THE COMMONWEALTH OF MASSACHUSETTS

ECONOMIC DEVELOPMENT ADMINISTRATION PROJECT NO. 01-01-14713

HAMILTON CANAL DISTRICT - PROJECT D-1

TWO BRIDGES AND STREETS F & G

IN THE CITY OF

LOWELL

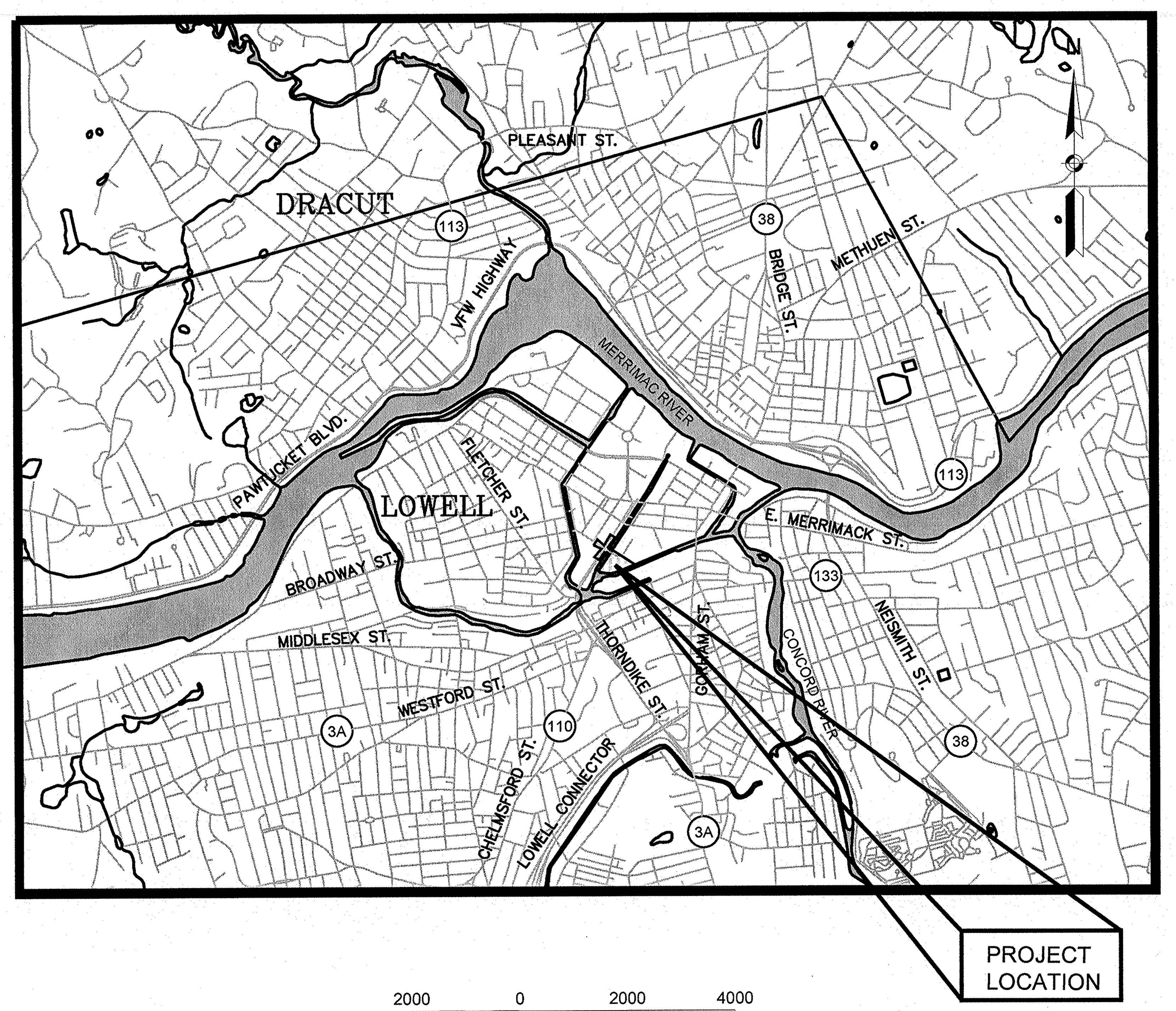
MIDDLESEX COUNTY

THE MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES DATED 1988, AS AMENDED, THE SUPPLEMENTAL SPECIFICATIONS DATED JULY 1, 2015, THE 2016 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

BROADWAY BRIDGE, STREETS F & G

NOTICE OF INTENT



2000 0 2000 4000
SCALE IN FEET

DATE	DESCRIPTION	REV #
10/8/2019	WHEEL CHAIR RAMP REVISIONS	12
9/16/2019	DUTTON ST TRAFFIC SIGNAL PULLBOX REVISION	11
8/23/2019	CB-20 DRAIN REVISION	10
6/3/2019	GARAGE SITE COORDINATION & BROADWAY/DUTTON REVISIONS	9
11/30/2018	DRAINAGE REVISIONS	8
10/19/2018	WATER, GAS, CATV, TEL, FIBER OPTIC & LIGHTING REVISIONS	7
6/15/2018	CURBING AND WALL MODIFICATIONS	6
5/16/2018	DRAINAGE, SEWER, AND WATER MODIFICATIONS	5
4/23/2018	CONNECTION TO EXISTING WATER MAIN REVISION	4
3/30/2018	PUMP STATION REVISIONS	3
3/8/2018	MODULAR BLOCK WALL REMOVED & GRADING REVISED	2
2/27/2018	DRAINGE, SEWER AND WATER MODIFICATIONS. MOUNTABLE CURB ADDED	1

SHEET NUMBERS 44-54

11/18/16
ELECTRICAL ENGINEER DATE
ENGINEERING ADVANTAGE, INC.

SHEET NUMBERS 77-107

11/18/16
STRUCTURAL ENGINEER DATE
TEC, INC.

10/11/2017
ENGINEER DATE

Vanasse Hangen Brustlin, Inc.
101 Walnut St., PO Box 9151
Watertown, MA 02472
617.924.1770 FAX 617.924.2286

DESIGNED BY	APPROVED BY	SHEET OF
SAD	PTS	1 119
DRAWN BY	DFTG CHECKED BY	VHB CAD FILE NAME
TBM	SAD	D1 COV.DWG
CHECKED BY	DATE	JOB NO.
SHK	OCTOBER 11, 2017	10808.00

GENERAL SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
JB	JB	JERSEY BARRIER
CB	CB	CATCH BASIN
		CATCH BASIN CURB INLET
FP	FP	FLAG POLE
GP	GP	GAS PUMP
MB	MB	MAIL BOX
		POST SQUARE
		POST CIRCULAR
WELL	WELL	WELL
EHH	EHH	ELECTRIC HANDHOLE
		FENCE GATE POST
GG	GG	GAS GATE
BHL #	BHL #	BORING HOLE
MW #	MW #	MONITORING WELL
TP #	TP #	TEST PIT
		HYDRANT
		LIGHT POLE
CO.BD.		COUNTY BOUND
		GPS POINT
		CABLE MANHOLE
		DRAINAGE MANHOLE
		ELECTRIC MANHOLE
		GAS MANHOLE
		MISC MANHOLE
		SEWER MANHOLE
		TELEPHONE MANHOLE
		WATER MANHOLE
MHB	MHB	MASSACHUSETTS HIGHWAY BOUND
MON		MONUMENT
SB		STONE BOUND
TB		TOWN OR CITY BOUND
		TRAVERSE OR TRIANGULATION STATION
TPL or GUY	TPL or GUY	TROLLEY POLE OR GUY POLE
HTP		TRANSMISSION POLE
UFB	UFB	UTILITY POLE W/ FIREBOX
UPDL	UPDL	UTILITY POLE WITH DOUBLE LIGHT
ULT	ULT	UTILITY POLE W / 1 LIGHT
UPL	UPL	UTILITY POLE
		BUSH
SIZE & TYPE		TREE
		STUMP
		SWAMP / MARSH
WG	WG	WATER GATE
PM	PM	PARKING METER
	OHW	OVERHEAD CABLE/WIRE
		CURBING
100 99		CONTOURS (ON-THE-GROUND SURVEY DATA)
100 99		CONTOURS (PHOTOGRAMMETRIC DATA)
	D	UNDERGROUND DRAIN PIPE (DOUBLE LINE 24 INCH AND OVER)
	E	UNDERGROUND ELECTRIC DUCT (DOUBLE LINE 24 INCH AND OVER)
	G	UNDERGROUND GAS MAIN (DOUBLE LINE 24 INCH AND OVER)
	S	UNDERGROUND SEWER MAIN (DOUBLE LINE 24 INCH AND OVER)
	T	UNDERGROUND TELEPHONE DUCT (DOUBLE LINE 24 INCH AND OVER)
	W	UNDERGROUND WATER MAIN (DOUBLE LINE 24 INCH AND OVER)
		BALANCED STONE WALL
		GUARD RAIL - STEEL POSTS
		GUARD RAIL - WOOD POSTS
x		CHAIN LINK OR METAL FENCE
		WOOD FENCE
		HAY BALES/SILT FENCE
		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

