

MASSACHUSETTS DEPARTMENT OF TRANSPORTATION HIGHWAY DIVISION

LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	1	39
PROJECT FILE NO.		606189	

TITLE SHEET & INDEX

PLAN AND PROFILE OF
ROUTE 38 ROADWAY AND INTERSECTION IMPROVEMENTS

IN THE CITY/TOWN OF
LOWELL - ROUTE 38
MIDDLESEX COUNTY

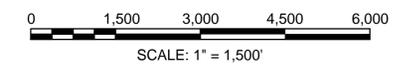
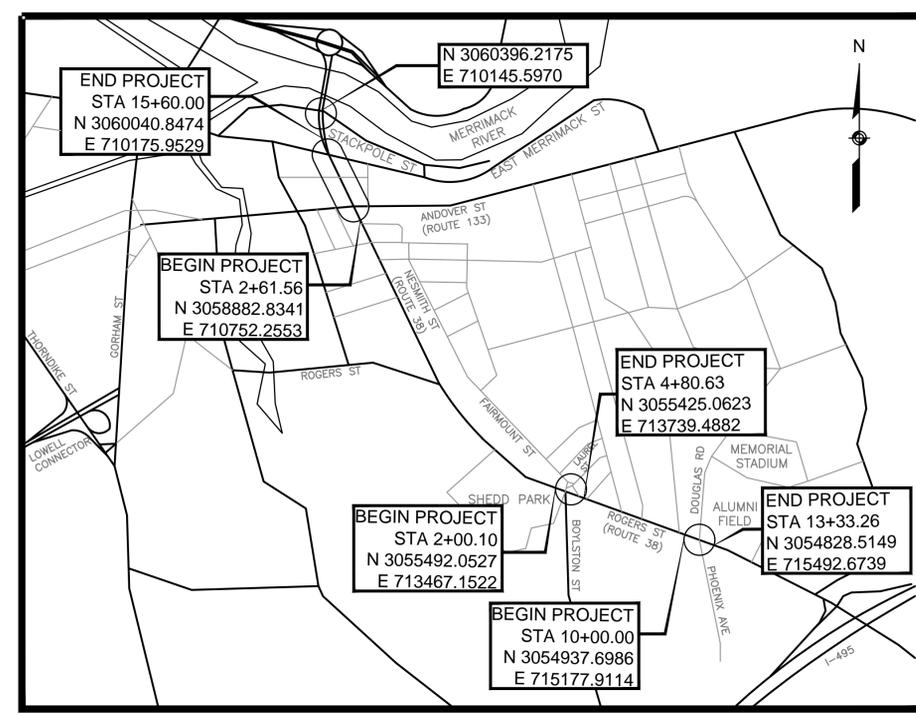
FEDERAL AID PROJECT NO.

25% SUBMITTAL

THE MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES DATED 1988, AS AMENDED, THE SUPPLEMENTAL SPECIFICATIONS DATED JULY 1, 2015, THE 2014 CONSTRUCTION STANDARD DETAILS, THE 2015 OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, THE LATEST MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS WITH MASSACHUSETTS AMENDMENTS, 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, WILL GOVERN.

INDEX

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LENGTH OF PROJECT = 1,912.14 FEET = 0.362 MILES

DESIGN DESIGNATION (ROUTE 38)

	NESMITH STREET	ROGERS STREET
DESIGN SPEED	30 MPH	40 MPH
ADT (2014)	29,600	26,000
ADT (2024)	31,100	27,300
K	7.4%	7.8%
D	56.0%	58%
T (PEAK HOUR)	2%	2%
T (AVERAGE DAY)	2%	2%
DHV	1,290	1,236
DDHV	2,300	2,130
FUNCTIONAL CLASSIFICATION	URBAN PRINCIPAL ARTERIAL	URBAN PRINCIPAL ARTERIAL

25% SUBMITTAL DATE: 2/26/2016

DATE	DESCRIPTION	REV #

BAYSIDE ENGINEERING
600 Unicorn Park Drive • Woburn, MA 01801
Phone: 781.932.3201 • Fax: 781.932.3413
www.baysideengineering.com

RECOMMENDED FOR APPROVAL

DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION APPROVED:	APPROVED
DIVISION ADMINISTRATOR DATE	CHIEF ENGINEER DATE HIGHWAY ADMINISTRATOR DATE

GENERAL SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		JERSEY BARRIER ON BRIDGE OR JERSEY BARRIER
		CATCH BASIN
		CATCH BASIN CURB INLET
		FLAG POLE
		GAS PUMP
		MAIL BOX
		POST SQUARE
		POST CIRCULAR
		STEEL POLE
		WELL
		ELECTRIC HANDHOLE
		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
		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)
		BALANCE STONE WALL
		GUARD RAIL - STEEL POSTS
		GUARD RAIL - WOOD POSTS
		CHAIN LINK OR METAL FENCE
		WOOD FENCE
		HAY BALES/SILT FENCE
		TREE LINE OR LIMIT OF CLEARING AND GRUBBING
		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

GENERAL NOTES:

- THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY 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.
- THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES.
- 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 CONTRACTOR'S EXPENSE.
- THE TERM "PROPOSED" (PROP.) MEANS WORK TO BE CONSTRUCTED USING NEW MATERIALS OR, WHERE APPLICABLE, REUSING EXISTING MATERIALS IDENTIFIED AS "REMOVE AND RESET" (R&R).
- JOINTS BETWEEN NEW BITUMINOUS CONCRETE ROADWAY PAVEMENT AND SAWCUT EXISTING PAVEMENT SHALL BE SEALED IN ACCORDANCE WITH ITEM 453 OF THE SPECIAL PROVISIONS.
- ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS SHALL BE RETAINED UNLESS INDICATED OTHERWISE ON THE DRAWINGS.
- ALL PROPOSED PAVEMENT MARKINGS SHALL BE THERMOPLASTIC.
- DRAINAGE ELEVATIONS ARE PROVIDED FOR DESIGN PURPOSES ONLY. THE CONTRACTOR SHALL VERIFY BY TEST PIT, THE LOCATIONS OF EXISTING UTILITIES WHICH MAY CONFLICT WITH THE PROPOSED DRAINAGE DESIGN. ANY FIELD ADJUSTMENTS REQUIRED WILL BE MADE AS APPROVED OR DIRECTED BY THE ENGINEER. ONLY AFTER THE CONTRACTOR VERIFIES ELEVATIONS FOR THE CONSTRUCTABILITY OF THE DRAINAGE SYSTEM SHALL ANY STRUCTURES BE ORDERED. ANY FIELD ADJUSTMENTS TO LINE & GRADE UP TO A DEPTH OF 5' SHALL BE INCLUDED IN THE COST OF THE PIPE. PIPE EXCAVATION GREATER THAN 5' WILL BE PAID UNDER CLASS B TRENCH EXCAVATION.
- FIELD SURVEY CONDUCTED IN JUNE 2014 AND PROVIDED BY BAYSIDE ENGINEERING, INC., 600 UNICORN PARK DRIVE, WOBURN, MA 01801. HORIZONTAL DATUM IS BASED ON MASS GRID SYSTEM NAD 1983. ELEVATIONS SHOWN ON THIS PLAN REFER TO THE NAVD OF 1988.

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 - 12"
		CROSSWALK - 12" LINES SPACED 8' APART
		SOLID WHITE LINE - 6"
		SOLID WHITE SHOULDER LINE - 6"
		SOLID YELLOW LINE - 6"
		BROKEN WHITE LINE - 6"
		BROKEN YELLOW LINE - 6"
		DOTTED WHITE LINE - 6"
		DOTTED YELLOW LINE - 6"
		DOTTED WHITE LINE EXTENSION - 6"
		DOTTED YELLOW LINE EXTENSION - 6"
		DOUBLE WHITE LINE - 2 - 6" LINES
		DOUBLE YELLOW CENTERLINE - 2 - 6" LINES

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 IRON PIPE
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
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	GUARD
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

LOWELL - ROUTE 38 ROADWAY & INTERSECTION IMPROVEMENTS

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MA	-	2	39

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LEGEND, ABBREVIATIONS & GENERAL NOTES

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

CAB.	CABINET
CCVE	CLOSED CIRCUIT VIDEO EQUIPMENT
DW	STEADY DON'T WALK
FDW	FLASHING DON'T WALK
FR	FLASHING CIRCULAR RED
FRL	FLASHING RED LEFT ARROW
FRR	FLASHING RED RIGHT ARROW
FY	FLASHING CIRCULAR AMBER
FYL	FLASHING AMBER LEFT ARROW
FYR	FLASHING AMBER 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 WALK
Y	STEADY CIRCULAR AMBER
YL	STEADY AMBER LEFT ARROW

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	3	39
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TYPICAL SECTIONS & PAVEMENT NOTES

PAVEMENT NOTES:

PROPOSED PAVEMENT MILLING AND OVERLAY:
2" SUPERPAVE SURFACE COURSE - 12.5 (SSC-12.5) OVER
0.07 GAL/SY TACK COAT OVER
PAVEMENT MICROMILLING

PROPOSED FULL DEPTH MAJOR BOX WIDENING (GREATER THAN 4' WIDE):
2" SUPERPAVE SURFACE COURSE - 12.5 (SSC-12.5) OVER
0.05 GAL/SY TACK COAT OVER
2" SUPERPAVE INTERMEDIATE COURSE - 19.0 (SIC-19.0) OVER
0.05 GAL/SY TACK COAT OVER
4" SUPERPAVE BASE COURSE - 37.5 (SBC-37.5) OVER
4" DENSE GRADED CRUSHED STONE OVER
8" GRAVEL BORROW, TYPE B

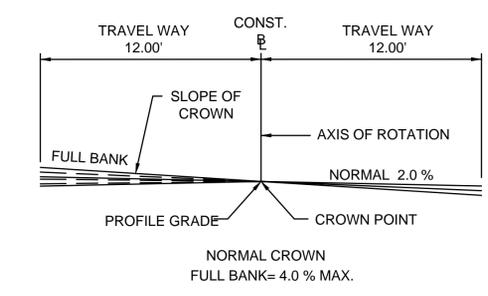
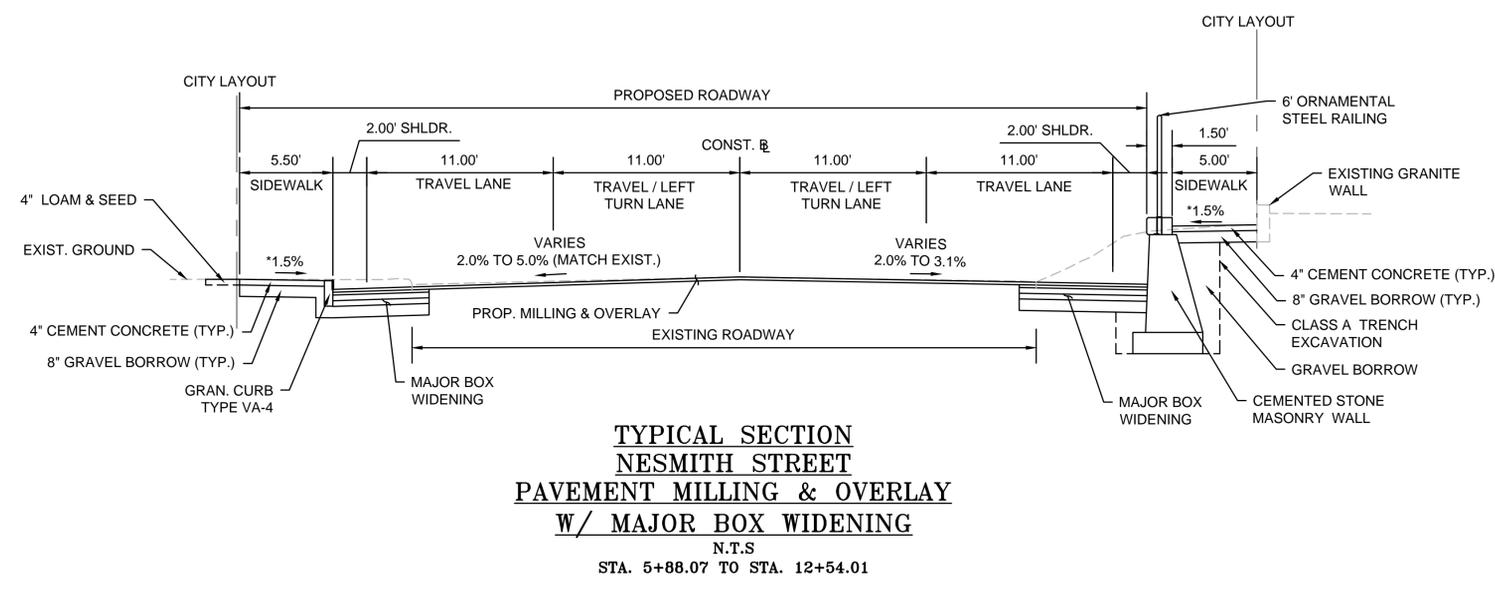
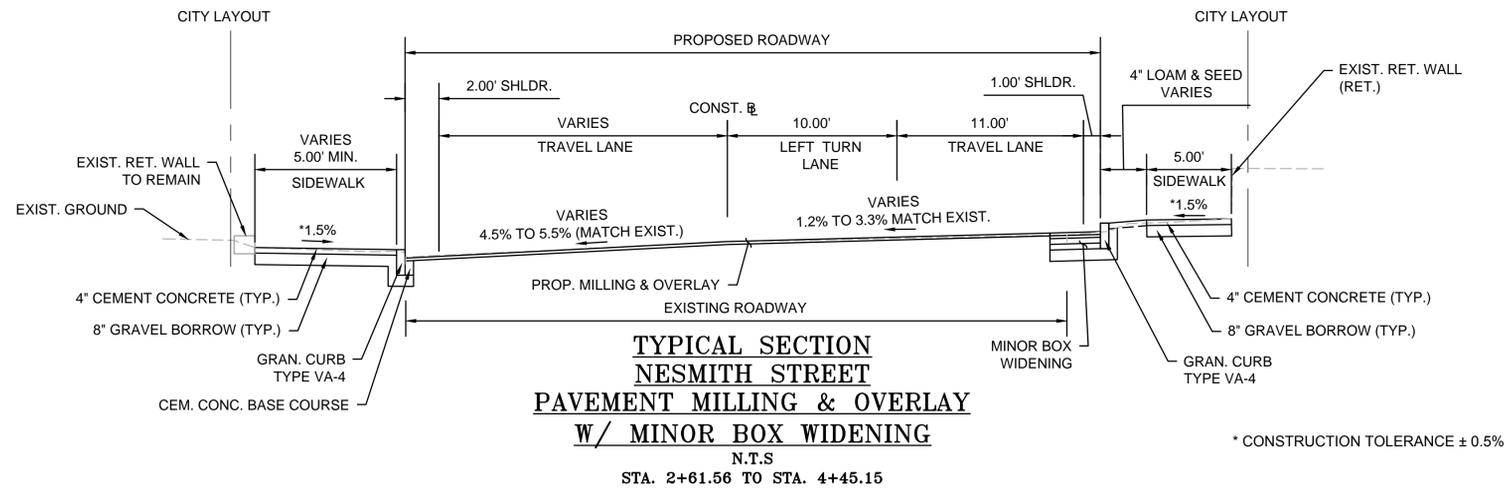
PROPOSED FULL DEPTH MINOR BOX WIDENING (LESS THAN 4' WIDE):
2" SUPERPAVE SURFACE COURSE - 9.5 (SSC-9.5) OVER
0.05 GAL/SY TACK COAT OVER
2" SUPERPAVE INTERMEDIATE COURSE - 19.0 (SIC-19.0) OVER
0.05 GAL/SY TACK COAT OVER
6" H.E.S. CEMENT CONCRETE BASE OVER
8" GRAVEL BORROW, TYPE B

PROPOSED CEMENT CONCRETE SIDEWALK / WALK / WHEELCHAIR RAMP:
4" CEMENT CONCRETE OVER
8" GRAVEL BORROW, TYPE B

PROPOSED CEMENT CONCRETE SIDEWALK AT DRIVEWAY:
6" CEMENT CONCRETE OVER
8" GRAVEL BORROW, TYPE B

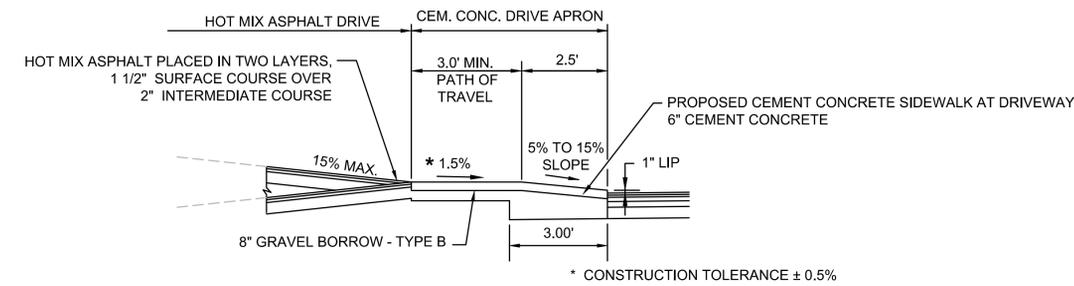
PROPOSED HMA DRIVEWAY:
1 1/2" SUPERPAVE SURFACE COURSE - 9.5 (SSC-9.5) OVER
0.05 GAL/SY TACK COAT OVER
2" SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC-12.5) OVER
8" GRAVEL BORROW, TYPE B

PROPOSED HMA WALK SURFACE:
1" SUPERPAVE SURFACE COURSE - 9.5 (SSC-9.5) OVER
0.05 GAL/SY TACK COAT OVER
1.5" SUPERPAVE INTERMEDIATE COURSE - 12.5 (SIC-12.5) OVER
8" GRAVEL BORROW, TYPE B

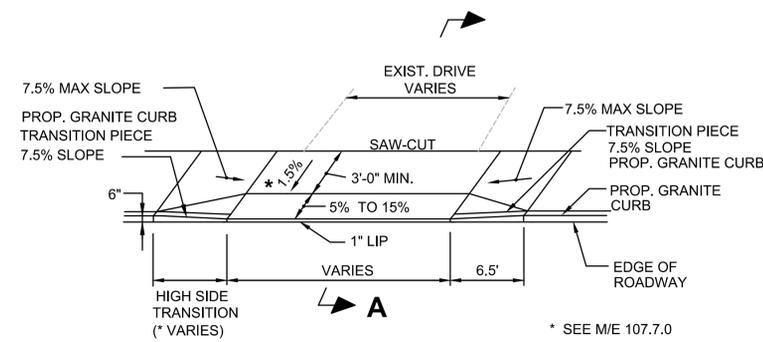


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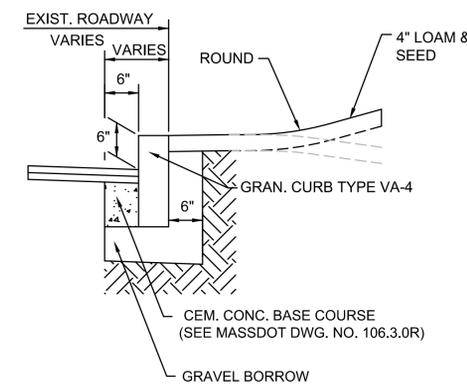
CONSTRUCTION DETAILS



SECTION A-A
N.T.S.



TYPICAL DRIVEWAY ENTRANCE
(SIDEWALK SIDE)
N.T.S.



