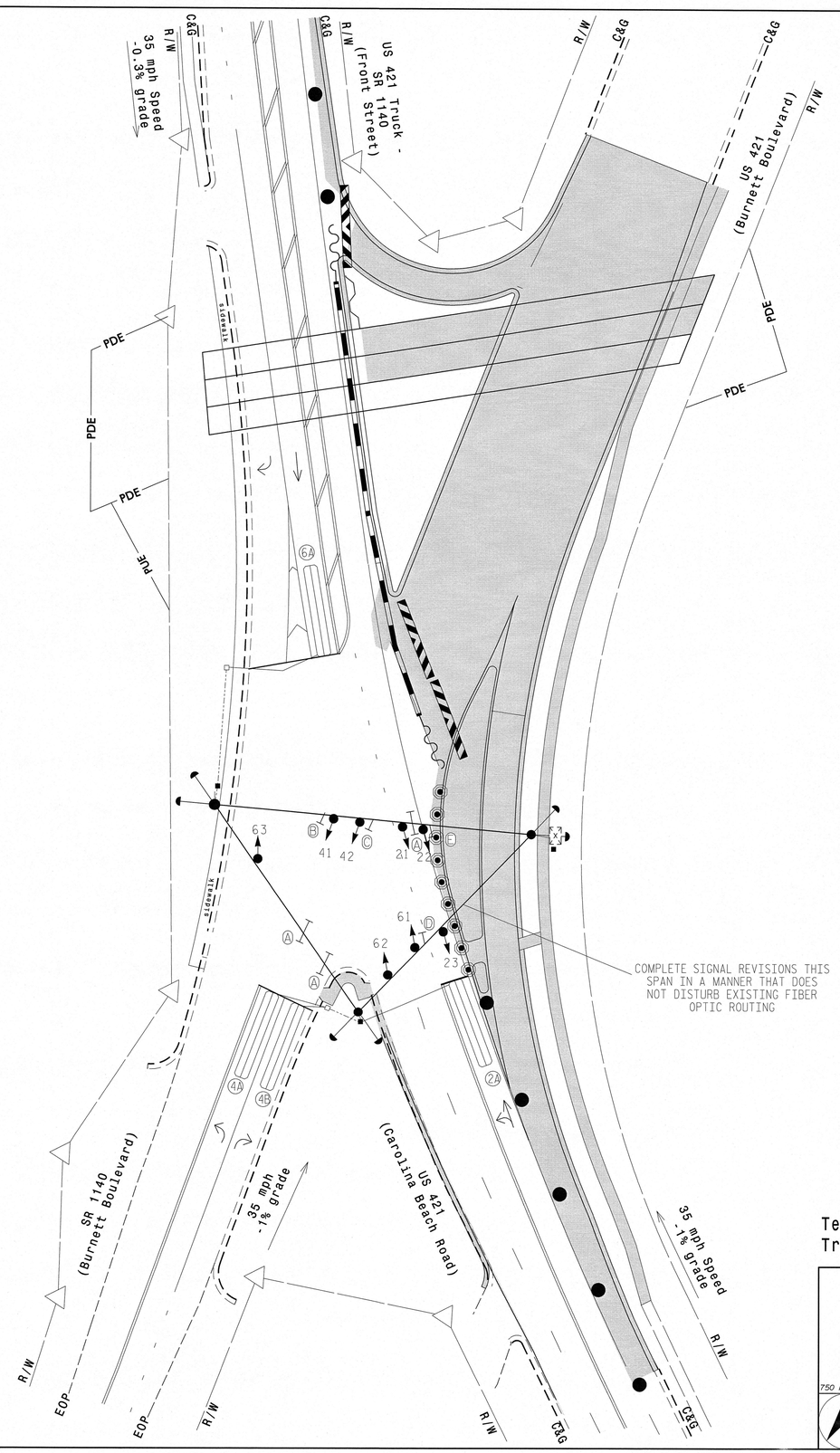
TABLE OF OPERATION

SIGNAL FACE	PHASE Ø2+6	PHASE Ø4	PHASE FLASH
21, 22, 23	G	R	Y
41, 42	R	G	R
61, 62	G	R	Y
63	F	→	Y

SIGNAL FACE I.D.