PAVEMENT MARKINGS SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		PAVEMENT ARROW - WHITE
ONLY	ONLY	LEGEND "ONLY" - WHITE
	SL	STOP LINE
	CW	CROSSWALK

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
C	CABLE
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
D	DRAIN
DI	DROP INLET
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DW	DOMESTIC WATER
DWY	DRIVEWAY
E	ELECTRICAL
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
FFE	FINISHED FLOOR ELEVATION
FM	FORCE MAIN
FO	FIBER OPTIC
FP	FIRE PROTECTION
GAR	GARAGE
GD	GROUND
GG	GAS GATE
GI	GUTTER INLET
GIP	GALVANIZED IRON PIPE
GRAN	GRANITE
GRAV	GRAVEL
GRD	GUARD
HDPE	HIGH DENSITY POLYETHYLENE
HDW	HEADWALL
HMA	HOT MIX ASPHALT
HOR	HORIZONTAL
HYD	HYDRANT
INV	INVERT
JCT	JUNCTION
L	LENGTH OF CURVE
LNHP	LOWELL NATIONAL HISTORIC PARK
LP	LIGHT POLE
LT	LEFT
MAX	MAXIMUM
MB	MAILBOX
MH	MANHOLE
MHB	MASSACHUSETTS HIGHWAY BOUND
MIN	MINIMUM
NIC	NOT IN CONTRACT
NO.	NUMBER
NPS	NATIONAL PARK SERVICE
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
P.G.L.	PROFILE GRADE LINE
PI	POINT OF INTERSECTION
PIV	POST INDICATOR VALVE
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	POLYVINYL CHLORIDE
PVC	POINT OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENCY
PVMT	PAVEMENT
PWW	PAVED WATER WAY
LB	LEACH BASIN
RAP	RECYCLED ASPHALT PAVEMENT MATERIAL
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
RTRC	REINFORCED THERMOSETTING RESIN CONDUIT
SB	STONE BOUND
SG	SWITCHGEAR
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 %, TELEPHONE, TRANSFORMER
TAN	TANGENT
TEMP	TEMPORARY
TC	TOP OF CURB
TOS	TOP OF SLOPE
TYP	TYPICAL
UG	UNDERGROUND
UP	UTILITY POLE
VAR	VARIES
VERT	VERTICAL
VC	VERTICAL CURVE
W	WATER MAIN
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, TILE, 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

SWL	SOLID WHITE LINE
SYL	SOLID YELLOW LINE
BWL	BROKEN WHITE LINE
BYL	BROKEN YELLOW LINE
	DOTTED WHITE LINE
#	NUMBER OF PARKING STALLS
DYL	DOTTED YELLOW LINE
DWLEx	DOTTED WHITE LINE EXTENSION
DYLEx	DOTTED YELLOW LINE EXTENSION
DBWL	DOUBLE WHITE LINE
DBYL	DOUBLE YELLOW LINE

LOWELL
TWO BRIDGES AND STREETS F & G
LEGEND & GENERAL NOTES

SHEET 02 OF 119

GENERAL NOTES

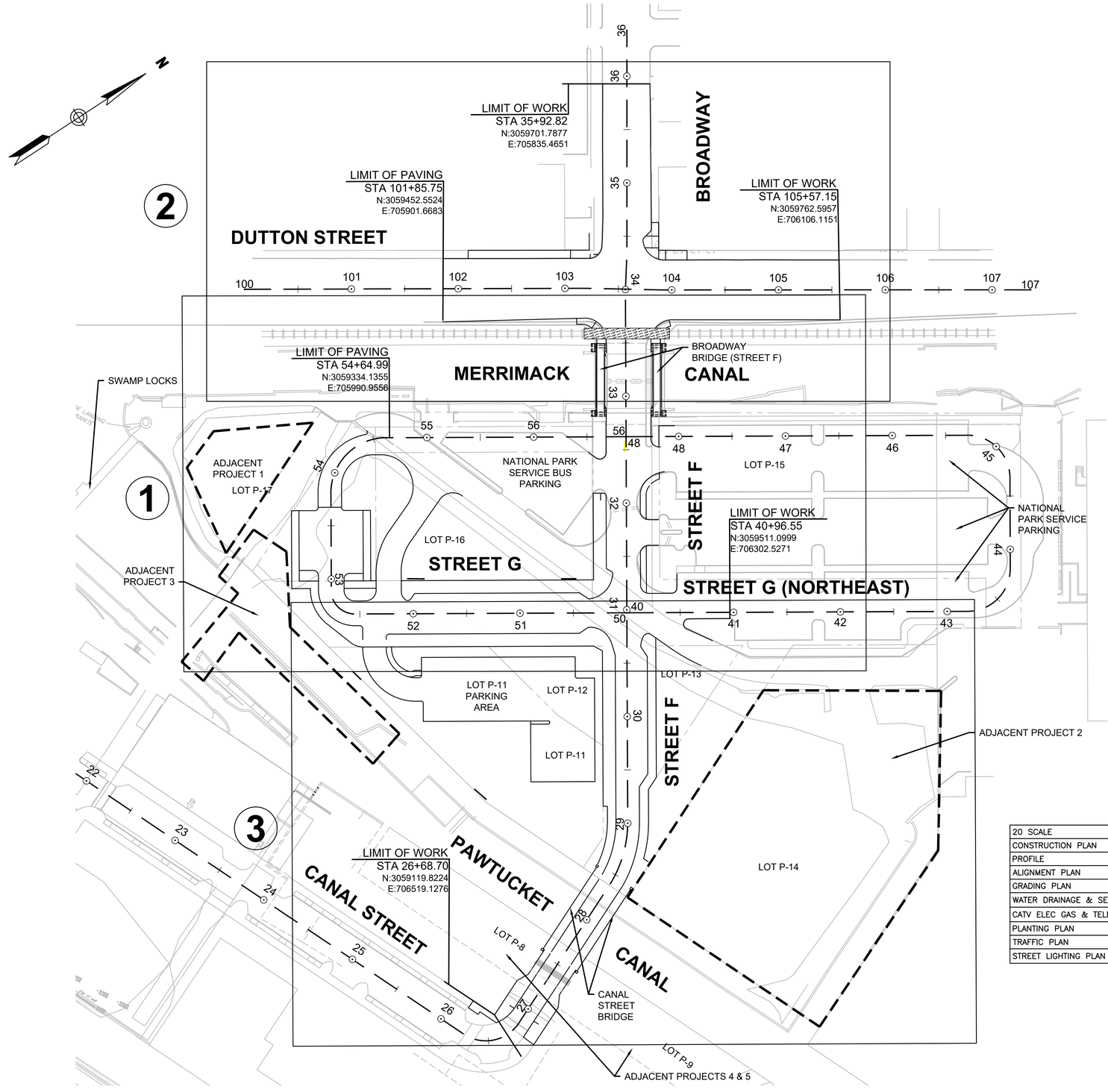
1. TOPOGRAPHICAL INFORMATION FROM A SURVEY BY MERIDIAN ASSOCIATES, INC., BEVERLY, MASSACHUSETTS BETWEEN FEBRUARY AND APRIL 2008 (HORIZONTAL: NAD 83, VERTICAL: NGVD 29, CONVERTED TO NGVD 88) AND SUPPLEMENTED WITH INFORMATION FROM A SURVEY BY VHB (HOR 83, VERT 88) DONE IN APRIL 2009, AND 2015.
2. THE LOCATIONS 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 SHALL 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.
3. 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.
4. THE CONTRACTOR SHALL ALTER THE MASONRY OF THE TOP SECTION OF ALL EXISTING DRAINAGE STRUCTURES AS NECESSARY FOR CHANGES IN GRADE, AND RESET ALL WATER AND DRAINAGE FRAMES, GRATES AND BOXES TO THE PROPOSED FINISH SURFACE GRADE. REQUIRED NEW MASONRY SHALL BE CLAY BRICK CONFORMING TO M4.05.2.
5. THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY COMPANIES.
6. EXISTING UTILITY POLES WILL BE RELOCATED BY OTHERS.
7. TREES AND SHRUBS WITHIN THE LIMITS OF GRADING SHALL BE REMOVED ONLY UPON APPROVAL OF THE ENGINEER.
8. AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT NO EXPENSE TO THE OWNER.
9. JOINTS BETWEEN NEW HOT MIX ASPHALT ROADWAY PAVEMENT AND SAWCUT EXISTING PAVEMENT SHALL BE SEALED WITH BITUMEN AND BACKSANDED.
10. ALL LATERAL DRAIN PIPES SHALL BE INSTALLED WITH A PITCH OF 0.01 FOOT PER FOOT (MINIMUM) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
11. ALL EXISTING STATE, COUNTY, CITY, AND TOWN LOCATION LINES AND PRIVATE PROPERTY LINES HAVE BEEN ESTABLISHED FROM AVAILABLE INFORMATION AND THEIR EXACT LOCATION ARE NOT GUARANTEED.
12. THE PRIMARY ELECTRICAL MANHOLE AND DUCT SYSTEM AS SHOWN HEREIN IS SUBJECT TO NATIONAL GRID APPROVAL OF MATERIALS AND CONFIGURATION PRIOR TO CONSTRUCTION.
13. THE GAS LINES AS SHOWN HEREIN ARE SHOWN FOR LOCATION AND COORDINATION WITH OTHER UTILITIES. DESIGN OF SYSTEM PIPING, VALVING AND CONNECTIONS ARE THE RESPONSIBILITY OF NATIONAL GRID.

