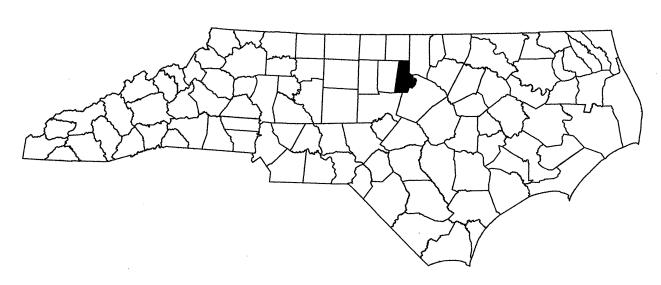
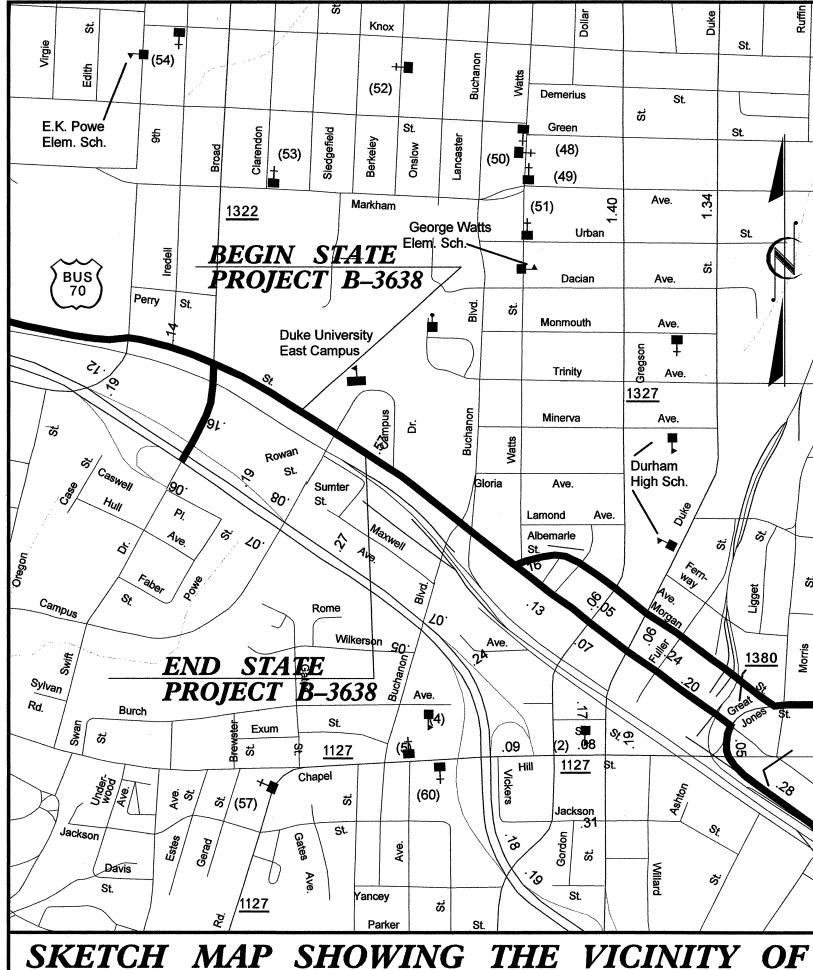
## STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

## TRANSPORTATION MANAGEMENT PLAN

## DURHAM COUNTY





SKETCH MAP SHOWING THE VICINITY OF STATE PROJECT B-3638

> N.C.D.O.T. WORK ZONE TRAFFIC CONTROL 1580 MAIL SERVICE CENTER (MSC) RALEIGH, NC 27699-1580

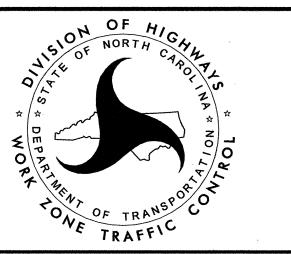
> > TRAFFIC CONTROL PROJECT ENGINEER

1020 BIRCH RIDGE DRIVE, RALEIGH, NC 27610 (DELIVERY) PHONE: (919) 250-4094 FAX: (919) 250-4098

J. S. BOURNE, P.E. STATE TRAFFIC MANAGEMENT ENGINEER J. S. KITE, P.E.

D. BISSETTE, P.E. TRAFFIC CONTROL PROJECT DESIGN ENGINEER

R. M. GARRETT TRAFFIC CONTROL DESIGN ENGINEER



## INDEX OF SHEETS

SHEET NO.

