

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION

WESTFORD STONY BROOK ROAD			
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	1	16
PROJECT FILE NO.		608861	

TITLE SHEET & INDEX

PLAN AND PROFILE OF
STONY BROOK ROAD OVER STONY BROOK
(BRIDGE NO. W-26-002)

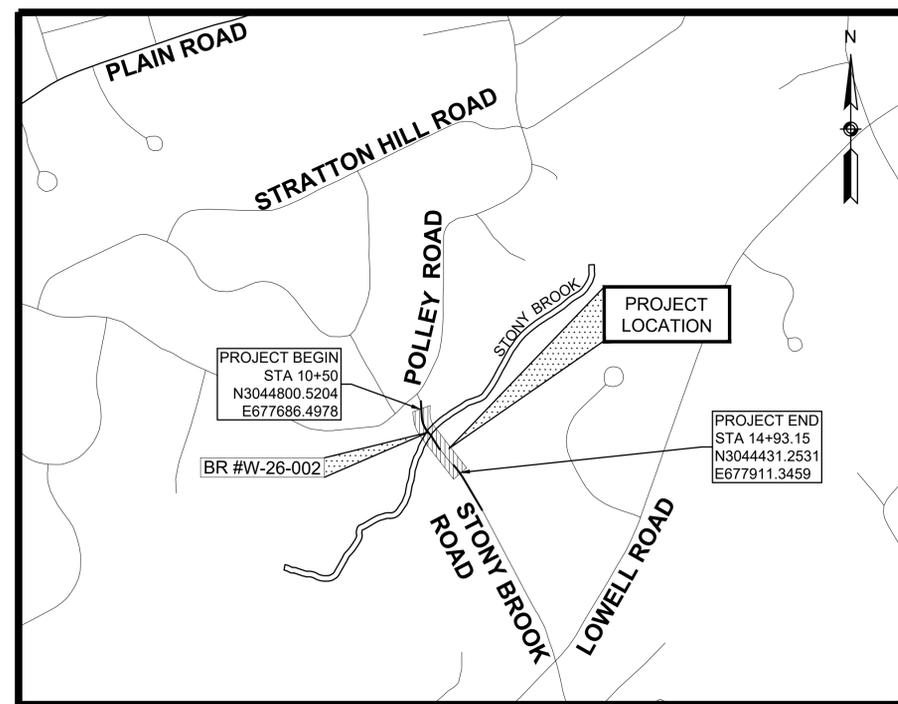
TOWN OF
WESTFORD
MIDDLESEX COUNTY

FEDERAL AID PROJECT NO.

25% SUBMITTAL

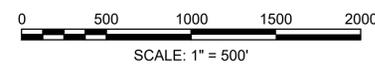
THESE PLANS ARE SUPPLEMENTED BY THE OCTOBER 2017 CONSTRUCTION STANDARD DETAILS, THE 2015 OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, THE 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING, AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK.

INDEX	
SHEET NO.	DESCRIPTION
1	TITLE SHEET & INDEX
2	LEGEND & ABBREVIATIONS
3	CONSTRUCTION NOTES
4	TYPICAL SECTIONS & PAVEMENT NOTES
5	CONSTRUCTION PLAN
6	CONSTRUCTION PROFILE
7	TRAFFIC SIGN & PAVEMENT MARKING PLAN
8-10	TEMPORARY TRAFFIC CONTROL PLANS
11	UTILITY PLAN
12-16	CROSS SECTIONS



DESIGN DESIGNATION (STONY BROOK ROAD)

DESIGN SPEED	30 MPH
ADT (2021)	429
ADT (2031)	438
K	10.3%
D	68.2%
T (PEAK HOUR)	0.5%
T (AVERAGE DAY)	0.2%
DHV	45
DDHV	31
FUNCTIONAL CLASSIFICATION	LOCAL



LENGTH OF PROJECT = 443 FEET = 0.084 MILES

<p>146 Dascomb Road 311 Main Street 169 Ocean Blvd, Unit 3 Andover, MA 01810 2nd Floor Worcester, MA 01608 PO Box 249 978-794-1792 508-868-5104 603-601-8154</p> <p>www.TheEngineeringCorp.com</p>		
<p>7/20/2021 25% SUBMITTAL -</p>		
DATE	DESCRIPTION	REV #
<p>APPROVED</p>		
CHIEF ENGINEER	DATE	

GENERAL SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		JERSEY BARRIER
		CATCH BASIN
		CATCH BASIN CURB INLET
		FLAG POLE
		GAS PUMP
		MAIL BOX
		POST SQUARE
		POST CIRCULAR
		WELL
		ELECTRIC HANDHOLE
		ELECTRIC METER
		FENCE GATE POST
		GAS GATE
		BORING HOLE
		MONITORING WELL
		TEST PIT
		HYDRANT
		LIGHT POLE
		COUNTY BOUND
		GPS POINT
		CABLE MANHOLE
		DRAINAGE MANHOLE
		ELECTRIC MANHOLE
		GAS MANHOLE
		MISC MANHOLE
		SEWER MANHOLE
		TELEPHONE MANHOLE
		WATER MANHOLE
		MASSACHUSETTS HIGHWAY BOUND
		MONUMENT
		STONE BOUND
		TOWN OR CITY BOUND
		TRaverse OR TRIANGULATION STATION
		TROLLEY POLE OR GUY POLE
		TRANSMISSION POLE
		UTILITY POLE W/ FIREBOX
		UTILITY POLE WITH DOUBLE LIGHT
		UTILITY POLE W / 1 LIGHT
		UTILITY POLE
		BUSH
		TREE
		STUMP
		SWAMP / MARSH
		WATER GATE
		PARKING METER
		OVERHEAD CABLE/WIRE
		CURBING
		CONTOURS (ON-THE-GROUND SURVEY DATA)
		CONTOURS (PHOTOGRAMMETRIC DATA)
		UNDERGROUND DRAIN PIPE (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND ELECTRIC DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND GAS MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND SEWER MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND TELEPHONE DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND WATER MAIN (DOUBLE LINE 24 INCH AND OVER)
		BALANCED STONE WALL
		GUARD RAIL - STEEL POSTS
		GUARD RAIL - WOOD POSTS
		GUARD RAIL - DOUBLE FACE - STEEL POSTS
		GUARD RAIL - DOUBLE FACE - WOOD POSTS
		CHAIN LINK OR METAL FENCE
		WOOD FENCE
		SEDIMENT CONTROL BARRIER
		TREE LINE
		SAWCUT LINE
		TOP OR BOTTOM OF SLOPE
		LIMIT OF EDGE OF PAVEMENT OR COLD PLANE AND OVERLAY
		BANK OF RIVER OR STREAM
		BORDER OF WETLAND
		100 FT WETLAND BUFFER
		200 FT RIVERFRONT BUFFER
		STATE HIGHWAY LAYOUT
		TOWN OR CITY LAYOUT
		COUNTY LAYOUT
		RAILROAD SIDELINE
		TOWN OR CITY BOUNDARY LINE
		PROPERTY LINE OR APPROXIMATE PROPERTY LINE
		EASEMENT

TRAFFIC SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		CONTROLLER PHASE ACTUATED
		TRAFFIC SIGNAL HEAD (SIZE AS NOTED)
		WIRE LOOP DETECTOR (6' x 6' TYP UNLESS OTHERWISE SPECIFIED)
		VIDEO DETECTION CAMERA
		MICROWAVE DETECTOR
		PEDESTRIAN PUSH BUTTON, SIGN (DIRECTIONAL ARROW AS SHOWN) AND SADDLE
		EMERGENCY PREEMPTION CONFIRMATION STROBE LIGHT
		VEHICULAR SIGNAL HEAD
		VEHICULAR SIGNAL HEAD, OPTICALLY PROGRAMMED
		FLASHING BEACON
		PEDESTRIAN SIGNAL HEAD, (TYPE AS NOTED OR AS SPECIFIED)
		RAILROAD SIGNAL
		SIGNAL POST AND BASE (ALPHA-NUMERIC DESIGNATION NOTED)
		MAST ARM, SHAFT AND BASE (ARM LENGTH AS NOTED)
		HIGH MAST POLE OR TOWER
		SIGN AND POST
		SIGN AND POST (2 POSTS)
		MAST ARM WITH LUMINAIRE
		OPTICAL PRE-EMPTION DETECTOR
		CONTROL CABINET, GROUND MOUNTED
		CONTROL CABINET, POLE MOUNTED
		FLASHING BEACON CONTROL AND METER PEDESTAL
		LOAD CENTER ASSEMBLY
		PULL BOX 12"x12" (OR AS NOTED)
		ELECTRIC HANDHOLE 12"x24" (OR AS NOTED)
		TRAFFIC SIGNAL CONDUIT

PAVEMENT MARKINGS SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		PAVEMENT ARROW - WHITE
		LEGEND "ONLY" - WHITE
		STOP LINE
		CROSSWALK
		SOLID WHITE LINE
		SOLID YELLOW LINE
		BROKEN WHITE LINE
		BROKEN YELLOW LINE
		DOTTED WHITE LINE
		DOTTED YELLOW LINE
		DOTTED WHITE LINE EXTENSION
		DOTTED YELLOW LINE EXTENSION
		DOUBLE WHITE LINE
		DOUBLE YELLOW LINE

ABBREVIATIONS

GENERAL	
AADT	ANNUAL AVERAGE DAILY TRAFFIC
ABAN	ABANDON
ADJ	ADJUST
APPROX.	APPROXIMATE
A.C.	ASPHALT CONCRETE
ACCM PIPE	ASPHALT COATED CORRUGATED METAL PIPE
BIT.	BITUMINOUS
BC	BOTTOM OF CURB
BD.	BOUND
BL	BASELINE
BLDG	BUILDING
BM	BENCHMARK
BO	BY OTHERS
BOS	BOTTOM OF SLOPE
BR.	BRIDGE
CB	CATCH BASIN
CBCI	CATCH BASIN WITH CURB INLET
CC	CEMENT CONCRETE
CCM	CEMENT CONCRETE MASONRY
CEM	CEMENT
CI	CURB INLET
CIP	CAST IN PLACE
CLF	CHAIN LINK FENCE
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CSP	CORRUGATED STEEL PIPE
CO.	COUNTY
CONC	CONCRETE
CONT	CONTINUOUS
CONST	CONSTRUCTION
CR GR	CROWN GRADE
DHV	DESIGN HOURLY VOLUME
DI	DROP INLET
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DW	STEADY DON'T WALK - PORTLAND ORANGE
DWY	DRIVEWAY
ELEV (or EL.)	ELEVATION
EM	ELECTRIC METER
EMB	EMBANKMENT
EOP	EDGE OF PAVEMENT
EXIST (or EX)	EXISTING
EXC	EXCAVATION
F&C	FRAME AND COVER
F&G	FRAME AND GRATE
FDN.	FOUNDATION
FLDSTN	FIELDSTONE
GAR	GARAGE
GD	GROUND
GG	GAS GATE
GI	GUTTER INLET
GIP	GALVANIZED IRON PIPE
GRAN	GRANITE
GRAV	GRAVEL
GRD	GRAD
HDW	HEADWALL
HMA	HOT MIX ASPHALT
HOR	HORIZONTAL
HYD	HYDRANT
INV	INVERT
JCT	JUNCTION
L	LENGTH OF CURVE
LB	LEACH BASIN
LP	LIGHT POLE
LT	LEFT
MAX	MAXIMUM
MB	MAILBOX
MH	MANHOLE
MHB	MASSACHUSETTS HIGHWAY BOUND
MIN	MINIMUM
NIC	NOT IN CONTRACT
NO.	NUMBER
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
P.G.L.	PROFILE GRADE LINE
PI	POINT OF INTERSECTION
POC	POINT ON CURVE
POT	POINT ON TANGENT
PRC	POINT OF REVERSE CURVATURE
PROJ	PROJECT
PROP	PROPOSED
PSB	PLANTABLE SOIL BORROW
PT	POINT OF TANGENCY
PVC	POINT OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENCY
PVMT	PAVEMENT
PWW	PAVED WATER WAY

ABBREVIATIONS (cont.)

GENERAL	
R	RADIUS OF CURVATURE
R&D	REMOVE AND DISPOSE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RDWY	ROADWAY
REM	REMOVE
RET	RETAIN
RET WALL	RETAINING WALL
ROW	RIGHT OF WAY
RR	RAILROAD
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
RT	RIGHT
SB	STONE BOUND
SHLD	SHOULDER
SMH	SEWER MANHOLE
ST	STREET
STA	STATION
SSD	STOPPING SIGHT DISTANCE
SHLO	STATE HIGHWAY LAYOUT LINE
SW	SIDEWALK
T	TANGENT DISTANCE OF CURVE/TRUCK %
TAN	TANGENT
TEMP	TEMPORARY
TC	TOP OF CURB
TOS	TOP OF SLOPE
TYP	TYPICAL
UP	UTILITY POLE
VAR	VARIES
VERT	VERTICAL
VC	VERTICAL CURVE
WCR	WHEEL CHAIR RAMP
WG	WATER GATE
WIP	WROUGHT IRON PIPE
WM	WATER METER/WATER MAIN
X-SECT	CROSS SECTION

TRAFFIC SIGNAL ABBREVIATIONS

CAB	CABINET
CCVE	CLOSED CIRCUIT VIDEO EQUIPMENT
DW	STEADY UPRAISED HAND
FDW	FLASHING UPRAISED HAND
FR	FLASHING CIRCULAR RED
FRL	FLASHING RED LEFT ARROW
FRR	FLASHING RED RIGHT ARROW
FY	FLASHING CIRCULAR YELLOW
FYL	FLASHING YELLOW LEFT ARROW
FYR	FLASHING YELLOW RIGHT ARROW
G	STEADY CIRCULAR GREEN
GL	STEADY GREEN LEFT ARROW
GR	STEADY GREEN RIGHT ARROW
GSL	STEADY GREEN SLASH LEFT ARROW
GSR	STEADY GREEN SLASH RIGHT ARROW
GV	STEADY GREEN VERTICAL ARROW
OL	OVERLAP
PED	PEDESTRIAN
PTZ	PAN, TILT, ZOOM
R	STEADY CIRCULAR RED
RL	STEADY RED LEFT ARROW
RR	STEADY RED RIGHT ARROW
TR SIG	TRAFFIC SIGNAL
TSC	TRAFFIC SIGNAL CONDUIT
W	STEADY WALKING PERSON
Y	STEADY CIRCULAR YELLOW
YL	STEADY YELLOW LEFT ARROW

WESTFORD
STONY BROOK ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	2	16

PROJECT FILE NO. 608861

LEGEND & ABBREVIATIONS

WESTFORD
STONY BROOK ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	3	16

PROJECT FILE NO. 608861

CONSTRUCTION NOTES

CONSTRUCTION NOTES:

- EXISTING CONDITIONS INFORMATION COMPILED FROM SURVEY BY FELDMAN LAND SURVEYORS PERFORMED IN MAY 2021.
HORIZONTAL DATUM = NAD83 (MASSACHUSETTS STATE PLANE COORDINATES)
VERTICAL DATUM = NAVD88
- ALL EXISTING STATE, COUNTY AND TOWN LOCATION LINES HAVE BEEN ESTABLISHED FROM AN ACTUAL ON-THE-GROUND SURVEY. ALL PRIVATE PROPERTY LINES HAVE BEEN ESTABLISHED FROM AVAILABLE INFORMATION AND THEIR EXACT LOCATION ARE NOT GUARANTEED.
- THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL CONTACT DIGSAFE (1-888-DIGSAFE) A MINIMUM OF 72 HOURS PRIOR TO ANY CONSTRUCTION TO VERIFY THE LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
- WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
- ALL MUNICIPALLY OWNED UTILITY STRUCTURES (CATCH BASINS, DRAIN MANHOLES, WATER GATES, ETC.) SHALL BE ADJUSTED BY THE CONTRACTOR TO FINISHED GRADE UNLESS DIRECTED OTHERWISE. THE CONTRACTOR SHALL COORDINATE WITH THE WESTFORD HIGHWAY DEPARTMENT TO ALLOW FOR THE REPLACEMENT OF EXISTING UTILITY STRUCTURES IN POOR CONDITION.
- ALL PRIVATELY OWNED UTILITY STRUCTURES (GAS GATES, ELECTRIC /TELEPHONE MANHOLES, ETC.) SHALL BE ADJUSTED TO FINISHED GRADE BY THE PRIVATE UTILITY COMPANY, UNLESS DIRECTED OTHERWISE. THE CONTRACTOR SHALL COORDINATE WITH PRIVATE UTILITY COMPANIES FOR THE ALTERATION AND ADJUSTMENT, AS NECESSARY.
- AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTORS EXPENSE.
- ALL DISTURBED AREAS OUTSIDE THE CURBLINE SHALL BE STABILIZED WITH 4" LOAM AND SEED, UNLESS OTHERWISE NOTED.
- THE TERM "PROPOSED" (PROP) MEANS WORK TO BE CONSTRUCTED USING NEW MATERIALS OR, WHERE APPLICABLE, RE-USING EXISTING MATERIALS IDENTIFIED AS "REMOVE AND RESET" (R&R), AS APPROVED BY THE ENGINEER.
- THE TERM "MEET EXIST" MEANS TO MEET BOTH THE EXISTING ALIGNMENT AND ELEVATION.
- ALL EXISTING TREES WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS INDICATED OTHERWISE ON THE DRAWINGS. ALL PROVIDED DIMENSIONS REFER TO THE DIAMETER AT BREAST HEIGHT.
- TREE TRIMMING SHALL BE PERFORMED IN ADVANCE OF RELOCATED UTILITY POLES AND OVERHEAD WIRES. CONTRACTOR SHALL COORDINATE WITH NGRID FOR LOCATIONS.
- WETLAND REPLICATION AREAS WILL BE DETERMINED IN FINAL DESIGN AND IN CONJUNCTION WITH THE WESTFORD CONSERVATION COMMISSION.
- CLEARING AND GRUBBING SHALL EXTEND FIVE FEET BEYOND THE LIMIT OF GRADING; EXCEPT FOR WHEN THE FIVE FOOT EXTENSION ENCROACHES FURTHER INTO ADJACENT WETLANDS.
- DURING CONSTRUCTION, WHEN STONY BROOK ROAD IS CLOSED, A SHED SHALL BE PLACED ADJACENT TO ULT #39 (APPROXIMATE LOCATION SHOWN ON THE PLANS). IT WILL BE THE CONTRACTORS RESPONSIBILITY TO TAKE TRASH AND RECYCLING BINS FOR 58 STONY BROOK ROAD AND PLACE THEM IN THE SHED FOR PICK UP. THE SHED SHALL ALSO CONTAIN A LOCK BOX FOR SUCH ITEMS INCLUDING, BUT NOT LIMITED TO, MAIL OR DELIVERED PACKAGES.