D1 LEG.DWG Plotted on 9-Oct-2017 3:24 PM

LOWELL
TWO BRIDGES AND STREETS F & G
KEY PLAN

SHEET 03 OF 119

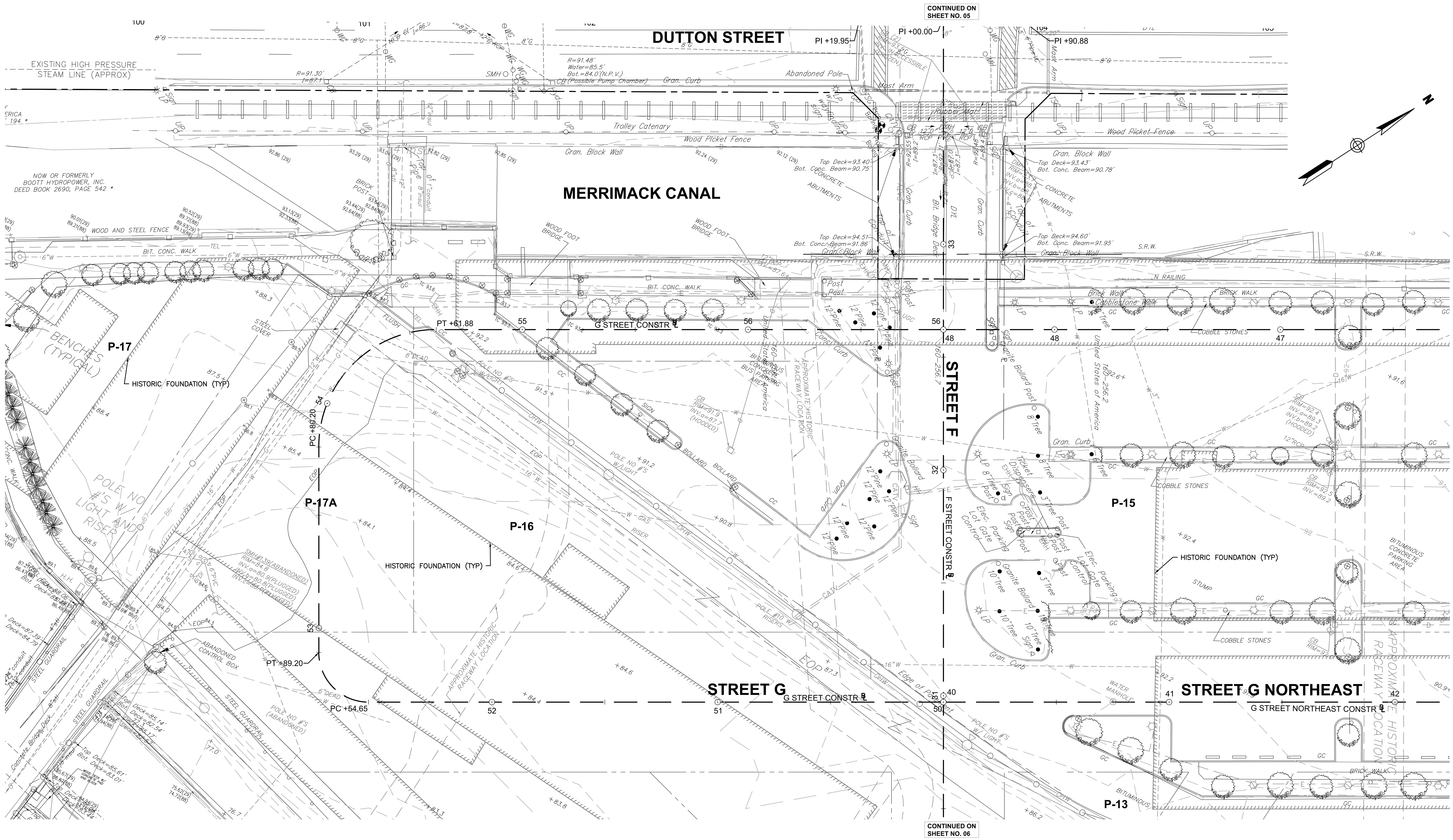
Plotted on 9-Oct-2017 7:02 PM
D1 KEY.DWG



20 SCALE	PLATE 1	PLATE 2	PLATE 3
CONSTRUCTION PLAN	12	13	14
PROFILE	15, 17		16
ALIGNMENT PLAN	18	19	20
GRADING PLAN	22	23	24
WATER DRAINAGE & SEWER PLAN	25	26	27
CATV ELEC GAS & TELE PLAN	28	29	30
PLANTING PLAN	31		32
TRAFFIC PLAN	33	34	35
STREET LIGHTING PLAN	##		##

50 0 50 100
SCALE IN FEET

LOWELL
TWO BRIDGES AND STREETS F & G
EXISTING CONDITIONS PLAN

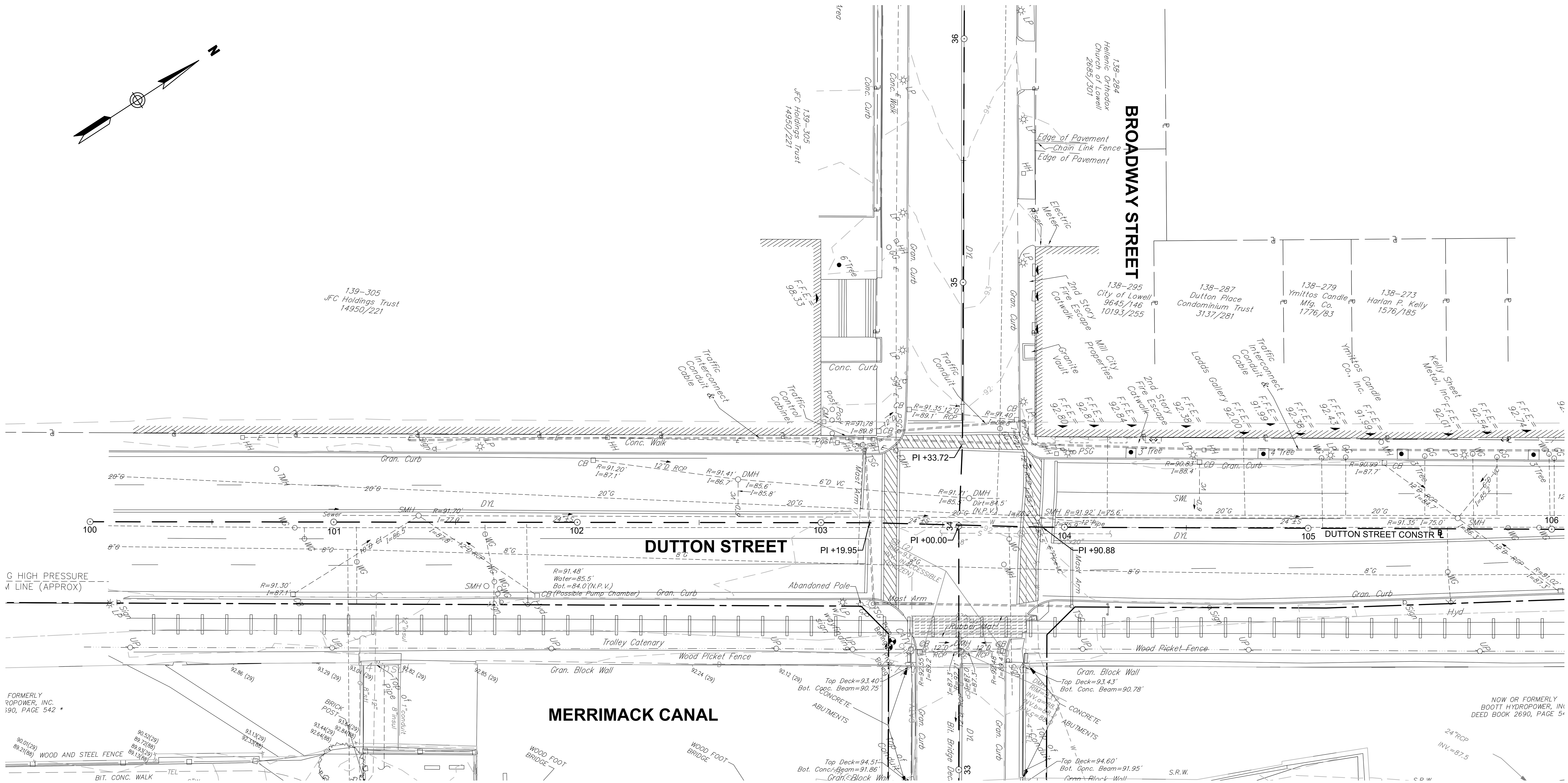


SCALE IN FEET (20 0 20 40)