TITLE

TMP-1

TMP-1A

TMP-1B

TITLE SHEET, AND INDEX OF SHEETS

LIST OF APPLICABLE ROADWAY STANDARD DRAWINGS AND LEGEND

TRANSPORTATION OPERATIONS PLAN: (MANAGEMENT STRATEGIES, GENERAL NOTES AND LOCAL NOTES)

NOT USED

TMP-3

TMP-2

**PHASING** DETAIL

TMP-5

TMP-4

DETOUR ROUTES

TMP-6

DETOUR ROUTE SIGNING

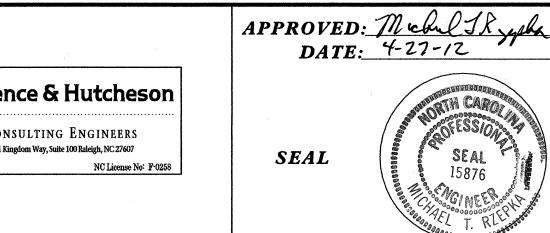
TMP-7

INTERSECTION DETAILS

SHEET NO.

TMP-1





WORK ZONE SAFETY & MOBILITY

"from the MOUNTAINS to the COAST"

## ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS SHOWN 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		
1101.01	TWO-WAY UNDIVIDED AND URBAN FREEWAYS ADVANCE WORK ZONE WARNING SIGNS		
1101.02	TEMPORARY LANE CLOSURES		
1101.03	TEMPORARY ROAD CLOSURES		
1101.11	TRAFFIC CONTROL DESIGN TABLES		
1110.01	STATIONARY WORK ZONE SIGNS		
1110.02	PORTABLE WORK ZONE SIGNS		
1115.01	FLASHING ARROW PANELS		
1130.01	DRUMS		
1135.01	CONES		
1145.01	BARRICADES		
1150.01	FLAGGING DEVICES		
1165.01	TRUCK MOUNTED IMPACT ATTENUATOR		
1180.01	SKINNY DRUM		
1261.01	GUARDRAIL AND BARRIER DELINEATOR SPACING		
1261.02	GUARDRAIL AND BARRIER DELINEATOR TYPES		
1262.01	GUARDRAIL END DELINEATION		

## **LEGEND**



### **GENERAL**

DIRECTION OF TRAFFIC FLOW

DIRECTION OF PEDESTRIAN TRAFFIC FLOW

----- EXIST. PVMT.

NORTH ARROW

PROPOSED PVMT.

WORK AREA

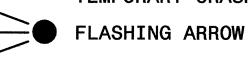
CONTINUING CONSTRUCTION

REMOVAL

### TRAFFIC CONTROL DEVICES

BARRICADE (TYPE III)

DRUM SKINNY DRUM STUBULAR MARKER TEMPORARY CRASH CUSHION



FLASHING ARROW PANEL (TYPE C)

**FLAGGER** 

LAW ENFORCEMENT

TRUCK MOUNTED IMPACT ATTENUATOR (TMIA)

CHANGEABLE MESSAGE SIGN

### TEMPORARY SIGNING

PORTABLE SIGN

STATIONARY SIGN

STATIONARY OR PORTABLE SIGN

### SIGNALS



### PAVEMENT MARKINGS

——EXISTING LINES

----TEMPORARY LINES

### PAVEMENT MARKERS

CRYSTAL/CRYSTAL

CRYSTAL/RED YELLOW/YELLOW

## PAVEMENT MARKING SYMBOLS

PAVEMENT MARKING SYMBOLS

APPROVED: MullILysle DATE: 4-27-12



ROADWAY STANDARD DRAWINGS LEGEND & TEMPORARY PAVEMENT MARKING SCHEDULE

## TRANSPORTATION OPERATIONS PLAN



Florence & Hutcheson

PROJ. REFERENCE NO. SHEET NO.

B-3638
TMP-1B

CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607

NC License No: F-0258

## MANAGEMENT STRATEGIES

THE FOLLOWING LISTED STRATEGIES DERIVE FROM ASSESSMENTS OF THE WORK ZONE IMPACTS CONDUCTED DURING THE DEVELOPMENTAL STAGES OF THIS TRANSPORTATION MANAGEMENT PLAN (TMP).

#### RECOMMENDED MANAGEMENT STRATEGIES:

- FULL ROAD CLOSURE (US 70 BUS. / MAIN STREET)
- LOCAL DETOUR ROUTES FOR THROUGH TRAFFIC
- (LOCAL TRAFFIC TO SOUTHGATE RESIDENCE HALL TO BE MAINTAINED)
- COOPERATIVE LAW ENFORCEMENT
- INCREASED PENALTIES FOR WORK ZONE VIOLATIONS

## GENERAL NOTES

CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWINGS, STANDARD DETAILS AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS, OR RESULT IN DUPLICATE, OR UNDESIRED OVERLAPPING OF DEVICES. MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING OR REMOVAL OF DEVICES, AS DIRECTED BY THE ENGINEER.