All Heads L.E.D.





OASIS 2070L 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
2A	6'x40'	0'	2-4-2	Y	2	Y	Y	-	-	-	-	-
4A	6'x40'	0'	2-4-2	Y	4	Y	Y	-	-	-	-	-
4B	6'x40'	0'	2-4-2	Y	4	Y	Y	-	-	-	-	-
6A	6'x40'	0'	2-4-2	Y	6	Y	Y	-	-	-	-	-

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Set all detector units to presence mode.
4. Reposition all signal heads as shown.
5. Reposition all signs as shown.
6. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

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	
	Directional Arrow	
N/A	Permanent Utility Easement	— PUE —
N/A	Permanent Drainage Easement	— PDE —
Ⓐ	Street Name Sign (Double Sided)	Ⓐ
Ⓑ	Left Arrow "ONLY" Sign (R3-5L)	Ⓑ
Ⓒ	Right Arrow "ONLY" Sign (R3-5R)	Ⓒ
Ⓓ	No Left Turn Sign (R3-2)	Ⓓ
Ⓔ	No Right Turn Sign (R3-1)	Ⓔ
	Construction Zone	
	Construction Zone Drums	
	Construction Barricade	
	Crash Cushion	
	Portable Concrete Barrier	

OASIS 2070L TIMING CHART

FEATURE	PHASE 2	PHASE 4	PHASE 6
Min Green 1 *	10	7	10
Extension 1 *	2.0	3.0	2.0
Max Green 1 *	60	30	60
Yellow Clearance	3.9	3.0	3.9
Red Clearance	3.6	3.8	2.5
Red Revert	2.0	2.0	2.0
Walk 1 *	-	-	-
Don't Walk 1	-	-	-
Seconds Per Actuation *	-	-	-
Max Variable Initial *	-	-	-
Time Before Reduction *	-	-	-
Time To Reduce *	-	-	-
Minimum Gap	-	-	-
Recall Mode	MIN RECALL	-	MIN RECALL
Vehicle Call Memory	YELLOW	-	YELLOW
Dual Entry	-	-	-
Simultaneous Gap	ON	ON	ON

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

Temporary Design 3
Traffic Control Phase III

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

Prepared for 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 421 (Carolina Beach Road)/
US 421 Truck-SR 1436 (Front St)
at
SR 1140 (Burnett Boulevard)

Division 03 New Hanover County Wilmington

PLAN DATE: May 2014	REVIEWED BY: MB Toth
PREPARED BY: LMM	REVIEWED BY:

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 022516 ENGINEER LISA M. MOON

Lisa M Moon 6-13-14
SIGNATURE DATE

SIG. INVENTORY NO. 03-0019T3

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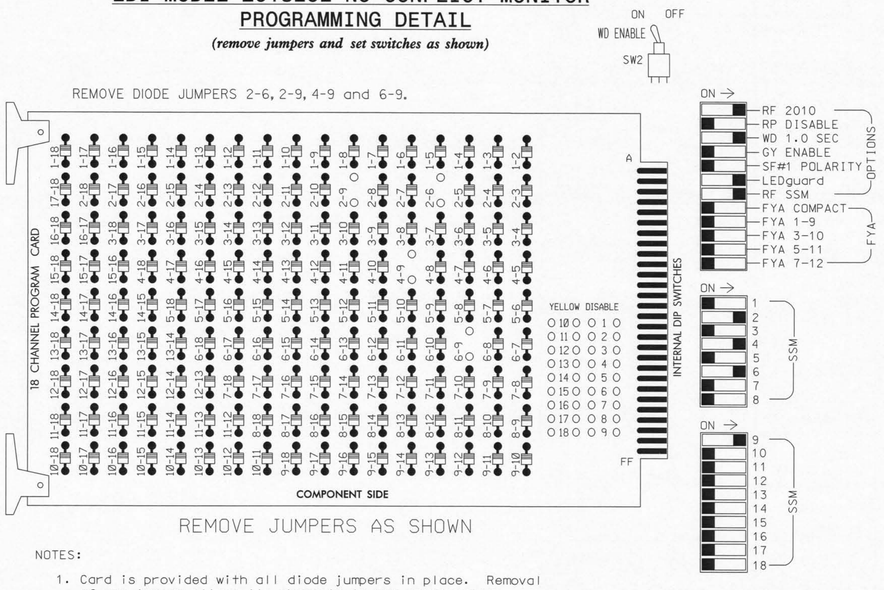
PROJECT REFERENCE NO.	SHEET NO.
17.BP.3.R.28	Sig. 9