**WESTFORD
STONY BROOK ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	4	16
PROJECT FILE NO.		608861	

**TYPICAL SECTIONS &
PAVEMENT NOTES**

PAVEMENT NOTES

PROPOSED BRIDGE PAVEMENT

SURFACE: 1 1/4" SUPERPAVE BRIDGE SURFACE COURSE - 12.5 (SSC-B - 12.5) OVER VARIABLE DEPTH (SEE NOTE 6) SUPERPAVE BRIDGE PROTECTIVE COURSE - 12.5 (SPC-B - 12.5) OVER

BASE: 8" PRECAST CONCRETE DECK (4000 PSI, 3/4", 585 HP CEMENT CONCRETE) OVER

SUBBASE: 1 1/2" GRAVEL BORROW, TYPE b

PROPOSED FULL DEPTH PAVEMENT

SURFACE: 1 1/2" SUPERPAVE SURFACE COURSE - 12.5 (SSC - 12.5) OVER 1 1/4" SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC - 12.5) OVER

BASE: 3/4" SUPERPAVE INTERMEDIATE COURSE - 19.0 (SIC - 19.0) OVER

SUBBASE: VARIABLE DEPTH (SEE NOTE 7) (12" MIN.) GRAVEL BORROW, TYPE b

PROPOSED HMA MILL AND OVERLAY

SURFACE: 1 1/4" SUPERPAVE SURFACE COURSE - 12.5 (SSC - 12.5) OVER 1 1/4" PAVEMENT FINE MILLING

PROPOSED HMA DRIVEWAY - RESIDENTIAL

SURFACE: 1 1/2" SUPERPAVE SURFACE COURSE - 9.5 (SSC - 9.5) OVER 2 1/2" SUPERPAVE SURFACE COURSE - 12.5 (SSC - 12.5) OVER

BASE: 8" SUITABLE EXISTING GRAVEL; ADD GRAVEL BORROW, TYPE b AS REQUIRED

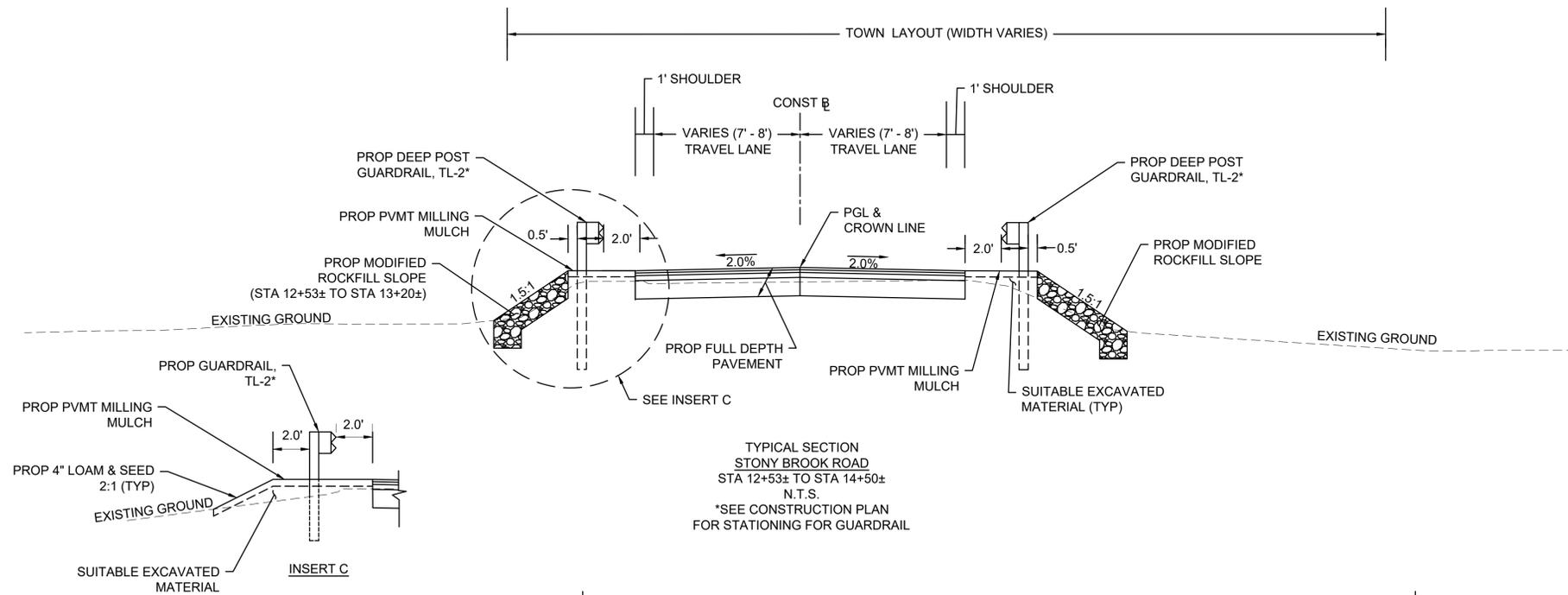
PROPOSED GRAVEL DRIVEWAY

SURFACE: 8" DENSE GRADED CRUSHED STONE (COMPACTED IN 4" (MAX) LIFTS)

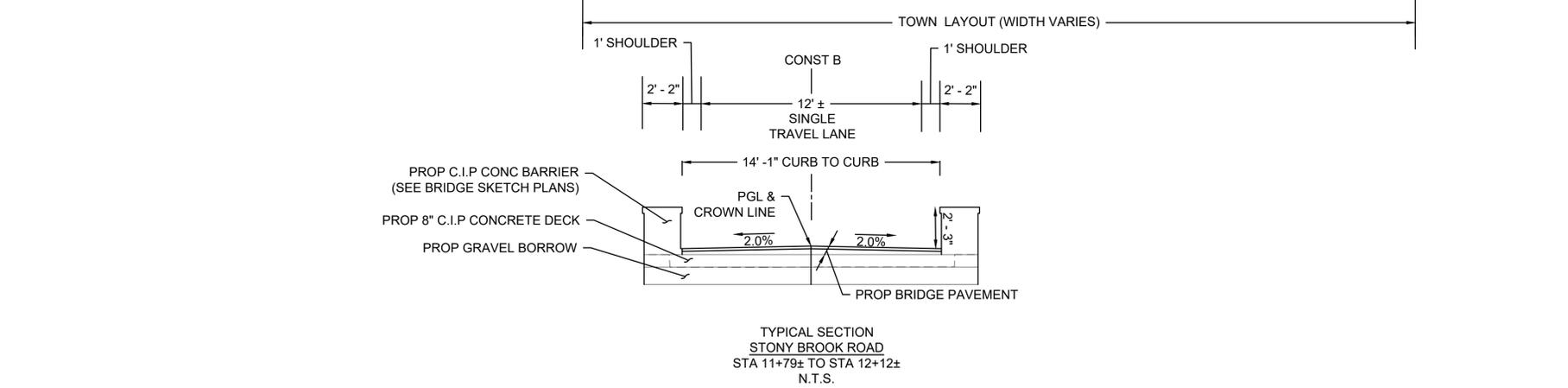
BASE: EXISTING MATERIAL

GENERAL PAVEMENT NOTES:

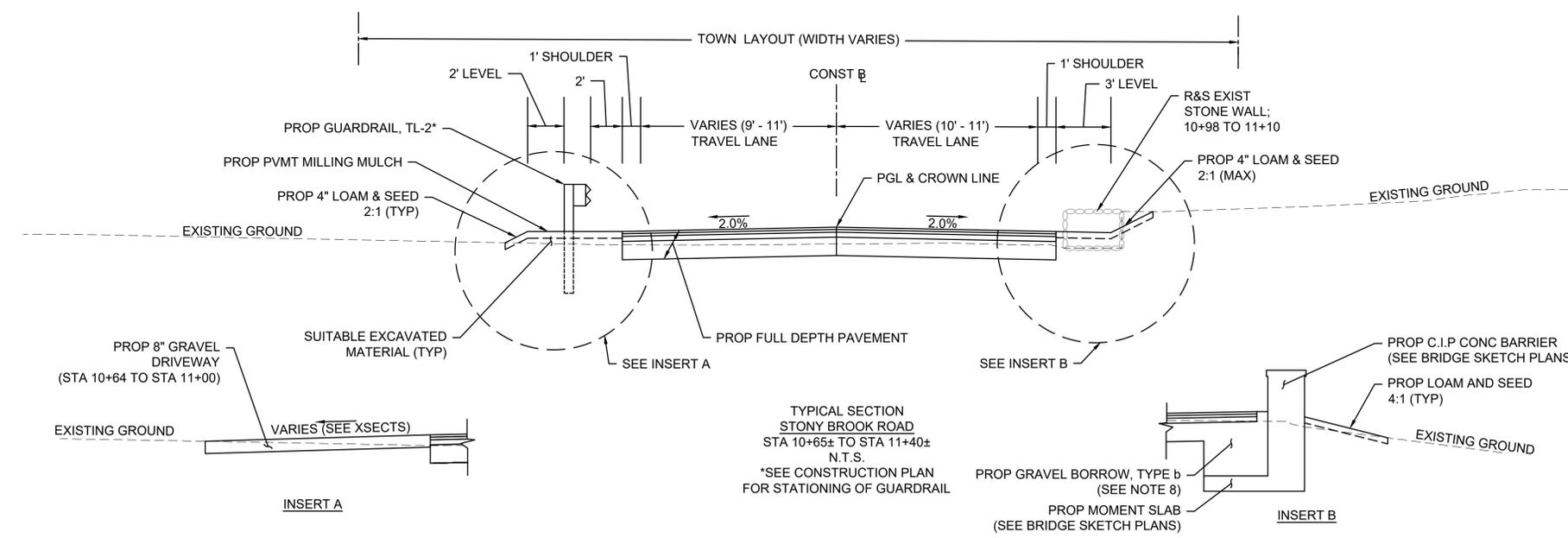
- ASPHALT EMULSION FOR TACK COAT SHALL BE APPLIED BETWEEN ALL ASPHALT SURFACES AND SAWCUT JOINTS BEFORE PAVING. HMA JOINT SEALANT SHALL BE APPLIED TO ALL COLD JOINTS (LONGITUDINAL AND TRANSVERSE) BEFORE PAVING SURFACE COURSE. ASPHALT EMULSION FOR TACK COAT SHALL BE RS-1h AND SHALL BE APPLIED AT A RATE CONSISTENT WITH MASSDOT STANDARD SPECIFICATION 450.43G2 ALL SURFACES SHALL BE CLEAN OF ALL ORGANICS, DEBRIS, AND SAND PRIOR TO PAVING.
- ALL HMA SHALL BE IN ACCORDANCE WITH SECTION 450.
- ASPHALT EMULSION FOR TACK COAT SHALL BE RS-1H TO RESIST TRACKING OF TACK BY HAUL VEHICLES.
- HMA FOR DRIVEWAYS SHALL BE IN ACCORDANCE WITH SECTION 702.
- ALL GRAVEL BORROW MEETING SPECIFICATION SHALL BE RETAINED IN PLACE, COMPACTED, AND LEVELED AS REQUIRED.
- SUPERPAVE BRIDGE PROTECTIVE COURSE - 12.5 (SPC-B - 12.5) SHALL BE A VARIABLE DEPTH AS REQUIRED TO MEET PROPOSED LINES AND GRADES. BRIDGE PROTECTIVE COURSE SHALL BE PLACED IN 2" MAXIMUM LIFTS.
- IN AREAS OF PROPOSED FULL DEPTH PAVEMENT, THE CONTRACTOR SHALL EXCAVATE THE ENTIRETY OF EXISTING PAVEMENT SECTION AND PLACE GRAVEL BORROW, TYPE b AT A VARIABLE DEPTH TO MEET PROPOSED LINES AND GRADES.
- IN AREAS OVER THE PROPOSED C.I.P. MOMENT SLAB (SEE BRIDGE SKETCH PLANS) CONTRACTOR SHALL USE GRAVEL BORROW, TYPE b FROM THE BOTTOM OF PROPOSED PAVEMENT GRADE TO THE TOP OF THE PROPOSED MOMENT SLAB GRADE.



TYPICAL SECTION
STONY BROOK ROAD
STA 12+53± TO STA 14+50±
N.T.S.
*SEE CONSTRUCTION PLAN
FOR STATIONING FOR GUARDRAIL



TYPICAL SECTION
STONY BROOK ROAD
STA 11+79± TO STA 12+12±
N.T.S.



TYPICAL SECTION
STONY BROOK ROAD
STA 10+65± TO STA 11+40±
N.T.S.
*SEE CONSTRUCTION PLAN
FOR STATIONING OF GUARDRAIL

HIGHWAY GUARD DETAILS

STA 11+00 LT TO STA 11+27 LT TANGENT END TREATMENT
 STA 11+27 LT TO STA 11+34 LT GUARDRAIL, TL2
 STA 11+34 LT TO STA 11+76 LT TRANSITION TO RIGID BARRIER

STA 12+13 LT TO STA 12+52 LT TRANSITION TO RIGID BARRIER
 STA 12+52 LT TO STA 13+53 LT GUARDRAIL, TL2 (DEEP STEEL POSTS)
 STA 13+53 LT TO STA 13+79 LT TANGENT END TREATMENT

STA 12+15 RT TO STA 12+55 RT TRANSITION TO RIGID BARRIER
 STA 12+55 RT TO STA 13+77 RT GUARDRAIL, TL2 (DEEP STEEL POSTS)
 STA 13+77 RT TO STA 14+02 RT TANGENT END TREATMENT

TRAFFIC SIGNAL CONDUIT

NONE

WATER SUPPLY ALTERATIONS

NONE

DRAINAGE DETAILS

SEE UTILITY PLANS

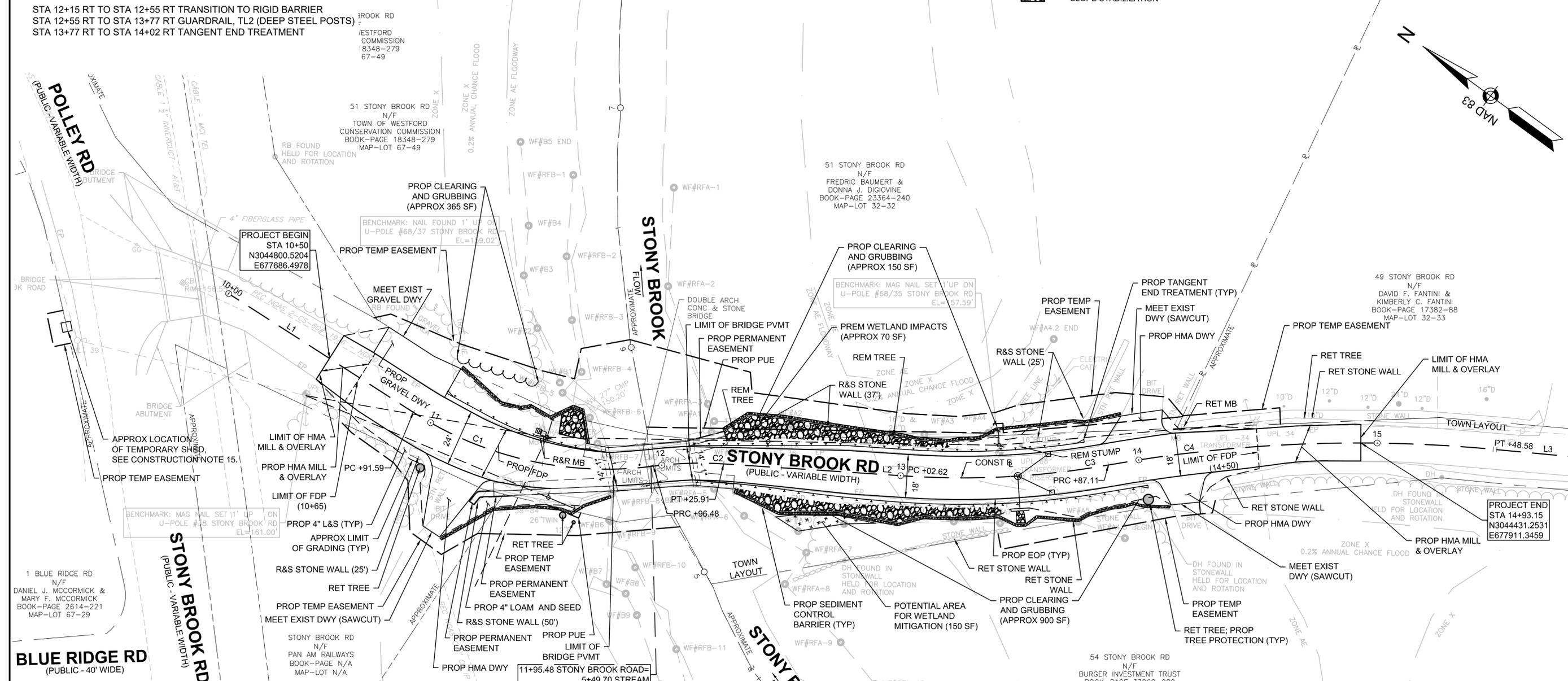
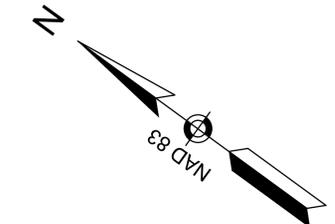
WESTFORD
 STONY BROOK ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	5	16

CONSTRUCTION PLAN

LEGEND

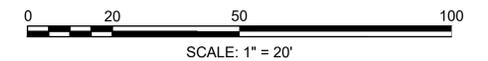
 = PROP MODIFIED ROCKFILL SLOPE STABILIZATION



STONY BROOK ROAD CONSTRUCTION BASELINE DATA

NUMBER	STARTING STATION	NORTHING	EASTING	CURVE DATA	LINE DATA	ENDING STATION	NORTHING	EASTING
L1	10+00.00	3044850.4330	677683.5426		S3°23'18"E 91.59'	10+91.59	3044759.0004	677688.9561
C1	10+91.59	3044759.0004	677688.9561	R=150.00' Δ=40°03'51" L=104.89' T=54.69'		11+96.48	3044664.7031	677729.8021
C2	11+96.48	3044664.7031	677729.8021	R=150.00' Δ=11°14'30" L=29.43' T=14.76'		12+25.91	3044641.4954	677747.8243
L2	12+25.91	3044641.4954	677747.8243		S32°12'39"E 76.71'	13+02.62	3044576.5884	677788.7154
C3	13+02.62	3044576.5884	677788.7154	R=350.00' Δ=13°49'48" L=84.48' T=42.45'		13+87.11	3044511.2084	677841.8970
C4	13+87.11	3044511.2084	677841.8970	R=600.00' Δ=15°25'11" L=161.48' T=81.23'		15+48.58	3044384.9220	677941.7427
L3	15+48.58	3044384.9220	677941.7427		S30°37'16"E 201.42'	17+50.00	3044211.5922	678044.3355