D1 EXIST CONDITION.DWG Plotted on 9-Oct-2017 3:26 PM

LOWELL
TWO BRIDGES AND STREETS F & G
EXISTING CONDITIONS PLAN

SHEET 05 OF 119



CONTINUED ON
SHEET NO. 04

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SCALE IN FEET

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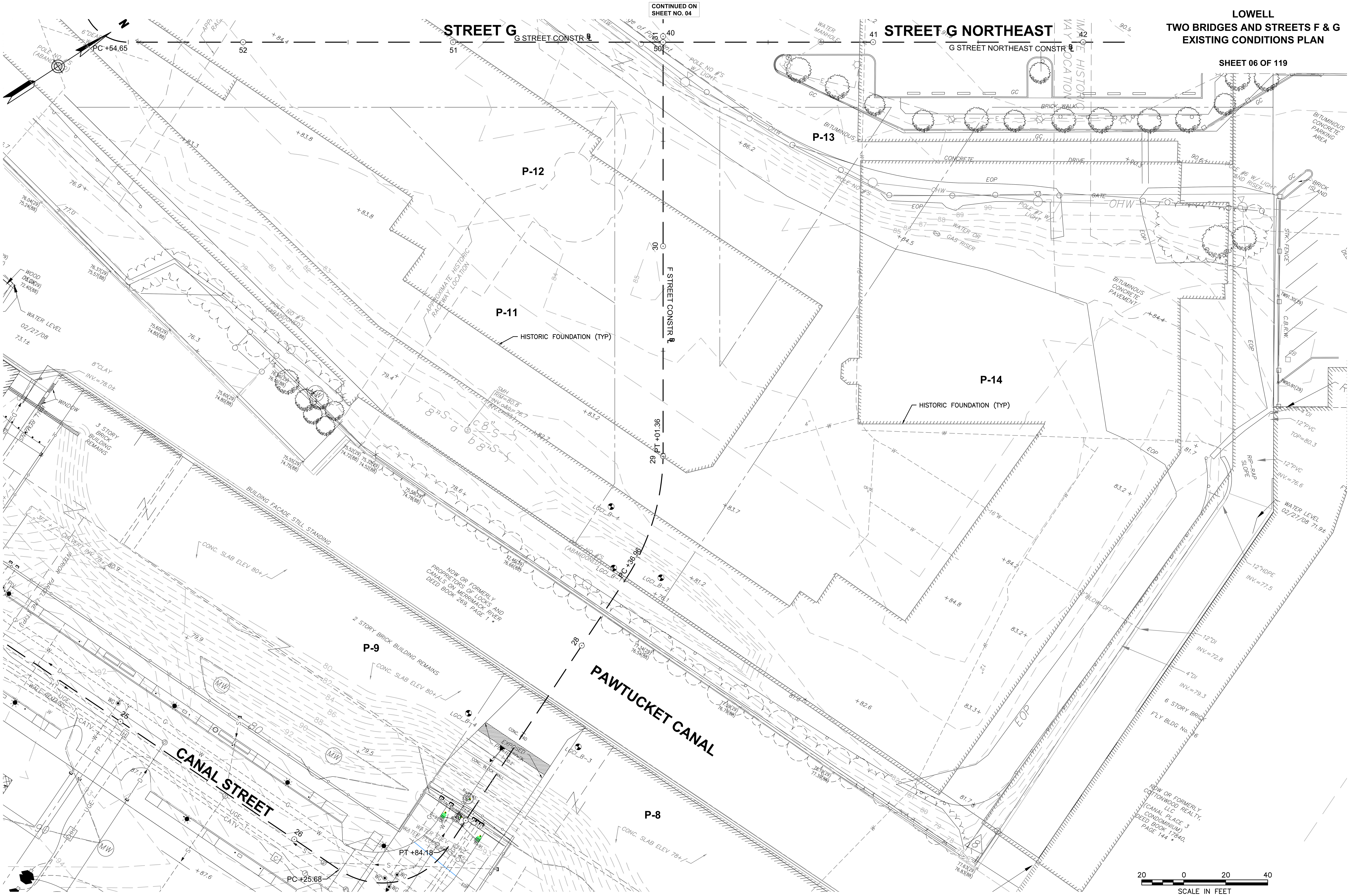


LOWELL
TWO BRIDGES AND STREETS F & G
EXISTING CONDITIONS PLAN

SHEET 06 OF 119

LOWELL
TWO BRIDGES AND STREETS F & G
DEMOLITION & SITE PREPARATION PLANS

SHEET 07 OF 119

D1 DEMO.DWG Plotted on 9-Oct-2017 7:05 PM

CONTINUED ON SHEET NO. 08

DUTTON STREET

MERRIMACK CANAL

STREET F

STREET G

STREET G NORTHEAST

LOT P-15

P-17

P-17A

P-16

P-15

P-12

SAWCUT

REM POLE

Abandoned Pole

PROP SEDIMENT LOG EROSION CONTROL BARRIER (TYP)

BRIDGE-MOUNTED CATV CONDUITS TO REMAIN UNTIL TEMP CONDUIT IS INSTALLED

SEE BROADWAY BRIDGE PLANS FOR BRIDGE DEMOLITION DETAILS

BRIDGE-MOUNTED TELEPHONE CONDUITS TO REMAIN UNTIL TEMP CONDUIT IS INSTALLED

PROTECT & MAINTAIN NPS UG TEL CONDUIT

CUT & CAP WATER

PROP 15' TEMP CONSTRUCTION GATE

REM STEEL COVER

REM FENCE

PROP TEMP CONST FENCE

REM CURB

REM LP

REM POSTS

RET

PROTECT & MAINTAIN ELECTRIC, TELEPHONE AND NPS LIGHTING CIRCUITS

REM UP AFTER TEMPORARY RELOCATION OF TEL TO NPS CANAL GATEHOUSE

REM TREES

REM POST

RET UG TEL & CABLE

REM BOLLARD

R&S BOLLARD

PROTECT & MAINTAIN ELECTRIC FEED TO LIGHTING AND PARKING GATE CONTROL

REM WATER

REM GAS AFTER DECONTAMINATION BY NGRID

REM CURB AS REQUIRED TO CONSTRUCT DRIVEWAY

CONST FENCE GATE (TYP)

POLE SHALL REMAIN AND MAY BE USED TEMPORARILY DURING CONSTRUCTION

R&S CURB

REM SMH AND SEWERS WITHIN 5 FEET OF FINISH GROUND SURFACE

CUT & CAP GAS (BO)

CUT & CAP WATER

REM W

PROP SEDIMENT LOG EROSION CONTROL BARRIER (TYP)

PROP SEDIMENTATION BARRIER (TYP)

PROP PENSTOCK CAP W/ REUSED PENSTOCK ROOF MATERIALS. SEAL ENDS WITH CEMENT MORTAR

PROP PENSTOCK CAPPING WITH 2' X 2' X3' CONCRETE BLOCKS (TYP)

PROP PENSTOCK CAP W/ REUSED PENSTOCK ROOF MATERIALS. SEAL ENDS WITH CEMENT MORTAR

PENSTOCK 1 (1375 SF) REM SOIL COVER & ROOF.. BACKFILL WITH EXCAVATED SOIL MEETING THE STANDARD FOR ORDINARY BORROW

PENSTOCK 2 (5600 SF) REM SOIL COVER & & ROOF. BACKFILL WITH EXCAVATED SOIL MEETING THE STANDARD FOR ORDINARY BORROW

PROP 24' TEMP CONSTRUCTION GATE

RET TREES

REM UP

REM FENCE

PROP TREE PROTECTION (TYP)

REM POST

MAINTAIN ELECTRIC FEED TO PARKING GATE CONTROL

REM BOLLARD

F STREET CONSTR ℄

G STREET CONSTR ℄

NOTES:

1. UNDERGROUND TELEPHONE, CABLE, ELECTRIC, LIGHTING, GAS AND WATER SYSTEMS ARE SHOWN FROM RECORD DRAWINGS. CONTRACTOR SHALL VERIFY UTILITY LOCATIONS PRIOR TO EXCAVATION, ORDERING OR INSTALLING PROPOSED UTILITY SYSTEMS.
2. PENSTOCKS/RACEWAYS LOCATIONS SHOWN ON THE PLANS ARE FROM RECORD DRAWINGS. CONTRACTOR SHALL VERIFY LOCATIONS AND LIMITS OF FILLING REQUIRED WITH THE ENGINEER PRIOR TO FILLING.
3. EXISTING WATER MAINS ENCOUNTERED DURING EXCAVATIONS OR FOUND WITHIN 4-FEET OF FINISH GRADE SHALL BE TESTED TO CONFIRM THEY ARE ABANDONED. ACTIVE LINES SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION. ABANDONED LINES SHALL BE CUT AND REMOVED AND THE REMAINING END SHALL BE PLUGGED WITH CONCRETE.
4. THE CUTTING, CAPPING AND REMOVAL OF THE EXISTING 8-INCH GAS MAIN SHALL BE BY NGRID GAS AND SHALL BE COORDINATED BY THE CONTRACTOR AFTER THE NEW GAS MAIN IS TESTED AND ACTIVATED BY NGRID.
5. EXISTING SEWER AND DRAINAGE PIPES AND MANHOLES ENCOUNTERED DURING EXCAVATIONS OR FOUND WITHIN 5-FEET OF FINISH GRADE SHALL BE CUT AND REMOVED AND THE REMAINING ENDS SHALL BE PLUGGED WITH CONCRETE.
6. EXISTING NPS LIGHTING, LIGHT HAND HOLES, LIGHTING CONDUIT AND PARKING GATE CONTROLLER SERVICE SHALL BE PROTECTED AND MAINTAINED UNLESS NOTED TO REMOVE OR RELOCATE. LIGHTING, ELECTRIC, TELEPHONE AND PARKING GATE CONTROL CIRCUITS DAMAGED DURING CONSTRUCTION SHALL BE RESTORED. ELECTRICAL AND LIGHTING CONDUIT SHOWN ON THE PLANS IS TAKEN FROM RECORD DRAWINGS AND NOT AN AS-BUILT CONDITION. LIGHT HAND HOLES ASSOCIATED WITH REMOVED AND RELOCATED OR STACKED LIGHTS SHOULD BE PROTECTED AND MOUNTED IN PLACE OR RELOCATED TO ACCOMMODATE NEW WORK.

CONTINUED ON SHEET NO. 09

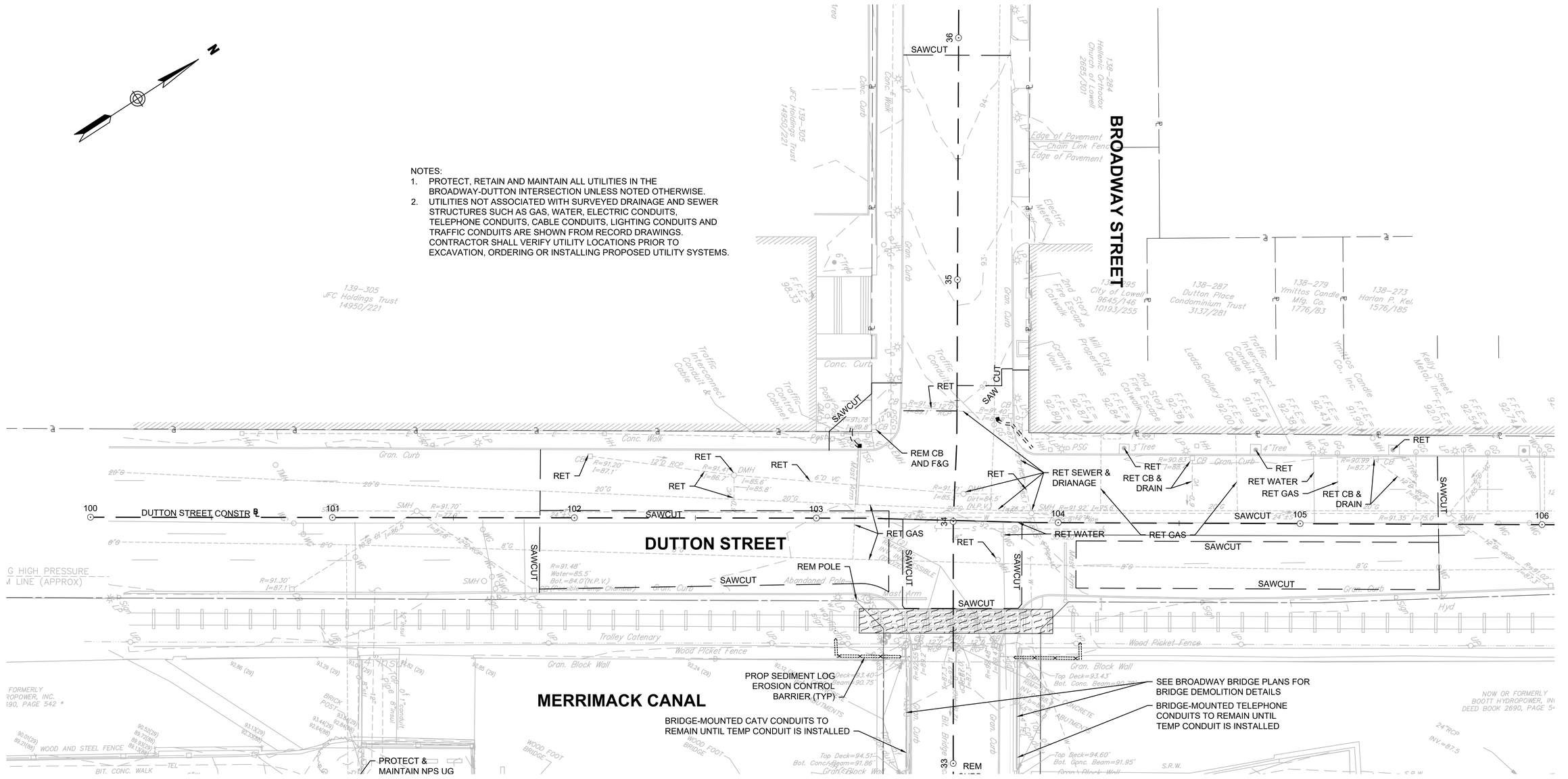
20 0 20 40
SCALE IN FEET

LOWELL
TWO BRIDGES AND STREETS F & G
DEMOLITION & SITE PREPARATION PLANS

SHEET 08 OF 119

D1 DEMO.DWG Plotted on 9-Oct-2017 7:05 PM

NOTES:
1. PROTECT, RETAIN AND MAINTAIN ALL UTILITIES IN THE BROADWAY-DUTTON INTERSECTION UNLESS NOTED OTHERWISE.
2. UTILITIES NOT ASSOCIATED WITH SURVEYED DRAINAGE AND SEWER STRUCTURES SUCH AS GAS, WATER, ELECTRIC CONDUITS, TELEPHONE CONDUITS, CABLE CONDUITS, LIGHTING CONDUITS AND TRAFFIC CONDUITS ARE SHOWN FROM RECORD DRAWINGS. CONTRACTOR SHALL VERIFY UTILITY LOCATIONS PRIOR TO EXCAVATION, ORDERING OR INSTALLING PROPOSED UTILITY SYSTEMS.



20 0 20 40
SCALE IN FEET

LOWELL
TWO BRIDGES AND STREETS F & G
DEMOLITION & SITE PREPARATION PLANS

SHEET 09 OF 119

D1 DEMO.DWG Plotted on 14-Feb-2016 3:32 PM

STREET G NORTHEAST

CONTINUED ON SHEET NO. 07

REM W

G STREET CONSTR ℄

PENSTOCK 1 (1375 SF) REM SOIL COVER & ROOF.. BACKFILL WITH EXCAVATED SOIL MEETING THE STANDARD FOR ORDINARY BORROW

PENSTOCK 2 (5600 SF) REM SOIL COVER & & ROOF. BACKFILL WITH EXCAVATED SOIL MEETING THE STANDARD FOR ORDINARY BORROW

PROP PENSTOCK CAP W/ REUSED PENSTOCK ROOF MATERIALS. SEAL ENDS WITH CEMENT MORTAR

REM GUARDRAIL

PROP TEMP CONSTRUCTION FENCE

REM UP (BY OTHERS)

PROP PENSTOCK CAP W/ REUSED PENSTOCK ROOF MATERIALS. SEAL ENDS WITH CEMENT MORTAR

REM SMH AND SEWERS WITHIN 5 FEET OF FINISH GROUND SURFACE

PROP SEDIMENTATION BARRIER (TYP)

F STREET CONSTR ℄

PROP 24' TEMP CONSTRUCTION GATE

REM UP

REM FENCE

REM CURB

SAWCUT

RET TREES

REM CURB

PROP TREE PROTECTION (TYP)