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches 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 Start Up In Green.
4. Program phases 2 and 6 for Yellow Flash, and overlap 1 as wag overlap.
5. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

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

SIGNAL HEAD HOOK-UP CHART

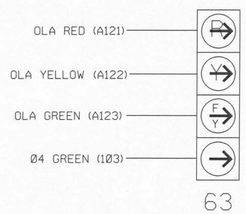
LOAD SWITCH NO.	S1	S2	S3	S4	S5		S6	S7	S8	S9	S10	S11	S12	AUX S1	AUX S2	AUX S3	AUX S4	AUX S5	AUX S6
CMU CHANNEL NO.	1	2	13	3	4		14	5	6	15	7	8	16	9	10	17	11	12	18
PHASE	1	2	2 PED	3	4		4 PED	5	6	6 PED	7	8	8 PED	OLA	OLB	SPARE	OLC	OLD	SPARE
SIGNAL HEAD NO.	NU	21,22, 23	NU	NU	41,42	63★	NU	NU	61,62	NU	NU	NU	NU	63★	NU	NU	NU	NU	NU
RED		128			101				134										
YELLOW		129			102				135										
GREEN		130			103				136										
RED ARROW														A121					
YELLOW ARROW														A122					
FLASHING YELLOW ARROW														A123					
GREEN ARROW						103													

NU = Not Used

★ See pictorial of head wiring in detail below.

4 SECTION FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)



NOTE

1. The sequence display for this signal requires special logic programming. See sheet 2 of 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	SLOT	Ø2 / 2A	SLOT	SLOT	SLOT	Ø4 / 4A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	FS / DC ISOLATOR
	L	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	Ø4 / 4B	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	ST / DC ISOLATOR
FILE "J"	U	SLOT	Ø6 / 6A	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
	L	EMPTY	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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

FS = FLASH SENSE
ST = STOP TIME

Reuse existing detector cards for temporary and final signal designs.

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
2A	TB2-5,6	I2U	39	1	2	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			
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			

INPUT FILE POSITION LEGEND: J2L
FILE J
SLOT 2
LOWER

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0019T3
DESIGNED: May 2014
SEALED: June 13, 2014
REVISED:

Signal Upgrade - Temporary Design 3 (Electrical Detail Sheet 1 of 2)

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 421 (Carolina Beach Road)/
US 421 Truck-SR 1436 (Front St)
at
SR 1140 (Burnett Boulevard)

Division 03 New Hanover County Wilmington

PLAN DATE: May 2014		REVIEWED BY:	LM Moon
PREPARED BY: AM Encarnacion		REVIEWED BY:	MB Toth

REVISIONS	INIT.	DATE

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

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

Melissa B. Toth 6/13/14
SIGNATURE DATE

SIG. INVENTORY NO. 03-0019T3

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mson3833 AT 0052901 42

PROJECT REFERENCE NO.	SHEET NO.
17.BP.3.R.28	Sig. 10

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 AND 3.