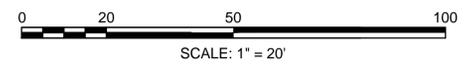
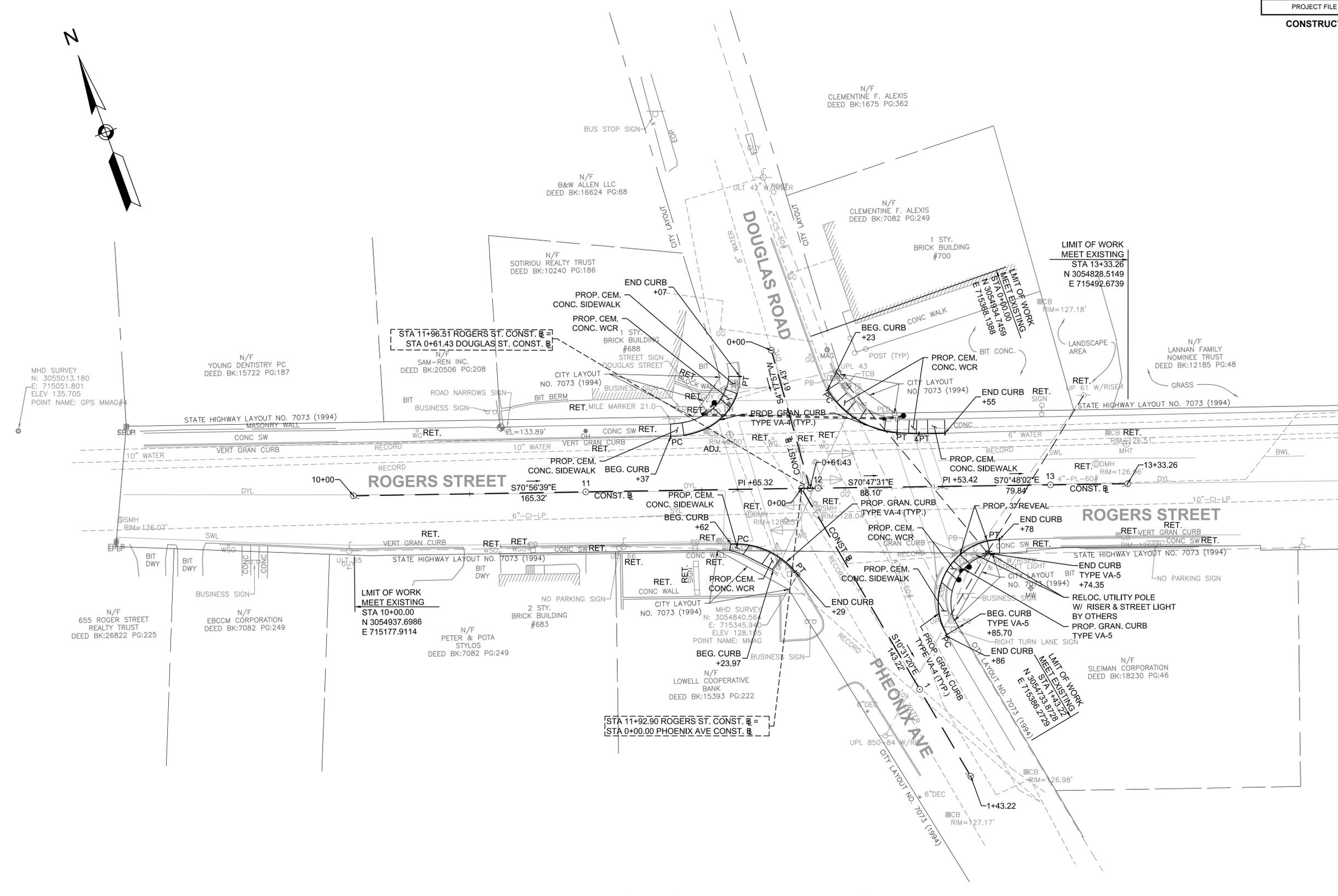
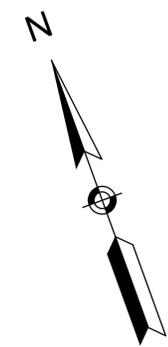
METHOD OF SETTING VERTICAL CURB
N.T.S.

LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS

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MA	-	5	39
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CONSTRUCTION PLANS

HIGHWAY GUARD DETAILS NONE
 TRAFFIC SIGNAL CONDUIT SEE BELOW
 WATER SUPPLY ALTERATIONS SEE BELOW
 DRAINAGE DETAILS SEE BELOW

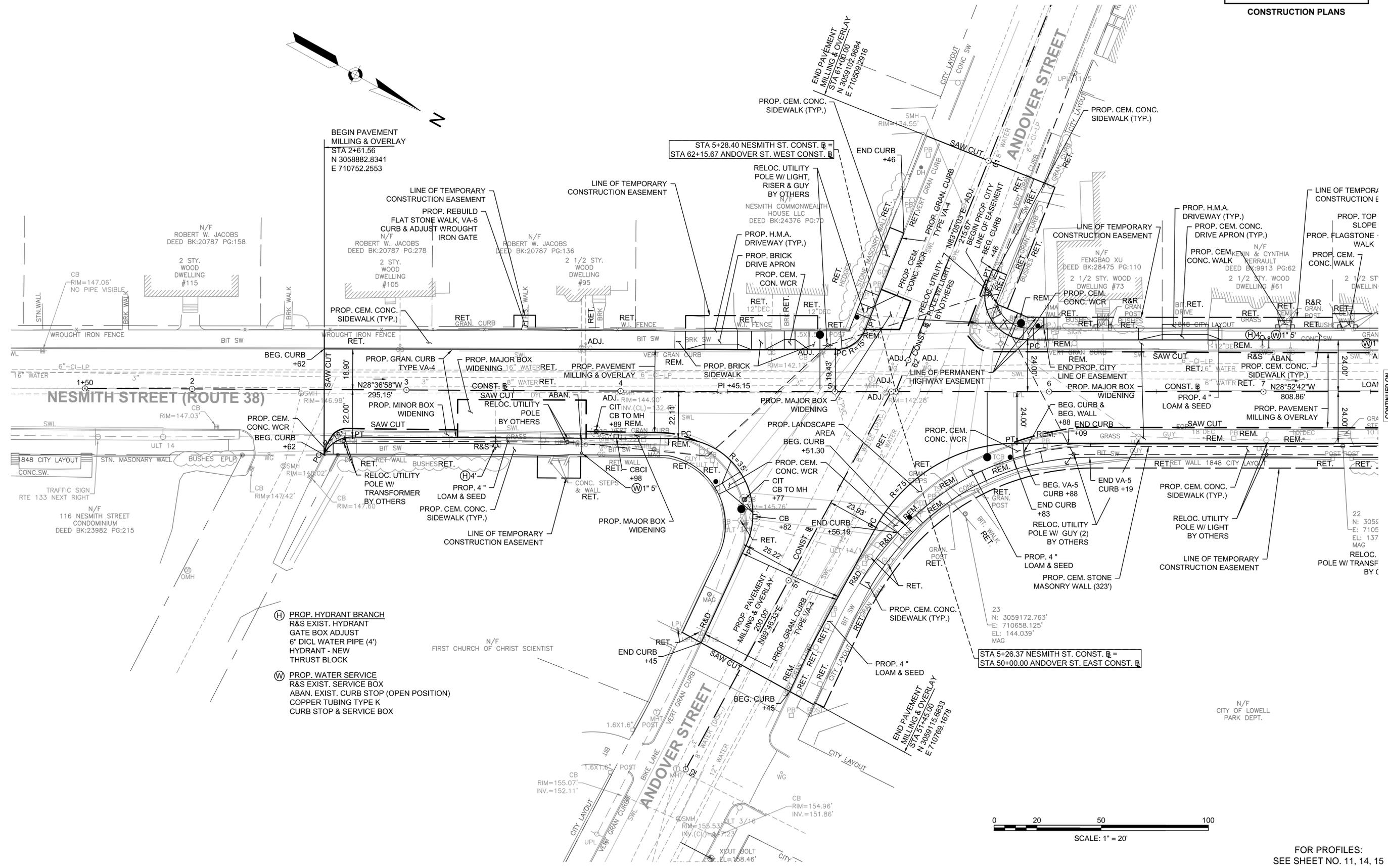
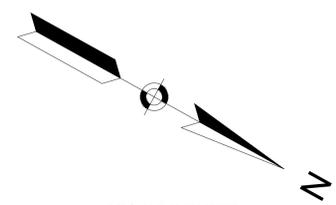


**LOWELL - ROUTE 38
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CONSTRUCTION PLANS

HIGHWAY GUARD DETAILS NONE
 TRAFFIC SIGNAL CONDUIT SEE BELOW
 WATER SUPPLY ALTERATIONS SEE BELOW
 DRAINAGE DETAILS SEE BELOW



- (H) PROP. HYDRANT BRANCH
R&S EXIST. HYDRANT GATE BOX ADJUST
6" DI CL WATER PIPE (4")
HYDRANT - NEW THRUST BLOCK
- (W) PROP. WATER SERVICE
R&S EXIST. SERVICE BOX
ABAN. EXIST. CURB STOP (OPEN POSITION)
COPPER TUBING TYPE K
CURB STOP & SERVICE BOX



FOR PROFILES:
SEE SHEET NO. 11, 14, 15

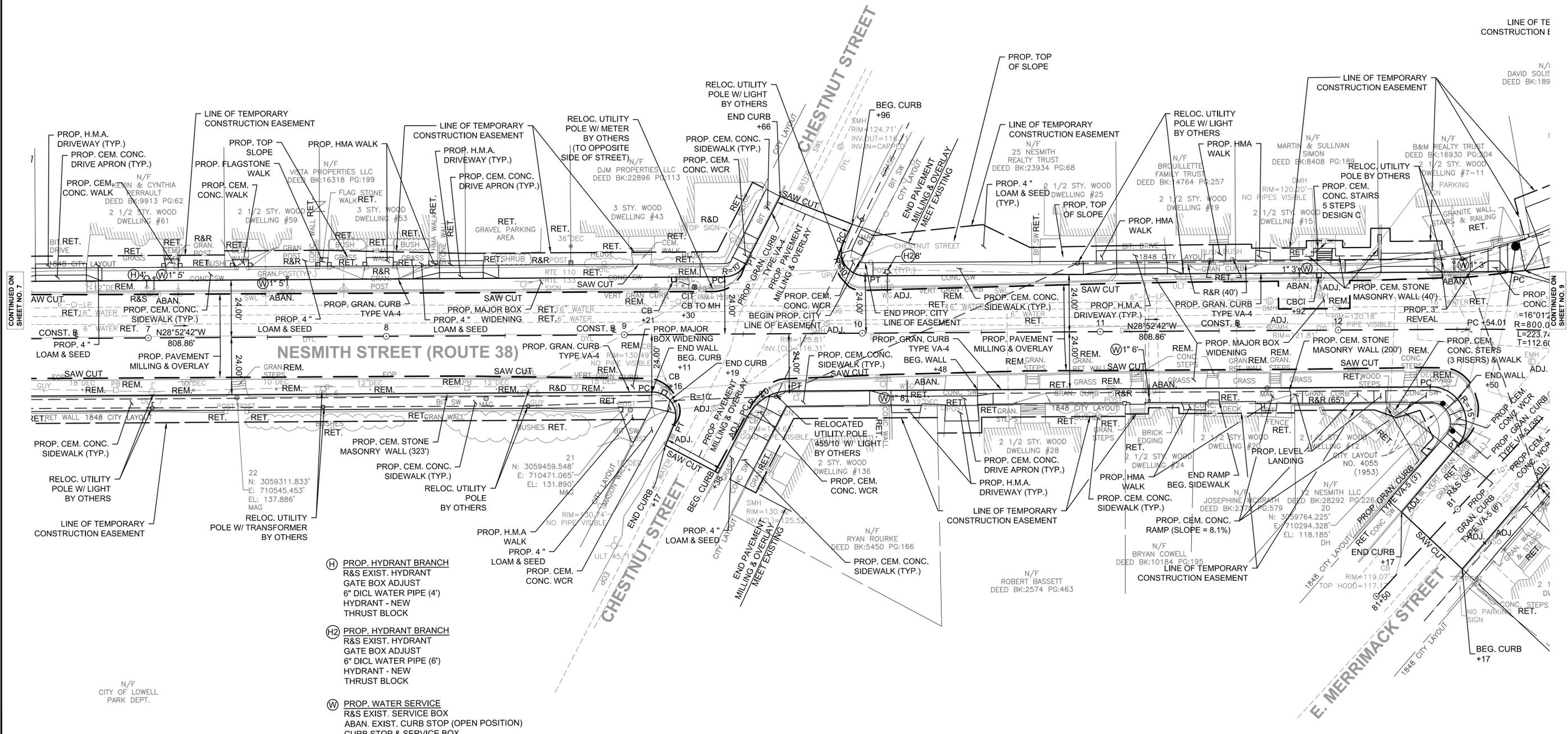
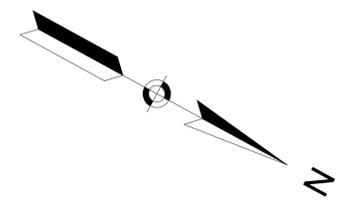
CONTINUED ON SHEET NO. 8

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ROADWAY & INTERSECTION IMPROVEMENTS**

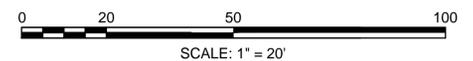
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CONSTRUCTION PLANS

HIGHWAY GUARD DETAILS NONE
 TRAFFIC SIGNAL CONDUIT SEE BELOW
 WATER SUPPLY ALTERATIONS SEE BELOW
 DRAINAGE DETAILS SEE BELOW



- (H) PROP. HYDRANT BRANCH
R&S EXIST. HYDRANT GATE BOX ADJUST 6" DI CL WATER PIPE (4") HYDRANT - NEW THRUST BLOCK
- (H2) PROP. HYDRANT BRANCH
R&S EXIST. HYDRANT GATE BOX ADJUST 6" DI CL WATER PIPE (6") HYDRANT - NEW THRUST BLOCK
- (W) PROP. WATER SERVICE
R&S EXIST. SERVICE BOX ABAN. EXIST. CURB STOP (OPEN POSITION) CURB STOP & SERVICE BOX



FOR PROFILE:
SEE SHEET NO. 12

CONTINUED ON SHEET NO. 7

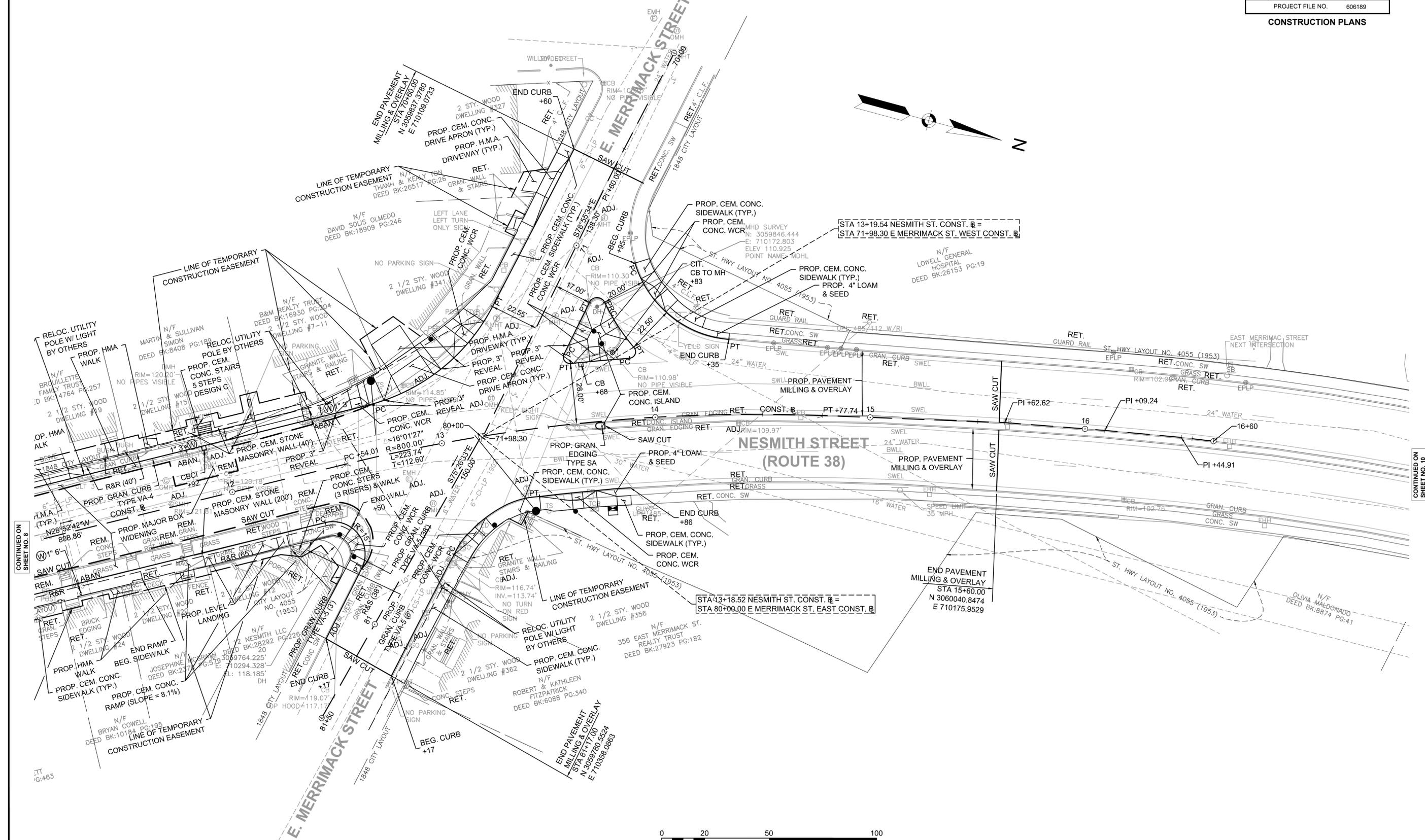
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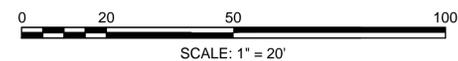
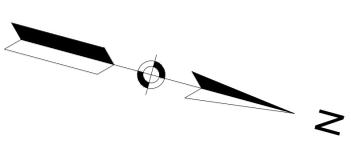
CONSTRUCTION PLANS

HIGHWAY GUARD DETAILS NONE
 TRAFFIC SIGNAL CONDUIT SEE BELOW
 WATER SUPPLY ALTERATIONS SEE BELOW
 DRAINAGE DETAILS SEE BELOW