PROP SEDIMENT LOG EROSION CONTROL BARRIER (TYP)

FLOATING SILT FENCE

PROP TEMP CONSTRUCTION FENCE

RET EXIST BRIDGE FOUNDATION SLAB

PAWTUCKET CANAL

CONC BLOCK RET WALL MAY BE RETAINED OR REUSED IN THE WORK AS DETERMINED BY THE CONTRACTOR

REM HIGHWAY GUARD

REM FENCE

REM FENCE

CANAL STREET

PT +84.18

PC +25.68

P-11

P-12

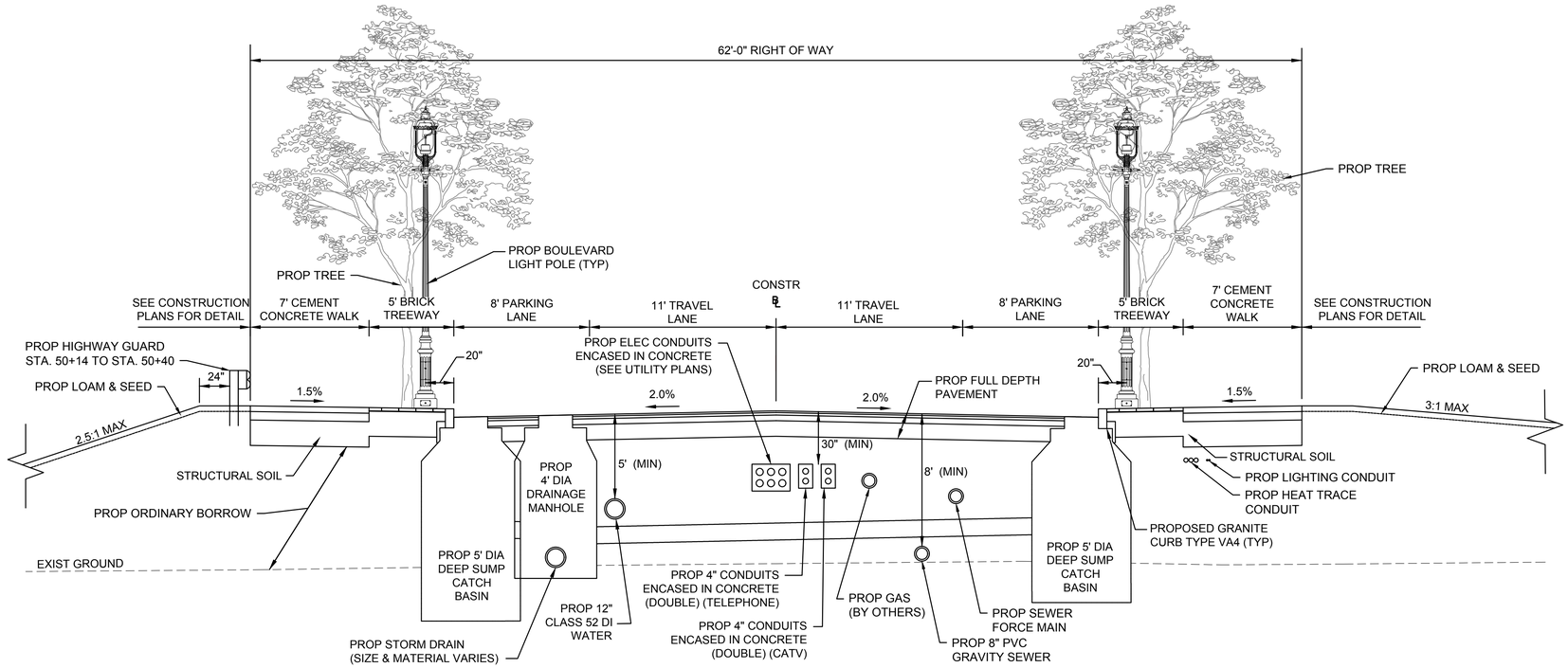
P-13

P-14

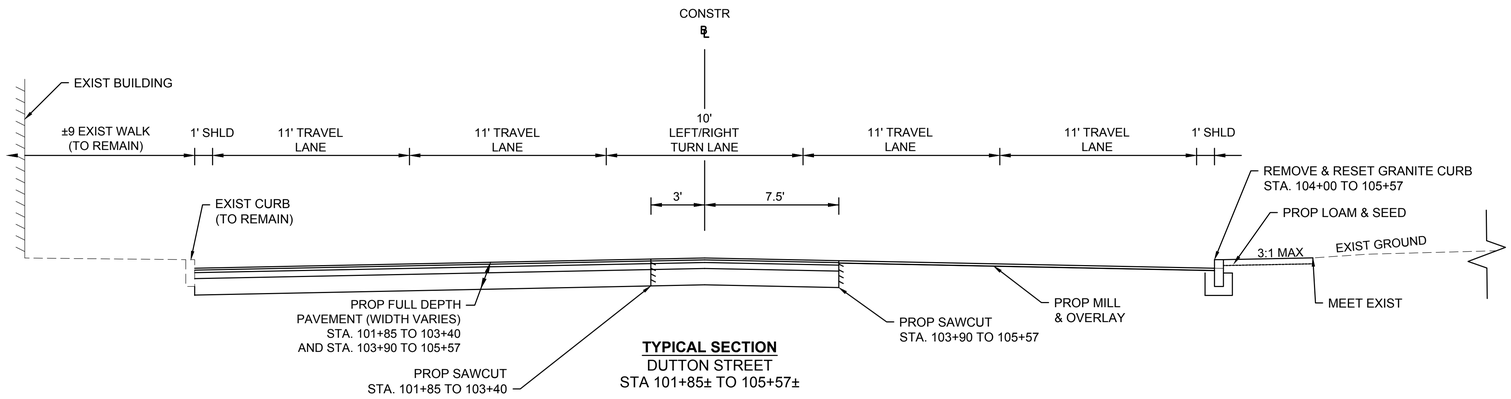
NOTES:

1. UNDERGROUND TELEPHONE, CABLE, ELECTRIC, LIGHTING, GAS AND WATER SYSTEMS ARE SHOWN FROM RECORD DRAWINGS. CONTRACTOR SHALL VERIFY UTILITY LOCATIONS PRIOR TO EXCAVATION, ORDERING OR INSTALLING PROPOSED UTILITY SYSTEMS.
2. PENSTOCKS/RACEWAYS LOCATIONS SHOWN ON THE PLANS ARE FROM RECORD DRAWINGS. CONTRACTOR SHALL VERIFY LOCATIONS AND LIMITS OF FILLING REQUIRED WITH THE ENGINEER PRIOR TO FILLING.
3. EXISTING WATER MAINS ENCOUNTERED DURING EXCAVATIONS OR FOUND WITHIN 4-FEET OF FINISH GRADE SHALL BE TESTED TO CONFIRM THEY ARE ABANDONED. ACTIVE LINES SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION. ABANDONED LINES SHALL BE CUT AND REMOVED AND THE REMAINING END SHALL BE PLUGGED WITH CONCRETE.
4. THE CUTTING, CAPPING AND REMOVAL OF THE EXISTING 8-INCH GAS MAIN SHALL BE BY NGRID GAS AND SHALL BE COORDINATED BY THE CONTRACTOR AFTER THE NEW GAS MAIN IS TESTED AND ACTIVATED BY NGRID.
5. EXISTING SEWER AND DRAINAGE PIPES AND MANHOLES ENCOUNTERED DURING EXCAVATIONS OR FOUND WITHIN 5-FEET OF FINISH GRADE SHALL BE CUT AND REMOVED AND THE REMAINING ENDS SHALL BE PLUGGED WITH CONCRETE.
6. EXISTING LIGHTING AND LIGHTING CONDUIT SHALL BE PROTECTED AND MAINTAINED UNLESS NOTED TO REMOVE OR RELOCATE. LIGHTING CIRCUITS DAMAGED DURING CONSTRUCTION SHALL BE RESTORED. ELECTRICAL AND LIGHTING CONDUIT SHOWN ON THE PLANS IS TAKEN FROM RECORD DRAWINGS AND NOT AN AS-BUILT CONDITION.
7. THE CONTRACTOR SHALL MAINTAIN THE EXISTING BRICK WALL AND SUPPORTS.
8. REMOVAL OF MISC. STEEL MATERIALS ON THE SOUTH SIDE OF PAWTUCKET CANAL SHALL BE INCLUDED IN UNCLASSIFIED EXCAVATION.
9. STOCKPILE OF EXISTING CONCRETE BLOCKS AND BARRIER SHALL BE REMOVED BY THE CITY.