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

```
LOGICAL I/O COMMAND #1  (+/-COMMAND#)
IF  ACTIVE PHASE       #4  IS ON
AND RED CLEAR ON PHASE #4  IS ON

              SCROLL DOWN

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

NOTE: LOGIC FOR PHASE 4 RED CLEAR WHEN TRANSITIONING FROM PHASE 4 TO PHASE 6 ACROSS THE BARRIER (HEAD 63).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #4  IS ON

              SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 4 (HEAD 63).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #4  IS ON

              SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 4 (HEAD 63).

OUTPUT REFERENCE SCHEDULE

OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

OVERLAP PROGRAMMING DETAIL

(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:|   X X
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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0019T3
DESIGNED: May 2014
SEALED: June 13, 2014
REVISED:

Signal Upgrade - Temporary Design 3 (Electrical Detail Sheet 2 of 2)

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 421 (Carolina Beach Road)/
US 421 Truck-SR 1436 (Front St)
at
SR 1140 (Burnett Boulevard)

Division 03 New Hanover County Wilmington

PLAN DATE:	May 2014	REVIEWED BY:	LM Moon
PREPARED BY:	AM Encarnacion	REVIEWED BY:	MB Toth

REVISIONS	INIT.	DATE

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

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

Melissa B. Toth 6/13/14
SIGNATURE DATE

SIG. INVENTORY NO. 03-0019T3

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

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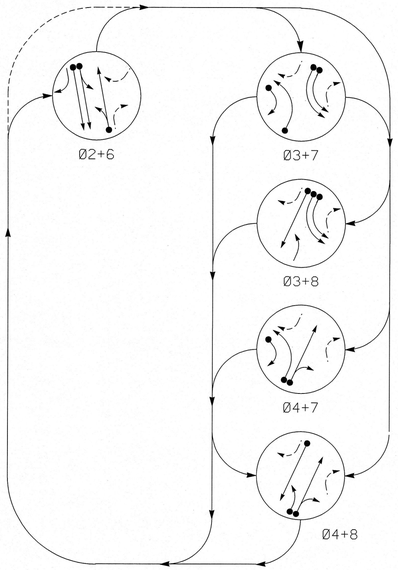
mscott33 AT DMS29142

PROJECT REFERENCE NO.	SHEET NO.
17.BP.3.R.28	Sig. 11

5 Phase
Fully Actuated
(Wilmington Signal System)

PHASING DIAGRAM



PHASING DIAGRAM DETECTION LEGEND

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

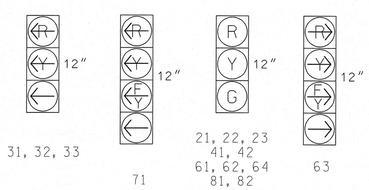
TABLE OF OPERATION

SIGNAL FACE	PHASE 02+06	03+07	03+08	04+07	04+08	FLASH
21, 22, 23	G	R	R	R	R	Y
31, 32, 33	←R	←	←	←R	←R	←R
41, 42	R	R	R	G	G	R
61, 62, 64	G	R	R	R	R	Y
63	←FY	→	→R	→	→R	→Y
71	←R	←	←FY	←	←FY	←R
81, 82	R	R	G	R	G	R

←FY = Flashing Yellow Arrow