FOR CONSTRUCTION PROFILE SEE SHEET 6

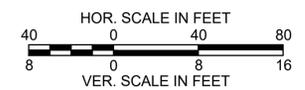
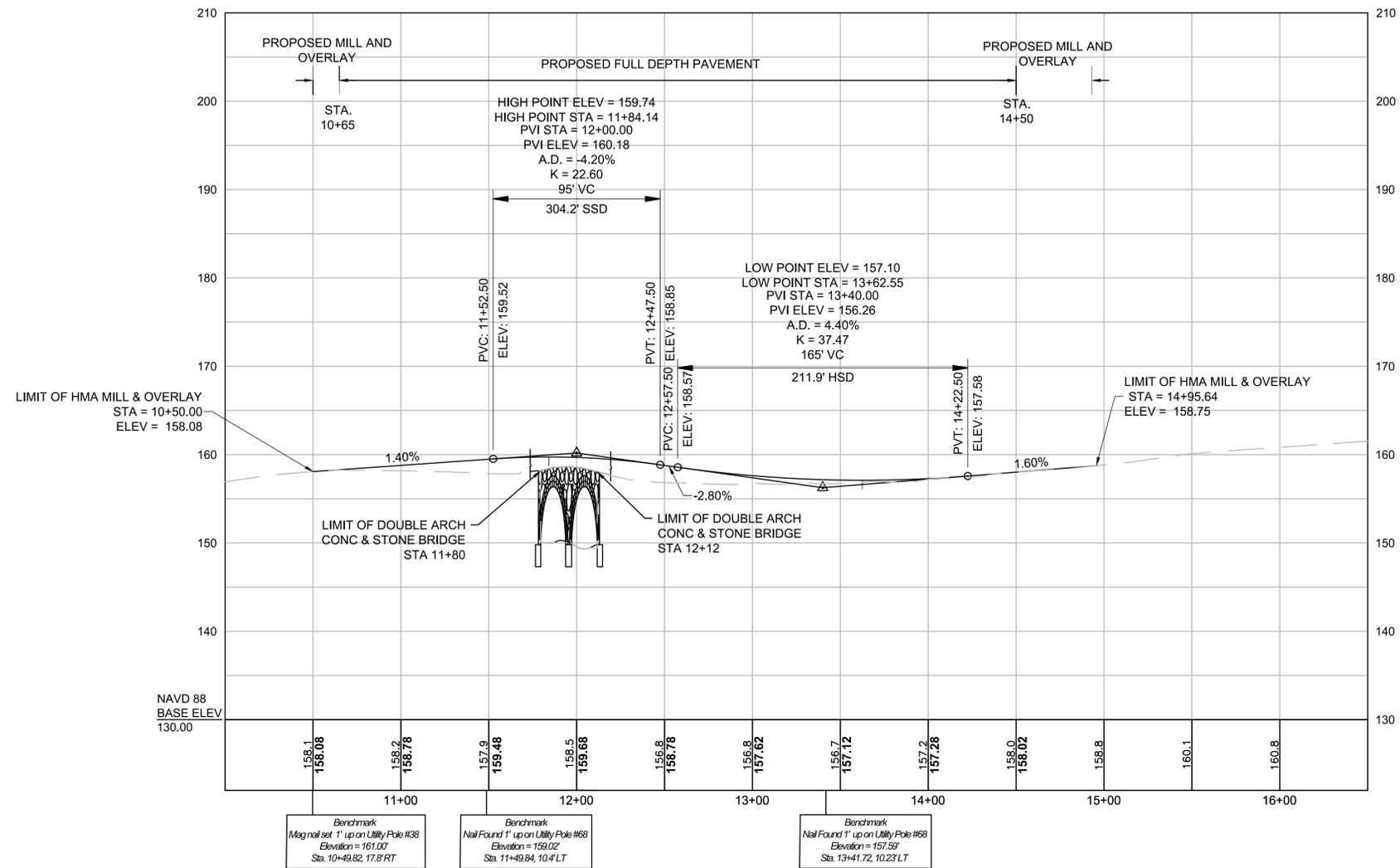


**WESTFORD
STONY BROOK ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	6	16
PROJECT FILE NO.		608861	

CONSTRUCTION PROFILE

STONY BROOK ROAD



FOR CONSTRUCTION PLANS: SEE SHEET NO. 5

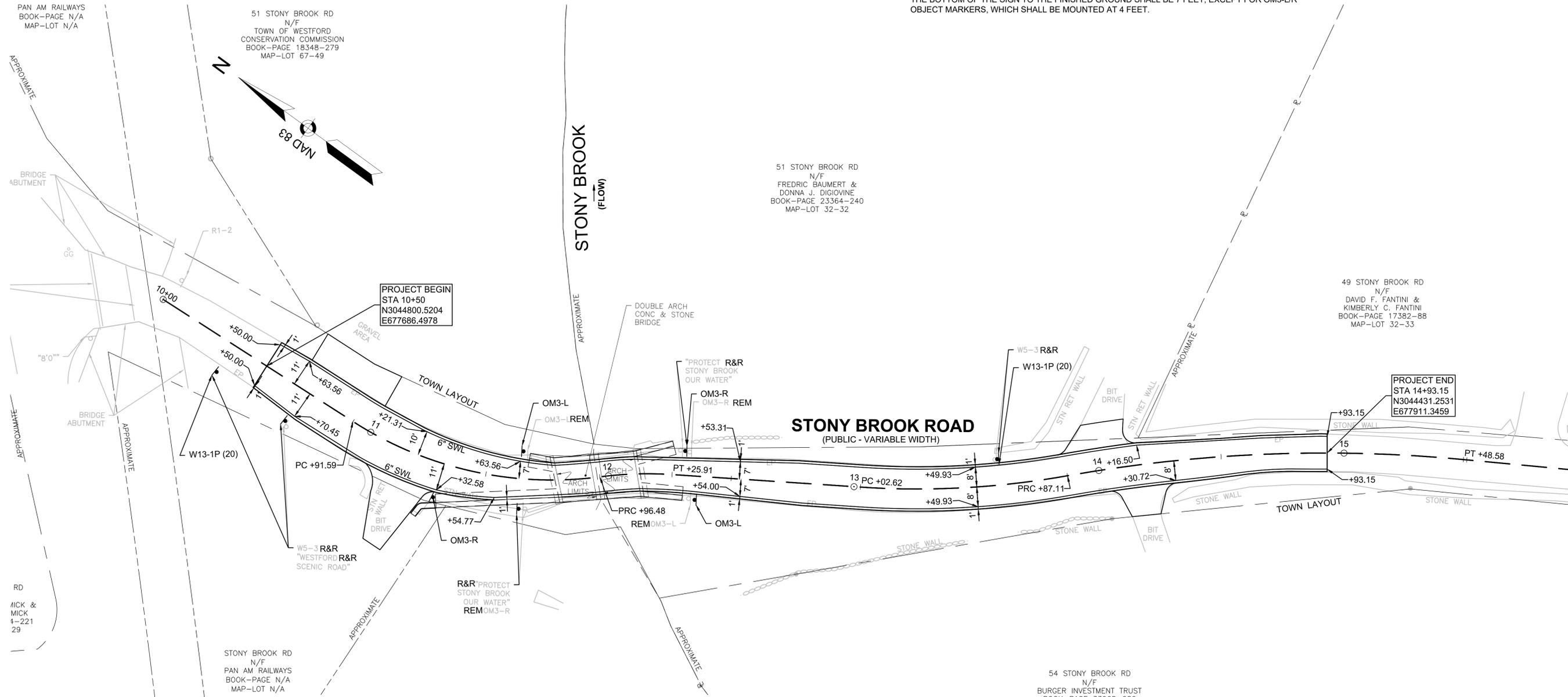
**WESTFORD
STONY BROOK ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	7	16
PROJECT FILE NO.		608861	

TRAFFIC SIGN & PAVEMENT MARKING PLAN

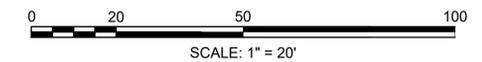
NOTES:

1. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS INDICATED OTHERWISE ON THE DRAWINGS.
2. ALL PAVEMENT MARKINGS WITHIN THE LIMITS OF WORK SHALL BE THERMOPLASTIC MATERIALS.
3. THE MINIMUM MOUNTING HEIGHT OF POST MOUNTED SIGNS, MEASURED VERTICALLY FROM THE BOTTOM OF THE SIGN TO THE FINISHED GROUND SHALL BE 7 FEET, EXCEPT FOR OM3-L/R OBJECT MARKERS, WHICH SHALL BE MOUNTED AT 4 FEET.



TRAFFIC SIGN SUMMARY

IDENTIFICATION NUMBER	SIZE OF SIGN (in)		LEGEND	TEXT DIMENSIONS (in)			NUMBER OF SIGNS REQUIRED	COLOR			SIZE AND NUMBER OF POSTS REQUIRED	UNIT AREA (SF)	TOTAL AREA (SF)
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR		BACK-GROUND	LEGEND	BORDER			
W13-1P (20)	18	18		SEE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS FOR DIMENSIONS			2	YELLOW	BLACK	BLACK	P5 2	2.25	4.50
OM3-L	12	36					2	YELLOW/ BLACK	N/A	N/A	P5 2	3.00	6.00
OM3-R	12	36					2	YELLOW/ BLACK	N/A	N/A	P5 2	3.00	6.00



NOTES:

1. ALL TEMPORARY TRAFFIC CONTROL WORK SHALL CONFORM TO THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) AND ALL REVISIONS, UNLESS SUPERCEDED BY THESE PLANS.
2. ALL SIGN LEGENDS, BORDERS, AND MOUNTING SHALL BE IN ACCORDANCE WITH THE MUTCD.
3. TEMPORARY CONSTRUCTION SIGNING AND ALL OTHER TRAFFIC CONTROL DEVICES SHALL BE IN PLACE PRIOR TO THE START OF ANY WORK.
4. TEMPORARY CONSTRUCTION SIGNING, BARRICADES, AND ALL OTHER NECESSARY WORK ZONE TRAFFIC CONTROL DEVICES SHALL BE REMOVED FROM THE HIGHWAY OR COVERED WHEN THEY ARE NOT REQUIRED FOR CONTROL OF TRAFFIC.
5. SIGNS AND SIGN SUPPORTS LOCATED ON OR NEAR THE TRAVELED WAY, CHANNELIZING DEVICES, BARRIERS, AND CRASH ATTENUATORS MUST PASS THE CRITERIA SET FORTH IN NCHRP REPORT 350, "RECOMMENDED PROCEDURES FOR THE SAFETY PERFORMANCE EVALUATION OF HIGHWAY FEATURES" AND/OR "MANUAL FOR ASSESSING SAFETY HARDWARE" (MASH).
6. CONTRACTORS SHALL NOTIFY EACH ADJUTANT AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OF ACCESS, SUCH AS CONDUIT INSTALLATION, EXISTING PAVEMENT EXCAVATION, TEMPORARY DRIVEWAY PAVEMENT PLACEMENT, AND SIMILAR OPERATIONS.
7. THE FIRST TEN PLASTIC DRUMS OF A TAPER SHALL BE MOUNTED WITH SEQUENTIAL FLASHING LIGHTS.
8. THE ADVISORY SPEED LIMIT, IF REQUIRED, SHALL BE DETERMINED BY THE ENGINEER.
9. DISTANCES ARE A GUIDE AND MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
10. MAXIMUM SPACING OF TRAFFIC DEVICES IN A TAPER (DRUMS OR CONES) IS EQUAL IN FEET TO THE SPEED LIMIT IN MPH.
11. MINIMUM LANE WIDTH IS TO BE 11 FEET UNLESS OTHERWISE SHOWN. MINIMUM LANE WIDTH TO BE MEASURED FROM THE EDGE OF DRUMS OR MEDIAN BARRIER.
12. ALL SIGNS SHALL BE MOUNTED ON THEIR OWN STANDARD SIGN SUPPORTS.
13. TEMPORARY FACILITIES, INCLUDING BUT NOT LIMITED TO, TEMPORARY PEDESTRIAN PASSAGEWAYS AROUND A CONSTRUCTION SITE, SHALL COMPLY WITH 521 CMR WHICH STATES, "NO ALTERATION SHALL BE UNDERTAKEN WHICH DECREASES OR HAS THE EFFECT OF DECREASING ACCESSIBILITY OR USABILITY OF A FACILITY BELOW THE REQUIREMENTS FOR NEW CONSTRUCTION."
14. BICYCLISTS SHALL BE ACCOMMODATED DURING CONSTRUCTION AT ALL TIMES.
15. NO WORK THAT IMPACTS THE TRAVELED WAY SHALL BE PERMITTED DURING PEAK HOUR TRAFFIC (7-9AM, 3-6PM).

LEGEND:

- CHANNELIZATION DEVICE
- ▨ WORK ZONE
- 🚚 WORK VEHICLE
- 👮 POLICE/FLAGGER DETAIL
- ➡ DIRECTION OF TRAFFIC
- 🚛 TRUCK MOUNTED ATTENUATOR
- 🚧 TYPE III BARRICADE
- 🚧 IMPACT ATTENUATOR
- 🚧 TRAFFIC OR PEDESTRIAN SIGNAL
- 📢 CHANGEABLE MESSAGE SIGN
- 🚧 MEDIAN BARRIER
- 🚧 SIGN
- 🚧 ARROW BOARD
- 🚧 MEDIAN BARRIER WITH WARNING LIGHTS
- 🚧 TEMPORARY PORTABLE RUMBLE STRIP

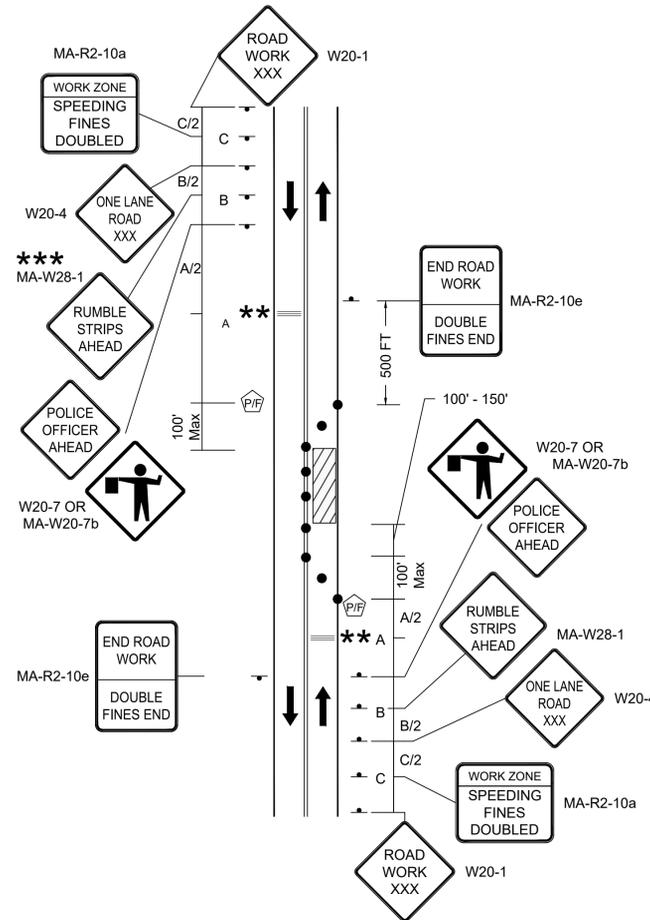
TAPER LENGTH CRITERIA FOR TEMPORARY TRAFFIC CONTROL ZONES

TYPE OF TAPER	TAPER LENGTH (L)
MERGING TAPER	AT LEAST L
SHIFTING TAPER	AT LEAST 0.5L
SHOULDER TAPER	AT LEAST 0.33L
ONE-LANE, TWO-WAY TRAFFIC TAPER	50 FT MIN. 100 FT MAX.
DOWNSTREAM TAPER	50 FT MIN. 100 FT MAX. PER LANE

FORMULAS FOR DETERMINING TAPER LENGTHS

SPEED LIMIT (S)	TAPER LENGTH (L) FEET
40 MPH OR LESS	$L = \frac{WS^2}{60}$
45 MPH OR MORE	$L = WS$

WHERE: L = TAPER LENGTH IN FEET
 W = WIDTH OF OFFSET IN FEET
 S = POSTED SPEED LIMIT, OR OFF-PEAK 85TH-PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED IN MPH



POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)	CHANNELIZATION DEVICES (DRUMS OR CONES)			
		TRAVEL LANE CLOSURE LENGTH (L) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	500 / 500 / 500	50	100	20	30
45-55	500 / 1000 / 1000	100	150	40	20

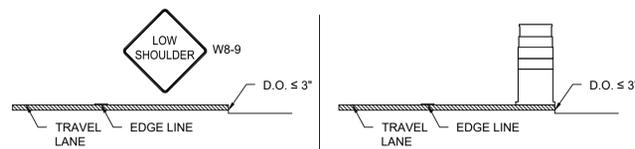
* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

POSTED REGULATORY OR WORK ZONE SPEED	SEPARATION BETWEEN RUMBLE STRIPS
36-mph to 55-mph	15-feet
35-mph and under	10-feet

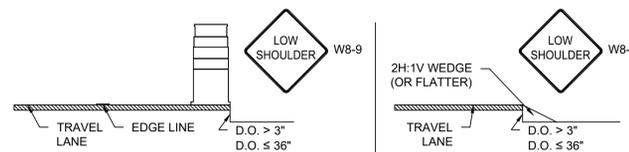
NOTES

1. IF POLICE DETAIL/UNIFORMED FLAGGER SUPPORT IS REQUIRED, PROVIDE TWO UNITS.
2. MA-R2-10a LOCATED AT C/2.
3. **OPTIONAL AT THE ENGINEER'S DISCRETION.
4. *** SHALL BE DEPLOYED IF RUMBLE STRIPS ARE PRESENT.

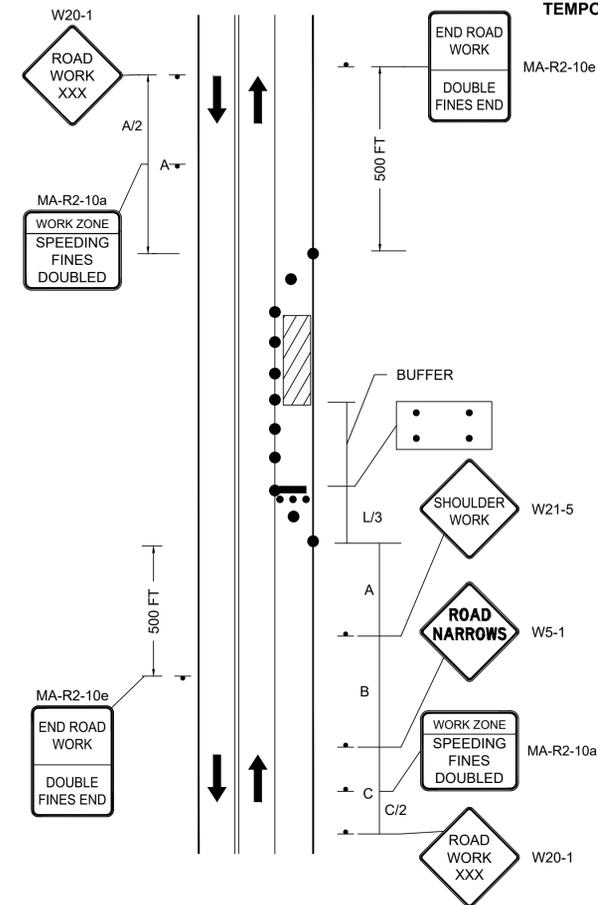
TWO LANE UNDIVIDED ROADWAY HALF OF ROADWAY CLOSED



VERTICAL DROP OFF LESS THAN 3"



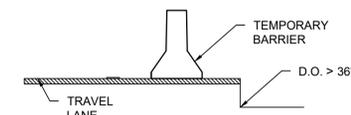
VERTICAL DROP OFF GREATER THAN 3" AND LESS THAN 36"



POSTED SPEED LIMIT (MPH)	SPACING FOR ADVANCE WARNING SIGNS (FT) (A,B,C)	CHANNELIZATION DEVICES (DRUMS OR CONES)			
		SHOULDER TAPER LENGTH (L/3) (FT)	BUFFER ZONE LENGTH (FT)	DEVICE SPACING (FT)	MIN # OF DEVICES*
25-40	500 / 500 / 500	110	305	20	45
45-55	500 / 1000 / 1000	220	495	40	30
60-65	1000 / 1600 / 2600	260	645	40	35

* NUMBER OF DEVICES BASED ON 400 FT WORK ZONE.