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT, EXCEPT WHEN OTHERWISE NOTED IN THE PLAN, OR DIRECTED BY THE ENGINEER.

#### TIME RESTRICTIONS

A) DO NOT CLOSE OR NARROW TRAVEL LANES AS FOLLOWS:

ROAD NAME

DAY AND TIME RESTRICTIONS

CAMPUS DR.

7:00 AM - 8:00 PM MON THRU SUN

AND

FROM 7:00 AM THE DAY BEFORE EAST CAMPUS MOVE IN TO 8:00 PM THE DAY AFTER EAST CAMPUS MOVE IN

B) DO NOT CLOSE ROADS AS FOLLOWS:

ROAD NAME

DAY AND TIME RESTRICTIONS

CAMPUS DR.

7:00 AM - 8:00 PM MON THRU SUN

FROM 7:00 AM THE DAY BEFORE EAST CAMPUS MOVE IN TO 8:00 PM THE DAY AFTER EAST CAMPUS MOVE IN

#### LANE AND SHOULDER CLOSURE REQUIREMENTS

- C) REMOVE LANE CLOSURE DEVICES FROM THE LANE WHEN WORK IS NOT BEING PERFORMED BEHIND THE LANE CLOSURE OR WHEN A LANE CLOSURE IS NO LONGER NEEDED. OR AS DIRECTED BY THE ENGINEER.
- D) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO AN UNDIVIDED FACILITY AND WITHIN 5 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.
  - WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO A DIVIDED FACILITY AND WITHIN 10 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.
- E) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN A LANE OF TRAVEL OF AN UNDIVIDED OR DIVIDED FACILITY, CLOSE THE LANE ACCORDING TO THE TRAFFIC CONTROL PLANS, ROADWAY STANDARD DRAWINGS OR AS DIRECTED BY THE ENGINEER. CONDUCT THE WORK SO THAT ALL PERSONNEL AND/OR EQUIPMENT REMAIN WITHIN THE CLOSED TRAVEL LANE.

#### TRAFFIC PATTERN ALTERATIONS

F) NOTIFY THE ENGINEER TWENTY ONE (30) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

#### <u>SIGNING</u>

- G) INSTALL ADVANCE WORK ZONE WARNING SIGNS WHEN WORK IS WITHIN 40 FT FROM THE EDGE OF TRAVEL LANE AND NO MORE THAN THREE (3) DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.
- H) PROVIDE SIGNING AND DEVICES REQUIRED TO CLOSE THE ROAD ACCORDING TO THE ROADWAY STANDARD DRAWINGS AND TRAFFIC CONTROL PLANS.

PROVIDE SIGNING REQUIRED FOR THE OFF-SITE DETOUR ROUTE AS SHOWN IN THE TRAFFIC CONTROL PLANS.

I) COVER OR REMOVE ALL SIGNS AND DEVICES REQUIRED TO CLOSE THE ROAD WHEN ROAD CLOSURE IS NOT IN OPERATION.

COVER OR REMOVE ALL SIGNS REQUIRED FOR THE OFF-SITE DETOUR WHEN THE DETOUR IS NOT IN OPERATION.

J) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.

#### TRAFFIC CONTROL DEVICES

K) PLACE TYPE III BARRICADES, WITH "ROAD CLOSED" SIGN R11-2 ATTACHED, OF SUFFICIENT LENGTH TO CLOSE ENTIRE ROADWAY.

#### PAVEMENT MARKINGS AND MARKERS

- L) INSTALL PAVEMENT MARKINGS AND PAVEMENT MARKERS ON THE FINAL SURFACE AS SHOWN IN THE PAVEMENT MARKING PLAN.
- M) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

#### MISCELLANEOUS

- N) LAW ENFORCEMENT MAY BE USED TO MAINTAIN TRAFFIC THROUGH THE WORK AREA AND/OR INTERSECTIONS, AS DIRECTED BY THE ENGINEER.
- O) ALL CURB RAMP LOCATIONS SHALL BE DERIVED FROM STATIONING SHOWN ON PAVEMENT MARKING PLANS OR AS DIRECTED BY THE ENGINEER IN COORDINATION WITH THE SIGNING AND DELINEATION UNIT.
- P) CONTRACTOR SHALL MAINTAIN SIDEWALK ACCESS AT ALL TIMES AS STATED IN THE PHASING. CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE TEMPORARY SIDEWALKS (CONCRETE, ASPHALT, OR OTHER SUITABLE MATERIAL AS APPROVED BY THE ENGINEER) AT ALL LOCATIONS WHERE THE OPEN PEDESTRIAN TRAVELWAY HAS BEEN REMOVED FOR CONSTRUCTION OPERATIONS (UTILITIES, DRAINAGE, ETC.).