SIGNAL FACE I.D.

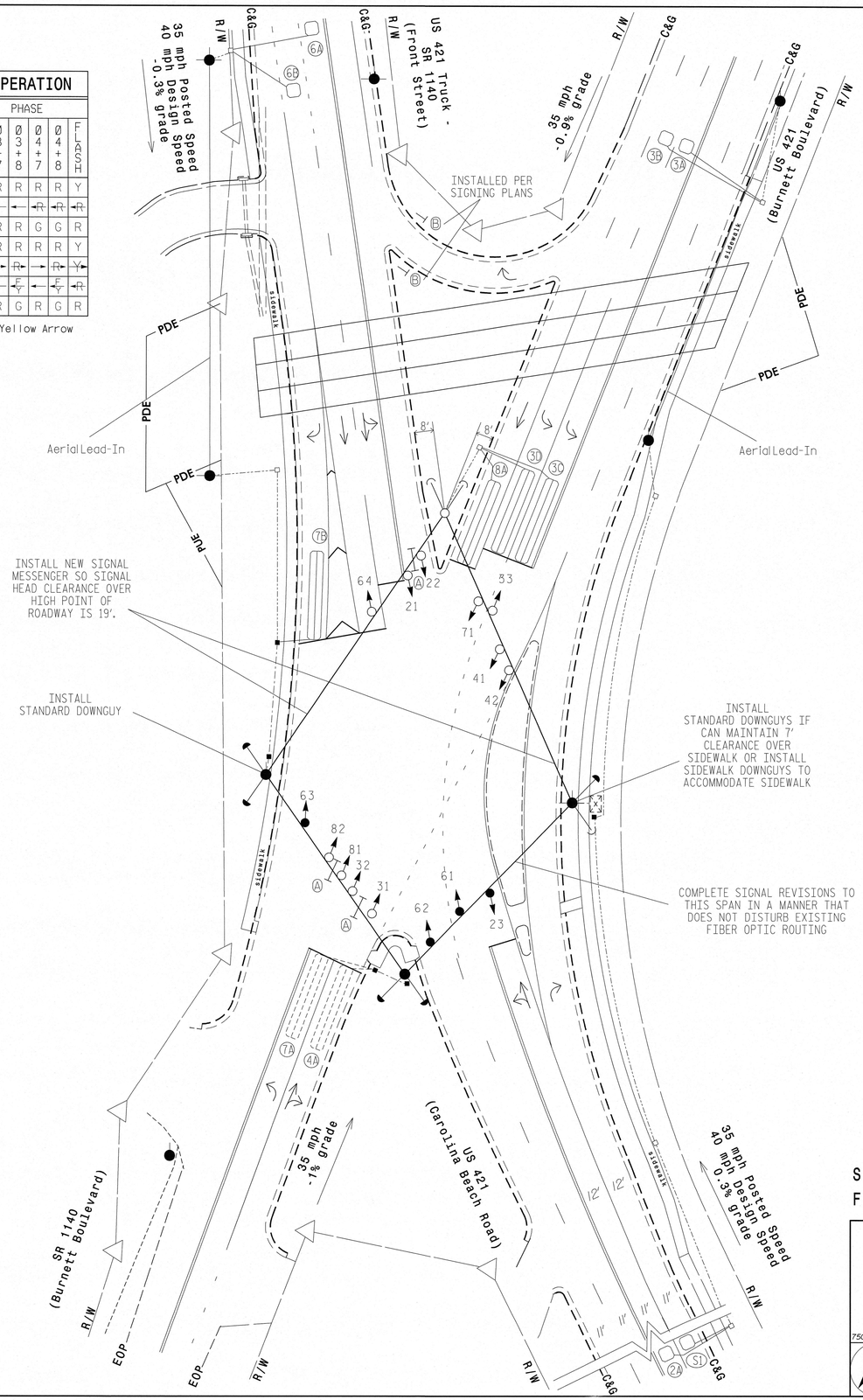
All Heads L.E.D.



OASIS 2070L TIMING CHART

FEATURE	PHASE 2	3	4	6	7	8
Min Green 1 *	12	7	7	12	7	7
Extension 1 *	6.0	5.0	2.0	6.0	3.0	2.0
Max Green 1 *	60	45	25	60	20	25
Yellow Clearance	4.2	3.2	3.9	4.2	3.0	3.9
Red Clearance	2.7	3.4	3.3	2.0	4.2	3.3
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	2.5	-	-	1.8	-	-
Max Variable Initial *	31	-	-	31	-	-
Time Before Reduction *	15	5	-	15	-	-
Time To Reduce *	30	15	-	30	-	-
Minimum Gap	3.3	3.0	-	3.3	-	-
Recall Mode	SOFT RECALL	-	-	SOFT RECALL	-	-
Vehicle Call Memory	YELLOW	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	ON
Simultaneous Gap	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.



OASIS 2070L 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
2A	6'x6'	250'	5	Y	2	Y	Y	-	-	-	-	-
3A	6'x6'	200'	5	Y	3	-	Y	-	2.3	-	-	-
3B	6'x6'	200'	5	Y	3	-	Y	-	2.3	-	-	-
3C	6'x40'	0'	2-4-2	Y	3	Y	Y	Y	2	5	-	-
3D	6'x40'	0'	2-4-2	Y	3	Y	Y	Y	2	5	-	-
4A	6'x40'	0'	2-4-2	-	4	Y	Y	-	-	-	-	-
6A	6'x6'	250'	5	Y	6	Y	Y	-	-	-	-	-
6B	6'x6'	250'	5	Y	6	Y	Y	-	-	-	-	-
7A	6'x40'	0'	2-4-2	-	7	Y	Y	-	-	15	-	-
					4	Y	Y	-	-	-	-	-
7B	6'x40'	0'	2-4-2	Y	7	Y	Y	-	-	15	-	Y
8A	6'x40'	0'	2-4-2	Y	8	Y	Y	-	-	-	-	Y
S1	6'x6'	250'	5	Y	-	-	-	-	-	-	Y	Y

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 3 and/or phase 7 may be lagged.
4. Reposition existing signal heads numbered 23, 62, and 63.
5. Reposition existing street name signs for Carolina Beach Road and Front Street as shown.
6. Relocate street name sign for Burnett Blvd as shown.
7. Set all detector units to presence mode.
8. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.

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	
	Directional Arrow	
Ⓐ	Street Name Sign (Double Sided)	Ⓐ
Ⓑ	"YIELD" Sign (R1-2)	Ⓑ
N/A	Permanent Utility Easement — PUE —	
N/A	Permanent Drainage Easement — PDE —	

Signal Upgrade
Final Design

ATKINS
1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

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

US 421 (Carolina Beach Road)/
US 421 Truck-SR 1436 (Front St)
at
US 421/SR 1140 (Burnett Blvd)

Division 03 New Hanover County Wilmington

PLAN DATE: May 2014	REVIEWED BY: MB Toth
PREPARED BY: LMM	REVIEWED BY:

SCALE 0 30 1"=30'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022516 LISA M. MOON
SIGNATURE DATE 6-13-14
SIG. INVENTORY NO. 03-0019

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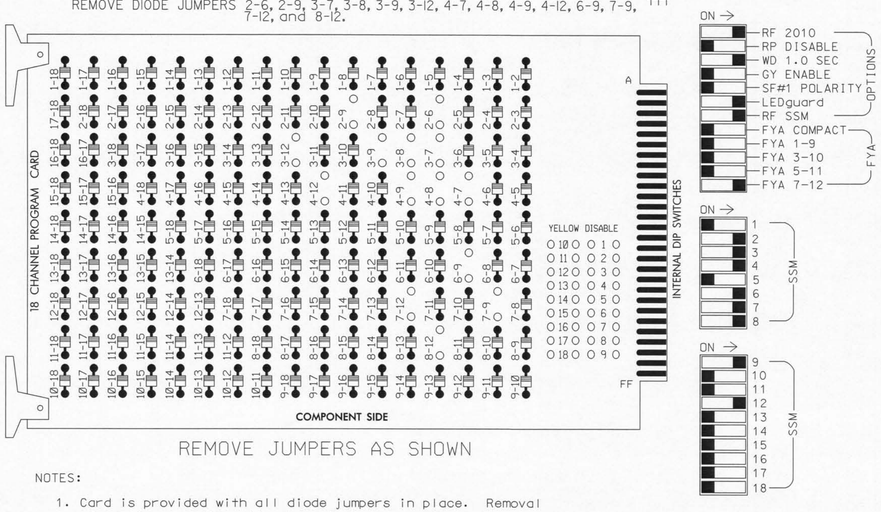
PROJECT REFERENCE NO.	SHEET NO.
17.BP.3.R.28	Sig. 12

EDI MODEL 2018ECL-NC CONFLICT MONITOR PROGRAMMING DETAIL

(remove jumpers and set switches as shown)

REMOVE DIODE JUMPERS 2-6, 2-9, 3-7, 3-8, 3-9, 3-12, 4-7, 4-8, 4-9, 4-12, 6-9, 7-9, 7-12, and 8-12.



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. Program phase 8 for Dual Entry.
3. Enable Simultaneous Gap-Out for all phases.
4. Program phases 2 and 6 for Variable Initial and Gap Reduction.
5. Program phases 2 and 6 for Start Up In Green.
6. Program phases 2 and 6 for Yellow Flash, and overlap 1 as wag overlap.
7. The cabinet and controller are part of the Wilmington Signal System.

EQUIPMENT INFORMATION

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

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.	NU	21,22, 23	NU	31,32, 33	41,42	NU	NU	61,62, 64	NU	63★	71★	81,82	NU	63★	NU	NU	NU	71★	NU
RED		128			101			134				107							
YELLOW		129			102			135		✳		108							
GREEN		130			103			136				109							
RED ARROW				116										A121				A101	
YELLOW ARROW				117										A122				A102	
FLASHING YELLOW ARROW														A123				A103	
GREEN ARROW				118						124	124								

NU = Not Used

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

★ See pictorial of head wiring in detail below.

4 SECTION FYA SIGNAL WIRING DETAIL

(wire signal heads as shown)

NOTE

1. The sequence display for this signal requires special logic programming. See sheet 2 of 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	SLOT	Ø2	Ø3	SLOT	SLOT	Ø3	Ø4	WIRED INPUT ⊗	SYS. DET. S1	SLOT	SLOT	SLOT	SLOT	FS
			2A	3C			3A	4A							DC ISOLATOR
	L	EMPTY	NOT USED	Ø3 3D	EMPTY	EMPTY	Ø3 3B	NOT USED		NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	ST
															DC ISOLATOR
FILE "J"	U	SLOT	Ø6	SLOT	SLOT	SLOT	Ø7	Ø8	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT	SLOT
			6A				7A	8A							
	L	EMPTY	Ø6 6B	EMPTY	EMPTY	EMPTY	Ø7 7B	NOT USED	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY	EMPTY