TWO LANE UNDIVIDED ROADWAY SHOULDER CLOSED



VERTICAL DROP OFF GREATER THAN 36"

WESTFORD STONY BROOK ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	8	16

PROJECT FILE NO. 608861

TEMPORARY TRAFFIC CONTROL PLANS - 1 OF 3

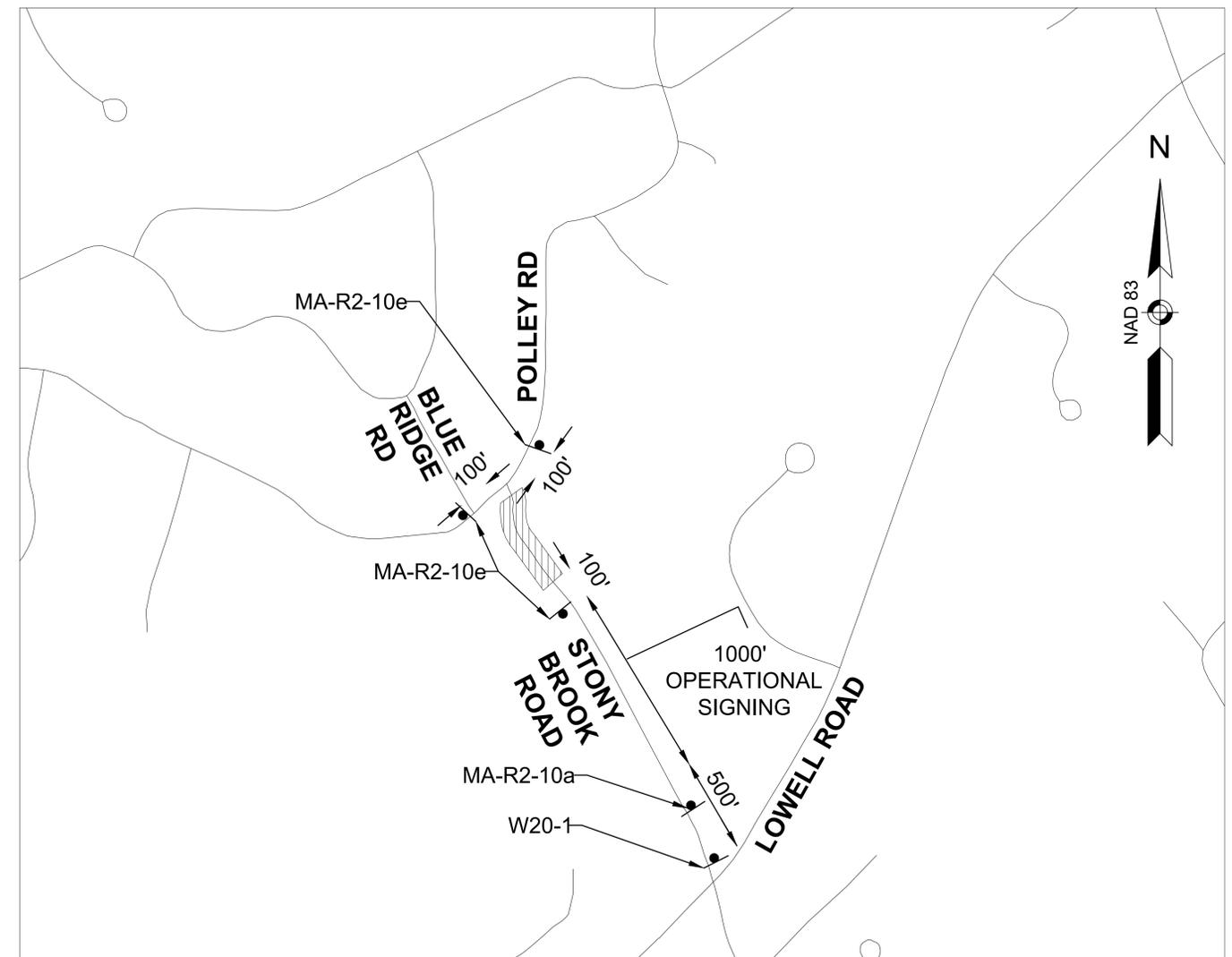
WESTFORD
STONY BROOK ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	9	16
PROJECT FILE NO.		608861	

TEMPORARY TRAFFIC CONTROL PLANS - 2 OF 3

TEMPORARY TRAFFIC CONTROL SIGN SUMMARY												
IDENTIFICATION NUMBER	SIZE OF SIGN (in)		LEGEND	TEXT DIMENSIONS (in)			NUMBER OF SIGNS REQUIRED	COLOR			UNIT AREA (SF)	TOTAL AREA (SF)
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR		BACK-GROUND	LEGEND	BORDER		
W16-8p	33	8		4B/2B	2 2	N/A	21	FL. ORANGE	BLACK	BLACK	1.83	38.50
M4-8	24	12		SEE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS			20	FL. ORANGE	BLACK	BLACK	2.00	40.00
M6-1L	21	15					4	FL. ORANGE	BLACK	BLACK	2.19	8.75
M6-1R	21	15					4	FL. ORANGE	BLACK	BLACK	2.19	8.75
M6-2L	21	15					2	FL. ORANGE	BLACK	BLACK	2.19	4.38
M6-2R	21	15					2	FL. ORANGE	BLACK	BLACK	2.19	4.38
M6-3	21	15					9	FL. ORANGE	BLACK	BLACK	2.19	19.69
MA-R2-10a	48	36		MASSDOT STANDARD SIGN			2	FL. ORANGE/WHITE	BLACK	BLACK	12.00	24.00
MA-R2-10e	36	48		MASSDOT STANDARD SIGN			3	FL. ORANGE/WHITE	BLACK	BLACK	12.00	36.00
R11-2a	48	30		SEE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS			2	WHITE	BLACK	BLACK	10.00	20.00
R11-4	60	30					3	WHITE	BLACK	BLACK	12.50	37.50
W5-1	36	36					1	FL. ORANGE	BLACK	BLACK	9.00	9.00
W8-9	36	36					2	FL. ORANGE	BLACK	BLACK	9.00	18.00
W20-1	36	36					2	FL. ORANGE	BLACK	BLACK	9.00	18.00
W20-3	36	36					1	FL. ORANGE	BLACK	BLACK	9.00	9.00
W20-4	36	36					2	FL. ORANGE	BLACK	BLACK	9.00	18.00

TEMPORARY TRAFFIC CONTROL SIGN SUMMARY												
IDENTIFICATION NUMBER	SIZE OF SIGN (in)		LEGEND	TEXT DIMENSIONS (in)			NUMBER OF SIGNS REQUIRED	COLOR			UNIT AREA (SF)	TOTAL AREA (SF)
	WIDTH	HEIGHT		LETTER HEIGHT	VERTICAL SPACING	ARROW RTE. MKR		BACK-GROUND	LEGEND	BORDER		
W20-7	36	36		SEE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS			2	FL. ORANGE	BLACK	BLACK	9.00	18.00
MA-W20-7b	36	36		MASSDOT STANDARD SIGN			2	FL. ORANGE	BLACK	BLACK	9.00	18.00
W21-5	36	36		SEE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS			1	FL. ORANGE	BLACK	BLACK	9.00	9.00
MA-W28-1	36	36		MASSDOT STANDARD SIGN			2	FL. ORANGE	BLACK	BLACK	9.00	18.00



ADVANCED WARNING SCHEMATIC
N.T.S

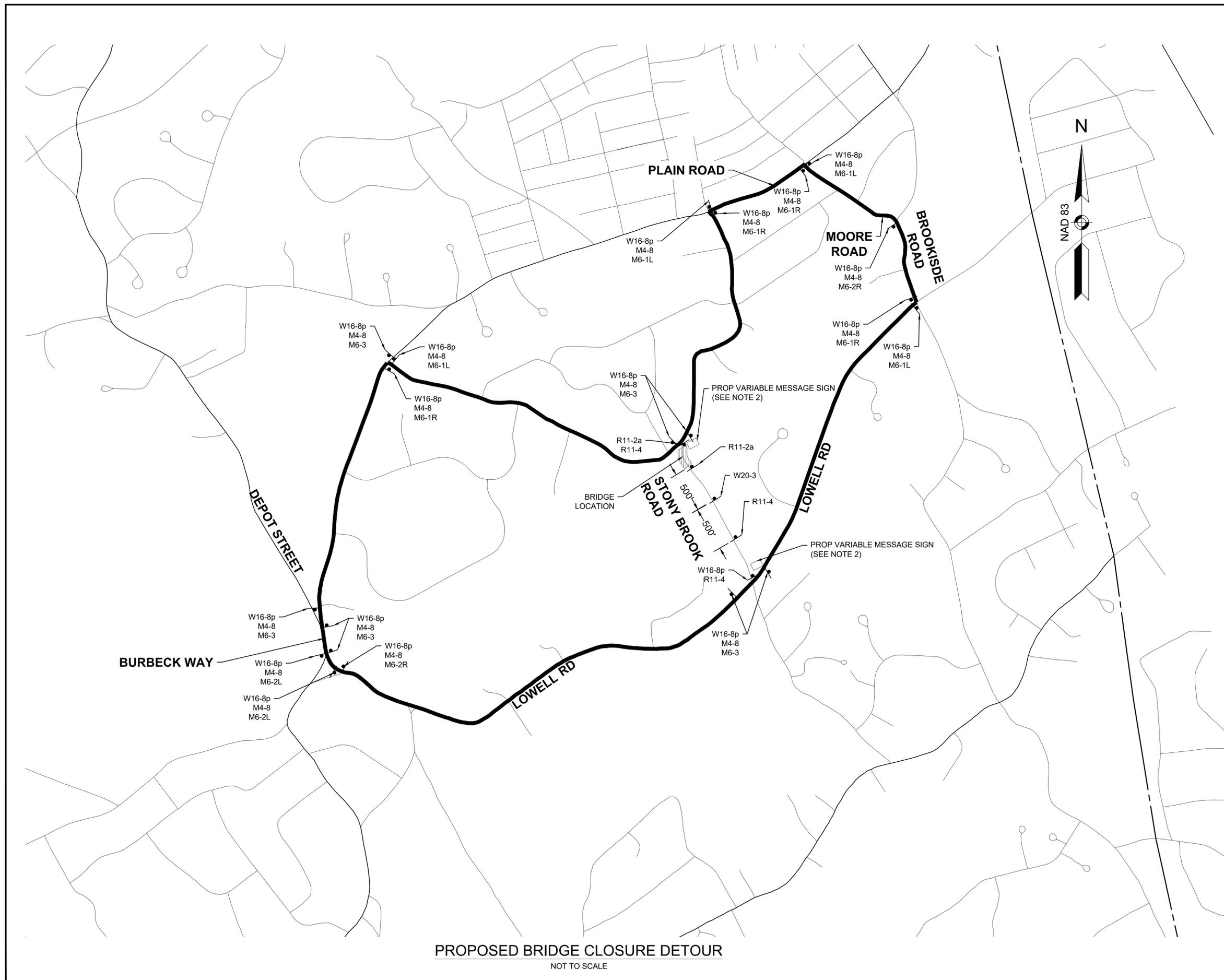
**WESTFORD
STONY BROOK ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	10	16
PROJECT FILE NO.		608861	

TEMPORARY TRAFFIC CONTROL PLANS - 3 OF 3

NOTES:

1. ALL DETOUR SIGNS SHALL BE INSTALLED WITHIN THE RIGHT OF WAY LIMITS.
2. VARIABLE MESSAGES SIGNS TO BE SET UP 2 WEEKS PRIOR TO ROAD CLOSURE. MESSAGE TO READ:
"STONY BROOK RD
CLOSED X/X/XX
SEEK ALT ROUTE"



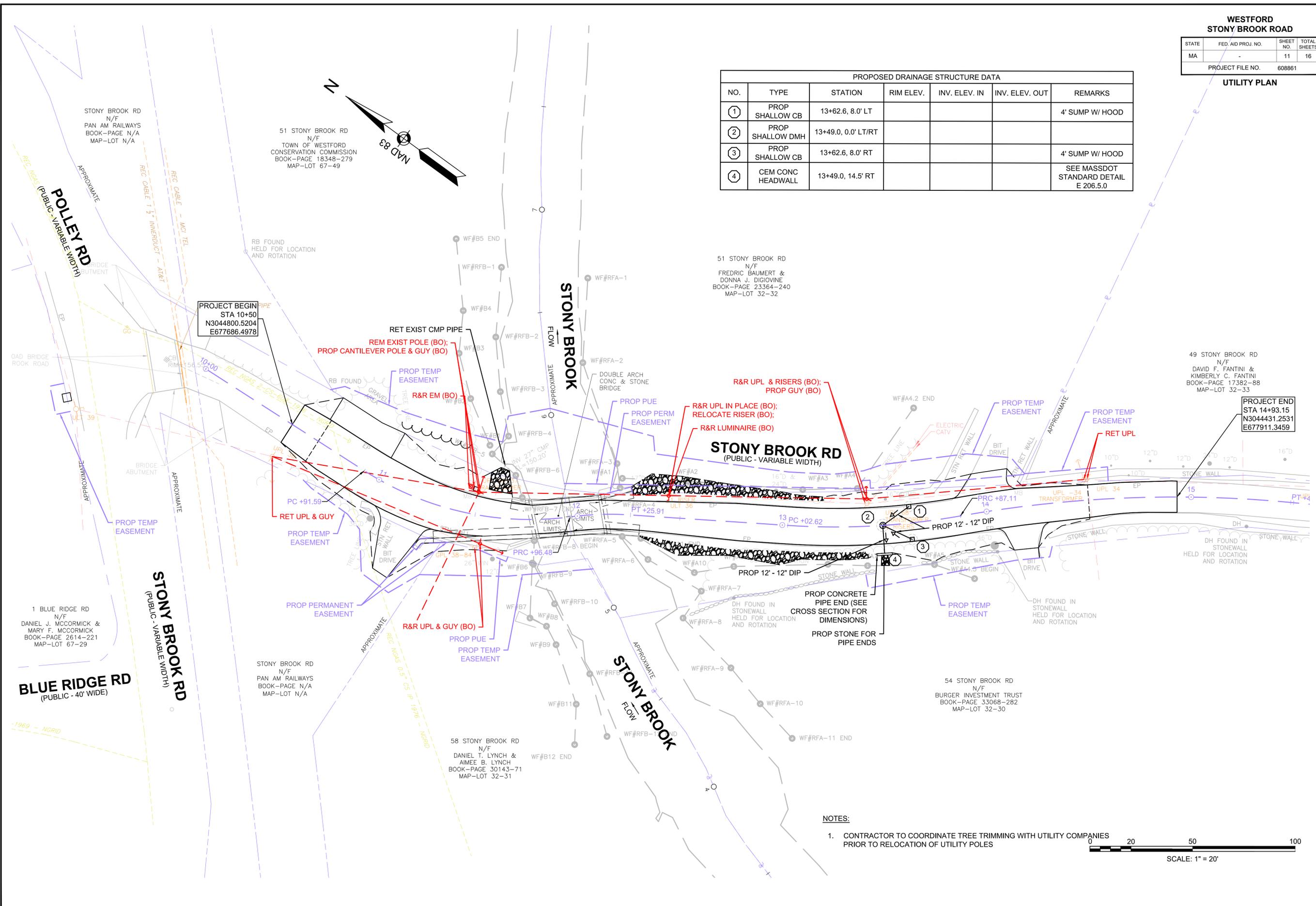
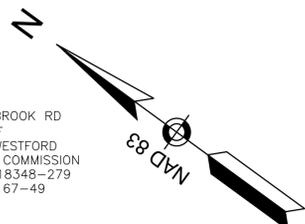
PROPOSED BRIDGE CLOSURE DETOUR
NOT TO SCALE

**WESTFORD
STONY BROOK ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	11	16
PROJECT FILE NO. 608861			

UTILITY PLAN

PROPOSED DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. ELEV. IN	INV. ELEV. OUT	REMARKS
①	PROP SHALLOW CB	13+62.6, 8.0' LT				4' SUMP W/ HOOD
②	PROP SHALLOW DMH	13+49.0, 0.0' LT/RT				
③	PROP SHALLOW CB	13+62.6, 8.0' RT				4' SUMP W/ HOOD
④	CEM CONC HEADWALL	13+49.0, 14.5' RT				SEE MASSDOT STANDARD DETAIL E 206.5.0



PROJECT BEGIN
STA 10+50
N3044800.5204
E677686.4978

PROJECT END
STA 14+93.15
N3044431.2531
E677911.3459

51 STONY BROOK RD
N/F
FREDRIC BAUMERT &
DONNA J. DIGIOVINE
BOOK-PAGE 23364-240
MAP-LOT 32-32

49 STONY BROOK RD
N/F
DAVID F. FANTINI &
KIMBERLY C. FANTINI
BOOK-PAGE 17382-88
MAP-LOT 32-33

1 BLUE RIDGE RD
N/F
DANIEL J. MCCORMICK &
MARY F. MCCORMICK
BOOK-PAGE 2614-221
MAP-LOT 67-29

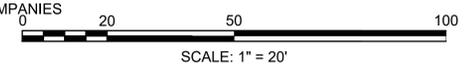
STONY BROOK RD
N/F
PAN AM RAILWAYS
BOOK-PAGE N/A
MAP-LOT N/A

58 STONY BROOK RD
N/F
DANIEL T. LYNCH &
AIMEE B. LYNCH
BOOK-PAGE 30143-71
MAP-LOT 32-31

54 STONY BROOK RD
N/F
BURGER INVESTMENT TRUST
BOOK-PAGE 33068-282
MAP-LOT 32-30

NOTES:

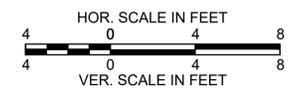
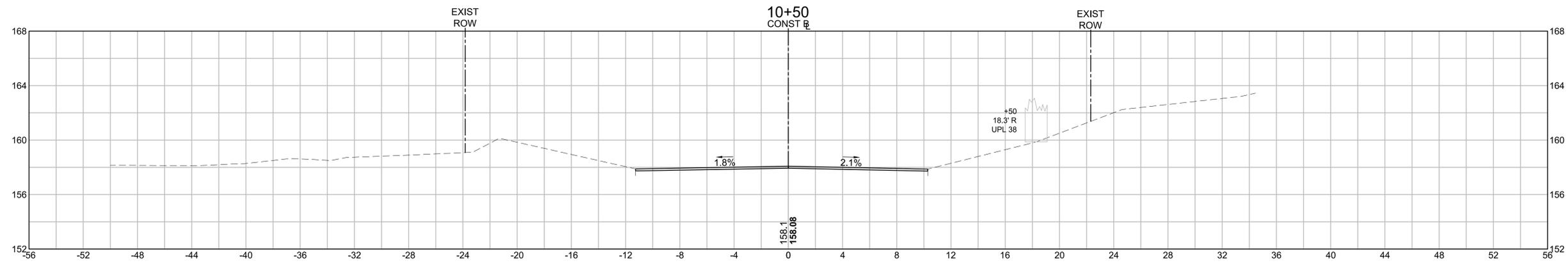
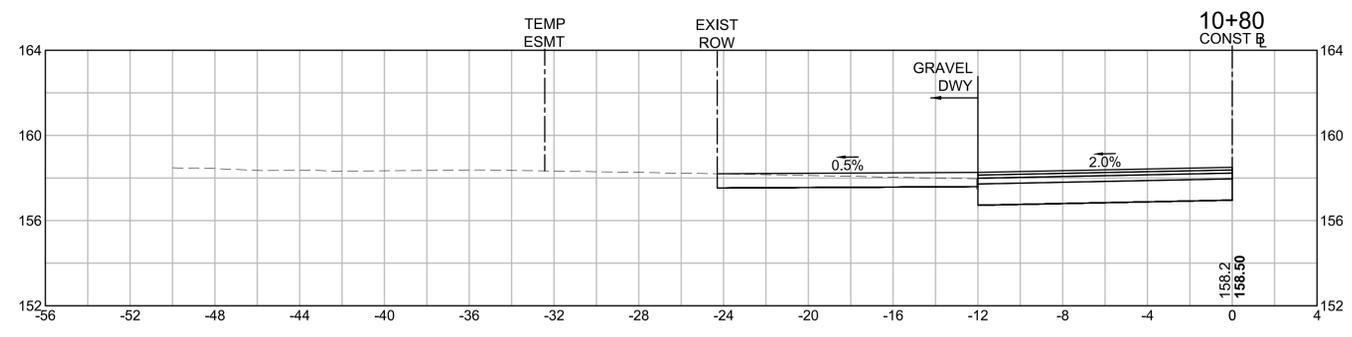
- CONTRACTOR TO COORDINATE TREE TRIMMING WITH UTILITY COMPANIES PRIOR TO RELOCATION OF UTILITY POLES



WESTFORD
STONY BROOK ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	12	16
PROJECT FILE NO.		608861	

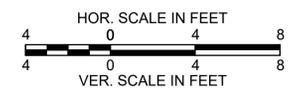
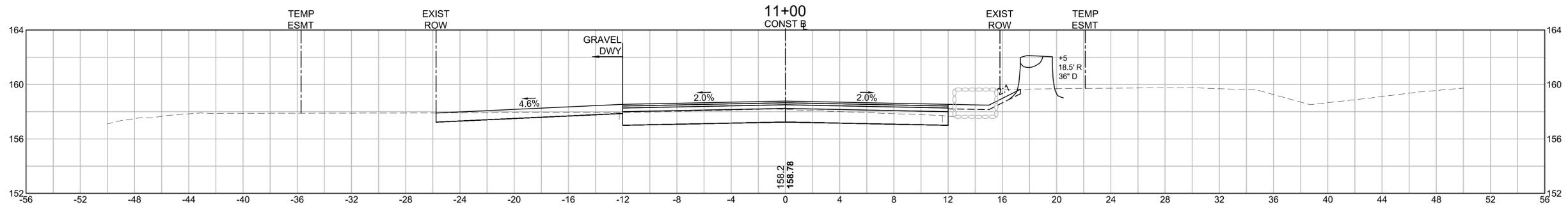
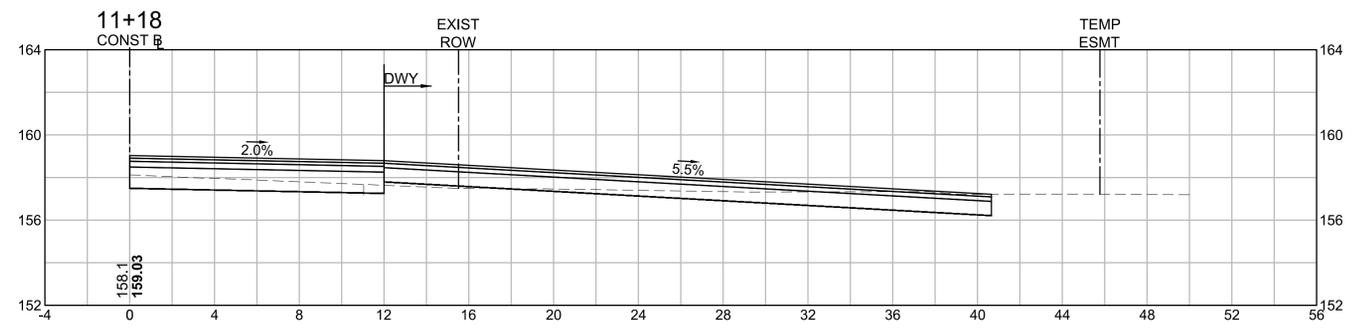
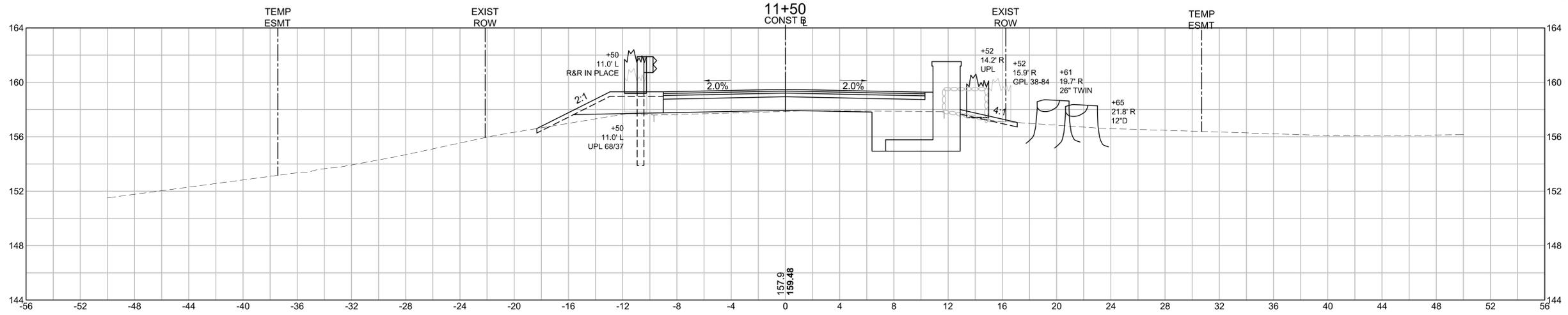
CROSS SECTIONS - 1 OF 5



WESTFORD
STONY BROOK ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	13	16
PROJECT FILE NO.		608861	

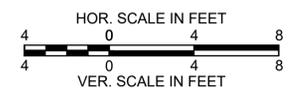
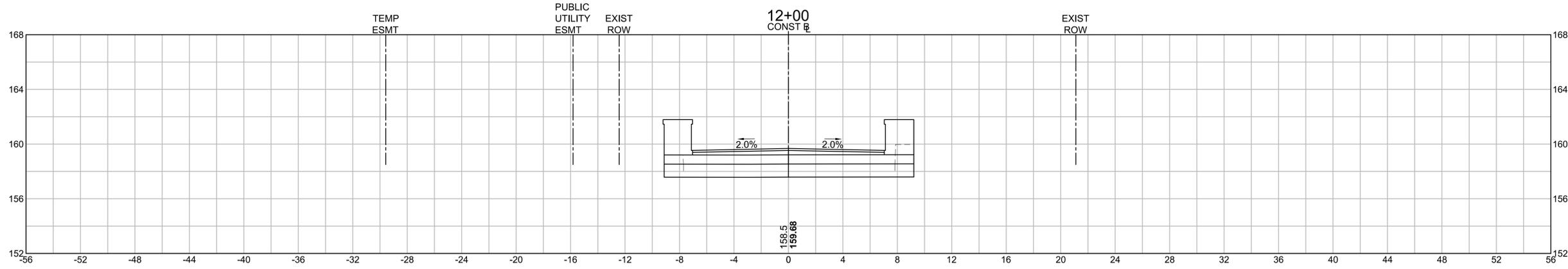
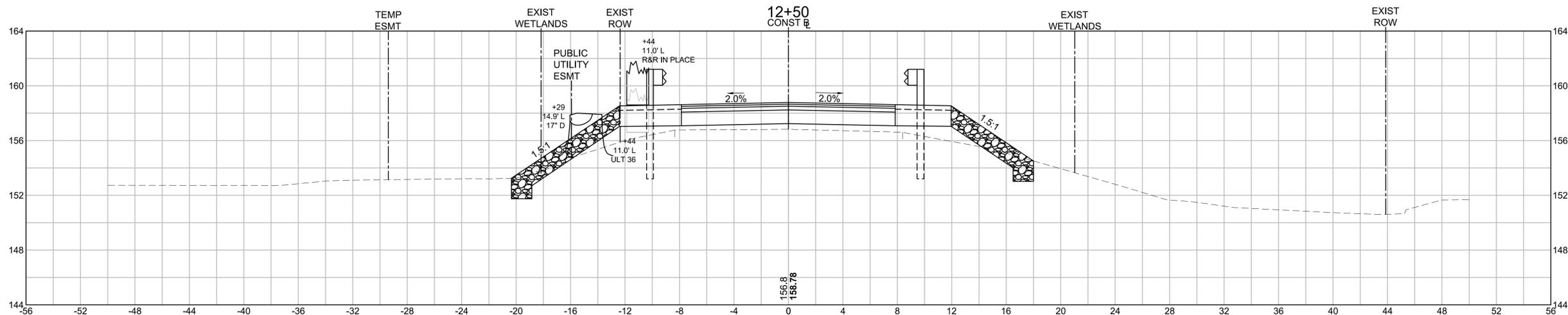
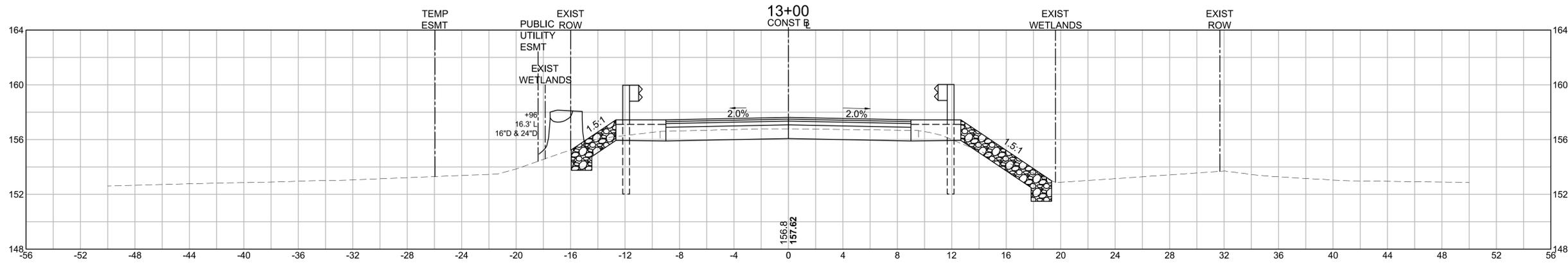
CROSS SECTIONS - 2 OF 5



WESTFORD
STONY BROOK ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	14	16
PROJECT FILE NO.		608861	

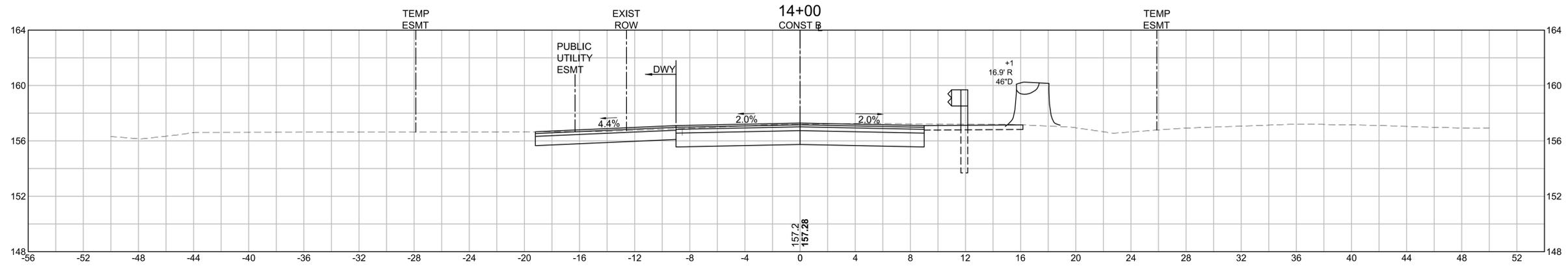
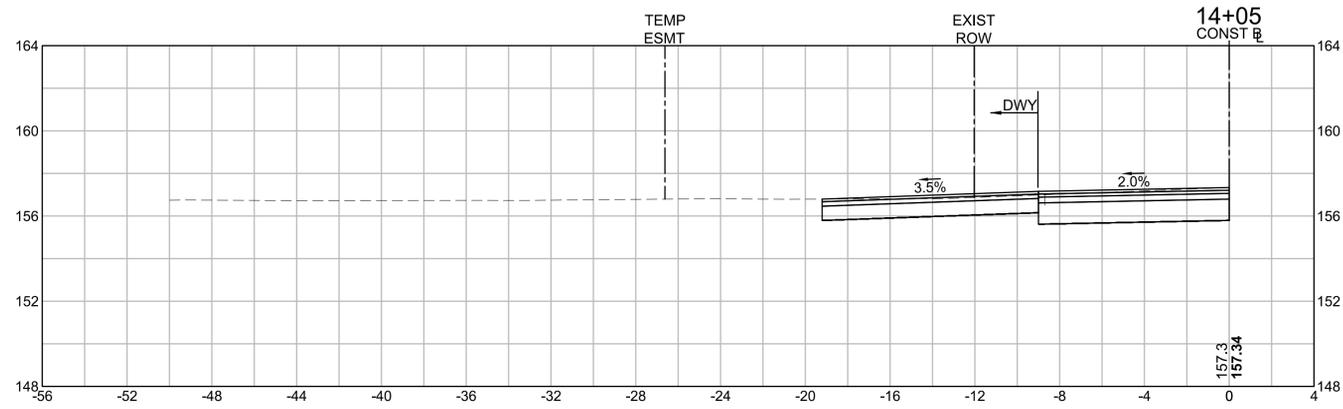
CROSS SECTIONS - 3 OF 5



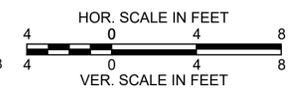
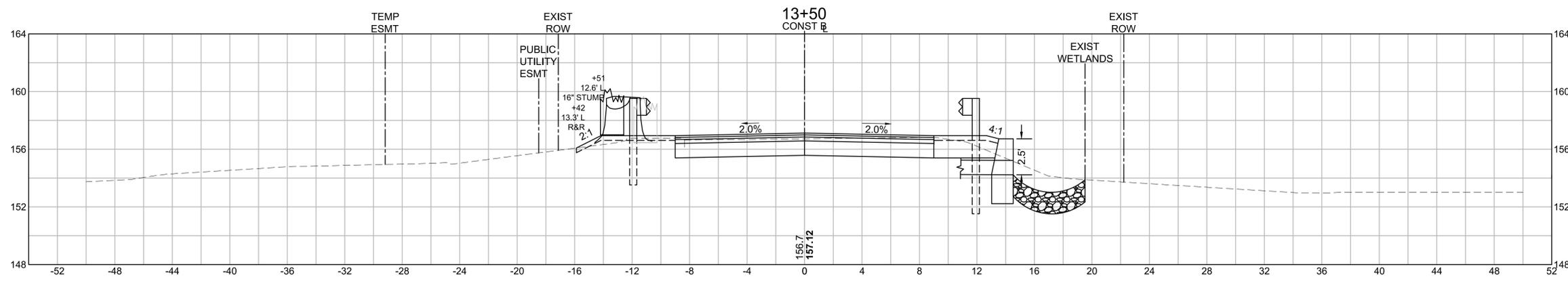
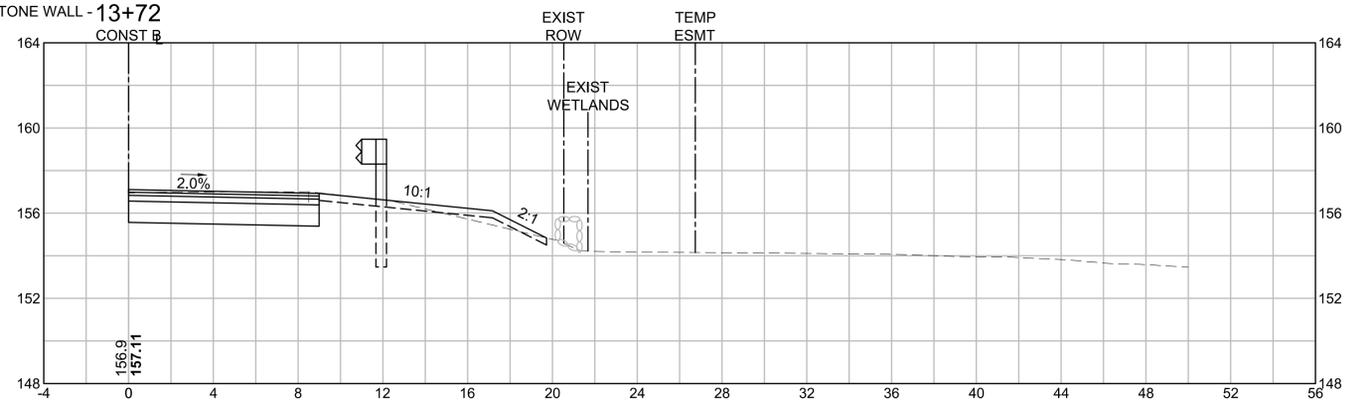
**WESTFORD
STONY BROOK ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	15	16
PROJECT FILE NO.		608861	