## LOCAL NOTES

NOTE: DUKE UNIVERSITY WILL PHOTOGRAPH THE STONE WALL AND PROVIDE COPIES OF SAME TO NCDOT FOR RECORDING IN ACCORDANCE WITH THE MEMORANDUM OF AGREEMENT FOR THE REPLACEMENT OF BRIDGE NO. 316, APPENDIX A.

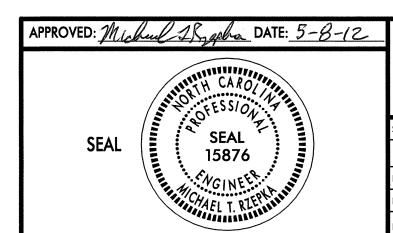
WORK IMPACTING THE EXISTING EAST CAMPUS STONE WALL TO BE PERFORMED IN THE FOLLOWING SEQUENCE:

- A. THE TOP CAP OF THE STONE WALL IS TO BE REMOVED AND STORED BY DUKE UNIVERSITY'S DESIGNATED WALL CONTRACTOR SO THAT IT CAN BE PRESERVED AND REUSED IN THE FINAL RECONSTRUCTION PRIOR TO REMOVAL OF ANY SECTIONS.
- B. REMOVE APPROXIMATELY 500' OF THE EXISTING STONE WALL AND STORE THE STONE MATERIAL NEARBY IN SUCH A MANNER THAT IT CAN BE REUSED.
- C. PRESERVE AS MUCH AS POSSIBLE OF THE STONE WALL FOUNDATION SO THAT DUKE UNIVERSITY'S DESIGNATED WALL CONTRACTOR CAN REBUILD THE RECONSTRUCTED STONE WALL ON THE EXISTING FOUNDATION.
- D. UPON COMPLETION OF THE MAIN STREET BRIDGE RECONSTRUCTION, DUKE UNIVERSITY'S DESIGNATED CONTRACTOR WILL RECONSTRUCT APPROXIMATELY 200' OF STONE WALL ON THE EAST SIDE OF THE BRIDGE AND APPROXIMATELY 200' ON THE WEST SIDE OF THE BRIDGE FOR A TOTAL OF 400'+/-. ALL WATER FILLED BARRIER PLACED ADJACENT TO THE REMOVED PORTIONS OF THE STONE WALL PER PHASE I, STEP 3 IS TO REMAIN ON THE PROJECT FOR THE WALL RECONSTRUCTION EFFORTS. (SEE CONTRACT SPECIAL PROVISIONS)

- EXISTING STEAM TUNNEL TO BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION.
- THE CONTRACTOR SHALL PROVIDE A PROTECTIVE CANOPY TO PROTECT PEDESTRIANS FROM FALLING DEBRIS ALONG THE EXISTING SIDEWALK BENEATH THE US 70 BUSINESS (MAIN STREET) BRIDGE STRUCTURE AT ALL TIMES DURING CONSTRUCTION. THE PROTECTIVE CANOPY SHALL BE CONSTRUCTED IN ACCORDANCE WITH LOCAL GOVERNMENT BUILDING CODES AND REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT (ADA). THE PROTECTIVE CANOPY SHALL BE ADEQUATELY LIT FOR NIGHTTIME USE. AT NO TIME SHALL MATERIALS OR EQUIPMENT BE STORED ON THE CANOPY ROOF. ALL WASTE OR FALLING DEBRIS SHALL BE REMOVED FROM THE CANOPY ROOF ON A DAILY BASIS OR AS DIRECTED BY THE ENGINEER.
- ) COORDINATION WITH NCDOT AND DUKE UNIVERSITY IS REQUIRED PRIOR TO ANY LANE OR ROAD CLOSURES ALONG CAMPUS DRIVE.

DUKE UNIVERSITY CONTACT: FLOYD WILLIAMS, PE
FACILITIES MANAGEMENT DEPARTMENT
(919) 660-4219
(919) 201-6982
FLOYD.WILLIAMS@DUKE.EDU

(MAIN ST.) TO DIRECT TRAFFIC TO THE DUKE EAST CAMPUS DURING THOSE TIMES CONSTRUCTION ACTIVITIES NECESSITATE THE CLOSURE OF CAMPUS DRIVE. NOTE: CAMPUS DRIVE IS TO REMAIN OPEN TO VEHICULAR TRAFFIC TO THE GREATEST EXTENT POSSIBLE DURING PROJECT CONSTRUCTION AND IS TO BE REOPENED ONCE ANY ACTIVITY NECESSITATING THE CLOSURE CEASES OR DURING PERIODS OF WORK INACTIVITY.