20 0 20 40
SCALE IN FEET



TYPICAL SECTION
STREET G
STA 50+00± TO 52+00±



TYPICAL SECTION
DUTTON STREET
STA 101+85± TO 105+57±

PAVEMENT NOTES

PROPOSED FULL DEPTH PAVEMENT

SURFACE: 1.75" SURFACE COURSE TYPE B OVER
1.75" INTERMEDIATE COURSE TYPE B

BASE: 3.5" HMA BASE COURSE MATERIAL PLACED IN ONE LIFT

SUBBASE: 12" GRAVEL BORROW, TYPE b

PROPOSED HOT MIX ASPHALT DRIVE

SURFACE: 1.5" TOP COURSE OVER
2.0" BINDER COURSE

FOUNDATION: 8" GRAVEL BORROW, TYPE b

PROPOSED CEMENT CONCRETE WALK / WHEELCHAIR RAMP

SURFACE: 4" CEMENT CONCRETE (6" AT WHEELCHAIR RAMPS)
AIR ENTRAINED 4000 PSI, 3/4", 610
6 X 6 W1.4 X W1.4 WWM REINFORCEMENT

FOUNDATION: 6" GRAVEL BORROW, TYPE b

PROPOSED CEMENT CONCRETE WALK AT TREEWAY

SURFACE: 4" CEMENT CONCRETE
AIR ENTRAINED 4000 PSI, 3/4", 610

FOUNDATION: 6" GRAVEL BORROW, TYPE b
18" STRUCTURAL SOIL

PROPOSED BRICK TREEWAY

SURFACE: 2.25" BRICK PAVERS

FOUNDATION: 1" SAND SETTING BED ON FILTER FABRIC OVER
18" STRUCTURAL SOIL

PROPOSED MILL & OVERLAY

SURFACE: 1.75" MILL
1.75" HMA SURFACE COURSE TYPE B
ASPHALT EMULSION TACK COAT

PROPOSED TEMPORARY HOT MIX ASPHALT WALK

SURFACE: 1.25" TOP COURSE OVER
1.25" BOTTOM COURSE

FOUNDATION: 6" GRAVEL BORROW SUBBASE, TYPE b

PROPOSED TEMPORARY PARKING LOT

SURFACE: 4" RECYCLED ASPHALT PAVEMENT (RAP)

FOUNDATION: 8" GRAVEL BORROW SUBBASE, TYPE b

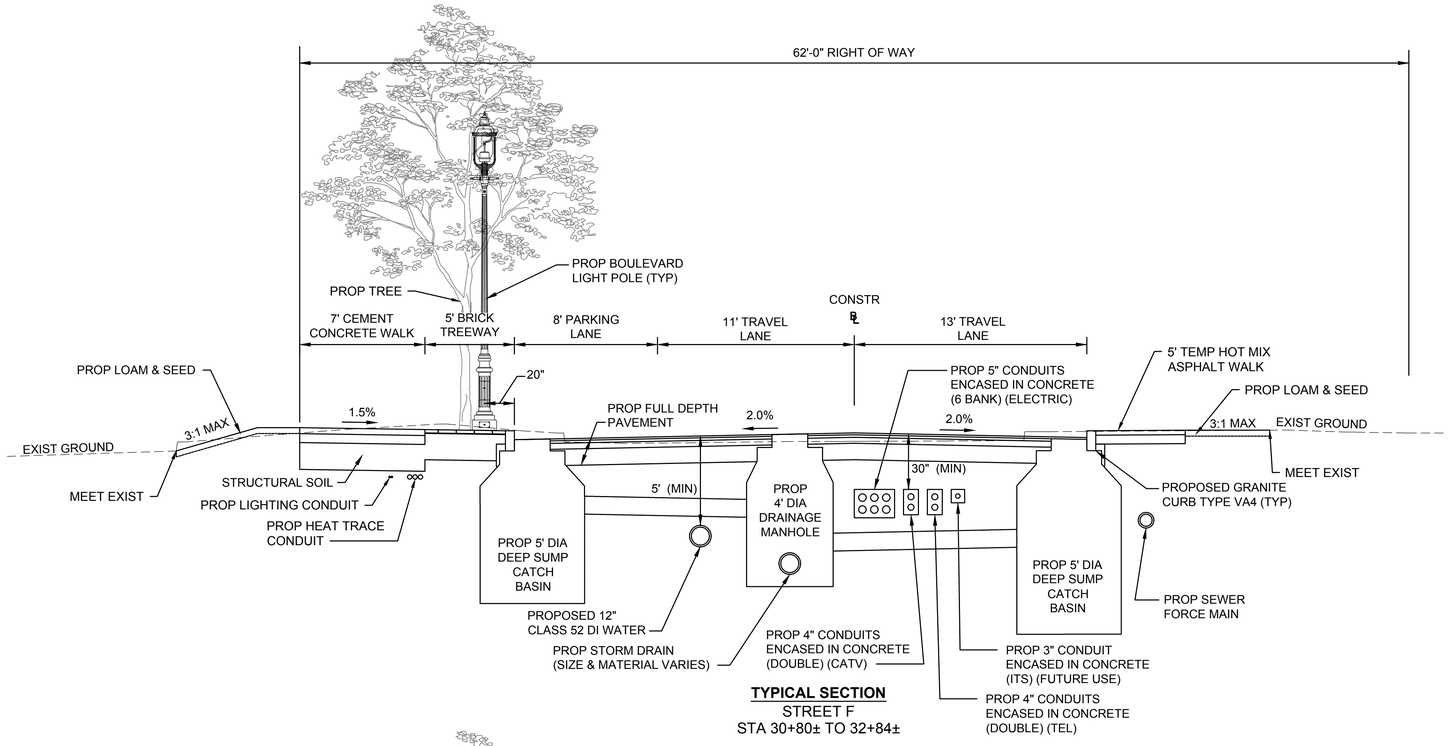
PROPOSED CEMENT CONCRETE DRIVEWAY

SURFACE: 6" CEMENT CONCRETE (610, AIR ENTRAINED, 4000 PSI, 3/4" STONE) W/ 6"X6"Xw1.4 WELDED WIRE MESH

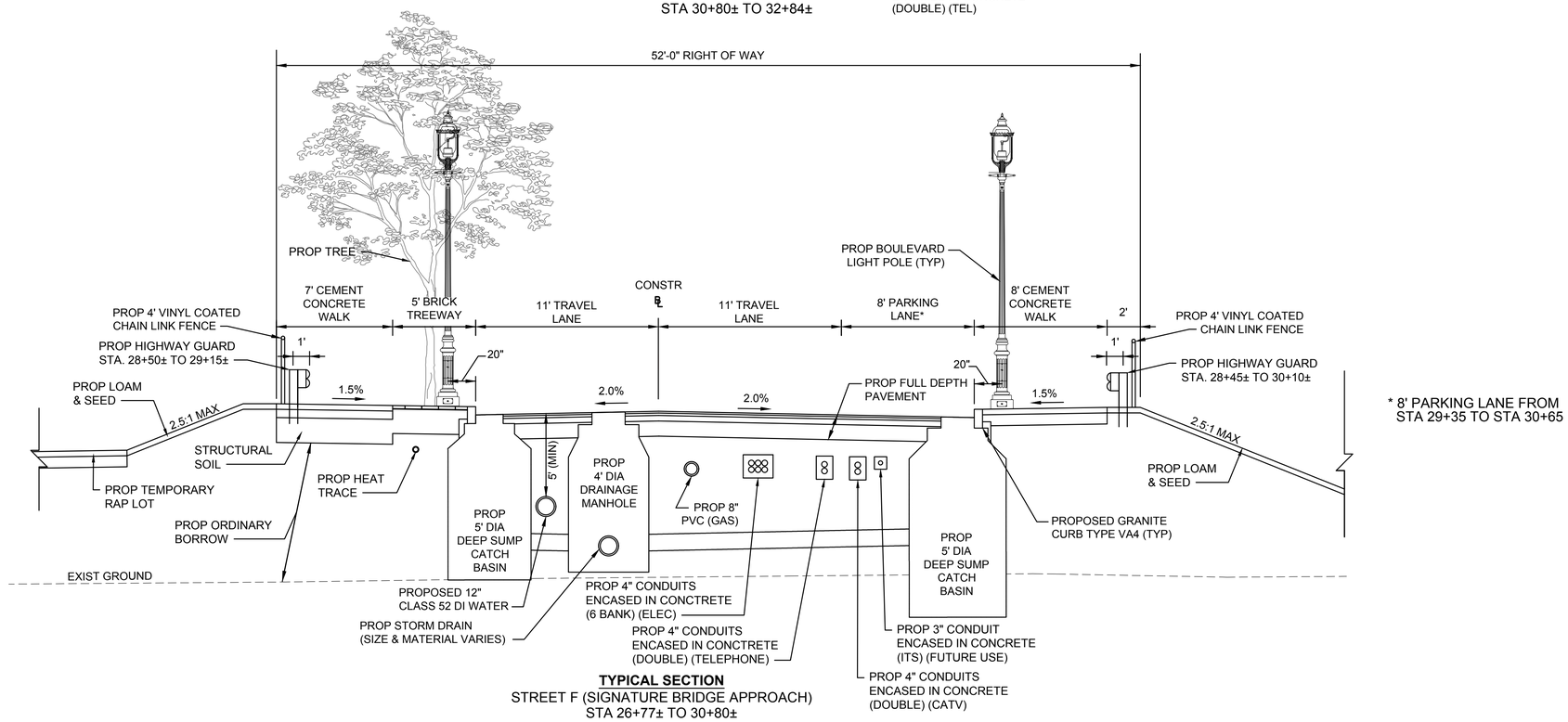
FOUNDATION: 8" GRAVEL BORROW SUBBASE, TYPE b