CONTINUED ON SHEET NO. 8

CONTINUED ON SHEET NO. 10



FOR PROFILES:
SEE SHEET NO. 13, 16, 17

606189.DWG (CON PLANS) DWG Plotted on 25-Feb-2016 2:51 PM

HIGHWAY GUARD DETAILS

NONE

TRAFFIC SIGNAL CONDUIT

SEE BELOW

WATER SUPPLY ALTERATIONS

SEE BELOW

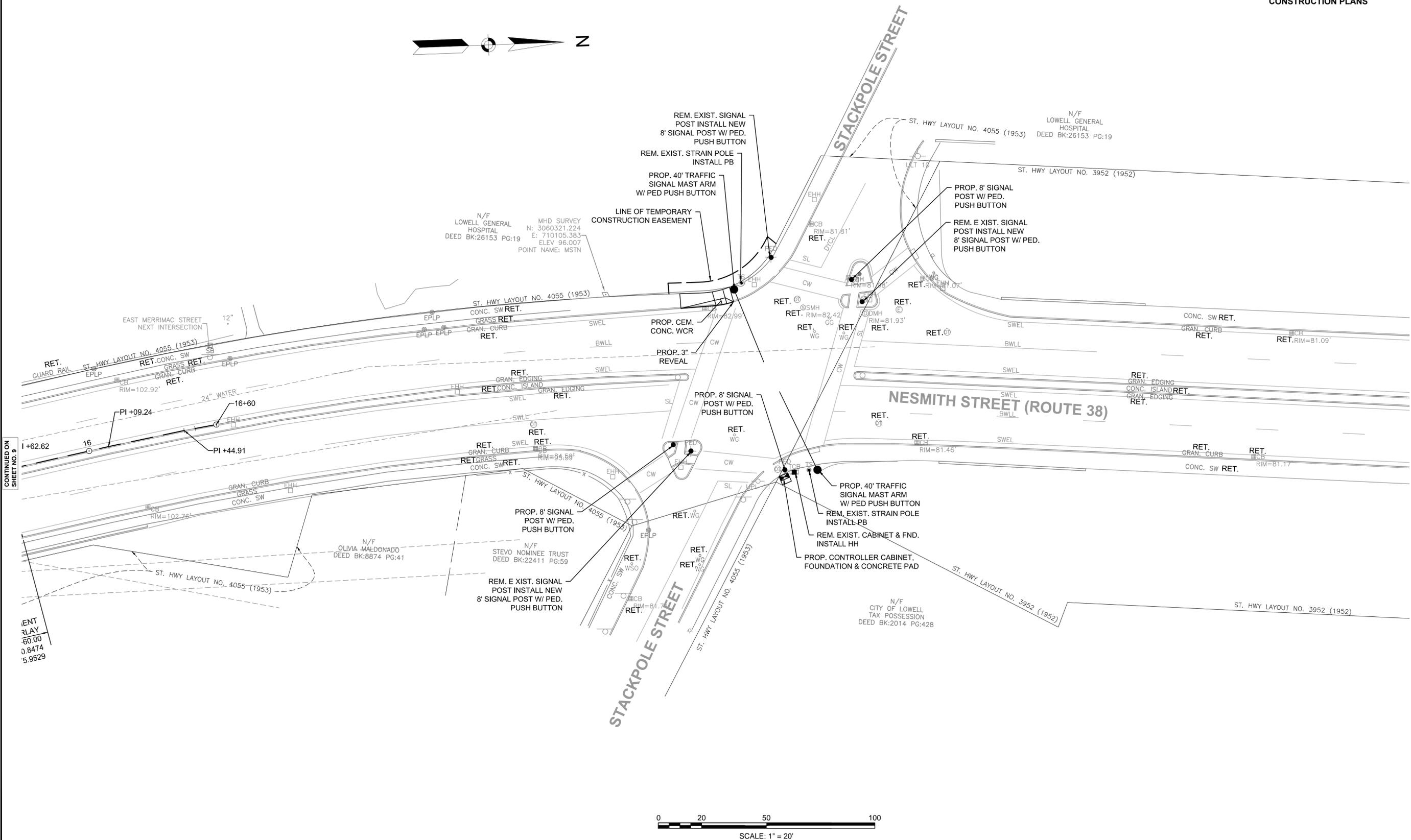
DRAINAGE DETAILS

SEE BELOW

LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS

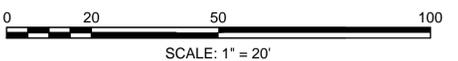
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	10	39
PROJECT FILE NO.		606189	

CONSTRUCTION PLANS



CONTINUED ON SHEET NO. 9

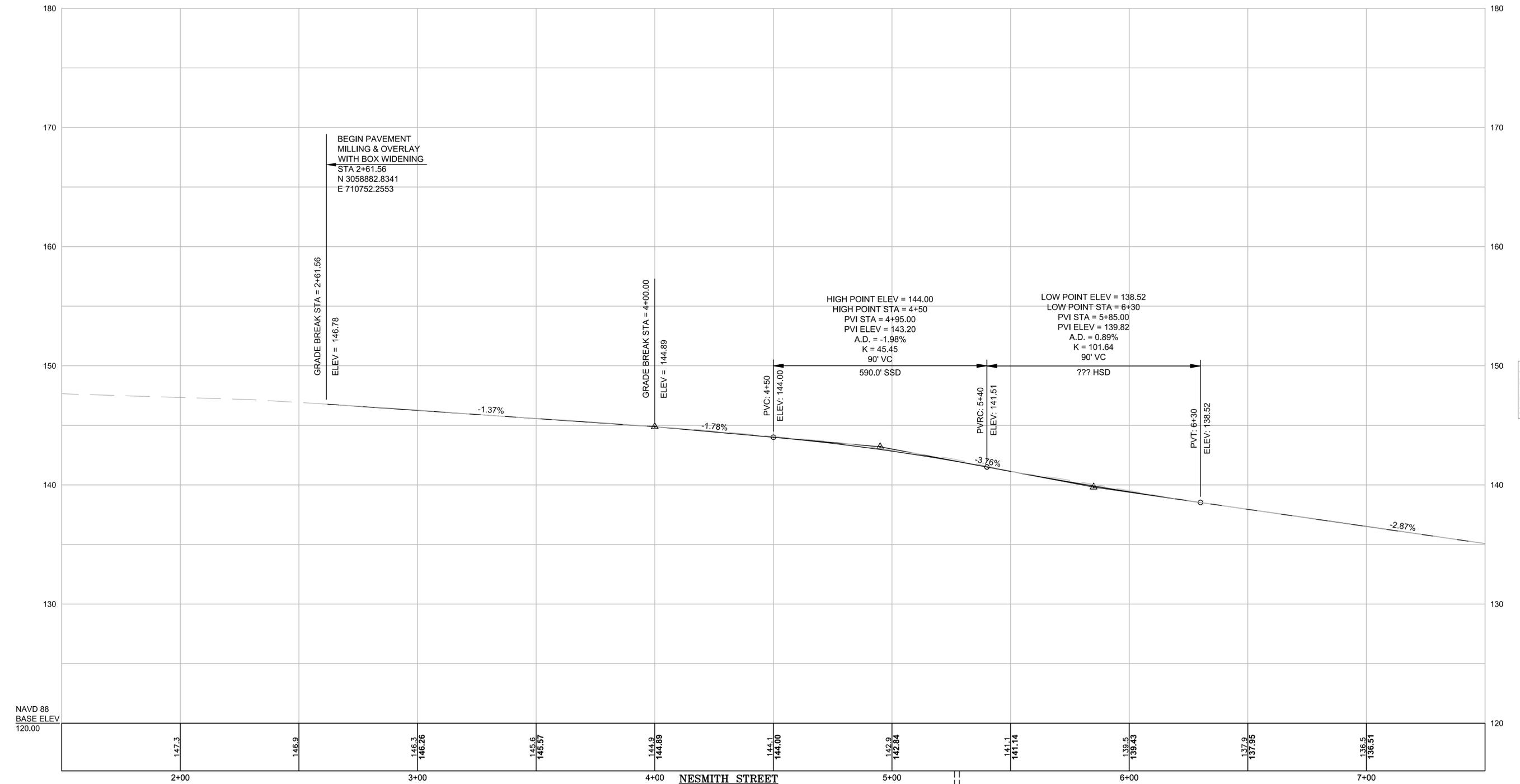
PERCENT
FLAY
60.00
0.8474
5.9529



LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	11	39
PROJECT FILE NO. 606189			

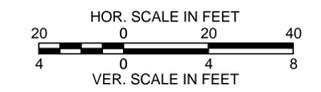
PROFILES



NAVD 88
BASE ELEV
120.00

Station	Elevation
2+00	147.3
2+50	146.9
3+00	146.3
3+00	146.26
3+50	145.6
3+50	145.57
4+00	144.9
4+00	144.89
4+50	144.1
4+50	144.00
5+00	142.9
5+00	142.84
5+50	141.1
5+50	141.14
6+00	139.5
6+00	139.43
6+50	137.9
6+50	137.95
7+00	136.5
7+00	136.51

STA 5+26.37 NESMITH ST. CONST. $R_c =$
 STA 50+00.00 ANDOVER ST. EAST CONST. $R_c =$
 STA 5+28.40 NESMITH ST. CONST. $R_c =$
 STA 62+15.67 ANDOVER ST. WEST CONST. $R_c =$



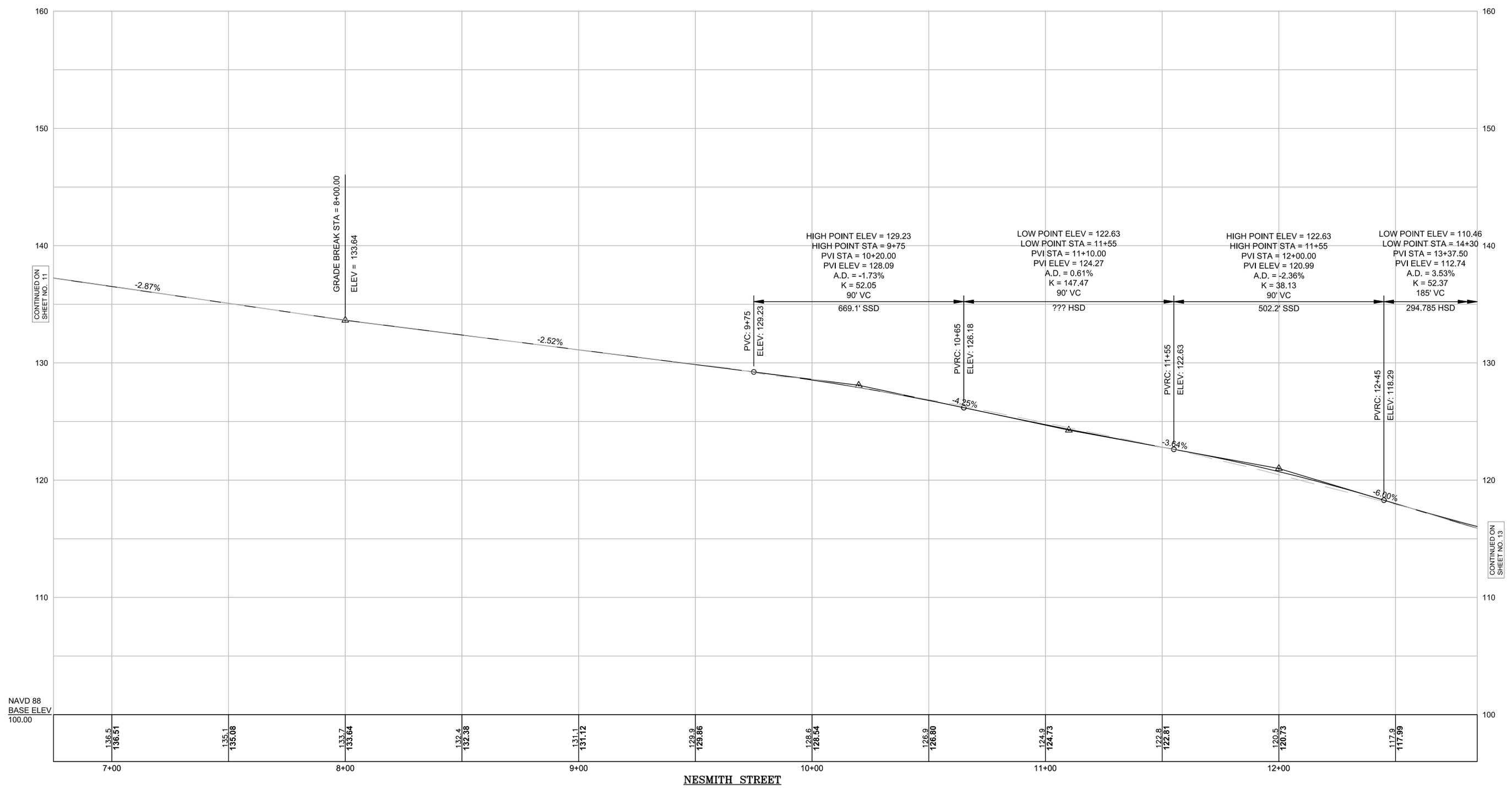
FOR CONSTRUCTION PLANS:
SEE SHEET NO. 7

CONTINUED ON
SHEET NO. 12

**LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS**

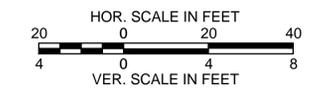
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	12	39
PROJECT FILE NO. 606189			

PROFILES



NAVD 88
BASE ELEV
100.00

NESMITH STREET



FOR CONSTRUCTION PLANS:
SEE SHEET NO. 8

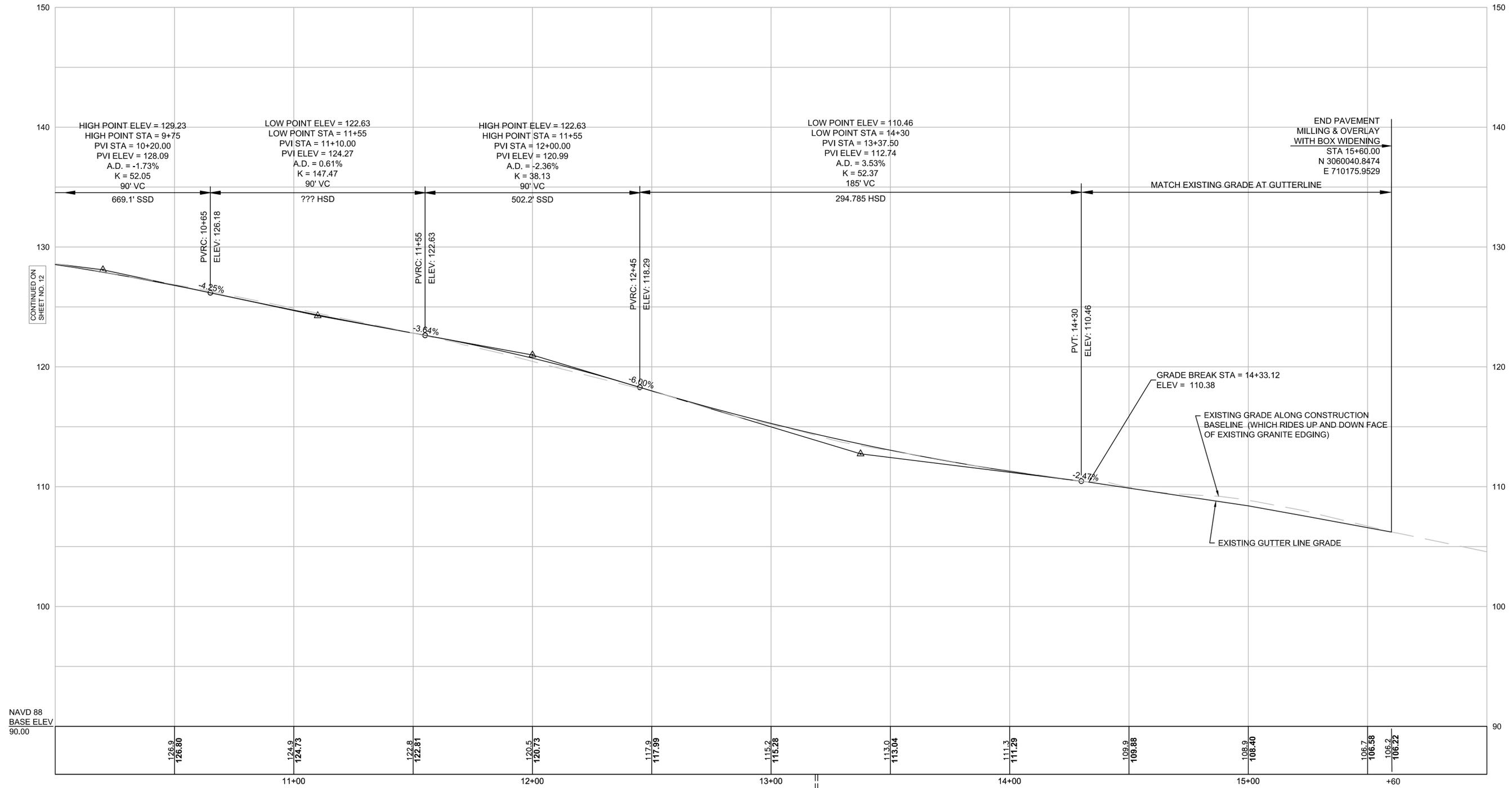
CONTINUED ON
SHEET NO. 11

CONTINUED ON
SHEET NO. 13

**LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	13	39
PROJECT FILE NO.		606189	

PROFILES

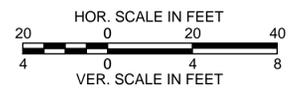


CONTINUED ON SHEET NO. 12

NAVD 88
BASE ELEV
90.00

STA 13+18.52 NESMITH ST. CONST. $R =$
 STA 80+00.00 E MERRIMACK ST. EAST CONST. $R =$
 STA 13+19.54 NESMITH ST. CONST. $R =$
 STA 71+98.30 E MERRIMACK ST. WEST CONST. $R =$

NESMITH STREET

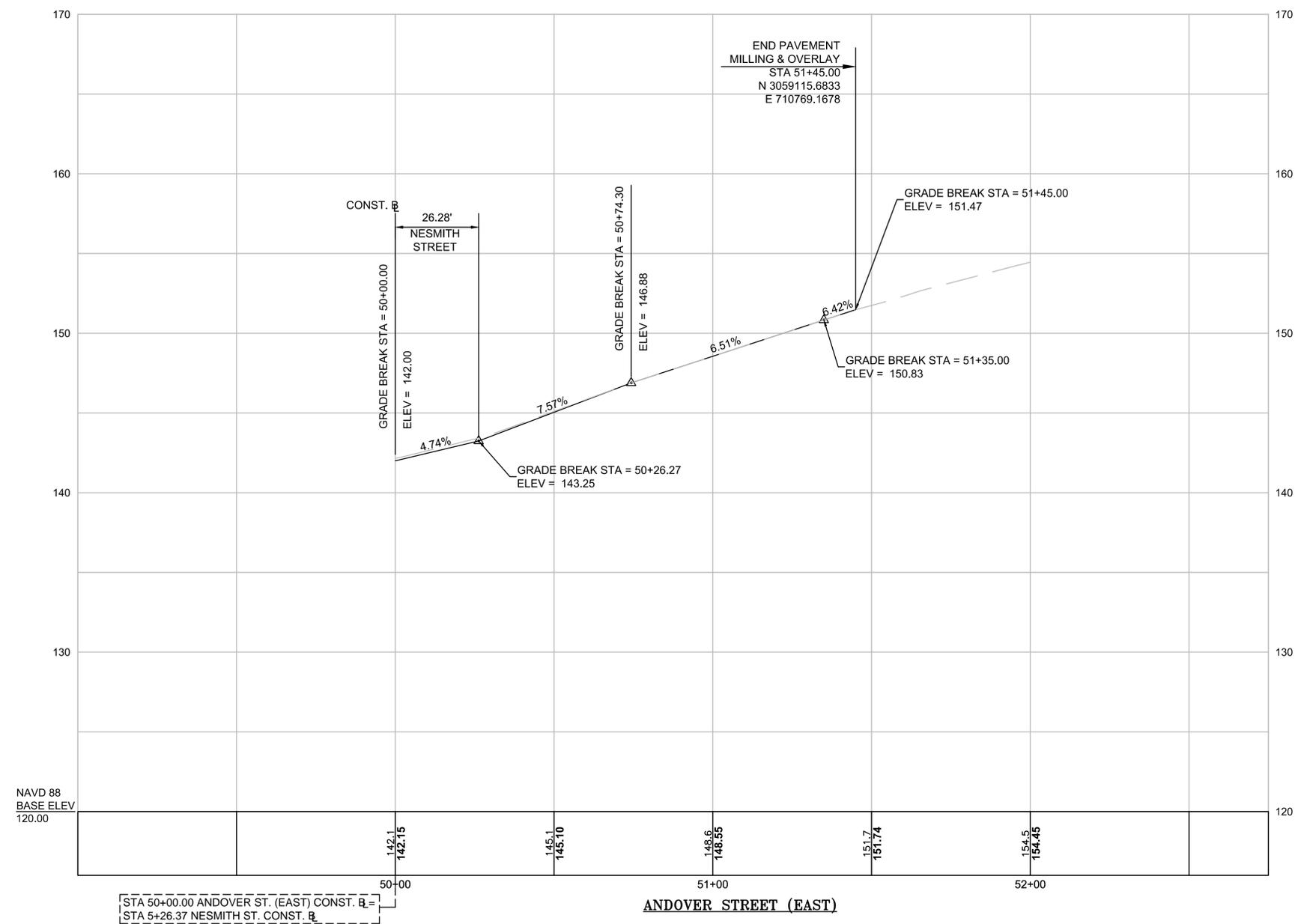


FOR CONSTRUCTION PLANS:
SEE SHEET NO. 9

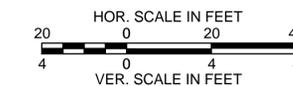
LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	14	39
PROJECT FILE NO.		606189	