CROSS SECTIONS - 4 OF 5



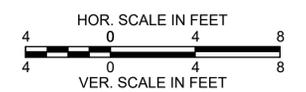
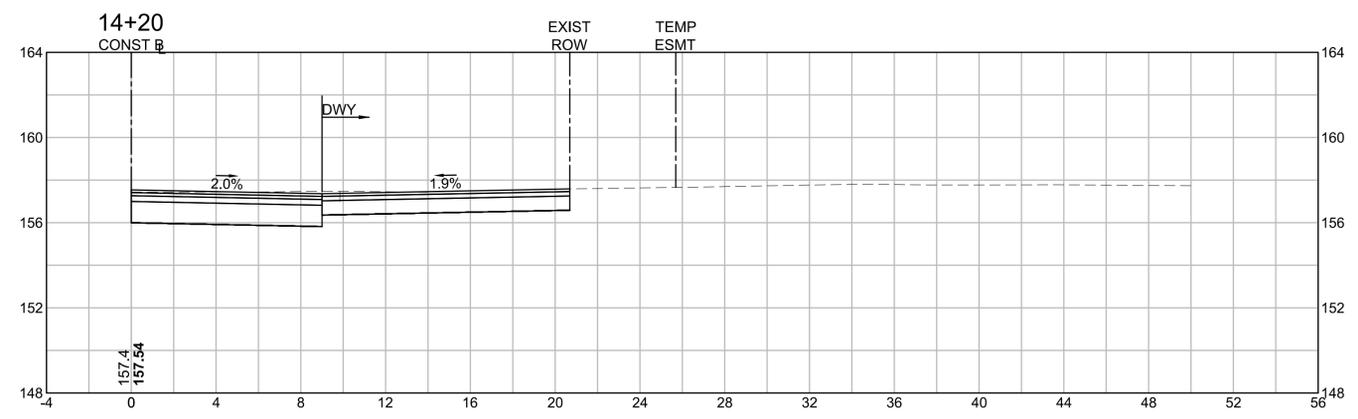
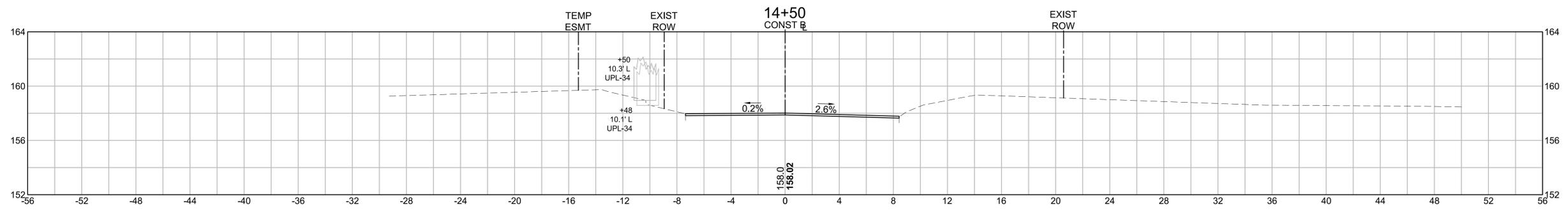
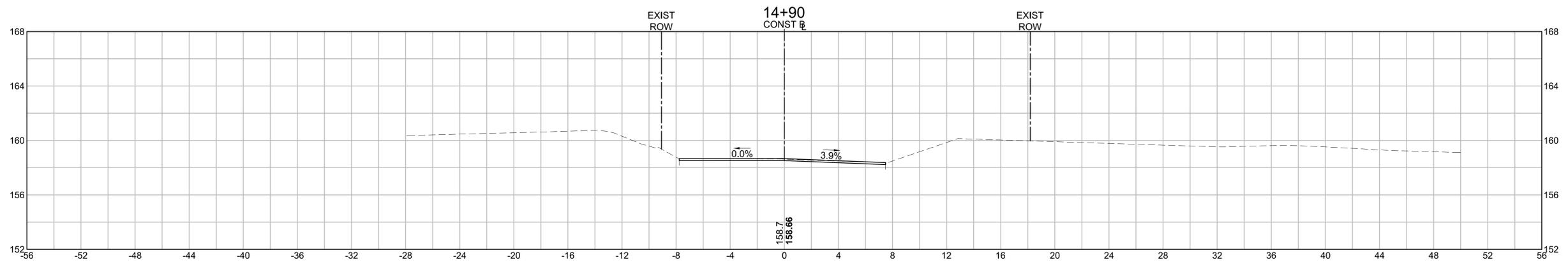
CRITICAL SECTION AT STONE WALL - 13+72

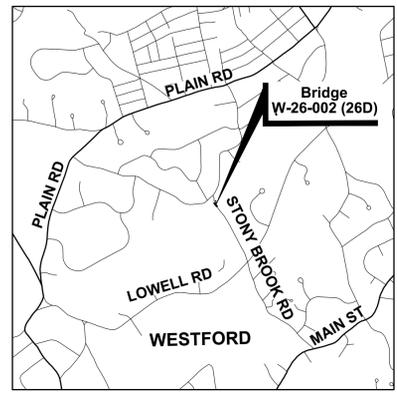
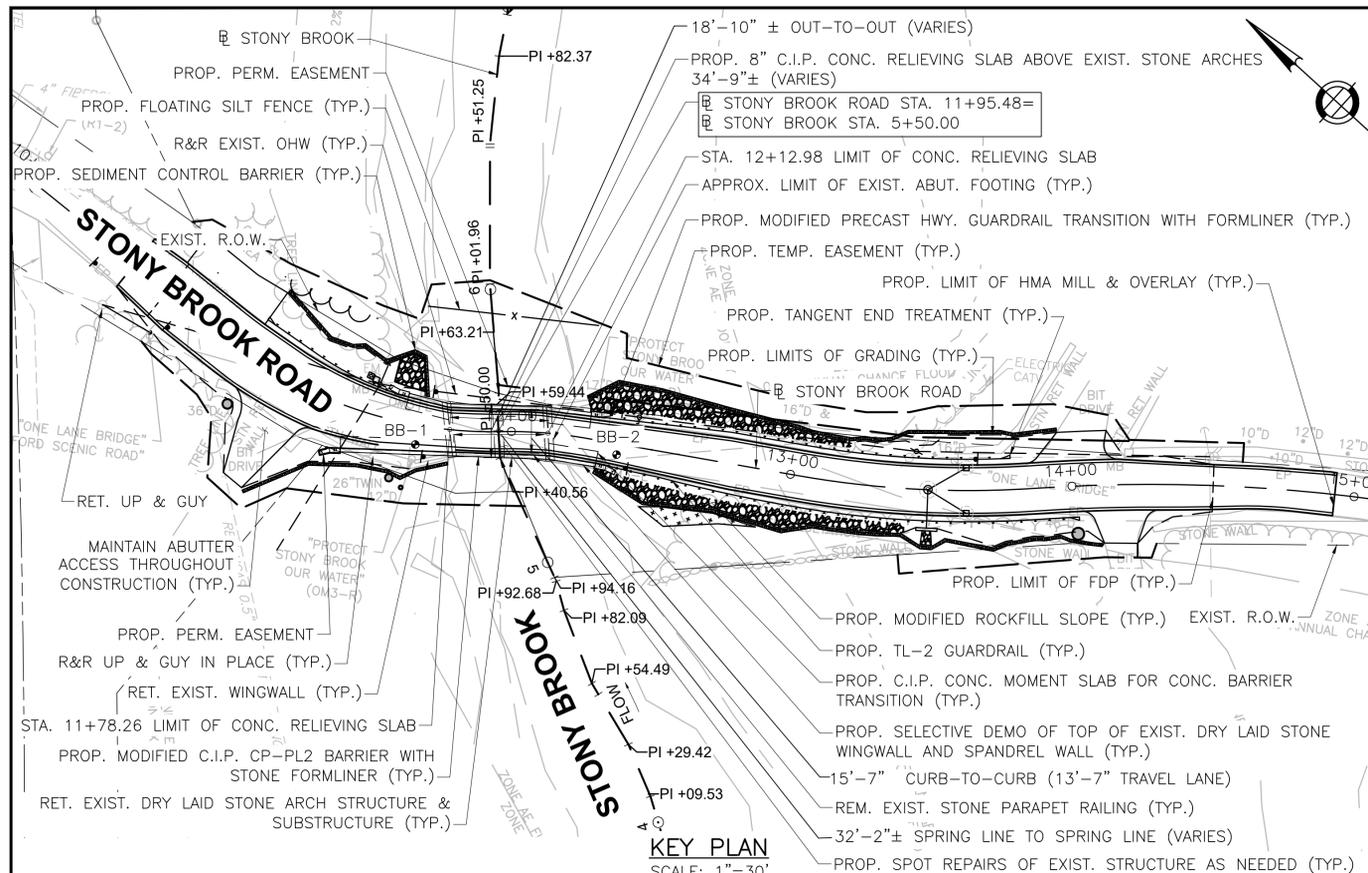


**WESTFORD
STONY BROOK ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	16	16
PROJECT FILE NO.		608861	

CROSS SECTIONS - 5 OF 5





LOCUS MAP
SCALE: 1"=2000'

NOTES:

1. IN ACCORDANCE WITH THE 2002 AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES 17TH EDITION FOR H20 LOADING.
2. APPROVAL DOES NOT INCLUDE STRUCTURAL ANALYSIS.
3. DIMENSIONS OF STRUCTURAL MEMBERS ARE APPROXIMATE, AND WILL BE FINALIZED DURING THE FINAL DESIGN PHASE.
4. SEE GEOTECHNICAL REPORT, DATED JULY 19, 2021.
5. SEE PRELIMINARY HYDRAULIC REPORT, DATED MONTH XX, 2021.
6. NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988 IS USED THROUGHOUT.
7. FOR MORE BASELINE LAYOUT INFORMATION SEE HIGHWAY PLANS.

TRAFFIC DATA		
	ROADWAY OVER	ROADWAY UNDER
DESIGN YEAR	2021	YEAR
AVERAGE DAILY TRAFFIC - PRESENT	429	ADT
AVERAGE DAILY TRAFFIC - DESIGN YEAR	438	ADT
DESIGN HOURLY VOLUME	45	DHV
DIRECTIONAL DISTRIBUTION	68.2%	DIST
TRUCK PERCENTAGE - AVERAGE DAY	0.2%	ADTT
TRUCK PERCENTAGE - PEAK HOUR	0.5%	PHTT
DESIGN SPEED	30 MPH	DES
DIRECTIONAL DESIGN HOURLY VOLUME	31	DDHV

SEISMIC DESIGN CRITERIA	
DESIGN RETURN PERIOD:	1,000
DESIGN SPECTRA	
As	0.126
SDs	0.256
SD1	0.098
SITE CLASS	D
SEISMIC DESIGN CATEGORY (SDC)	A

HYDRAULIC DESIGN DATA	
DRAINAGE AREA (SQ. MILES)	N/A
DESIGN FLOOD DISCHARGE (C.F.S.)	N/A
DESIGN FLOOD FREQUENCY (YEARS)	N/A
DESIGN FLOOD VELOCITY (F.P.S.)	N/A
DESIGN FLOOD ELEVATION (FEET, NAVD)	N/A

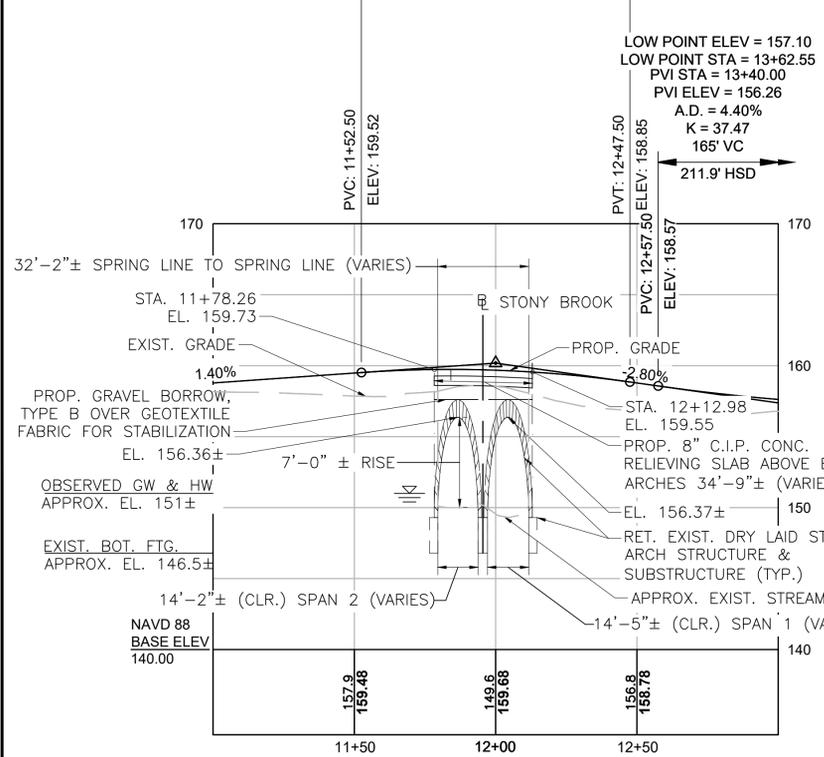
BASE (100-YEAR) FLOOD DATA	
BASE FLOOD DISCHARGE (C.F.S.)	N/A
BASE FLOOD ELEVATION (FEET, NAVD)	N/A

DESIGN AND CHECK SCOUR DATA	
DESIGN SCOUR FLOOD EVENT	N/A
RETURN FREQUENCY (YEARS)	N/A
DESIGN FLOOD ABUTMENT SCOUR DEPTH (FEET)	N/A
DESIGN FLOOD PIER SCOUR DEPTH (FEET)	N/A
CHECK SCOUR FLOOD EVENT	N/A
RETURN FREQUENCY (YEARS)	N/A
CHECK FLOOD ABUTMENT SCOUR DEPTH (FEET)	N/A
CHECK FLOOD PIER SCOUR DEPTH (FEET)	N/A

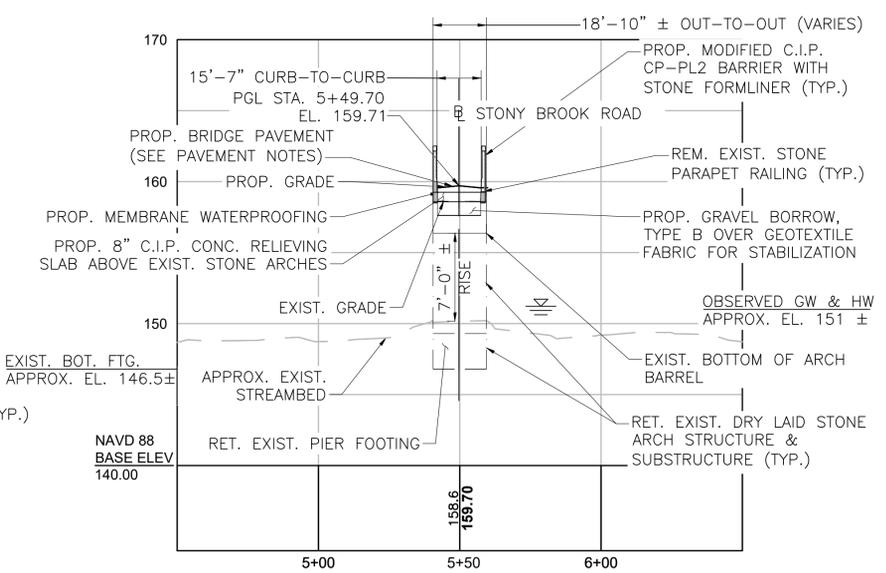
FLOOD OF RECORD	
DISCHARGE (C.F.S.)	N/A
FREQUENCY (IF KNOWN, YEARS)	N/A
MAXIMUM ELEVATION (FEET, NAVD)	N/A
DATE (MM/YYYY)	N/A
HISTORY OF ICE FLOES	N/A
EVIDENCE OF SCOUR AND EROSION	N/A

HIGH POINT ELEV = 159.74
HIGH POINT STA = 11+84.14
PVI STA = 12+00.00
PVI ELEV = 160.18
A.D. = -4.20%
K = 22.60
95' VC

LOW POINT ELEV = 157.10
LOW POINT STA = 13+62.55
PVI STA = 13+40.00
PVI ELEV = 156.26
A.D. = 4.40%
K = 37.47
165' VC



STONY BROOK ROAD PROFILE
HORIZONTAL SCALE: 1"=30'
VERTICAL SCALE: 1"=6'



STONY BROOK PROFILE
HORIZONTAL SCALE: 1"=30'
VERTICAL SCALE: 1"=6'

PROJECT INFORMATION	
PROJECT FILE NO.:	608861
PROJECT DESCRIPTION:	PROPOSED BRIDGE PRESERVATION
BRIDGE DESIGN LOADING:	H20
SURVEY:	FELDMAN LAND SURVEYORS
ELEVATION REFERENCE:	NAVD OF 1988
BENCH MARK:	NAIL SET 1' UP IN U.P. #68/37, EL. 159.02'
	NAIL SET 1' UP IN U.P. #68/35, EL. 157.59'

TEC, INC.
146 DASCOMB ROAD
ANDOVER, MA 01810

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION

SKETCH PLANS OF
PROPOSED BRIDGE PRESERVATION
WESTFORD
STONY BROOK ROAD
OVER STONY BROOK

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION

APPROVED BY _____ DATE _____

STRUCTURAL ELEMENTS: _____

TITLE: _____

HIGHWAY ELEMENTS: _____

TITLE: _____

608861_BR (W-26-002).DWG Picked on 19-May-2022 4:26 PM Final Sketch Plan Submittal (SPF) 19-MAY-2022

BORING 1 (BB-1)

GEOSCIENCE TESTING AND RESEARCH, INC.
 55 Middlesex Street, Suite 225, No. Chalmers, MA 01863
 Phone: (978) 251-6395 Fax: (978) 251-6396

Boring No: BB-1 Contract No: 18159 Pg. No: 1 of 2
 GTR Project Name: 18159 GTR Rep: S. Henry
 Proj. Name: Stony Brook Rd over Stony Brook Drilling Company: Soil Exploration Co.
 Location: Westford, Massachusetts

Driller: George Guzzo Helper(s): Travis Aranzani
 Start Date: 7/10/2018 End Date: 7/10/2018
 Equipment: Casing Sampler Core Groundwater Depth (ft)
 Type: NW SS NX Date: Time: Water Casing Hole
 Size I.D. 3" 1.4" 2.15 10-TL EOB 7 34 48
 Loc. North: 3,042,884 East: 477,708 Hammer Wt: 140 lb 140 lb
 Hammer Fall: 30" 30" -
 Note: Truck mounted Mobile Drill B-57 with Automatic Hammer

Depth Case BPF	Sample Data					Stratum	Additional Data	Notes
	No.	Pen/ Revs (in)	Depth (ft)	Blows per 6 inches	Field Test			
	SS-1	24/13	25-2.25	6-12		ASPHALT		
			9-8			FILL		
5	SS-2A	24/15	4-4.5	7-2		CLAY		
	SS-2B		4.5-6	1-2		SAND & SILT		
10	SS-3	24/16	9-11	9-7				
	SS-4	24/15	11-13	14-9				
15	SS-5	24/16	14-16	3-4				
			2-3					
20	SS-6	24/19	19-21	2-3				
			5-4					
25	SS-7	24/24	24-26	3-1				
			1-WH					
30	SS-8	24/10	29-31	33-15		GLACIAL TILL		
			9-8					