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

FS = FLASH SENSE
ST = STOP TIME

⊗ Wired Input - Do not populate slot with detector card

Reuse existing detector cards for temporary and final signal designs.

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
2A	TB2-5,6	I2U	39	1	2	2	Y	Y			
3A	TB4-9,10	I6U	41	3	4	3	-	Y		2.3	
3B	TB4-11,12	I6L	45	7	14	3	-	Y		2.3	
3C	TB2-9,10	I3U	63	25	32	3	Y	Y	Y	2	5
3D	TB2-11,12	I3L	76	38	42	3	Y	Y	Y	2	5
4A	TB6-1,2	I7U	65	27	34	4	Y	Y			
✳ S1	TB6-9,10	I9U	60	22	11	SYS					
6A	TB3-5,6	J2U	40	2	6	6	Y	Y			
6B	TB3-7,8	J2L	44	6	16	6	Y	Y			
7A[1]	TB5-9,10	J6U	42	4	8	7	Y	Y			15
	-	I8U	49	11	24	4	Y	Y			
7B	TB5-11,12	J6L	46	8	18	7	Y	Y			15
8A	TB7-1,2	J7U	66	28	38	8	Y	Y			

✳ SYSTEM DETECTOR ONLY. REMOVE THE VEHICLE PHASE ASSIGNED TO THIS DETECTOR IN THE DEFAULT PROGRAMMING.

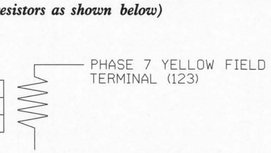
[1] Add jumpers from J6-F to I8-W, on rear of input file..

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)



THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0019
DESIGNED: May 2014
SEALED: June 13, 2014
REVISED:

Signal Upgrade - Final Design (Electrical Detail Sheet 1 of 2)

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 421 (Carolina Beach Road)/
US 421 Truck-SR 1436 (Front St)
at
US 421/SR 1140 (Burnett Blvd)

Division 03 New Hanover County Wilmington

Prepared for the Offices of: Transportation Mobility and Safety Division, State of North Carolina, Department of Transportation, Signal Management Section

750 N.Greenfield Pkwy,Garner,NC 27529

PLAN DATE: May 2014	REVIEWED BY: LM Moon
PREPARED BY: AM Encarnacion	REVIEWED BY: MB Toth

REVISIONS	INIT.	DATE

SEAL: NORTH CAROLINA PROFESSIONAL SEAL 025892 ENGINEER MELISSA B. TOTH

Melissa B Toth 6/13/14
SIGNATURE DATE

SIG. INVENTORY NO. 03-0019

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

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PROJECT REFERENCE NO.	SHEET NO.
17.BP.3.R.28	Sig. 13

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       #7  IS ON
AND RED CLEAR ON PHASE #7  IS ON

SCROLL DOWN

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

NOTE: LOGIC FOR PHASE 7 RED CLEAR WHEN TRANSITIONING FROM PHASE 7 TO PHASE 6 (HEAD 63).

PRESS '+'