PROFILE
SIDE STREETS



STA 50+00.00 ANDOVER ST. (EAST) CONST. \square =
STA 5+26.37 NESMITH ST. CONST. \square

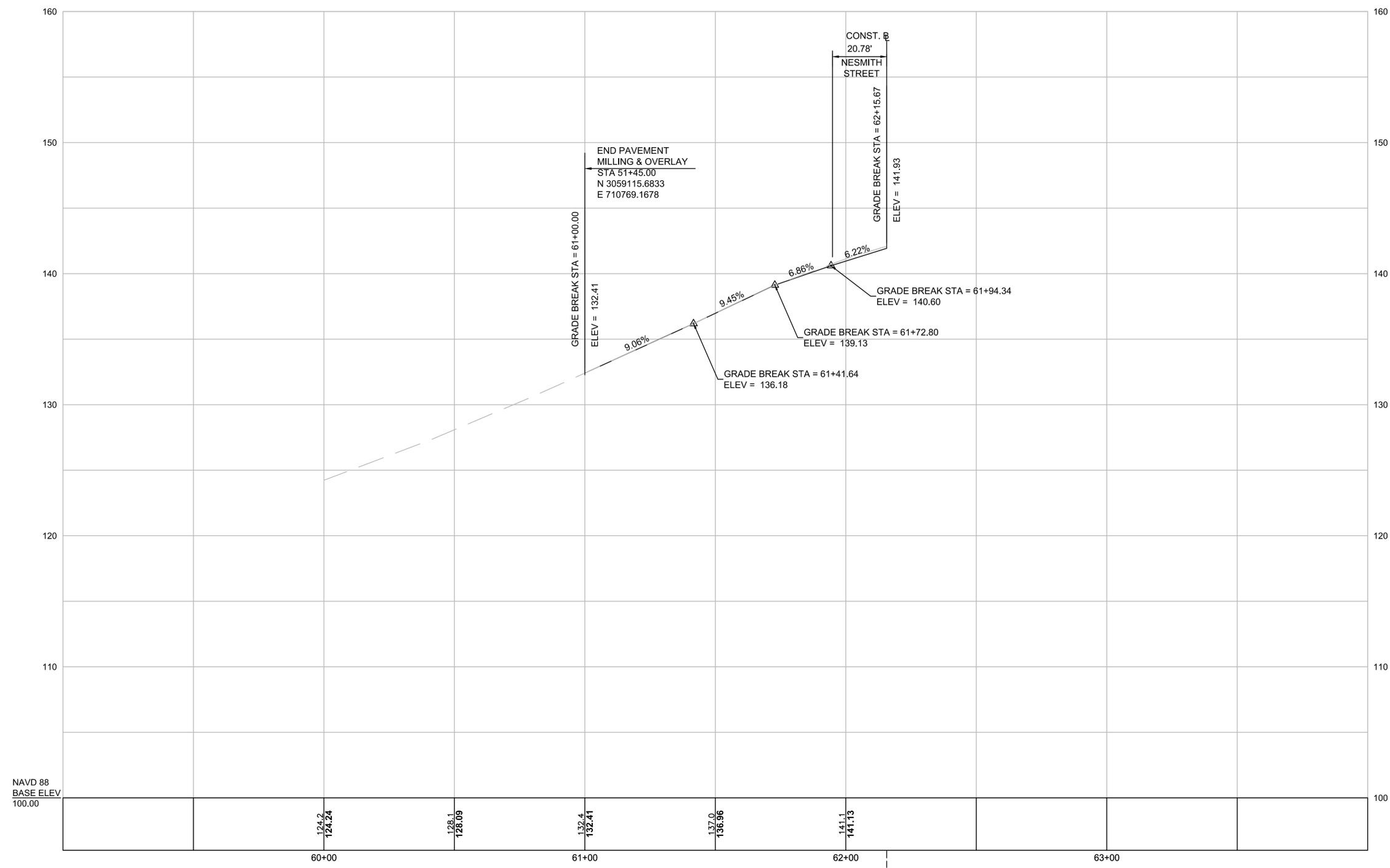


FOR CONSTRUCTION PLAN:
SEE SHEET NOS. 7

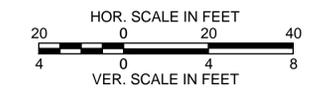
LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	15	39
PROJECT FILE NO.		606189	

PROFILE
SIDE STREETS



ANDOVER STREET (WEST) [STA 62+15.67 ANDOVER ST. (WEST) CONST. B]
[STA 5+28.40 NESMITH ST. CONST. B]

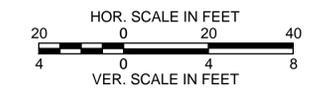
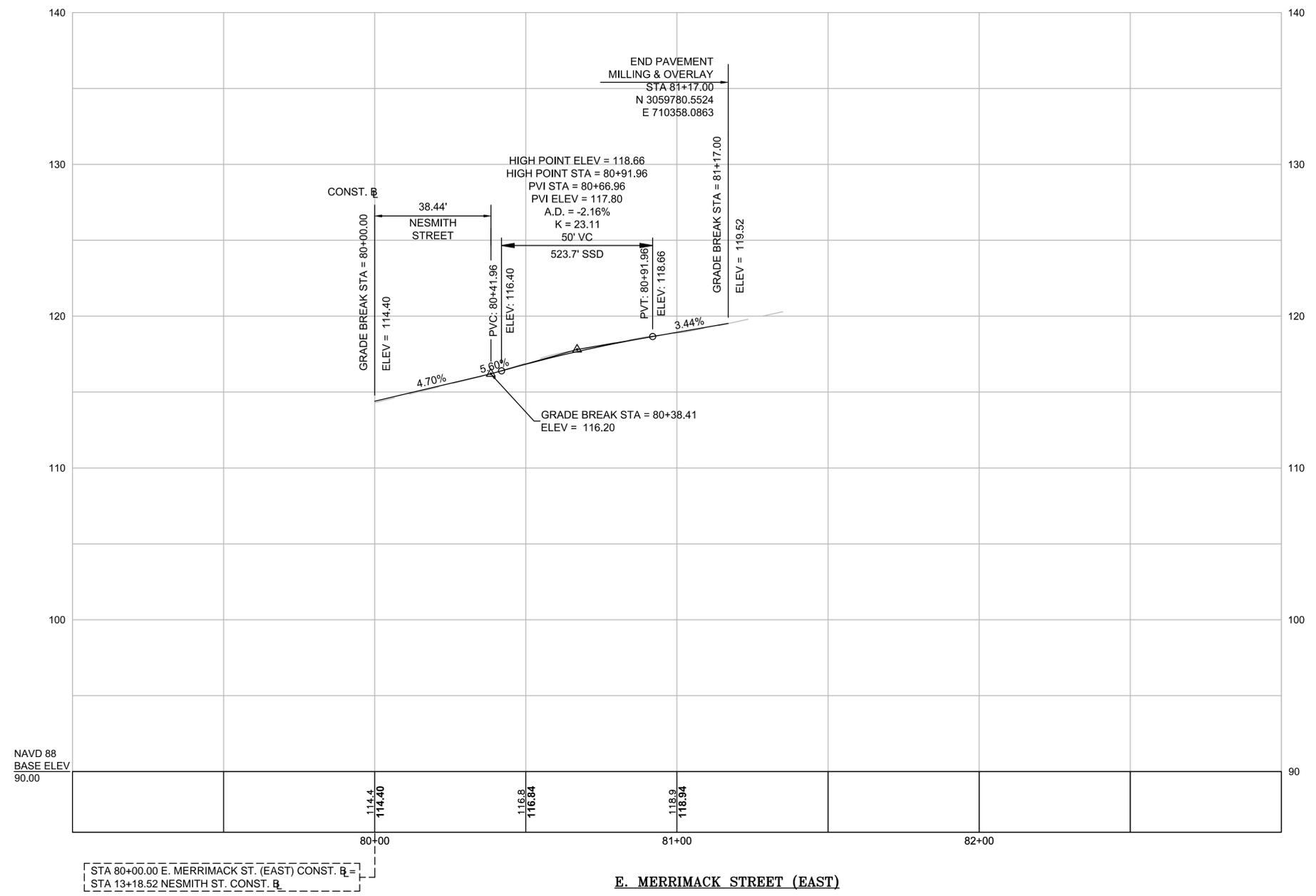


FOR CONSTRUCTION PLAN:
SEE SHEET NOS. 7

LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	16	39
PROJECT FILE NO.		606189	

PROFILE
SIDE STREETS

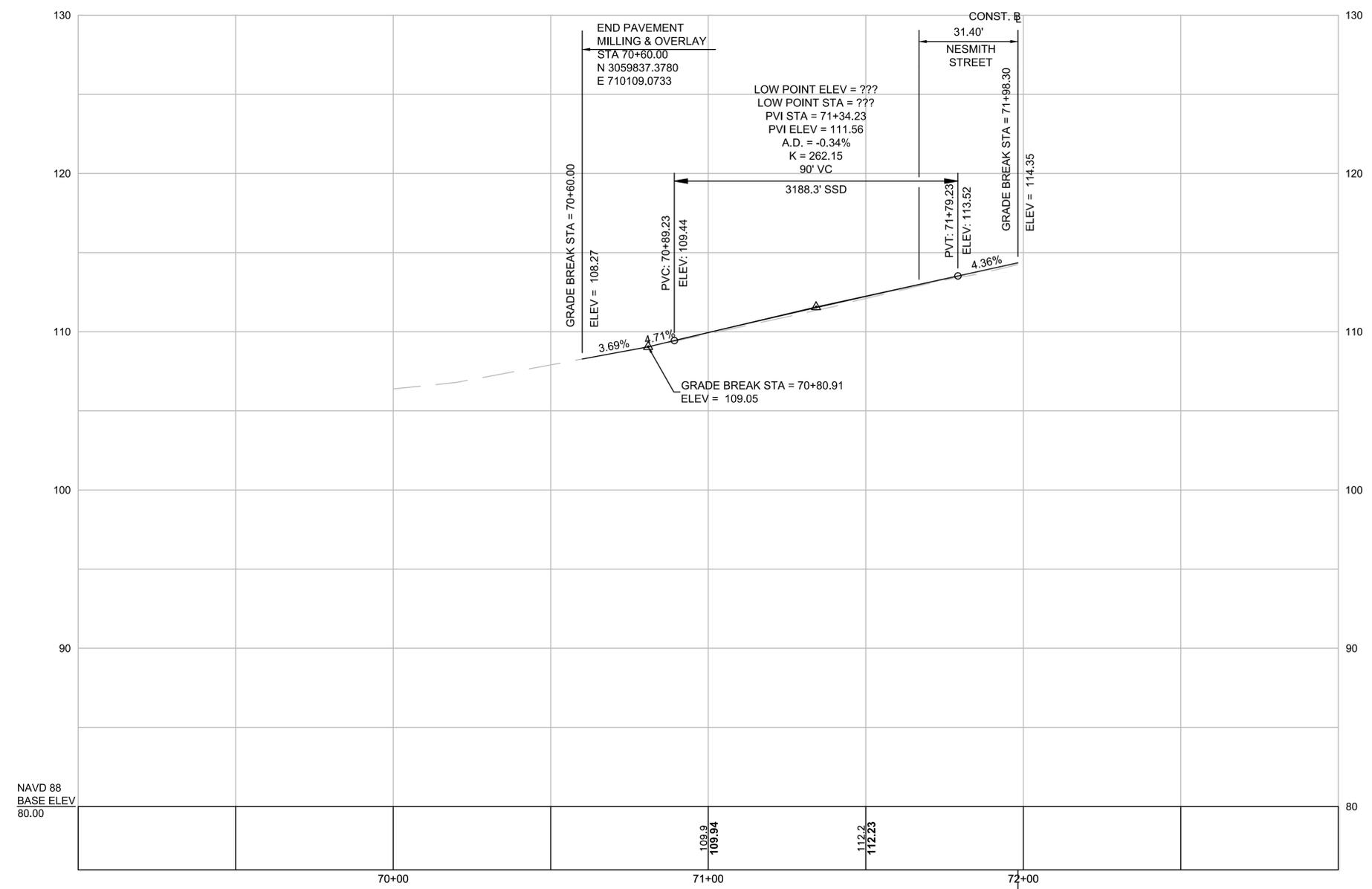


FOR CONSTRUCTION PLANS:
SEE SHEET NOS. 9

LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS

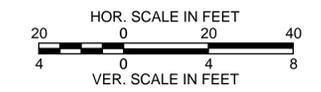
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	17	39
PROJECT FILE NO.		606189	

PROFILE
SIDE STREETS



STA 71+98.30 E. MERRIMACK ST. (WEST) CONST. R =
STA 13+19.54 NESMITH ST. CONST. R =

E. MERRIMACK STREET (WEST)

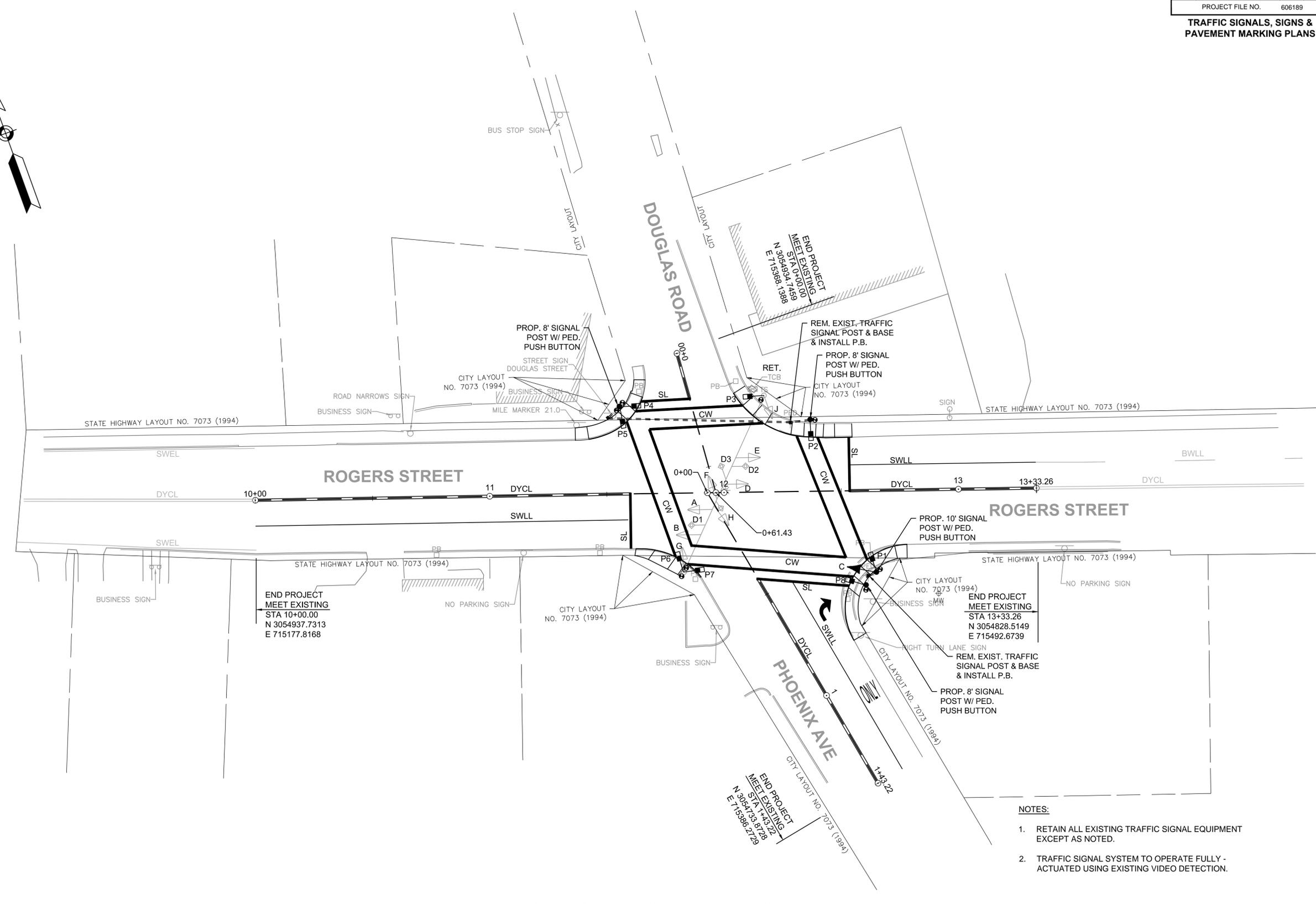
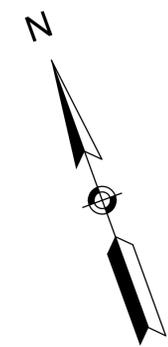


FOR CONSTRUCTION PLANS:
SEE SHEET NOS. 9

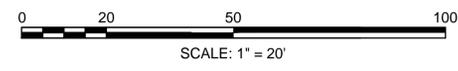
LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	18	39
PROJECT FILE NO.		606189	

TRAFFIC SIGNALS, SIGNS & PAVEMENT MARKING PLANS



- NOTES:**
1. RETAIN ALL EXISTING TRAFFIC SIGNAL EQUIPMENT EXCEPT AS NOTED.
 2. TRAFFIC SIGNAL SYSTEM TO OPERATE FULLY - ACTUATED USING EXISTING VIDEO DETECTION.