EXIST. GROUND SURFACE
EL. 158±

OBSERVED GROUND WATER
& HIGH WATER (7/10/18)
APPROX. EL. 151±

EXIST. BOT. NORTH FTG.
APPROX. EL. 146.5±

NOTES:
 1. Based on drilling action, change in strata at approximately 28 ft below ground surface
 2. Rack core jammed multiple times around 38 ft below ground surface, rollerbit used to advance borehole with spoon refusal at noted depths

Order of Sample Description (Modified Burmeister)	PENETRATION RESISTANCE (N) GUIDE	
	Cohesives Soil (Sands)	Cohesive Soil (Clays)
1. Moisture Content: Dry, Moist, Wet	Relative Density: Blows per Foot	Consistency: Blows per Foot
2. Soil Relative Density or Consistency	Very Loose - 2-4	Very Soft - Blows 2
3. Color	Loose - 4-10	Soft - 2-4
4. Major Component: Should be capitalized	Medium Dense - 10-30	Medium Stiff - 4-8
5. Minor Component: "sand" - 20% to 50% minor grain size	Dense - 30-50	Stiff - 8-15
"silt" - 10% to 30% minor grain size	Very Dense - Over 50	Very Stiff - 15-30
"trace" - 10% of minor grain size		Hard - Over 30

GEOSCIENCE TESTING AND RESEARCH, INC.
 55 Middlesex Street, Suite 225, No. Chalmers, MA 01863
 Phone: (978) 251-6395 Fax: (978) 251-6396

Boring No: BB-1 Contract No: 18159 Pg. No: 2 of 2
 GTR Project Name: 18159 GTR Rep: S. Henry
 Proj. Name: Stony Brook Rd over Stony Brook Drilling Company: Soil Exploration Co.
 Location: Westford, Massachusetts

Driller: George Guzzo Helper(s): Travis Aranzani
 Start Date: 7/10/2018 End Date: 7/10/2018
 Equipment: Casing Sampler Core Groundwater Depth (ft)
 Type: NW SS NX Date: Time: Water Casing Hole
 Size I.D. 3" 1.4" 2.15 10-TL EOB 7 34 48
 Loc. North: 3,042,884 East: 477,708 Hammer Wt: 140 lb 140 lb
 Hammer Fall: 30" 30" -
 Note: Truck mounted Mobile Drill B-57 with Automatic Hammer

Depth Case BPF	Sample Data					Stratum	Additional Data	Notes
	No.	Pen/ Revs (in)	Depth (ft)	Blows per 6 inches	Field Test			
						GLACIAL TILL		
35	SS-9	17/1	34-34	50/1		WEATHERED BEDROCK		
	RC-1	24/24	34-36	05/09		Highly weathered to completely disintegrated, aplombic to fine grained, moderately hard dark grey PHYLITE and SCHIST interbedded with local Quartzite bands.	Rec= 100% RQD= 0%	
	RC-2	12/12	36-37	04/49			Rec= 100% RQD= 0%	
40						WEATHERED BEDROCK		
45	SS-10	0/0	44-44	50/0		No recovery		
50	SS-11	0/0	49-49	50/0		No recovery		
						Bottom of boring at 49 ft below ground surface		

NOTES:
 1. Based on drilling action, change in strata at approximately 28 ft below ground surface
 2. Rack core jammed multiple times around 38 ft below ground surface, rollerbit used to advance borehole with spoon refusal at noted depths

Order of Sample Description (Modified Burmeister)	PENETRATION RESISTANCE (N) GUIDE	
	Cohesives Soil (Sands)	Cohesive Soil (Clays)
1. Moisture Content: Dry, Moist, Wet	Relative Density: Blows per Foot	Consistency: Blows per Foot
2. Soil Relative Density or Consistency	Very Loose - 2-4	Very Soft - Blows 2
3. Color	Loose - 4-10	Soft - 2-4
4. Major Component: Should be capitalized	Medium Dense - 10-30	Medium Stiff - 4-8
5. Minor Component: "sand" - 20% to 50% minor grain size	Dense - 30-50	Stiff - 8-15
"silt" - 10% to 30% minor grain size	Very Dense - Over 50	Very Stiff - 15-30
"trace" - 10% of minor grain size		Hard - Over 30

BORING 2 (BB-2)

GEOSCIENCE TESTING AND RESEARCH, INC.
 55 Middlesex Street, Suite 225, No. Chalmers, MA 01863
 Phone: (978) 251-6395 Fax: (978) 251-6396

Boring No: BB-2 Contract No: 18159 Pg. No: 1 of 2
 GTR Project Name: 18159 GTR Rep: S. Henry
 Proj. Name: Stony Brook Rd over Stony Brook Drilling Company: Soil Exploration Co.
 Location: Westford, Massachusetts

Driller: George Guzzo Helper(s): Travis Aranzani
 Start Date: 7/11/2018 End Date: 7/11/2018
 Equipment: Casing Sampler Core Groundwater Depth (ft)
 Type: NW SS NX Date: Time: Water Casing Hole
 Size I.D. 3" 1.4" 2.15 11-TL EOB 6.5 27.5 34
 Loc. North: 3,042,830 East: 477,753 Hammer Wt: 140 lb 140 lb
 Hammer Fall: 30" 30" -
 Note: Truck mounted Mobile Drill B-57 with Automatic Hammer

Depth Case BPF	Sample Data					Stratum	Additional Data	Notes
	No.	Pen/ Revs (in)	Depth (ft)	Blows per 6 inches	Field Test			
	SS-1	24/16	25-2.25	10-9		ASPHALT		
			9-6			GRANULAR FILL		
5	SS-2	24/4	4-6	5-2		CLAY		
			1-3					
10	SS-3	24/10	9-11	12-15				
	SS-4	24/16	11-13	16-19				
			15-10					
15	SS-5	24/0	14-16	7-4				
			4-6					
20	SS-6	24/12	19-21	9-3				
			14-38					
25	SS-7	24/10	24-26	13-9				
			33-17					
30	SS-8	0/0	29-29	50/1				
	RC-1	48/43	29-33	06/15		WEATHERED BEDROCK		

EXIST. GROUND SURFACE
EL. 158±

OBSERVED GROUND WATER
& HIGH WATER (7/11/18)
APPROX. EL. 151.5±

EXIST. BOT. SOUTH FTG.
APPROX. EL. 146.5±

NOTES:
 1. Based on drilling action, change in strata at approximately 23 feet below ground surface
 2. Casing refusal at ~278 below ground surface, rollerbit advanced to ~39 ft below ground surface

Order of Sample Description (Modified Burmeister)	PENETRATION RESISTANCE (N) GUIDE	
	Cohesives Soil (Sands)	Cohesive Soil (Clays)
1. Moisture Content: Dry, Moist, Wet	Relative Density: Blows per Foot	Consistency: Blows per Foot
2. Soil Relative Density or Consistency	Very Loose - 2-4	Very Soft - Blows 2
3. Color	Loose - 4-10	Soft - 2-4
4. Major Component: Should be capitalized	Medium Dense - 10-30	Medium Stiff - 4-8
5. Minor Component: "sand" - 20% to 50% minor grain size	Dense - 30-50	Stiff - 8-15
"silt" - 10% to 30% minor grain size	Very Dense - Over 50	Very Stiff - 15-30
"trace" - 10% of minor grain size		Hard - Over 30

GEOSCIENCE TESTING AND RESEARCH, INC.
 55 Middlesex Street, Suite 225, No. Chalmers, MA 01863
 Phone: (978) 251-6395 Fax: (978) 251-6396

Boring No: BB-2 Contract No: 18159 Pg. No: 2 of 2
 GTR Project Name: 18159 GTR Rep: S. Henry
 Proj. Name: Stony Brook Rd over Stony Brook Drilling Company: Soil Exploration Co.
 Location: Westford, Massachusetts

Driller: George Guzzo Helper(s): Travis Aranzani
 Start Date: 7/11/2018 End Date: 7/11/2018
 Equipment: Casing Sampler Core Groundwater Depth (ft)
 Type: NW SS NX Date: Time: Water Casing Hole
 Size I.D. 3" 1.4" 2.15 11-TL EOB 6.5 27.5 34
 Loc. North: 3,042,830 East: 477,753 Hammer Wt: 140 lb 140 lb
 Hammer Fall: 30" 30" -
 Note: Truck mounted Mobile Drill B-57 with Automatic Hammer

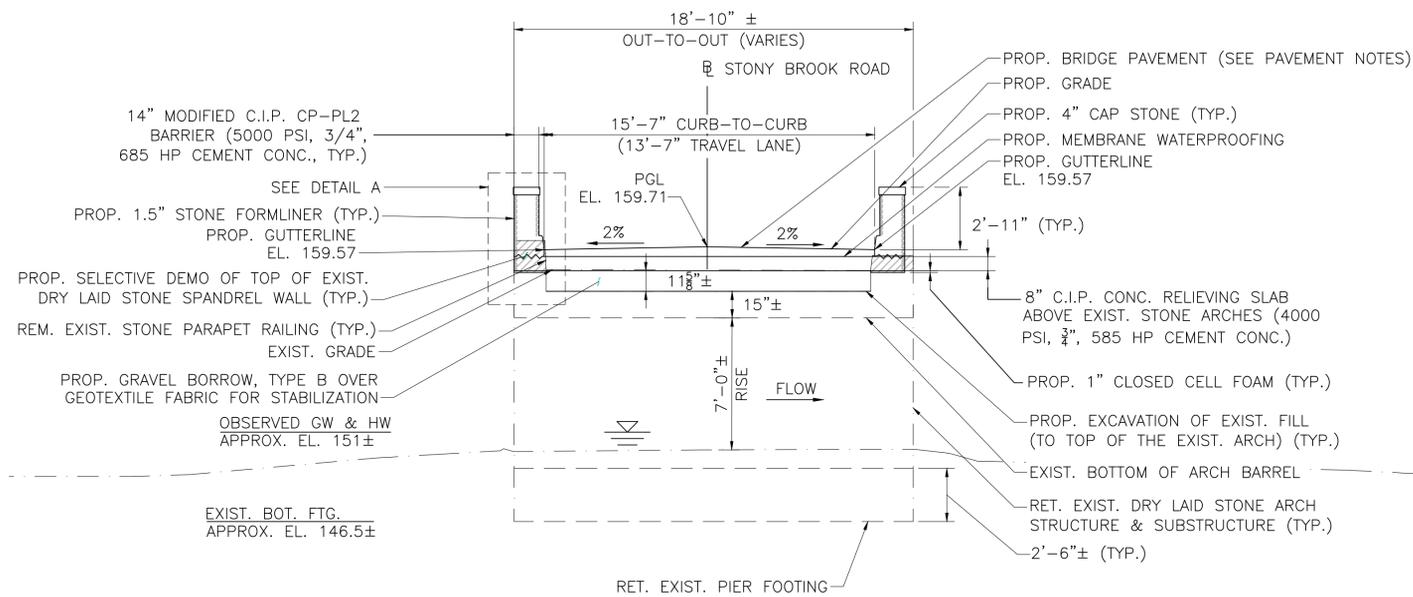
Depth Case BPF	Sample Data					Stratum	Additional Data	Notes
	No.	Pen/ Revs (in)	Depth (ft)	Blows per 6 inches	Field Test			
	RC-1	48/43	29-33	5/01				
				04/35				
	RC-2	15/15	33-34	05/40				
35						slightly to moderately weathered, moderately fractured, finely bedded, aplombic to fine grained, moderately hard dark grey PHYLITE and SCHIST interbedded with local Quartzite bands.	REC= 80% RQD= 50%	
						Bottom of boring at 34 feet below ground surface		

NOTES:
 1. Based on drilling action, change in strata at approximately 33 feet below ground surface
 2. Casing refusal at ~278 below ground surface, rollerbit advanced to ~39 ft below ground surface

Order of Sample Description (Modified Burmeister)	PENETRATION RESISTANCE (N) GUIDE	
	Cohesives Soil (Sands)	Cohesive Soil (Clays)
1. Moisture Content: Dry, Moist, Wet	Relative Density: Blows per Foot	Consistency: Blows per Foot
2. Soil Relative Density or Consistency	Very Loose - 2-4	Very Soft - Blows 2
3. Color	Loose - 4-10	Soft - 2-4
4. Major Component: Should be capitalized	Medium Dense - 10-30	Medium Stiff - 4-8
5. Minor Component: "sand" - 20% to 50% minor grain size	Dense - 30-50	Stiff - 8-15
"silt" - 10% to 30% minor grain size	Very Dense - Over 50	Very Stiff - 15-30
"trace" - 10% of minor grain size		Hard - Over 30

- BORING NOTES:**
- LOCATION OF BORINGS AND SHOWN ON THE PLAN THUS: ●
 - BORINGS ARE TAKEN FOR PURPOSE OF DESIGN AND SHOW CONDITIONS AT BORING POINTS ONLY, BUT DO NOT NECESSARILY SHOW THE NATURE OF THE MATERIALS TO BE ENCOUNTERED DURING CONSTRUCTION.
 - WATER LEVELS SHOWN ON BORING LOGS WERE OBSERVED AT THE TIME OF TAKING BORINGS AND DO NOT NECESSARILY SHOW THE TRUE GROUND WATER LEVEL.
 - FIGURES IN COLUMNS INDICATE NUMBER OF BLOWS REQUIRED TO DRIVE A 1 1/8" I.D. SPLIT SPOON SAMPLER 6" USING A 140 POUND WEIGHT FALLING 30".
 - BORING SAMPLES ARE STORED AT A STORAGE FACILITY LOCATED ON ROUTE 114 (219 WINTHROP AVE.) IN LAWRENCE, MA. THE CONTRACTOR MAY EXAMINE THE SOIL AND ROCK SAMPLES BY CONTACTING THE MASSDOT GEOTECHNICAL SECTION AT 10 PARK PLAZA, BOSTON, MA.
 - ALL BORINGS WERE MADE IN JULY, 2018.
 - BORINGS WERE MADE BY SOIL EXPLORATION CORP., 148 PIONEER DRIVE, LEOMINSTER, MA 01453.
 - THE NORTH AMERICAN VERTICAL DATUM (NAVD) 1988 IS USED THROUGHOUT.

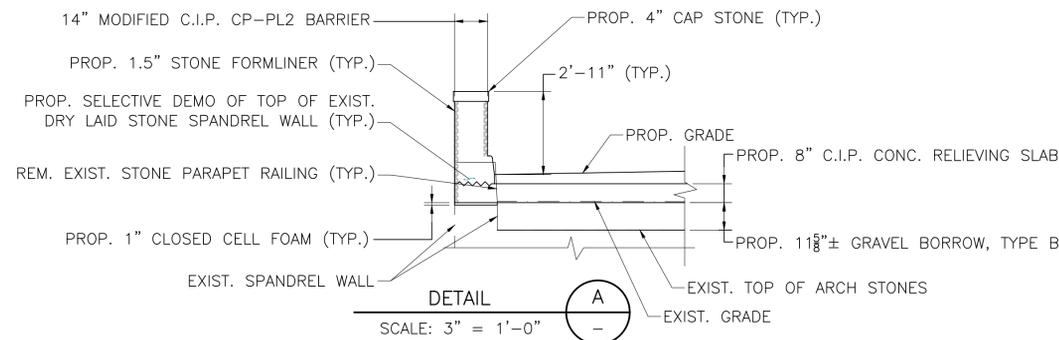
608661_BR21W6802.DWG Pinned on 19-May-2022 4:27 PM Final Sketch Plan Submittal (SPF) 19-MAY-2022



TRANSVERSE SECTION (LOOKING UPSTATION)

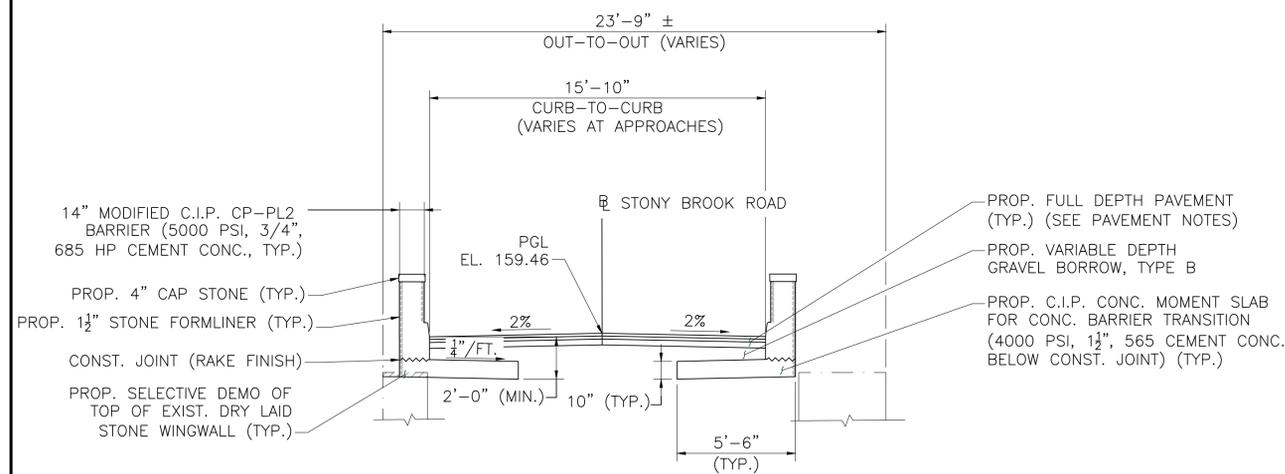
SCALE: 1/4" = 1'-0"

NOTE:
SECTION TAKEN ALONG THE \square OF STONY BROOK



DETAIL A

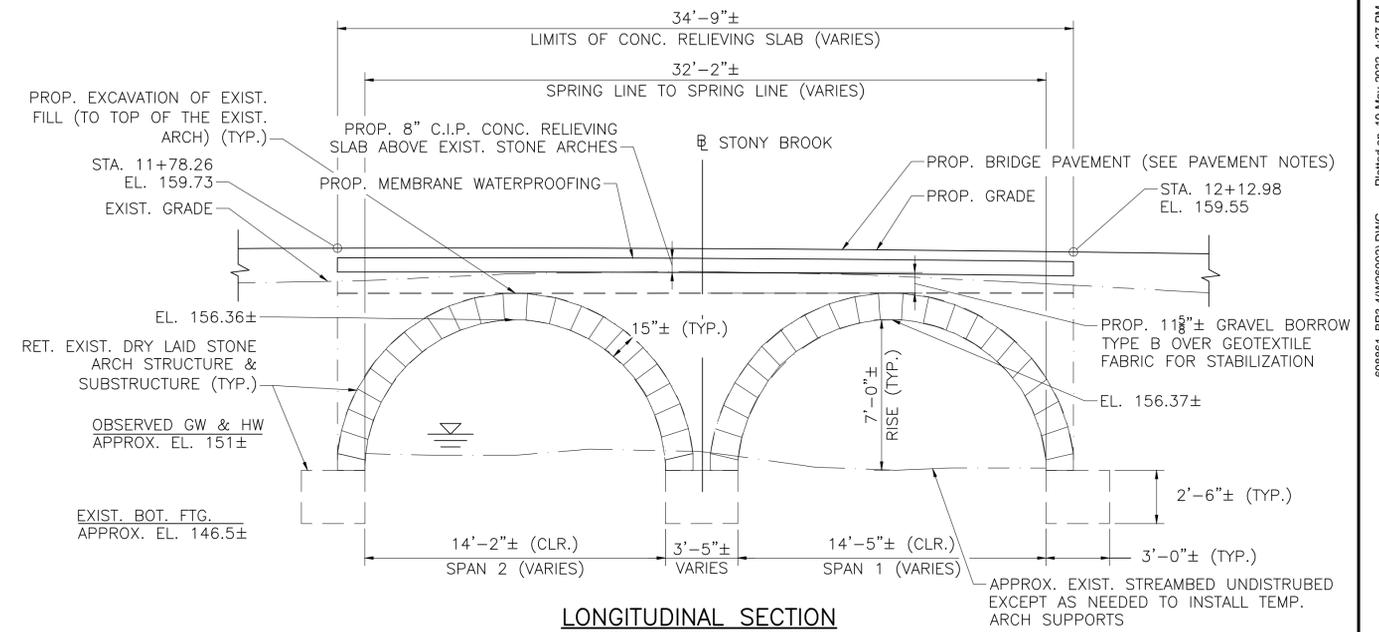
SCALE: 3" = 1'-0"