# TRANSPORTATION OPERATIONS PLAN

SCALE: NONE

DATE: 12–11

DWG. BY: TAG

DESIGN BY: TAG

REVIEWED BY: MTR

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#### Florence & Hutcheson

PROJ. REFERENCE NO. SHEET NO.

B-3638
TMP-3

CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607

## PHASING

STEP 1: INSTALL ADVANCE WARNING SIGNS, TEMPORARY ROAD AND SIDEWALK CLOSURE SIGNS AND DETOUR SIGNING KEEPING SIGNS COVERED (SEE ROADWAY STANDARD DRAWING NUMBER 1101.01 (SHEET 2 OF 3), 1101.03 (SHEET 1 OF 9) AND TMP-4 THRU TMP-7 AS APPLICABLE)

STEP 2: PLACE WATER-FILLED BARRIER ALONG EXISTING GRAVEL PATH (SEE SHEET TMP-4).
INSTALL PROPOSED CURB RAMPS ON CAMPUS DR. (SEE ROADWAY PLANS)

WHENEVER THE WORK OF PHASE I, STEPS 3 THROUGH 8 IMPACTS THE EXISTING EAST CAMPUS STONE WALL SEE LOCAL NOTE 1 ON SHEET TMP-1B

WORKING IN A CONTINUOUS MANNER, COMPLETE THE FOLLOWING WORK IN PHASE I, STEP 3.

STEP 3: USING ROADWAY STANDARD DRAWING NO. 1101.02 (SHEET 3 OF 15), CLOSE THE EASTBOUND RIGHT LANE OF -L- BETWEEN 9TH ST AND SWIFT AVE/BROAD ST.

UNCOVER TEMPORARY ROAD AND SIDEWALK CLOSURE SIGNS AND DETOUR SIGNS, CLOSE -L-, US 70 BUSINESS (MAIN ST.) TO TRAFFIC AND PLACE TRAFFIC ONTO TEMPORARY DETOURS (SEE ROADWAY STANDARD DRAWING NUMBER 1101.03, SHEET 1 OF 9 AND TMP-4 THRU TMP-7).

CLOSE EXISTING SIDEWALK ON US 70 BUSINESS (MAIN ST.) AND DETOUR PEDESTRIANS AND BIKE TRAFFIC TO EXISTING GRAVEL PATH (SEE SHEET TMP-4).

INSTALL WATER FILLED BARRIER ALONG THE EXISTING STONE WALL OF SUFFICIENT LENGTH TO PROTECT AND OR PREVENT INTRUSION INTO THE WORKSPACE BY PEDESTRIANS THROUGH RESULTANT GAPS ONCE PORTIONS OF THE WALL IS REMOVED FOR CONSTRUCTION. (SEE LOCAL NOTE 1 ON SHEET TMP-1B FOR PROPER WORK SEQUENCING REGARDING THE STONE WALL).

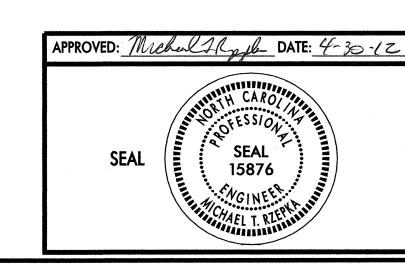
CONSTRUCT PROTECTIVE CANOPY (SEE LOCAL NOTE 3).

- STEP 4: USING FLAGGERS, LAW ENFORCEMENT AND TRAFFIC CONTROL DEVICES CLOSE CAMPUS DR. TO TRAFFIC.

  DISMANTLE AND REMOVE EXISTING BRIDGE. (SEE LOCAL NOTES 2, 3, 4 & 5)
- STEP 5: USING ROADWAY STANDARD DRAWING 1101.02 (SHEET 1 OF 15) AND ROAD CLOSURES ON CAMPUS DR. AS NECESSARY, COMPLETE CONSTRUCTION OF PROPOSED -L- STRUCTURE AND ROADWAY APPROACH FROM -L- STA. 13+65± TO -L- STA. 20+10±. COMPLETE PROPOSED WORK ON CAMPUS DR (SEE LOCAL NOTES 2, 3, 4, AND 5). (SEE STRUCTURE PLANS AND ROADWAY PLANS) (SEE INTERMEDIATE CONTRACT TIMES AND LIQUIDATED DAMAGES).
- STEP 6: PLACE THE FINAL PAVEMENT MARKINGS AND MARKERS ON -L-, US 70 BUSINESS (MAIN ST.) FROM -L- STA. 13+65± TO -L- STA. 20+10±. (SEE PAVEMENT MARKING PLANS)

WORKING IN A CONTINUOUS MANNER, COMPLETE THE FOLLOWING WORK IN PHASE I, STEP 7.