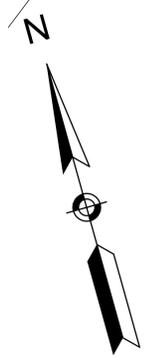
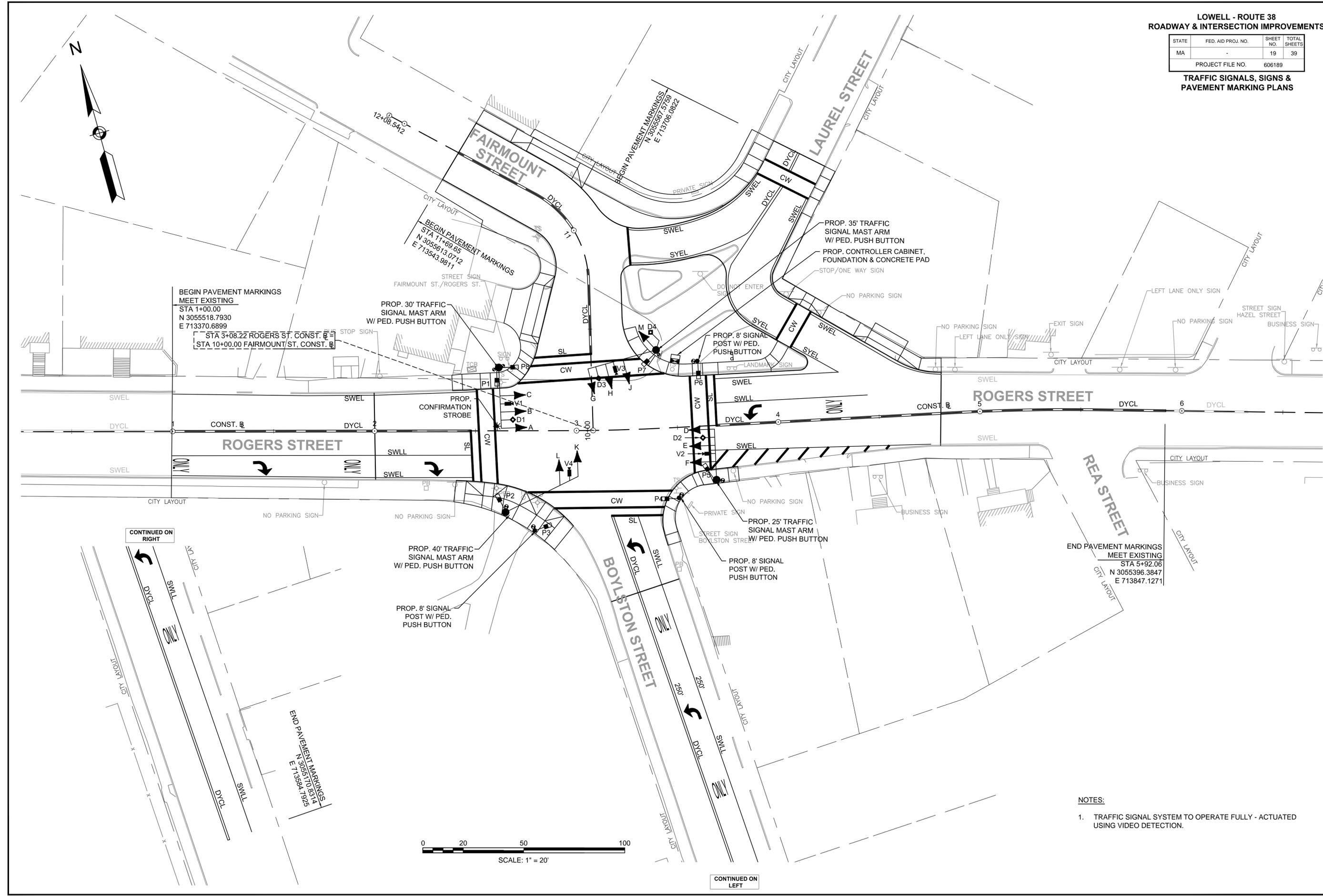


**LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	19	39
PROJECT FILE NO.		606189	

**TRAFFIC SIGNALS, SIGNS &
PAVEMENT MARKING PLANS**

606189.DWG(PAVEMENT MARKING).DWG Plotted on: 25-Feb-2016 2:55 PM



BEGIN PAVEMENT MARKINGS
MEET EXISTING
STA 1+00.00
N 3055518.7930
E 713370.6899

BEGIN PAVEMENT MARKINGS
STA 11+69.65
N 3053613.0712
E 713543.9811

PROP. 35' TRAFFIC
SIGNAL MAST ARM
W/ PED. PUSH BUTTON
PROP. CONTROLLER CABINET,
FOUNDATION & CONCRETE PAD
STOP/ONE WAY SIGN

PROP. 30' TRAFFIC
SIGNAL MAST ARM
W/ PED. PUSH BUTTON

PROP. 8' SIGNAL
POST W/ PED.
PUSH BUTTON

PROP. CONFIRMATION
STROBE

PROP. 25' TRAFFIC
SIGNAL MAST ARM
W/ PED. PUSH BUTTON

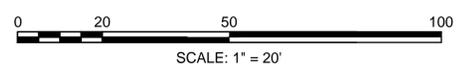
PROP. 40' TRAFFIC
SIGNAL MAST ARM
W/ PED. PUSH BUTTON

PROP. 8' SIGNAL
POST W/ PED.
PUSH BUTTON

END PAVEMENT MARKINGS
MEET EXISTING
STA 5+92.06
N 3055396.3847
E 713847.1271

CONTINUED ON
RIGHT

CONTINUED ON
LEFT

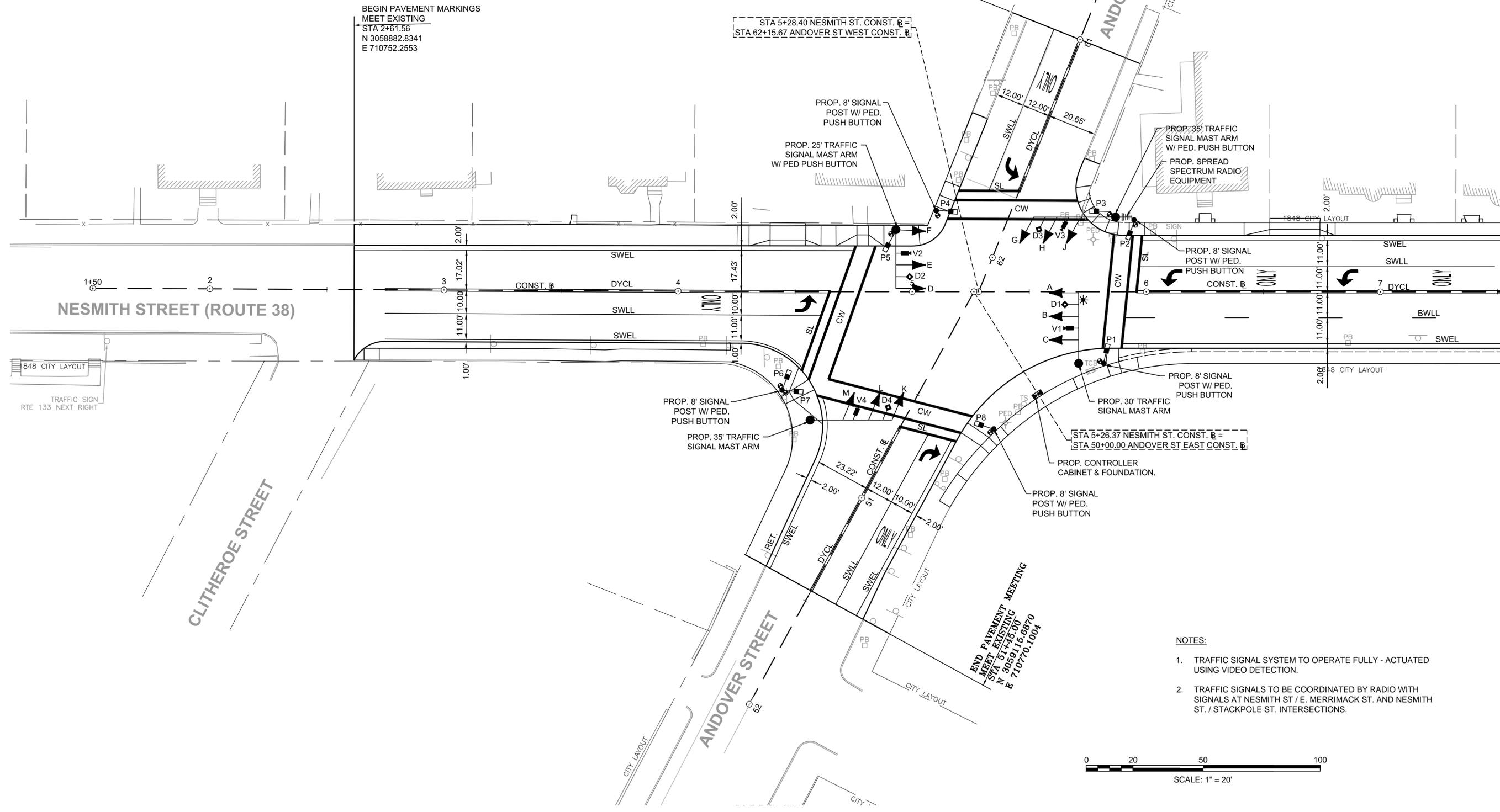
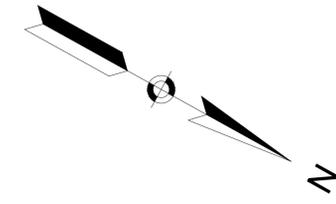


- NOTES:**
1. TRAFFIC SIGNAL SYSTEM TO OPERATE FULLY - ACTUATED USING VIDEO DETECTION.

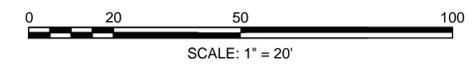
LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	20	39
PROJECT FILE NO.		606189	

TRAFFIC SIGNALS, SIGNS & PAVEMENT MARKING PLANS



- NOTES:
1. TRAFFIC SIGNAL SYSTEM TO OPERATE FULLY - ACTUATED USING VIDEO DETECTION.
 2. TRAFFIC SIGNALS TO BE COORDINATED BY RADIO WITH SIGNALS AT NESMITH ST / E. MERRIMACK ST. AND NESMITH ST. / STACKPOLE ST. INTERSECTIONS.

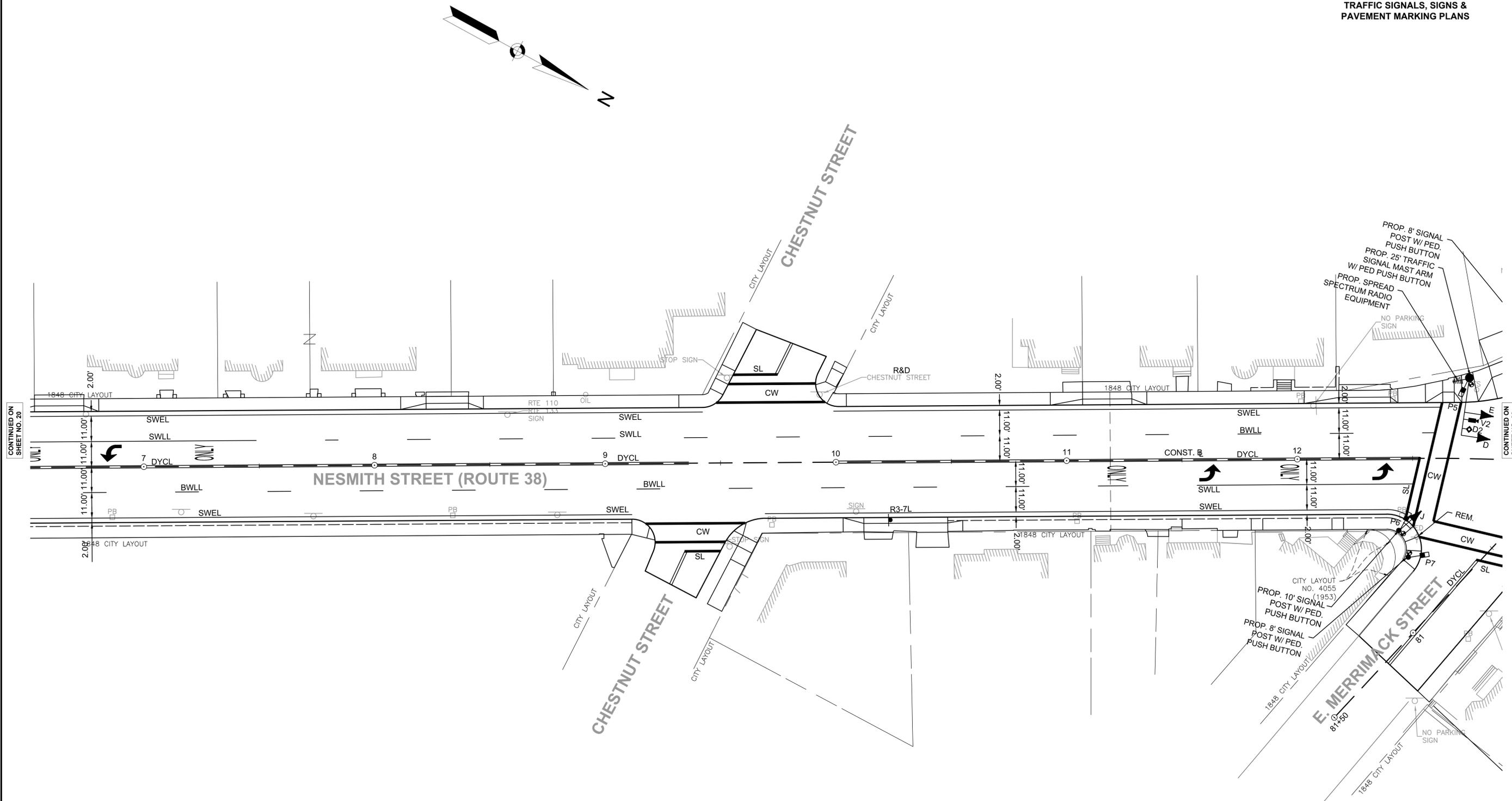
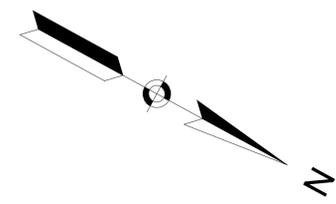


CONTINUED ON SHEET NO. 20

**LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS**

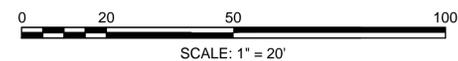
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	21	39
PROJECT FILE NO. 606189			

TRAFFIC SIGNALS, SIGNS & PAVEMENT MARKING PLANS



CONTINUED ON SHEET NO. 20

CONTINUED ON SHEET NO. 22



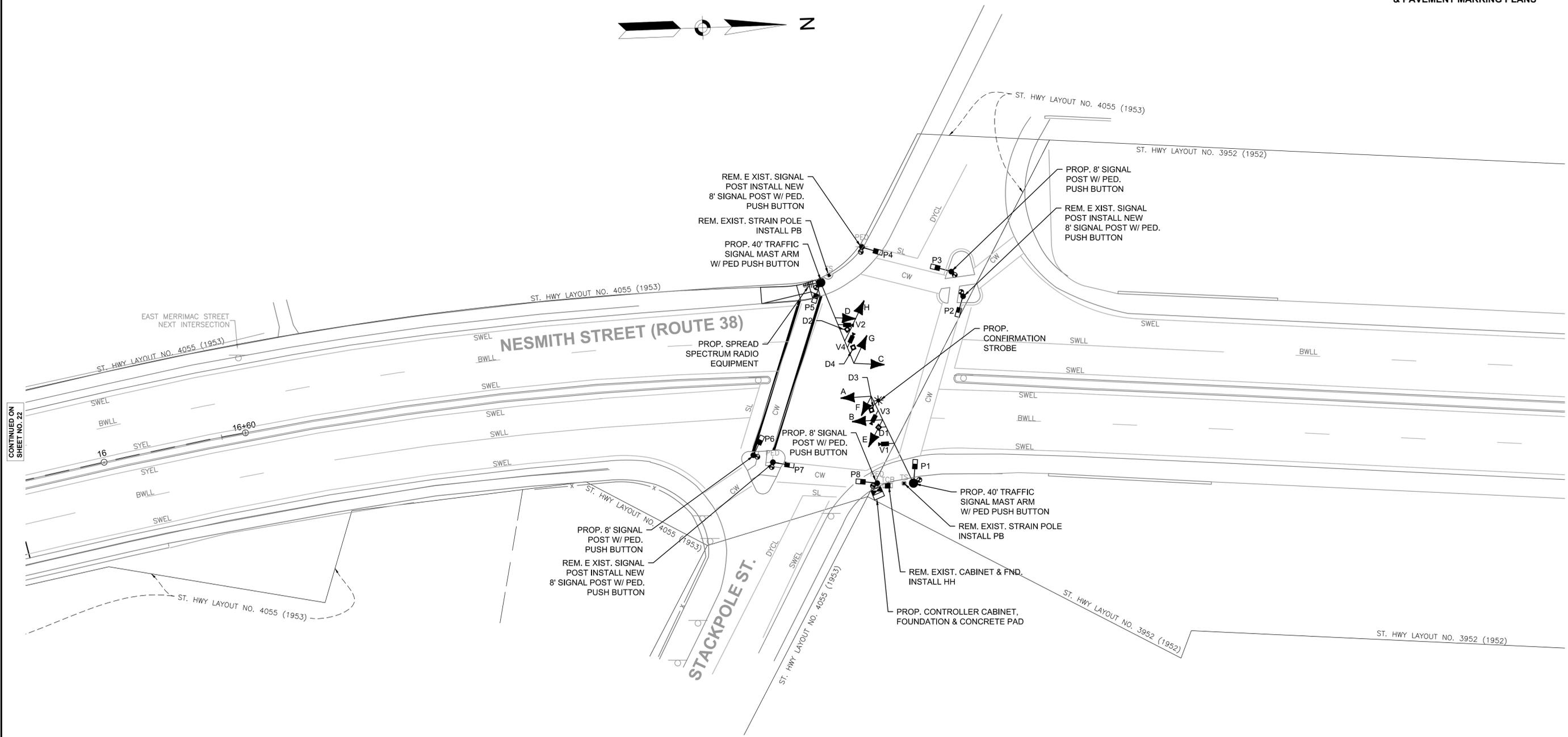
NOTES:

1. TRAFFIC SIGNAL SYSTEM TO OPERATE FULLY - ACTUATED USING VIDEO DETECTION.
2. TRAFFIC SIGNALS TO BE COORDINATED BY RADIO WITH SIGNALS AT NESMITH ST / STACKPOLE ST. AND NESMITH ST. / ANDOVER ST. INTERSECTIONS.

LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS

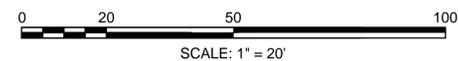
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	23	39
PROJECT FILE NO.		606189	

TRAFFIC SIGNALS, SIGNS
& PAVEMENT MARKING PLANS



CONTINUED ON
SHEET NO. 22

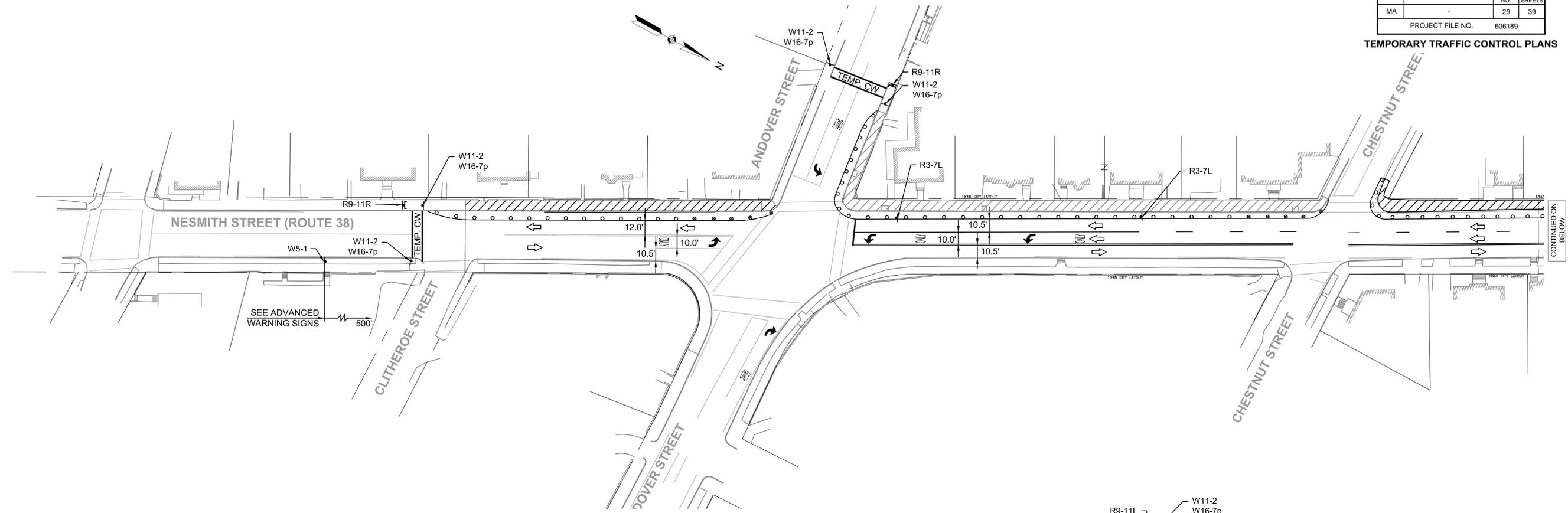
- NOTES:**
- EXISTING PAVEMENT MARKINGS TO BE RETAINED.
 - TRAFFIC SIGNAL SYSTEM TO OPERATE FULLY - ACTUATED USING VIDEO DETECTION.
 - TRAFFIC SIGNALS TO BE COORDINATED BY RADIO WITH SIGNALS AT NESMITH ST / E. MERRIMACK ST. AND NESMITH ST. / ANDOVER ST. INTERSECTIONS.



LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	29	39
PROJECT FILE NO.		606189	

TEMPORARY TRAFFIC CONTROL PLANS



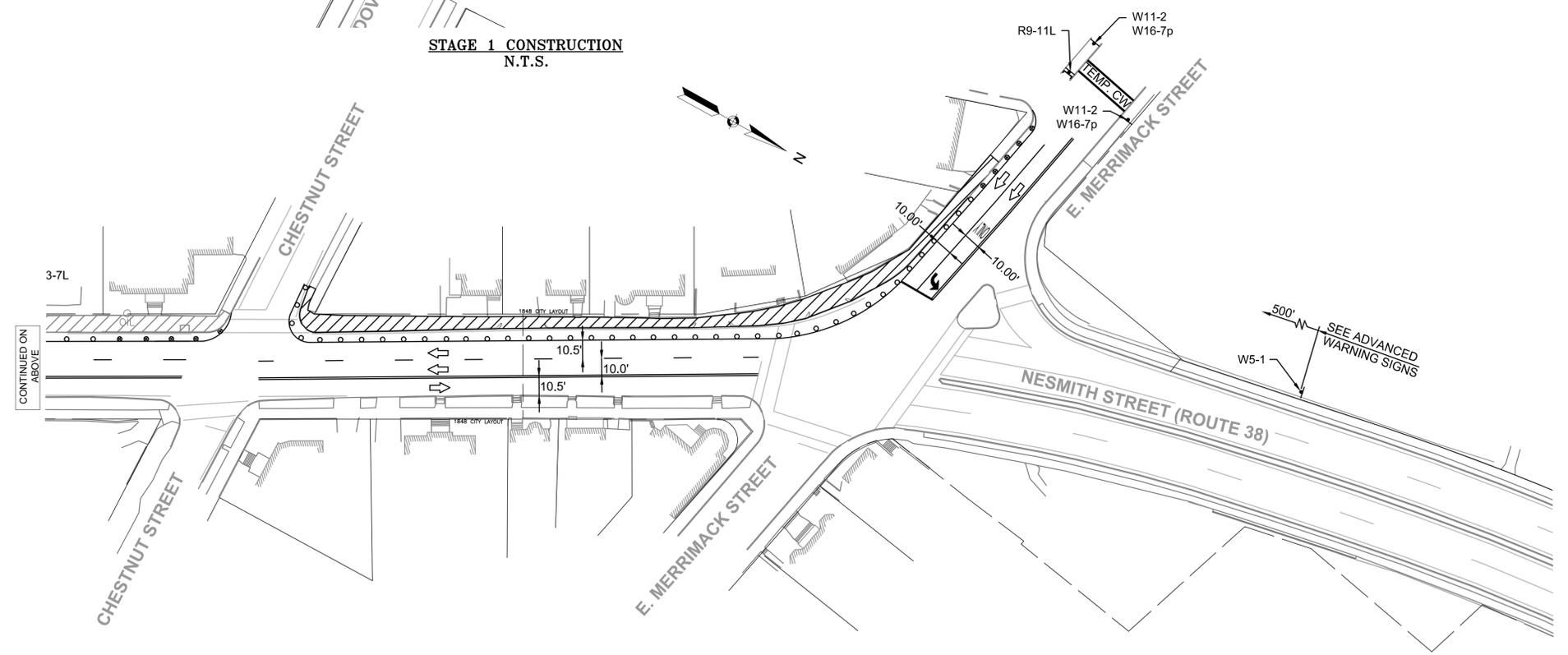
STAGE 1 CONSTRUCTION
N.T.S.

CONSTRUCTION NOTES:

1. THESE TEMPORARY TRAFFIC MANAGEMENT STAGE 1 AND STAGE 2 CONSTRUCTION SET-UPS ARE INTENDED TO SHOW THE FUNDAMENTAL REQUIREMENTS TO CONTROL TRAFFIC FLOW FOR THE PROPOSED ROADWAY CONSTRUCTION. OTHER SET-UPS OF SHORTER DURATION MAY BE REQUIRED WITHIN EACH STAGE IN ORDER TO CONSTRUCT CERTAIN PORTIONS OF THE PROJECT.
2. THE TEMPORARY TRAFFIC MANAGEMENT STAGE CONSTRUCTION SEQUENCE IS NOT INTENDED TO DIRECT THE CONTRACTOR IN METHOD OF OPERATION. THE CONTRACTOR MAY ELECT TO PROPOSE AND USE OTHER TEMPORARY TRAFFIC MANAGEMENT STAGE CONSTRUCTION SEQUENCE WITH PRIOR APPROVAL OF THE ENGINEER.

LEGEND

- WORK AREA
- REFLECTIVE DRUM W/ LIGHT
- REFLECTIVE DRUM W/ FLASHER
- DIRECTION OF TRAVEL
- TRAFFIC OFFICER/FLAGGER
- TEMPORARY SIGN
- PORTABLE BREAKAWAY BARRICADE TYPE III

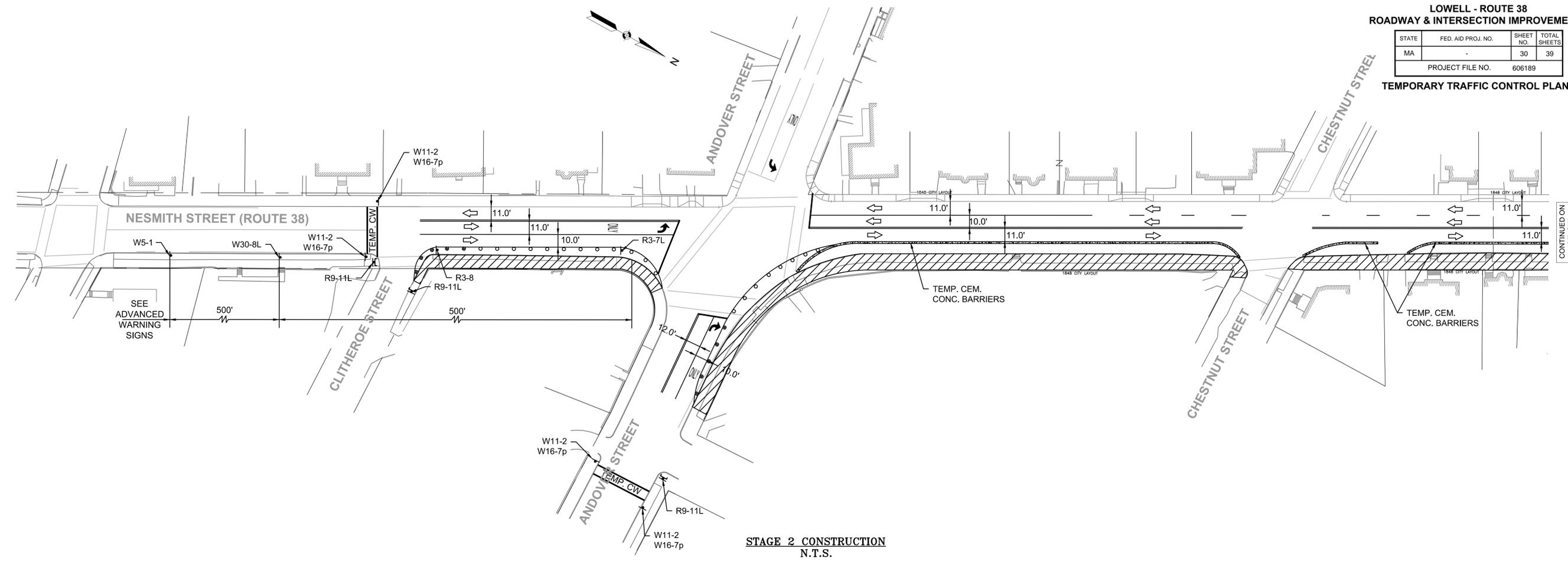


STAGE 1 CONSTRUCTION
N.T.S.

LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	30	39
PROJECT FILE NO. 606189			

TEMPORARY TRAFFIC CONTROL PLANS

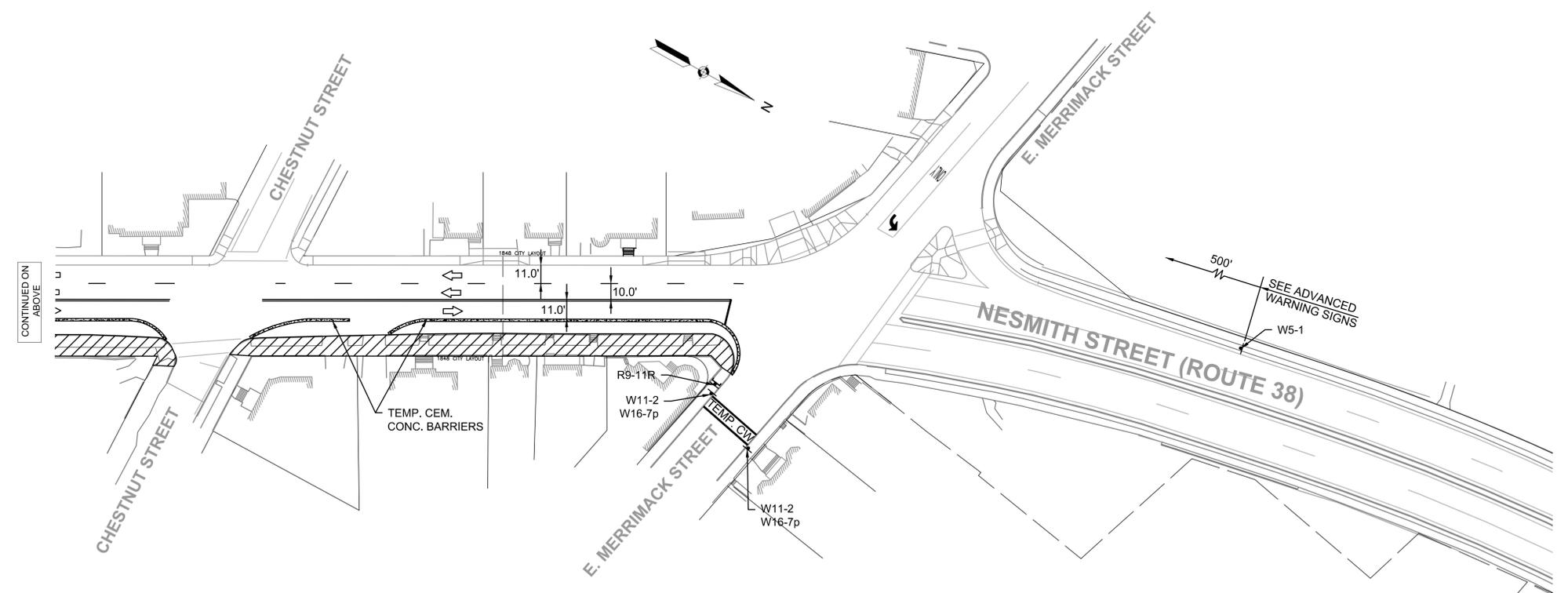


STAGE 2 CONSTRUCTION
N.T.S.

CONSTRUCTION NOTES:

1. THESE TEMPORARY TRAFFIC MANAGEMENT STAGE 1 AND STAGE 2 CONSTRUCTION SET-UPS ARE INTENDED TO SHOW THE FUNDAMENTAL REQUIREMENTS TO CONTROL TRAFFIC FLOW FOR THE PROPOSED ROADWAY CONSTRUCTION. OTHER SET-UPS OF SHORTER DURATION MAY BE REQUIRED WITHIN EACH STAGE IN ORDER TO CONSTRUCT CERTAIN PORTIONS OF THE PROJECT.
2. THE TEMPORARY TRAFFIC MANAGEMENT STAGE CONSTRUCTION SEQUENCE IS NOT INTENDED TO DIRECT THE CONTRACTOR IN METHOD OF OPERATION. THE CONTRACTOR MAY ELECT TO PROPOSE AND USE OTHER TEMPORARY TRAFFIC MANAGEMENT STAGE CONSTRUCTION SEQUENCE WITH PRIOR APPROVAL OF THE ENGINEER.

- WORK AREA
- REFLECTIVE DRUM W/ LIGHT
- REFLECTIVE DRUM W/ FLASHER
- DIRECTION OF TRAVEL
- TRAFFIC OFFICER/FLAGGER
- TEMPORARY SIGN
- ARROW BOARD
- PORTABLE BREAKAWAY BARRICADE TYPE III
- PAVEMENT MARKINGS TO COVER OR REMOVE
- CEMENT CONCRETE BARRIER



STAGE 2 CONSTRUCTION
N.T.S.

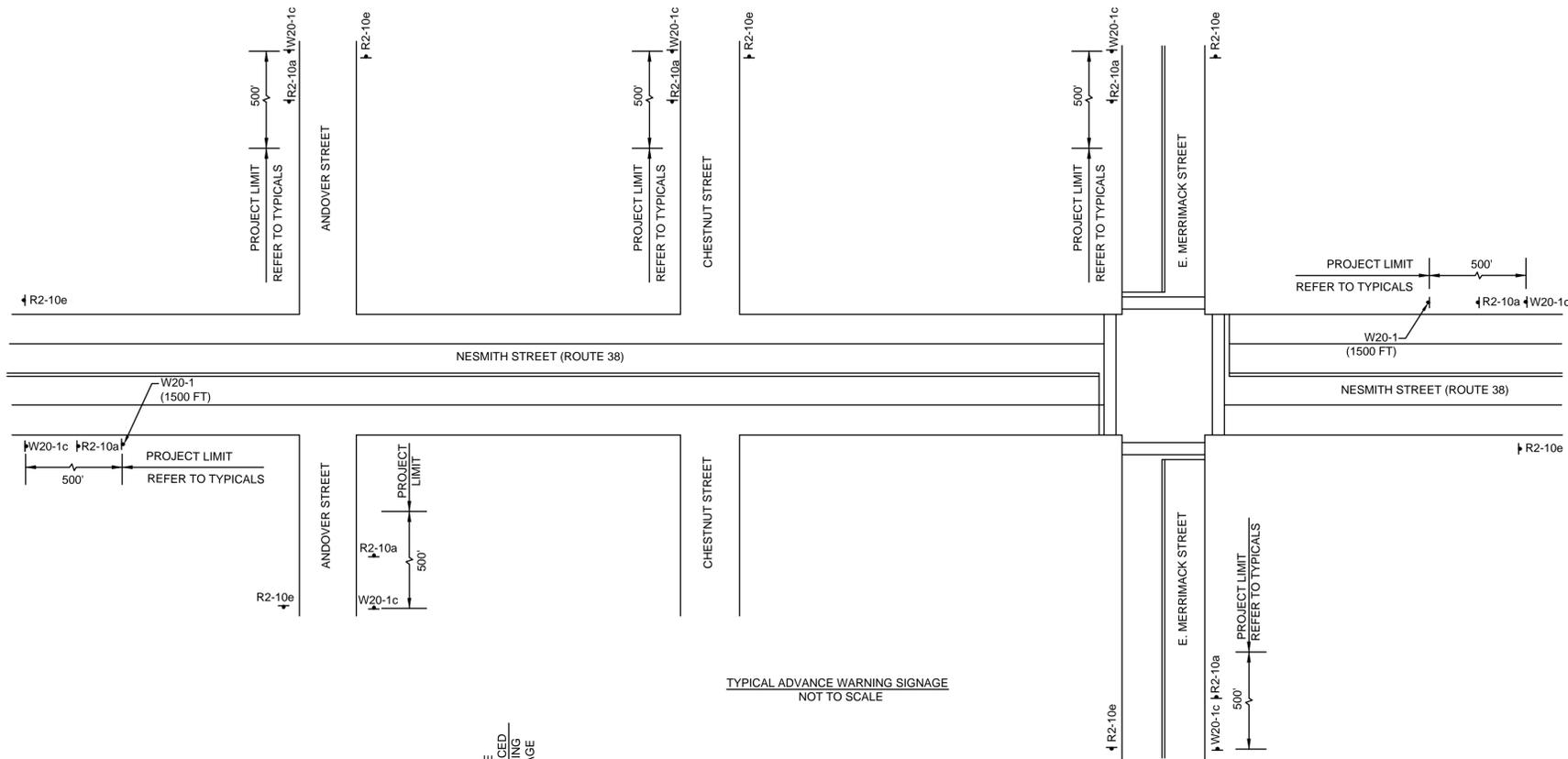
CONTINUED ON BELOW

CONTINUED ON ABOVE

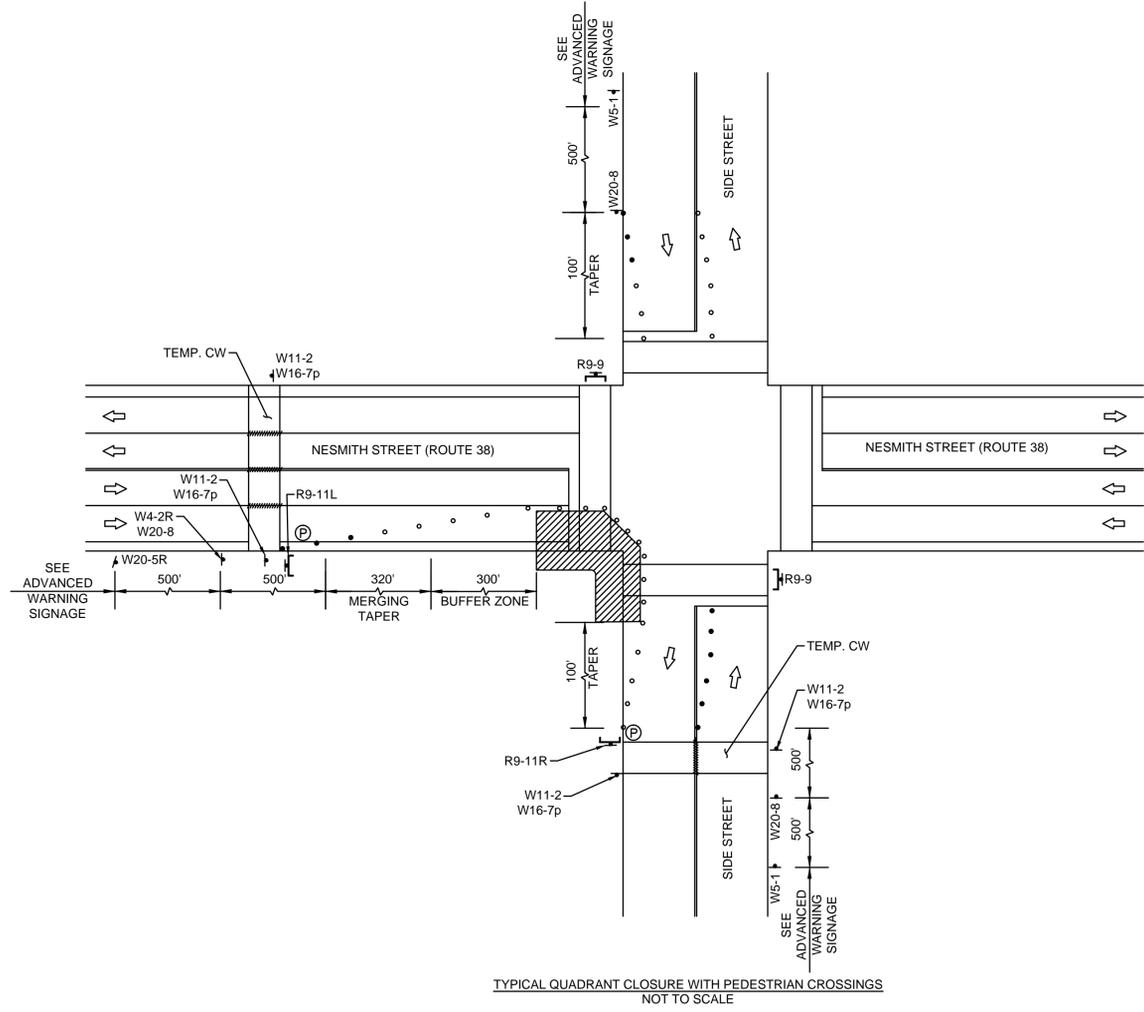
LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	31	39
PROJECT FILE NO.		606189	