```
LOGICAL I/O COMMAND #2  (+/-COMMAND#)
IF  ACTIVE PHASE       #7  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #52 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 7 (HEAD 63).

PRESS '+'

```
LOGICAL I/O COMMAND #3  (+/-COMMAND#)
IF  YELLOW ON PHASE    #7  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #51 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 7 (HEAD 63).

PRESS '+'

```
LOGICAL I/O COMMAND #4  (+/-COMMAND#)
IF  ACTIVE PHASE       #7  IS ON
AND RED CLEAR ON PHASE #7  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #39 ON
SET OUTPUT  ASSIGNMENT #40 OFF
```

NOTE: LOGIC FOR PHASE 7 RED CLEAR WHEN TRANSITIONING FROM PHASE 7 TO PHASE 8 (HEAD 71).

PRESS '+'

```
LOGICAL I/O COMMAND #5  (+/-COMMAND#)
IF  ACTIVE PHASE       #7  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #41 OFF
```

NOTE: LOGIC FOR SWITCHING FLASHING YELLOW ARROW "OFF" DURING PHASE 7 (HEAD 71).

PRESS '+'

```
LOGICAL I/O COMMAND #6  (+/-COMMAND#)
IF  YELLOW ON PHASE    #7  IS ON

SCROLL DOWN

THEN:
SET OUTPUT  ASSIGNMENT #40 ON
```

NOTE: LOGIC FOR YELLOW ARROW CLEARANCE FROM PHASE 7 (HEAD 71).

LOGIC I/O PROCESSOR PROGRAMMING COMPLETE

OUTPUT REFERENCE SCHEDULE

OUTPUT 39 = Overlap D Red
OUTPUT 40 = Overlap D Yellow
OUTPUT 41 = Overlap D Green
OUTPUT 50 = Overlap A Red
OUTPUT 51 = Overlap A Yellow
OUTPUT 52 = Overlap A Green

OVERLAP PROGRAMMING DETAIL

(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 '+' THREE TIMES

```
PAGE 1: VEHICLE OVERLAP 'D' 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?...N
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

THIS ELECTRICAL DETAIL IS FOR
THE SIGNAL DESIGN: 03-0019
DESIGNED: May 2014
SEALED: June 13, 2014
REVISED:

Signal Upgrade - Final Design (Electrical Detail Sheet 2 of 2)

ELECTRICAL AND PROGRAMMING DETAILS FOR:

US 421 (Carolina Beach Road)/
US 421 Truck-SR 1436 (Front St)
at
US 421/SR 1140 (Burnett Blvd)

Division 03 New Hanover County Wilmington

PLAN DATE:	May 2014	REVIEWED BY:	LW Moon
PREPARED BY:	AM Encarnacion	REVIEWED BY:	MB Toth

REVISIONS	INIT.	DATE

Prepared for the Offices of:
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Traffic Engineering Branch
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750 N.Greenfield Pkwy,Garner,NC 27529

SEAL
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