- STEP 7: REMOVE TEMPORARY ROAD CLOSURE SIGNS, DETOUR SIGNING, PROTECTIVE CANOPY INSTALLED DURING STEP 3, AND ALL TRAFFIC CONTROL DEVICES AND PLACE TRAFFIC ONTO -L-, US 70 BUSINESS (MAIN ST.) FROM -L- STA. 13+65± TO -L- STA. 20+10±.
- STEP 8: RESTORE GRAVEL PATHWAY ON DUKE EAST CAMPUS TO ITS ORIGINAL LOCATION AND CONDITION PRIOR TO CONSTRUCTION ACTIVITIES.



## PHASING

OF TRANSPORT

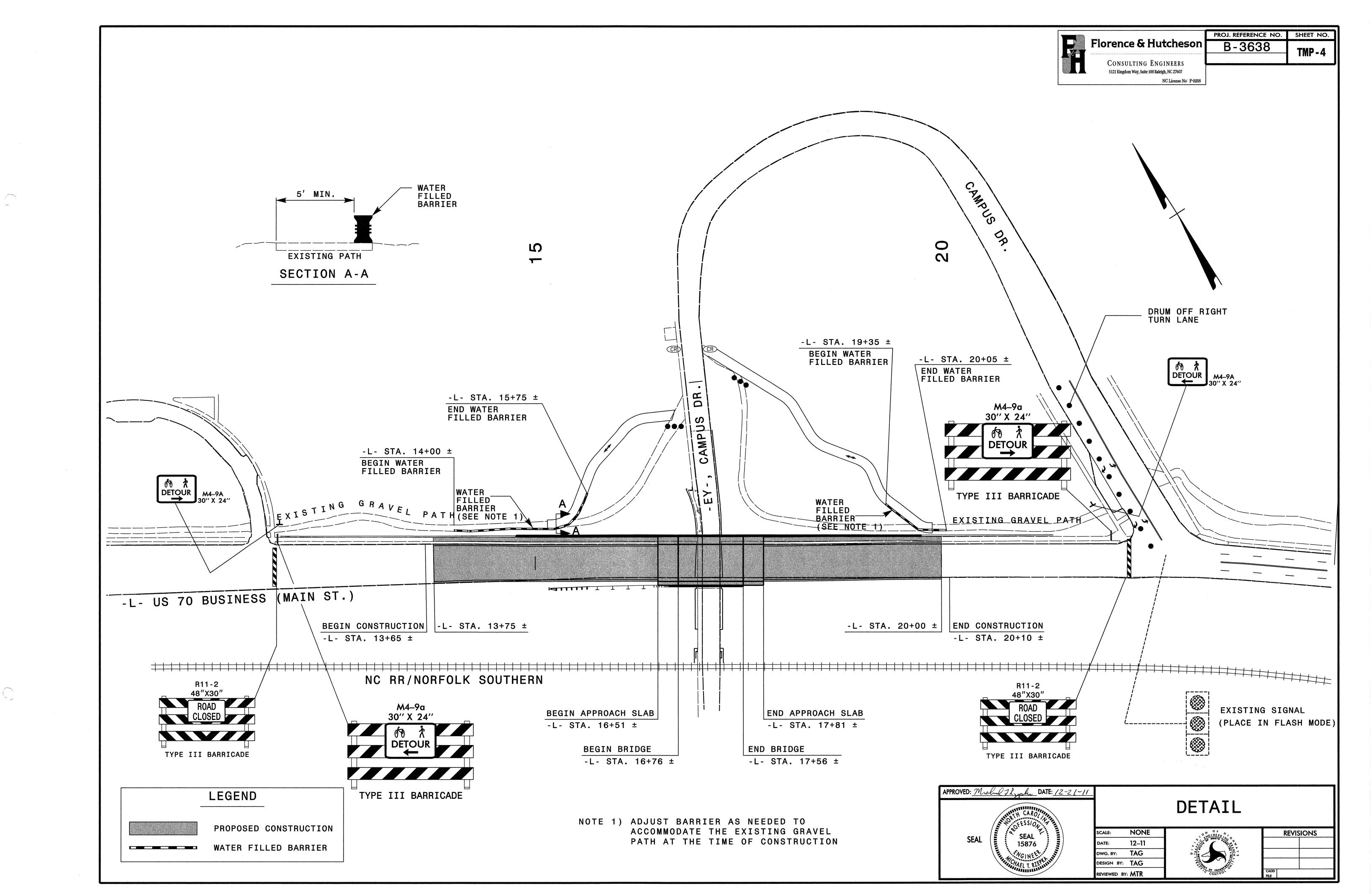
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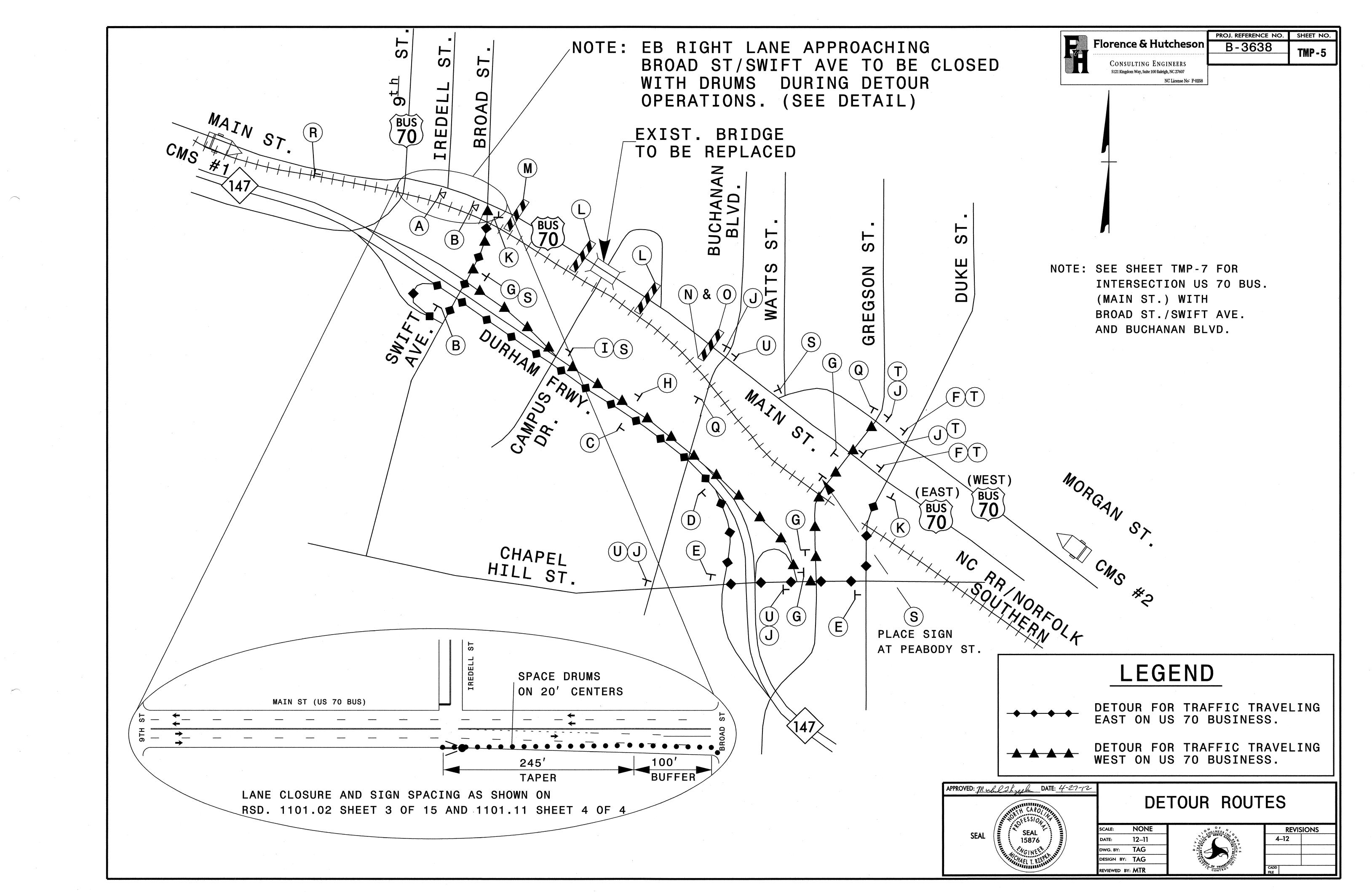
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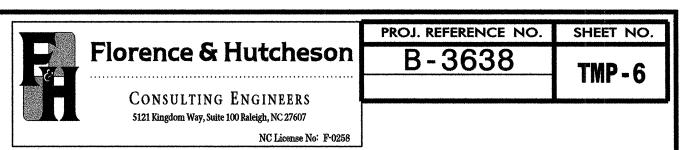
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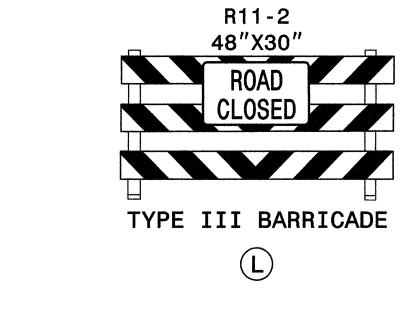
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REVIEWED BY: MTR