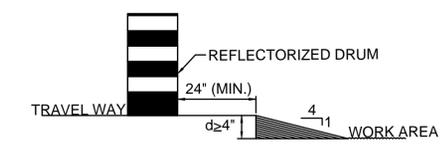
TEMPORARY TRAFFIC CONTROL PLANS



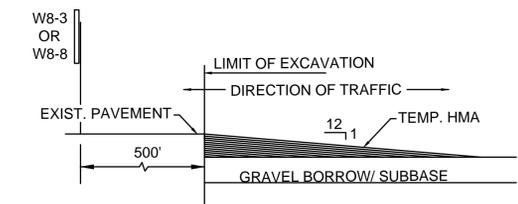
TYPICAL ADVANCE WARNING SIGNAGE
NOT TO SCALE



TYPICAL QUADRANT CLOSURE WITH PEDESTRIAN CROSSINGS
NOT TO SCALE



LATERAL DROP-OFF DETAIL
NOT TO SCALE



LONGITUDINAL DROP-OFF DETAIL
NOT TO SCALE

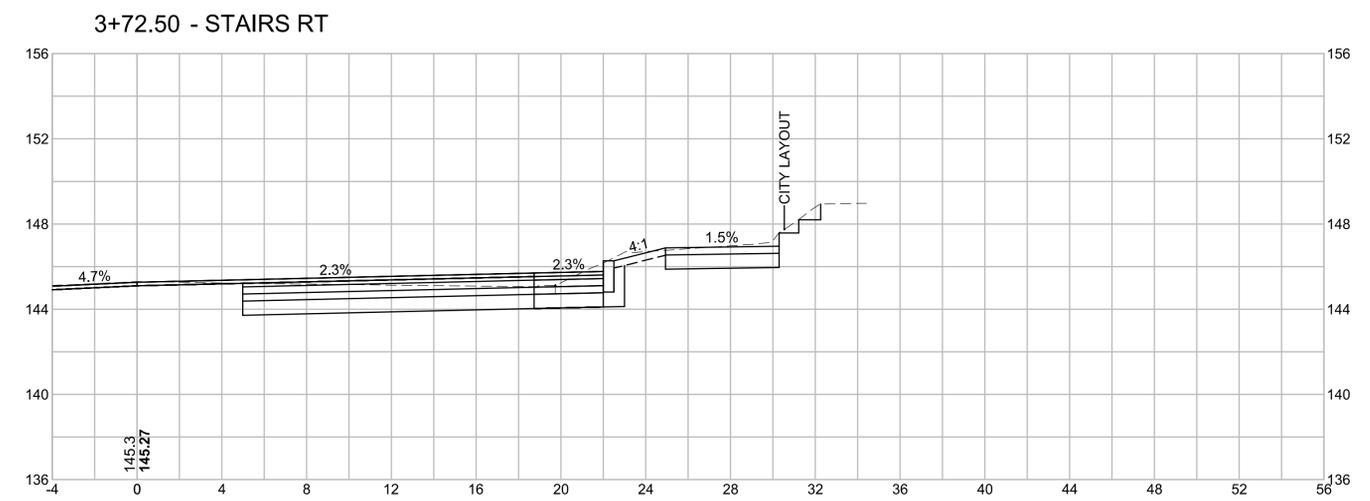
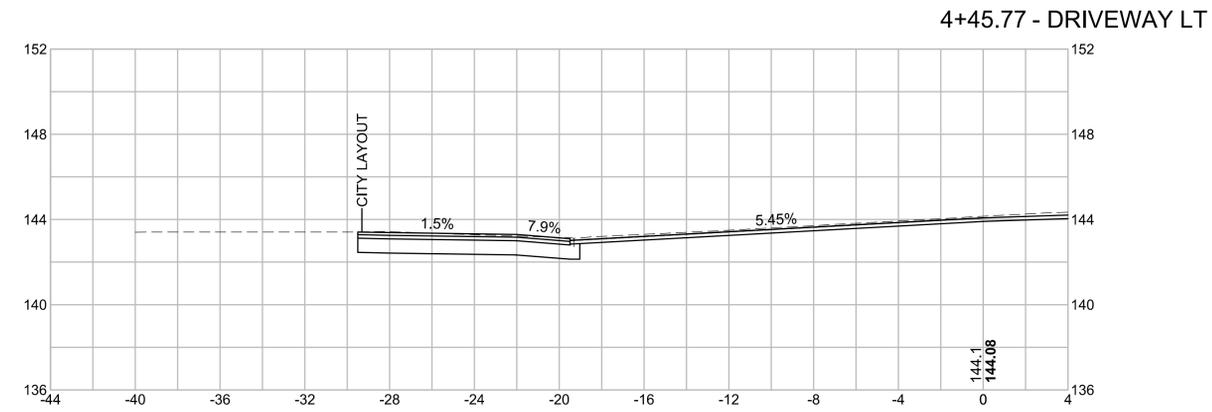
TRAFFIC MANAGEMENT NOTES:

1. INSTALL AND/OR RELOCATE TEMPORARY SIGNS, DRUMS, CONES AND OTHER TRAFFIC MAINTENANCE DEVICES AS REQUIRED.
2. ALL CONSTRUCTION SIGNING AND OTHER TRAFFIC MAINTENANCE DEVICES SHALL CONFORM WITH THE 2009 MUTCD AS AMENDED.
3. REMOVE OR COVER ALL TEMPORARY SIGNS, DRUMS, CONES AND OTHER TRAFFIC MAINTENANCE DEVICES THAT ARE NOT REQUIRED ON THE COMPLETION OF THE WORK, EACH DAY. THIS PARTICULARLY APPLIES TO THE W20-8 SIGNS, WHICH SHALL BE COMPLETELY COVERED OR REMOVED AT THE END OF EACH DAY.
4. CONTRACTOR SHALL USE TEMPORARY PATCHING OR BEVELED STEEL PLATES TO COVER TRENCHES NOT COMPLETED IN A DAYS WORK.
5. ALL DISTANCES MAY BE ADJUSTED TO FIT FIELD CONDITIONS, AS DIRECTED BY THE ENGINEER.
6. ACCESS TO ABUTTERS SHALL REMAIN OPEN AT ALL TIMES. IF A SHORT TERM TEMPORARY CLOSURE OF ACCESS TO ABUTTERS BECOME NECESSARY, THE CONTRACTOR SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE.
7. NO SIGNS SHALL BE ATTACHED TO DRUMS OR CONES. ALL CONSTRUCTION SIGNS SHALL BE ATTACHED TO THEIR OWN INDEPENDENT SUPPORTS AND MEET NCHRP 350 STANDARDS.
8. NO SIGNS SHALL BE VISIBLE TO TRAFFIC THAT MAY CONFLICT WITH ACTUAL CONDITIONS.
9. PAVEMENT MARKINGS NO LONGER APPLICABLE WHICH MIGHT CREATE CONFUSION SHALL BE OBLITERATED. TEMPORARY PAVEMENT MARKINGS SHALL BE USED AS NECESSARY AND SHALL BE IN PLACE BEFORE WORK IS COMPLETED EACH NIGHT.
10. THE MAXIMUM SPACING BETWEEN CHANNELIZING DEVICES IN A TAPER (IN FEET) SHOULD BE APPROXIMATELY EQUAL TO THE SPEED LIMIT (IN MPH).
11. WHERE NECESSARY, PEDESTRIANS SHALL BE PROVIDED WITH A SAFE CONVENIENT TRAVEL PATH THROUGH THE CONSTRUCTION ZONE FOR THE DURATION OF CONSTRUCTION BY USE OF APPROPRIATE TRAFFIC SIGNS, MAINTENANCE DEVICES AND/OR A POLICE OFFICER (DURING WORK HOURS). IF THE AREAS OF SIDEWALK NEED TO BE CLOSED OVERNIGHT, THE CONTRACTOR SHALL MAKE ALL REASONABLE PROVISIONS TO KEEP A SAFE PATHWAY OPEN FOR PEDESTRIANS.
12. LOCATION OF W11-2, W16-7P, AND R9-11 SIGNS TO BE APPROVED BY THE ENGINEER WHO WILL DETERMINE THE NECESSITY FOR PROVIDING TEMPORARY CROSSWALKS
13. DURING EACH PHASE, EDGES OF WORK MUST BE DELINEATED WITH REFLECTORIZED DRUMS OR CONES.
14. THE MINIMUM ALLOWABLE LANE WIDTH SHALL BE 10'-0", USE WIDER LANES WHENEVER POSSIBLE.
15. IF NECESSARY, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN AND/OR ADJUST TRAFFIC SIGNAL OPERATIONS WHILE CONSTRUCTION IS IN PROGRESS. THE CONTRACTOR SHALL OBTAIN THE WRITTEN APPROVAL OF THE ENGINEER PRIOR TO MAKING ADJUSTMENTS TO TRAFFIC SIGNAL OPERATIONS.
16. THE TEMPORARY TRAFFIC MANAGEMENT SET-UPS PROVIDED ARE INTENDED TO SHOW THE FUNDAMENTAL REQUIREMENTS TO CONTROL TRAFFIC FLOW DURING THE PROPOSED CONSTRUCTION. OTHER STANDARDIZED TRAFFIC MANAGEMENT TYPICAL SET-UPS MAY BE USED BY THE CONTRACTOR TO CONSTRUCT CERTAIN ELEMENTS OF THE PROJECT, IF APPROVED BY THE ENGINEER.
17. THE TEMPORARY TRAFFIC MANAGEMENT PLANS/TYPICALS ARE NOT INTENDED TO DIRECT THE CONTRACTOR IN METHOD OF OPERATION. THE CONTRACTOR MAY ELECT TO PROPOSE AND USE OTHER TEMPORARY TRAFFIC MANAGEMENT SET-UPS WITH PRIOR APPROVAL OF THE ENGINEER.

LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	32	39
PROJECT FILE NO.		606189	

CRITICAL CROSS SECTIONS

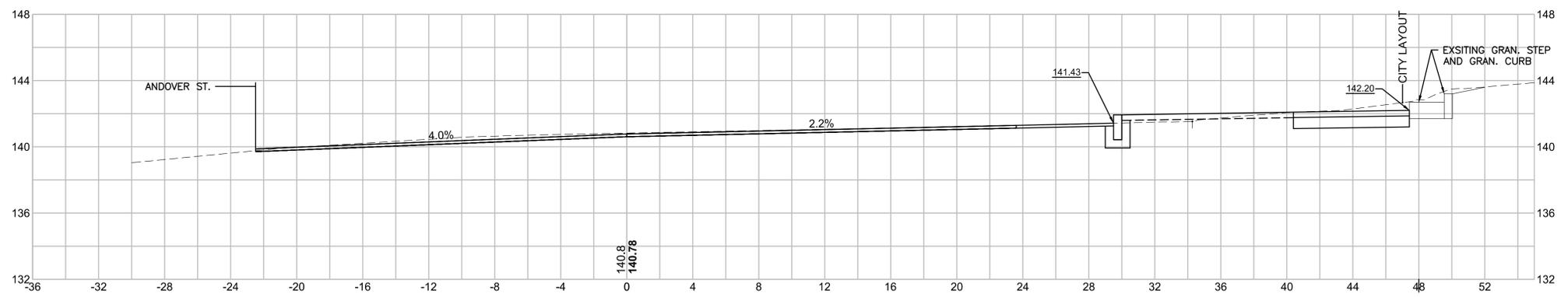


LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS

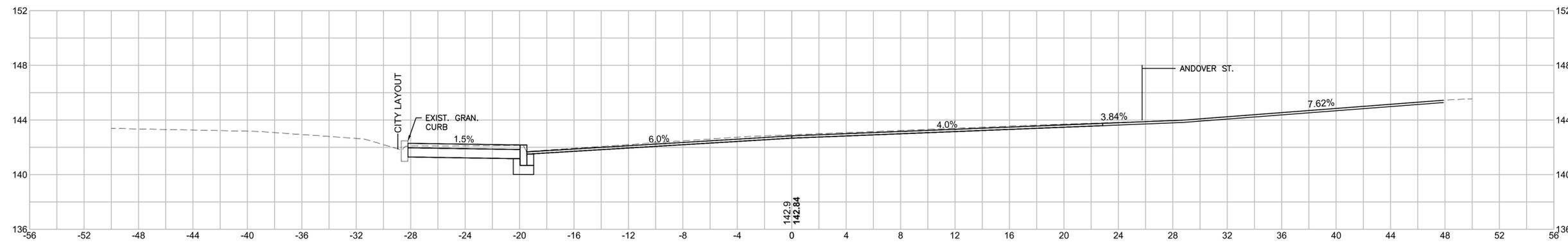
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	33	39
PROJECT FILE NO.		606189	

CRITICAL CROSS SECTIONS

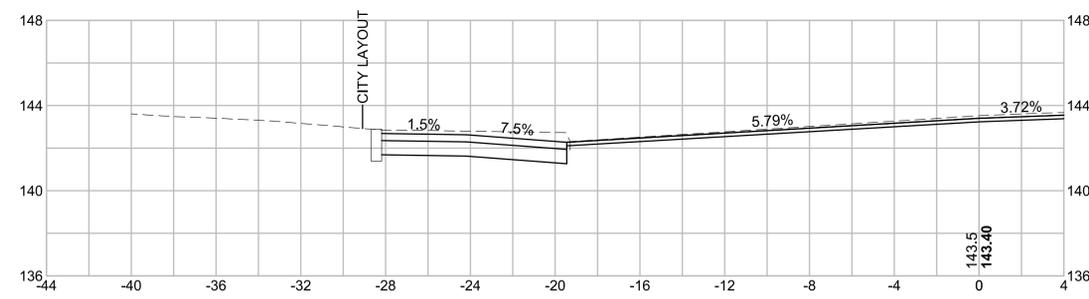
5+60 - WALKWAY RT



5+00



4+78.72 - WALKWAY LT

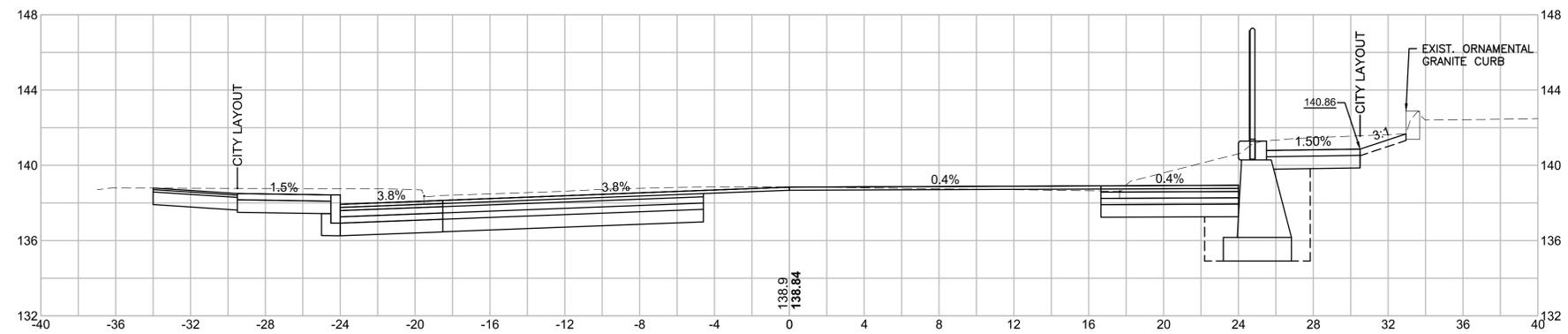


LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS

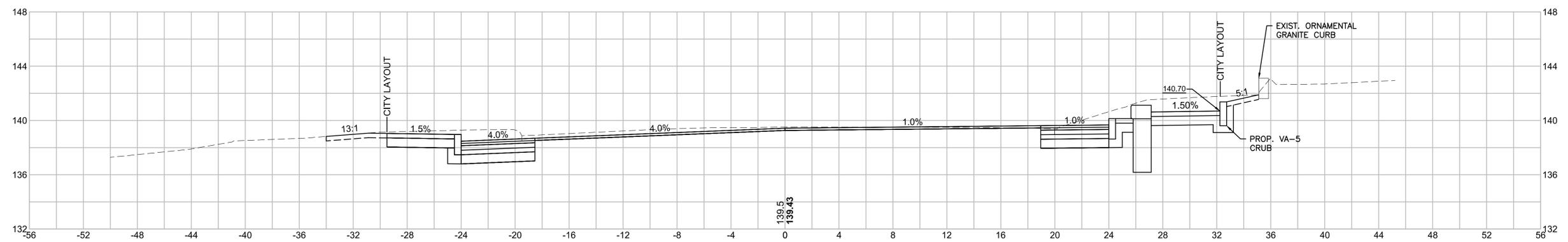
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	34	39
PROJECT FILE NO.		606189	