APPROACH ROADWAY SECTION

SCALE: 1/4" = 1'-0"

NOTE:
SECTION TAKEN AT STATION 12+19.51



LONGITUDINAL SECTION

SCALE: 1/4" = 1'-0"

NOTE:
SECTION TAKEN ALONG THE \square OF STONY BROOK ROAD

PAVEMENT NOTES:

PROPOSED BRIDGE PAVEMENT:

SURFACE: 1 1/2" SUPERPAVE BRIDGE SURFACE COURSE - 12.5 (SSC-B-12.5) OVER VARIABLE DEPTH SUPERPAVE BRIDGE PROTECTIVE COURSE - 12.5 (SPC-B-12.5) OVER

BASE: 8" CAST IN PLACE CONCRETE DECK (4000 PSI, 3/4", 585 HP CEMENT CONCRETE) OVER

SUBBASE: VARIABLE DEPTH GRAVEL BORROW, TYPE B

PROPOSED FULL DEPTH PAVEMENT:

SURFACE: 1 1/2" SUPERPAVE SURFACE COURSE - 12.5 (SSC-12.5) OVER 1 1/2" SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC-12.5)

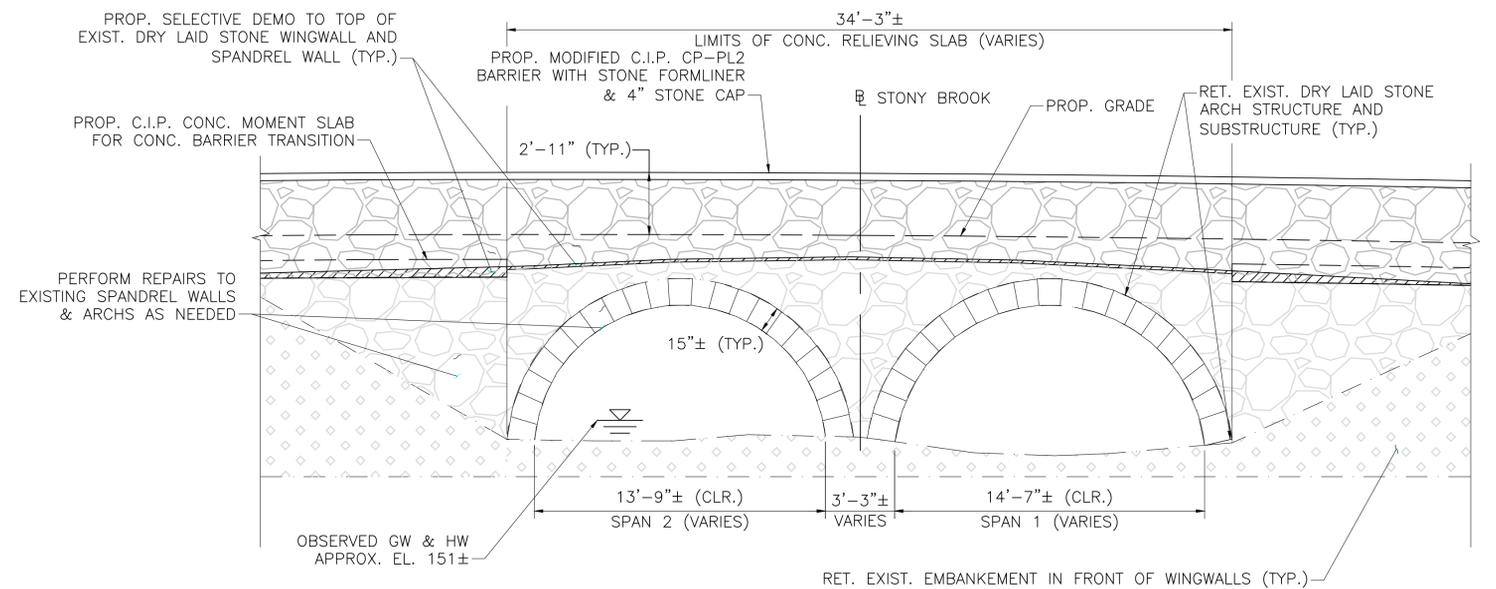
SUBBASE: 3 1/4" SUPERPAVE INTERMEDIATE COURSE - 19.0 (SIC-19.0) OVER VARIABLE DEPTH (12" MIN.) GRAVEL BORROW, TYPE B

PROPOSED HMA MILL AND OVERLAY:

SURFACE: 1 1/2" SUPERPAVE SURFACE COURSE - 12.5 (SSC-12.5) OVER 1 1/2" PAVEMENT FINE MILLING

NOTE:

THE AVERAGE ACTUAL BEARING PRESSURE = 3.8 KSF (ABUTMENT) & 6.7 KSF (PIER), PER 2002 AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES. THE RECOMMENDED ULTIMATE BEARING CAPACITY = 9.3 KSF (ABUTMENT) & 18.7 KSF (PIER), FACTOR OF SAFETY = 2.4 (ABUTMENT) & 2.7 (PIER).

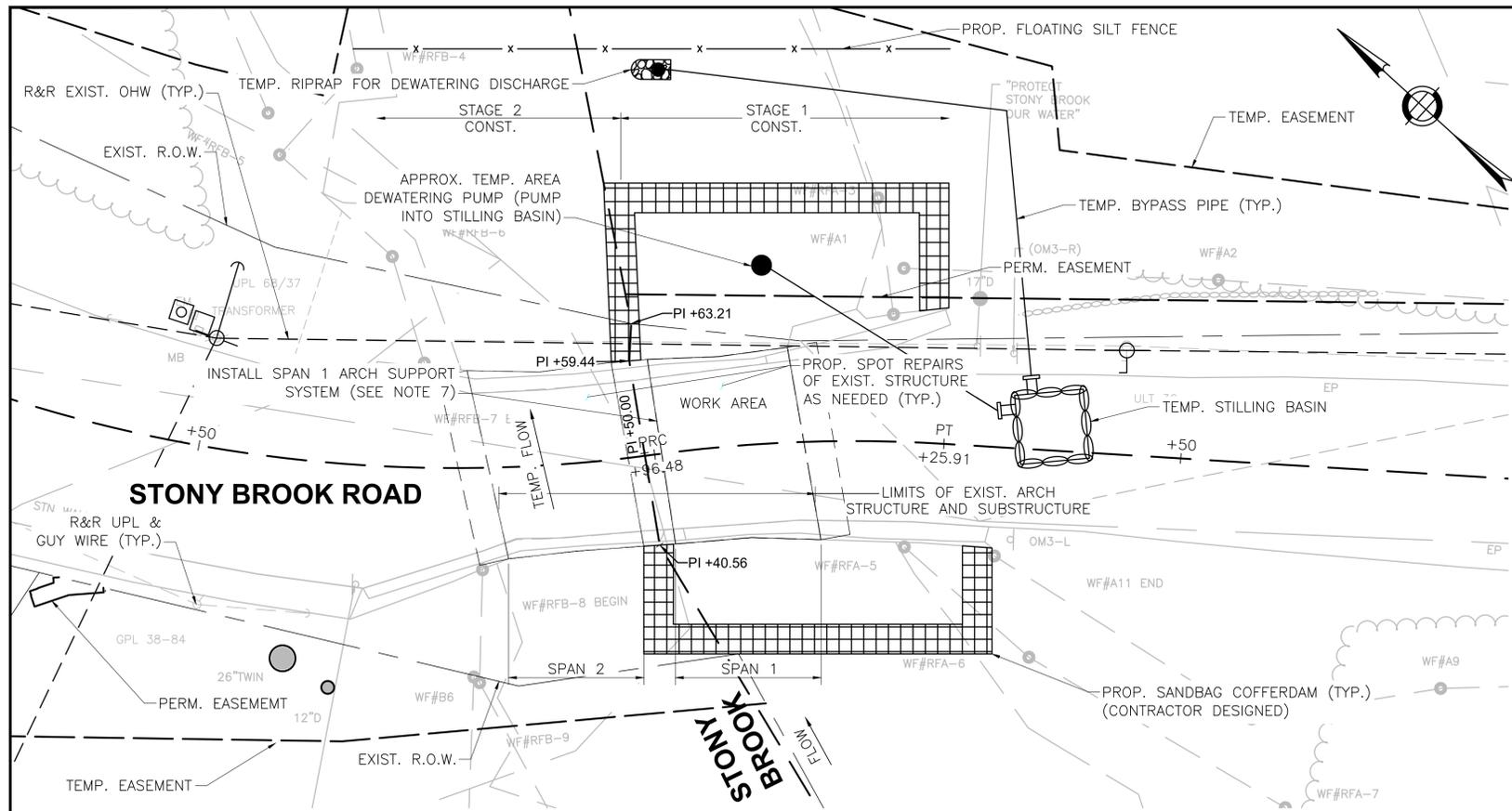


CHANNEL APPROACH SECTION

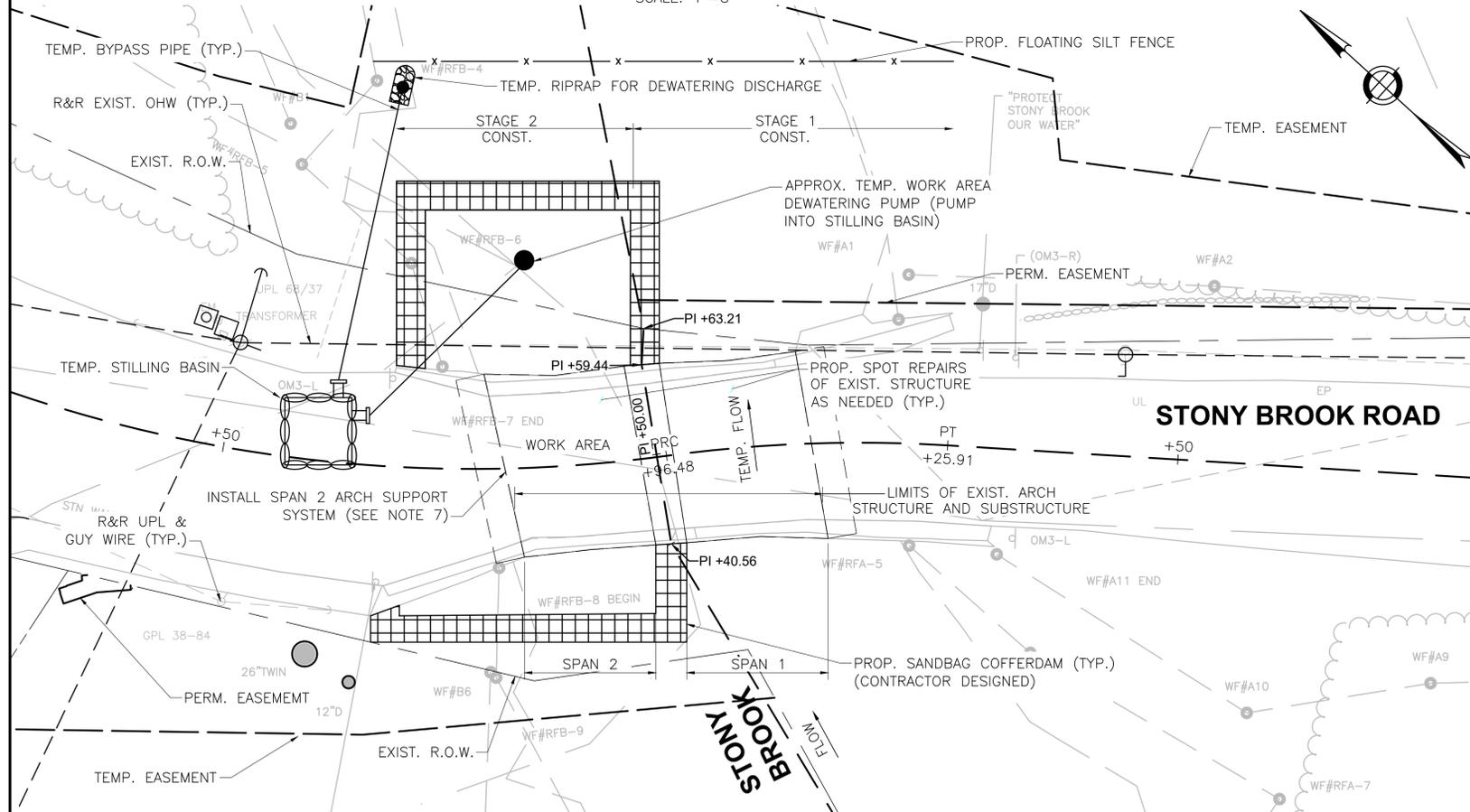
SCALE: 1/4" = 1'-0"

NOTE:

- SECTION TAKEN AT UPSTREAM STATION 5+40.61
- EXISTING STONE PARAPET RAILING NOT SHOWN FOR CLARITY.



CONTROL OF WATER - STAGE 1
SCALE: 1"=8'



CONTROL OF WATER - STAGE 2
SCALE: 1"=8'

CONTROL OF WATER / STAGING NOTES

GENERAL

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF THE CONTROL OF WATER (C.O.W.) SYSTEM AND SHALL SUBMIT A CONTROL OF WATER PLAN TO THE ENGINEER FOR APPROVAL.
2. STONY BROOK ROAD SHALL BE CLOSED TO VEHICULAR AND PEDESTRIAN TRAFFIC AT THE BRIDGE CROSSING PRIOR TO BEGINNING EXCAVATION. DETOUR SIGNAGE WILL BE INSTALLED IN ACCORDANCE WITH THE MUTCD.
3. C.O.W. SYSTEM SHALL BE DESIGNED USING A 2-YEAR (CONSTRUCTION) RETURN FREQUENCY FLOOD EVENT ELEVATION OF XXX.X. PROVIDED SYSTEM SHALL EXTEND 12" (MIN.) ABOVE STORM ELEVATION.
4. SANDBAG COFFERDAM SHALL BE REMOVED FROM THE DOWNSTREAM END TO THE UPSTREAM END TO PREVENT UNNECESSARY SEDIMENT FROM ENTERING THE WATERWAY.
5. C.O.W. SYSTEM SHALL BE INSPECTED DAILY FOR WATER LEAKS OR EROSION AND REPAIR PROCEDURES SHALL BE IMPLEMENTED ACCORDINGLY.
6. C.O.W. SYSTEM SHOWN IS FOR THE INSTALLATION OF THE TEMPORARY ARCH SUPPORT SYSTEM. C.O.W. SYSTEM FOR DEMOLITION OF THE TEMPORARY ARCH SUPPORT SYSTEM IS SIMILAR.
7. TEMPORARY ARCH SUPPORT SYSTEM SHALL ALLOW WATER TO FREELY TRAVEL THROUGH CONSTRUCTION SITE AND WITHSTAND ANY FLOW FORCES ENCOUNTERED.

STAGE 1

1. INSTALL CONTROL OF WATER SYSTEM AS SHOWN CONSISTING OF A SANDBAG COFFERDAM OR APPROVED EQUIVALENT.
2. DEWATER STAGE 1 WORK AREA TO INSTALL SPAN 1 TEMPORARY ARCH SUPPORT SYSTEM IN THE DRY.
3. REMOVE STAGE 1 CONTROL OF WATER SYSTEM.

STAGE 2

1. DIVERT STONY BROOK TO FLOW THROUGH THE SPAN 1 WITH THE PROPOSED TEMPORARY ARCH SUPPORT SYSTEM IN PLACE USING THE CONTROL OF WATER SYSTEM AS SHOWN.
2. DEWATER STAGE 2 WORK AREA TO INSTALL SPAN 2 TEMPORARY ARCH SUPPORT SYSTEM IN THE DRY.
3. REMOVE STAGE 2 CONTROL OF WATER SYSTEM.

STAGE 3

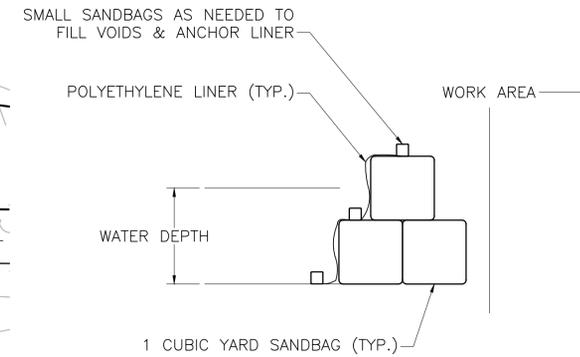
1. PREFORM BRIDGE WORK INCLUDING TOPSIDE EXCAVATION, SLAB INSTALLATION AND BARRIER INSTALLATION.

STAGE 4

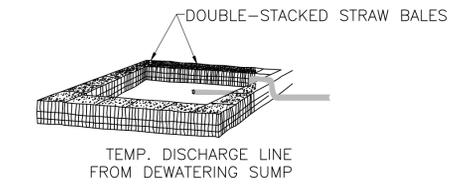
1. INSTALL CONTROL OF WATER SYSTEM PER STAGE 1 PLAN.
2. REMOVE SPAN 1 TEMPORARY ARCH SUPPORT SYSTEM.
3. RESTORE STREAMBED AS NEEDED.

STAGE 5

1. DIVERT STONY BROOK TO FLOW THROUGH SPAN 1 USING THE CONTROL OF WATER SYSTEM SHOWN.
2. REMOVE SPAN 2 TEMPORARY ARCH SUPPORT SYSTEM.
3. REMOVE ALL CONTROL OF WATER ELEMENTS.
4. RESTORE STREAMBED AS NEEDED.



SANDBAG COFFERDAM
SCALE: N.T.S.



TEMPORARY STILLING AREA
SCALE: N.T.S.

NOTES:
DISCHARGE TO SEDIMENTATION BASIN (AS SHOWN) OR TO SILTATION/ DEWATERING BAG SUCH AS FLOGARD DEWATERING BAG MODEL SC-DW1215Z, OR APPROVED EQUAL BY NORWOOD CONSERVATION COMMISSION. SYSTEM SHOWN IS CONCEPTUAL ONLY AND IS TO BE DESIGNED BY CONTRACTOR.