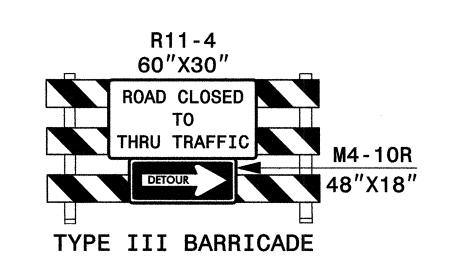
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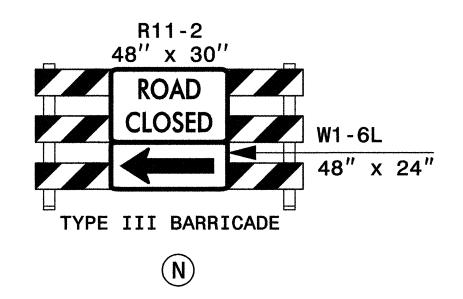


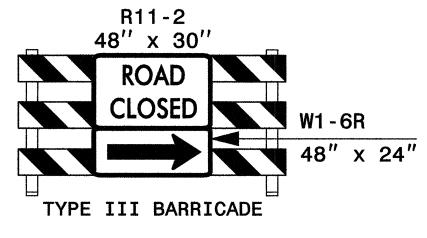






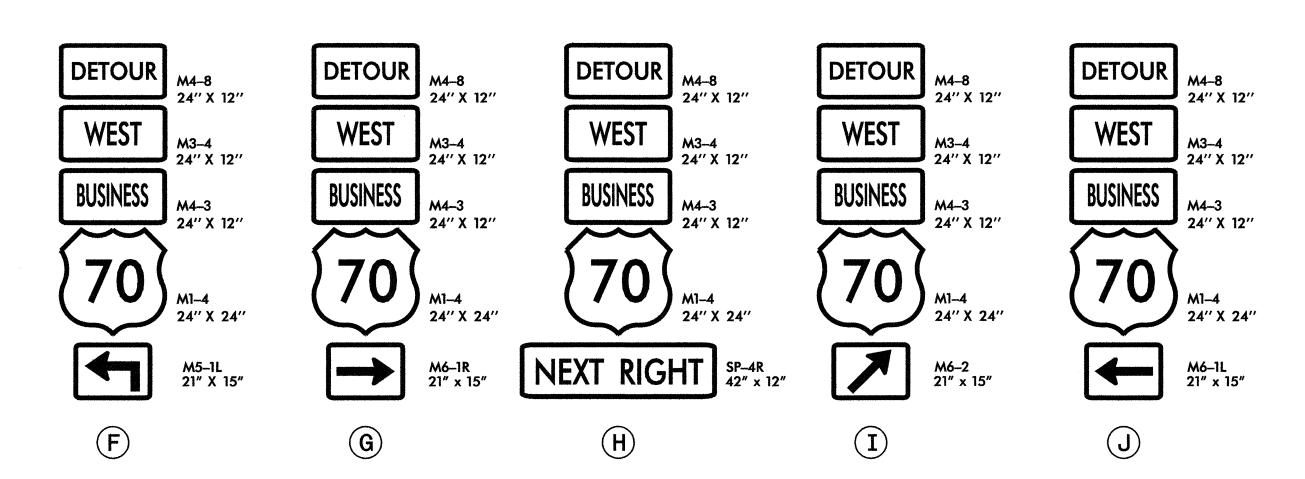
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CMS #2



DETOUR M4-8

NEXT RIGHT SP-4R 42" x 12"

**EAST** 

**BUSINESS** 

 $\bigcirc$ 

24" X 12"

M3-2 24" X 12"

M4-3 24" X 12"

DETOUR M4-8

M5-1R 21" X 15"

**EAST** 

**BUSINESS** 

A

DETOUR

**EAST** 

BUSINESS

B

M4–8 24" X 12"

M3-2 24" X 12"

M4–3 24" X 12" DETOUR M4-8

**EAST** 

**BUSINESS** 

24" X 12"

M3-2 24" X 12"

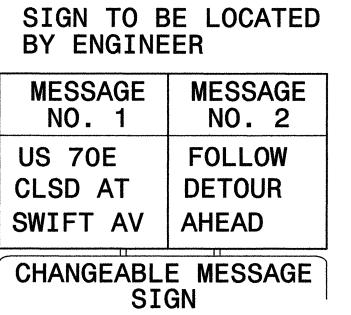
24" X 12"

**EAST** 

**BUSINESS** 

M3-2 24" X 12"

24" X 24"



CMS #1

SIGN TO BE LOCATED BY ENGINEER			
MESSAGE NO. 1	MESSAGE NO. 2		
US 70W	FOLLOW		
CLSD AT	DETOUR		
BUCHANAN	AHEAD		
CHANGEABLE MESSAGE SIGN			