CRITICAL CROSS SECTIONS

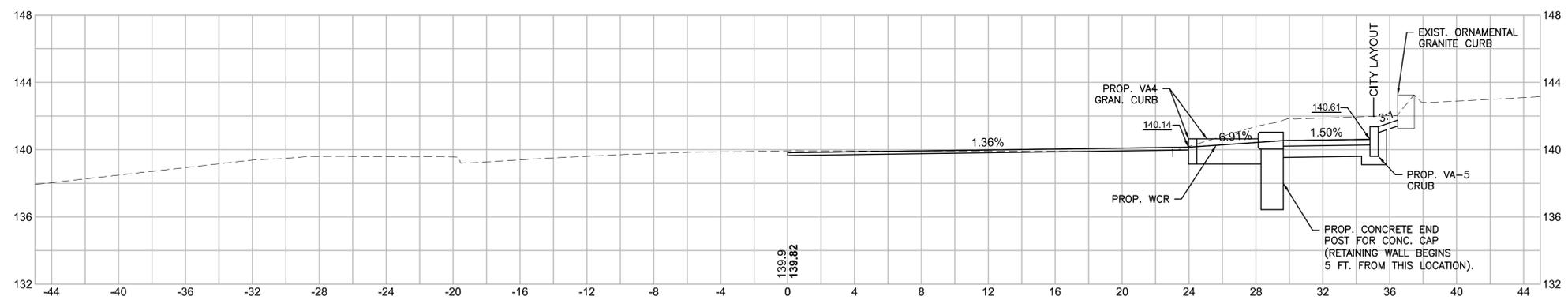
6+19.24 - CEM. STONE MASONRY WALL RT



6+00



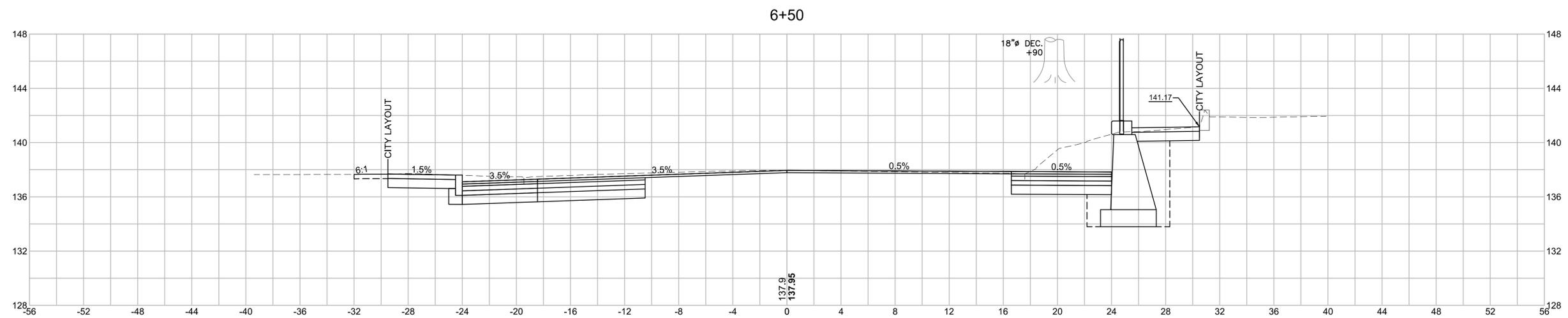
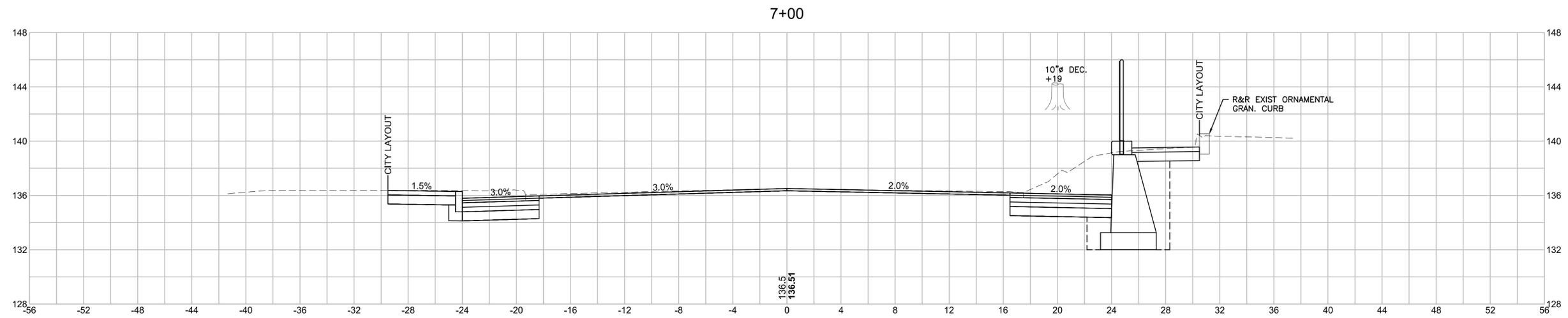
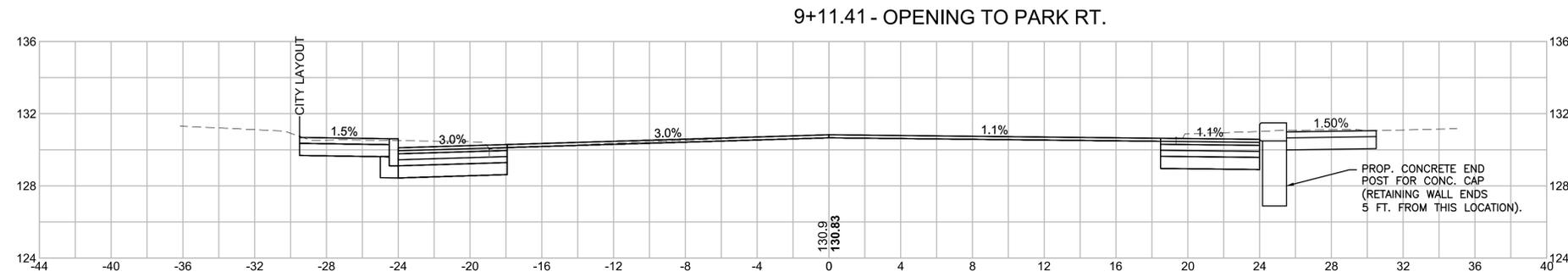
5+88 - BEG. CEM. STONE MASONRY WALL RT



**LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	35	39
PROJECT FILE NO.		606189	

CRITICAL CROSS SECTIONS

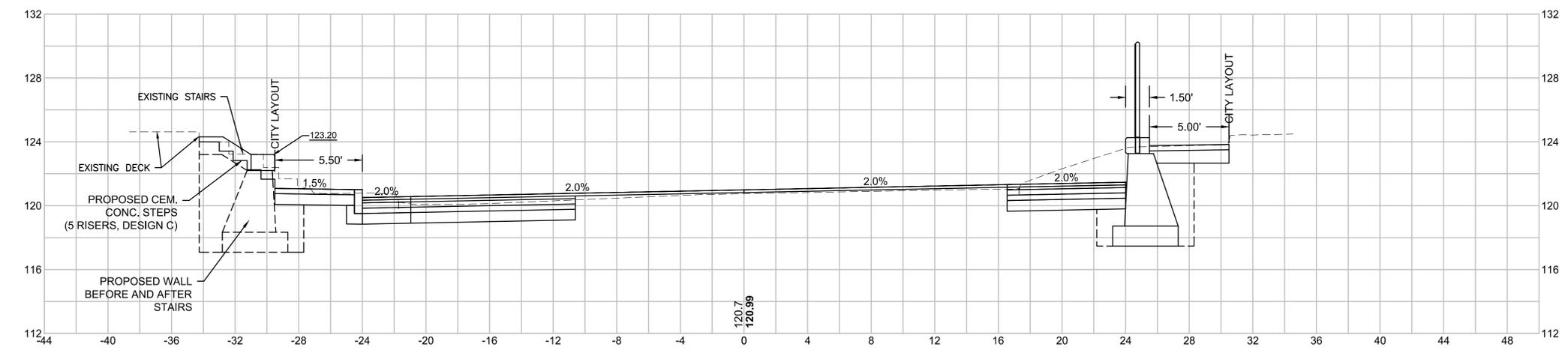


**LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS**

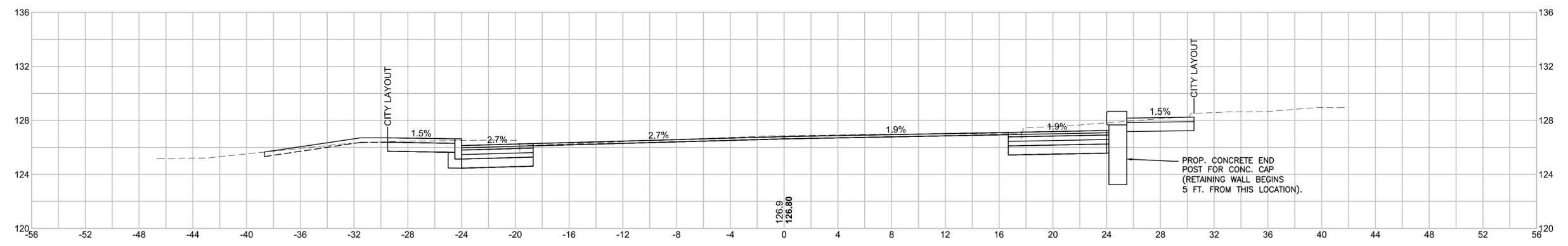
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	36	39
PROJECT FILE NO.		606189	

CRITICAL CROSS SECTIONS

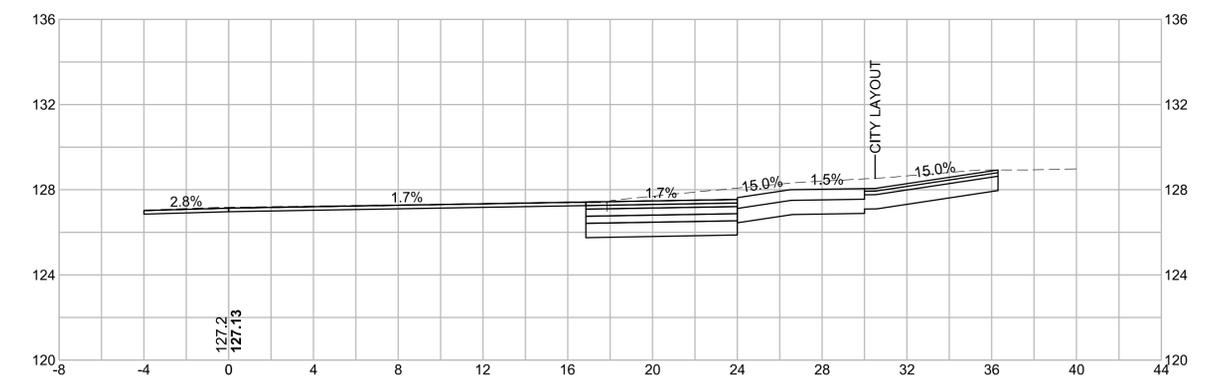
11+94.42 - STEPS LT



10+50



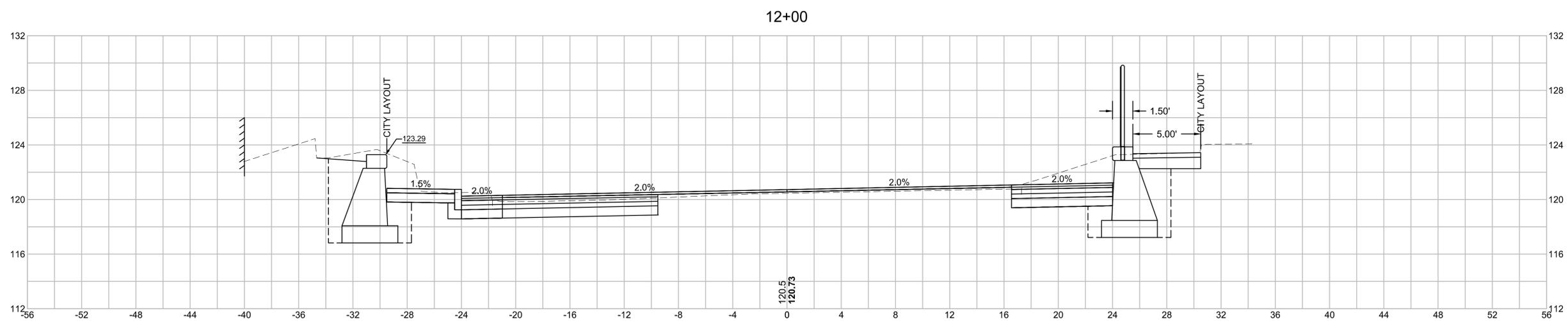
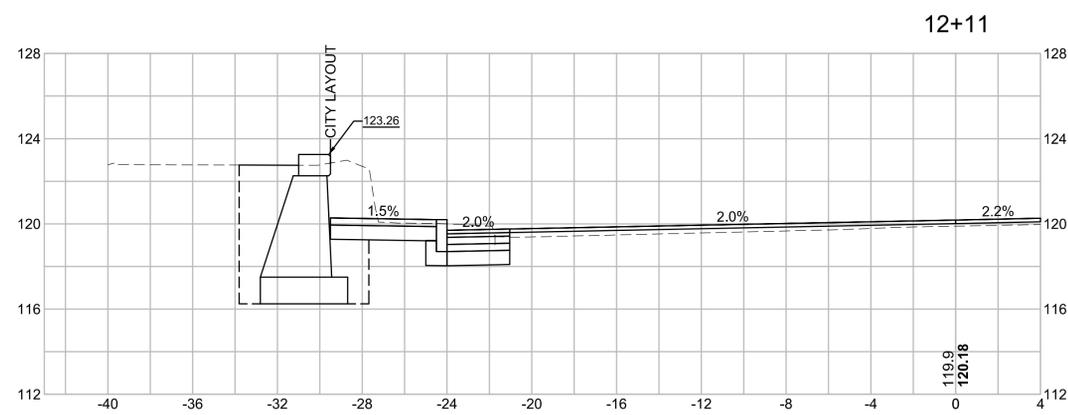
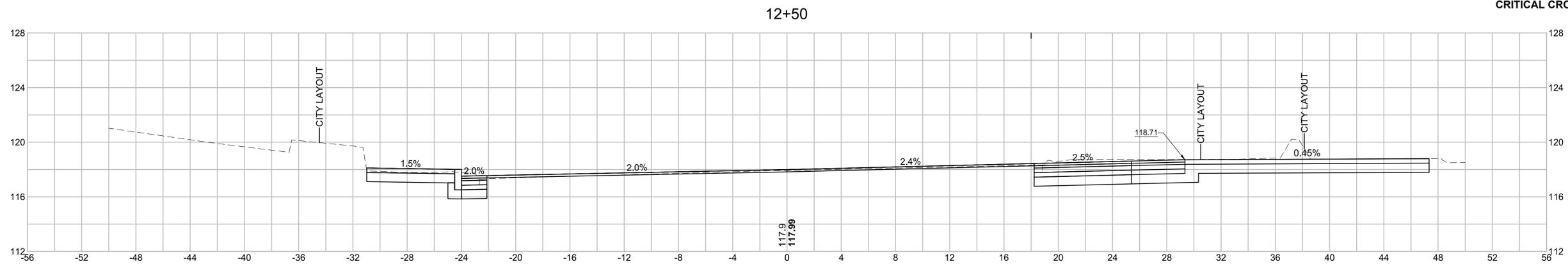
10+41.36 - DRIVEWAY RT



LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	37	39
PROJECT FILE NO.		606189	

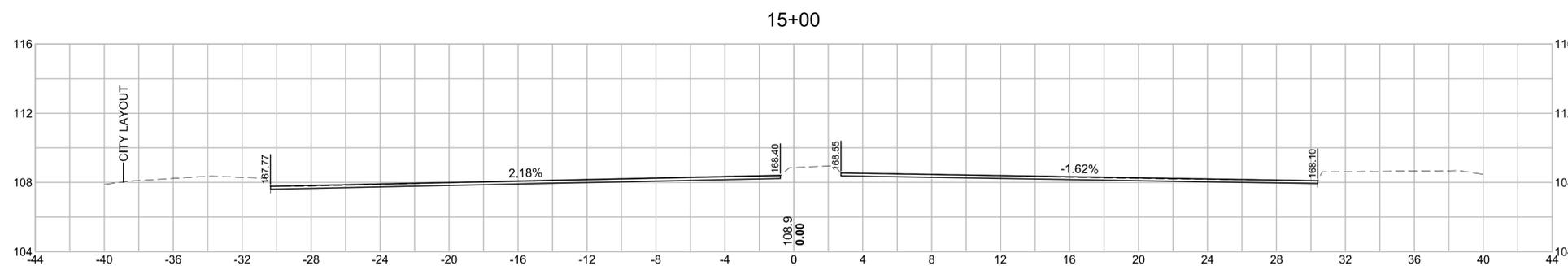
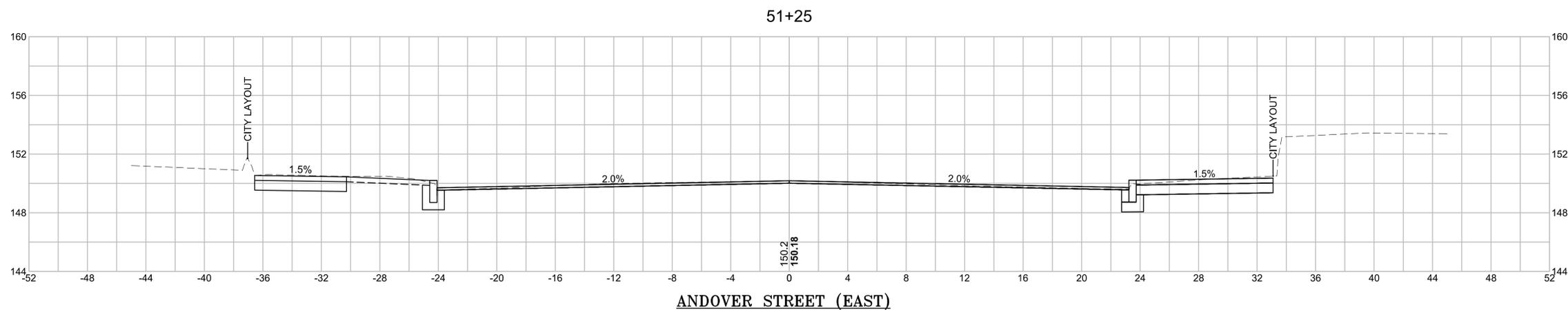
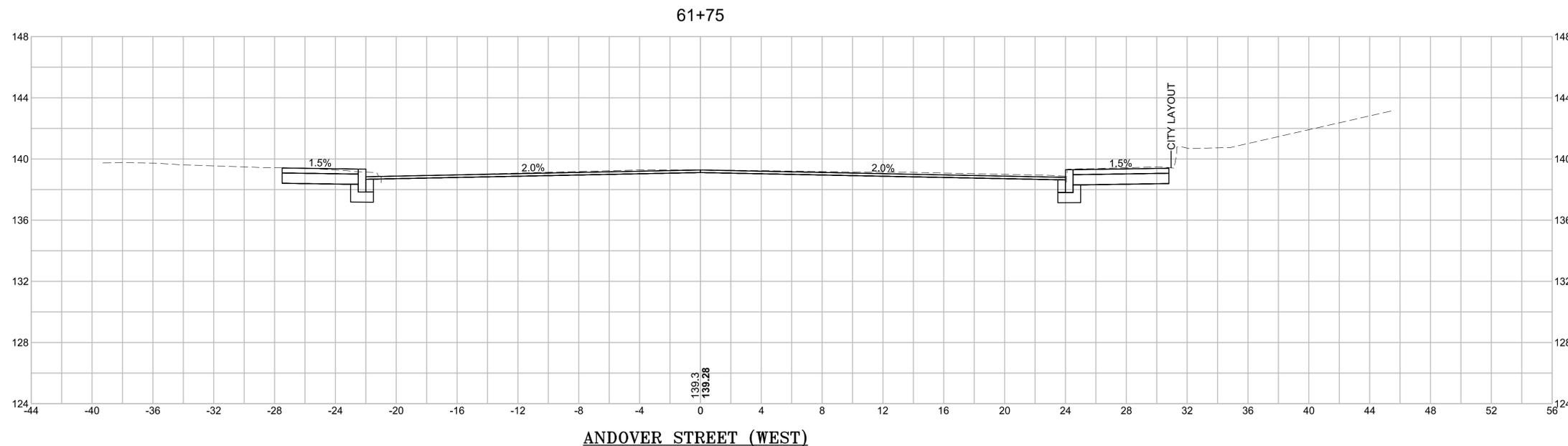
CRITICAL CROSS SECTIONS



LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	38	39
PROJECT FILE NO. 606189			

CRITICAL CROSS SECTIONS



**LOWELL - ROUTE 38
ROADWAY & INTERSECTION IMPROVEMENTS**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	-	39	39
PROJECT FILE NO.		606189	

**CRITICAL CROSS SECTIONS
SIDE STREETS**