LOWELL
TWO BRIDGES AND STREETS F & G
TYPICAL SECTIONS

SHEET 11 OF 119



TYPICAL SECTION
STREET F
STA 30+80± TO 32+84±



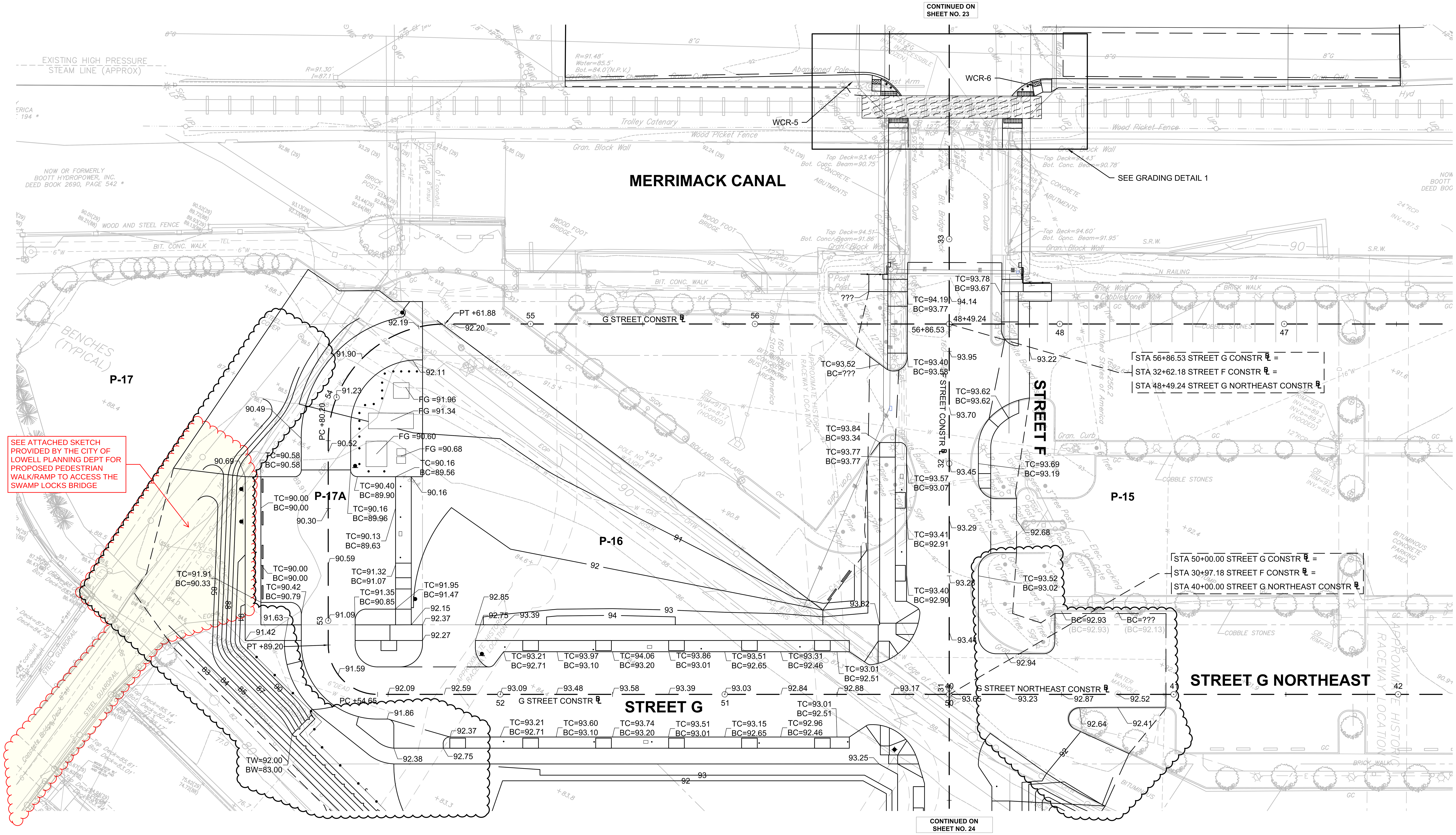
TYPICAL SECTION
STREET F (SIGNATURE BRIDGE APPROACH)
STA 26+77± TO 30+80±

* 8' PARKING LANE FROM STA 29+35 TO STA 30+65

LOWELL
TWO BRIDGES AND STREETS F & G
GRADING PLANS

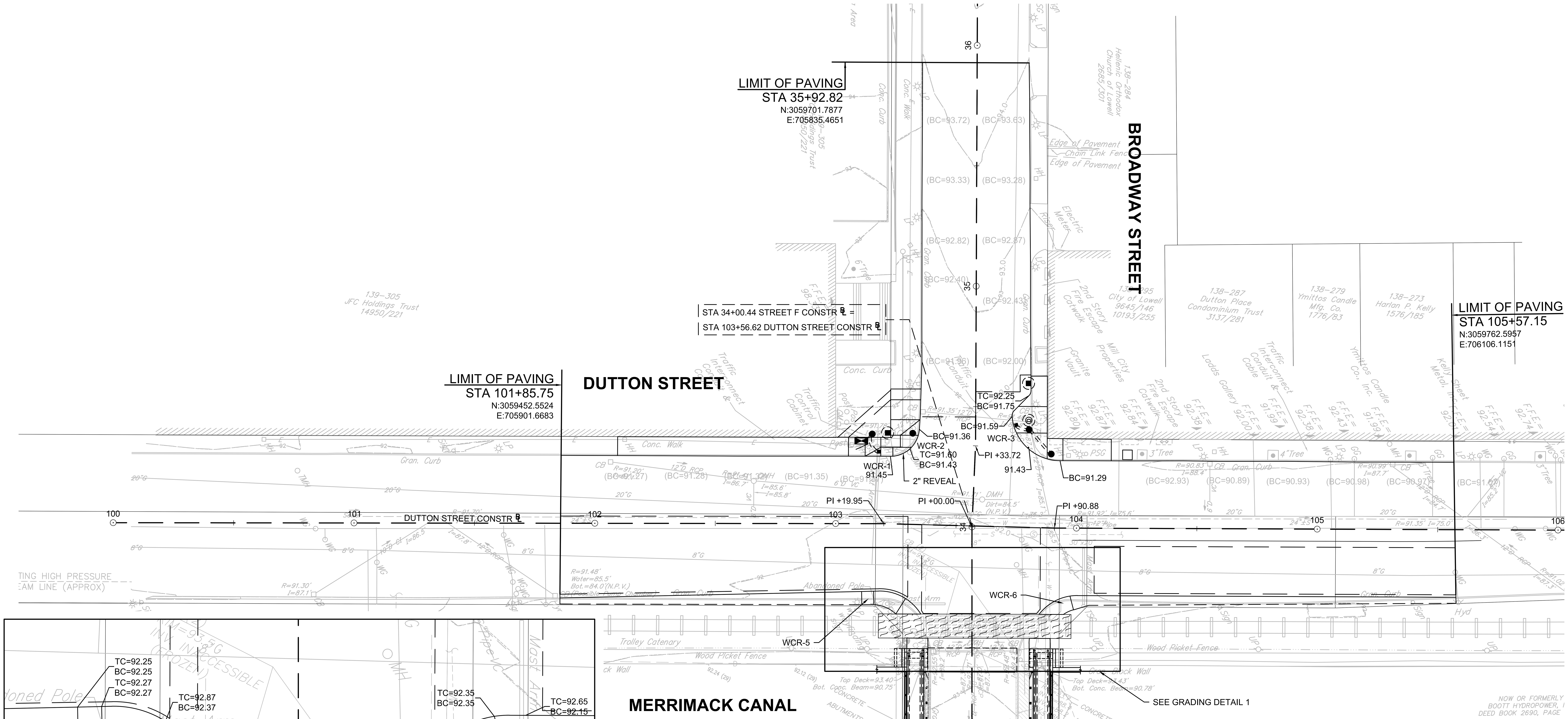
Plotted on 1-Sep-2020 9:16 PM

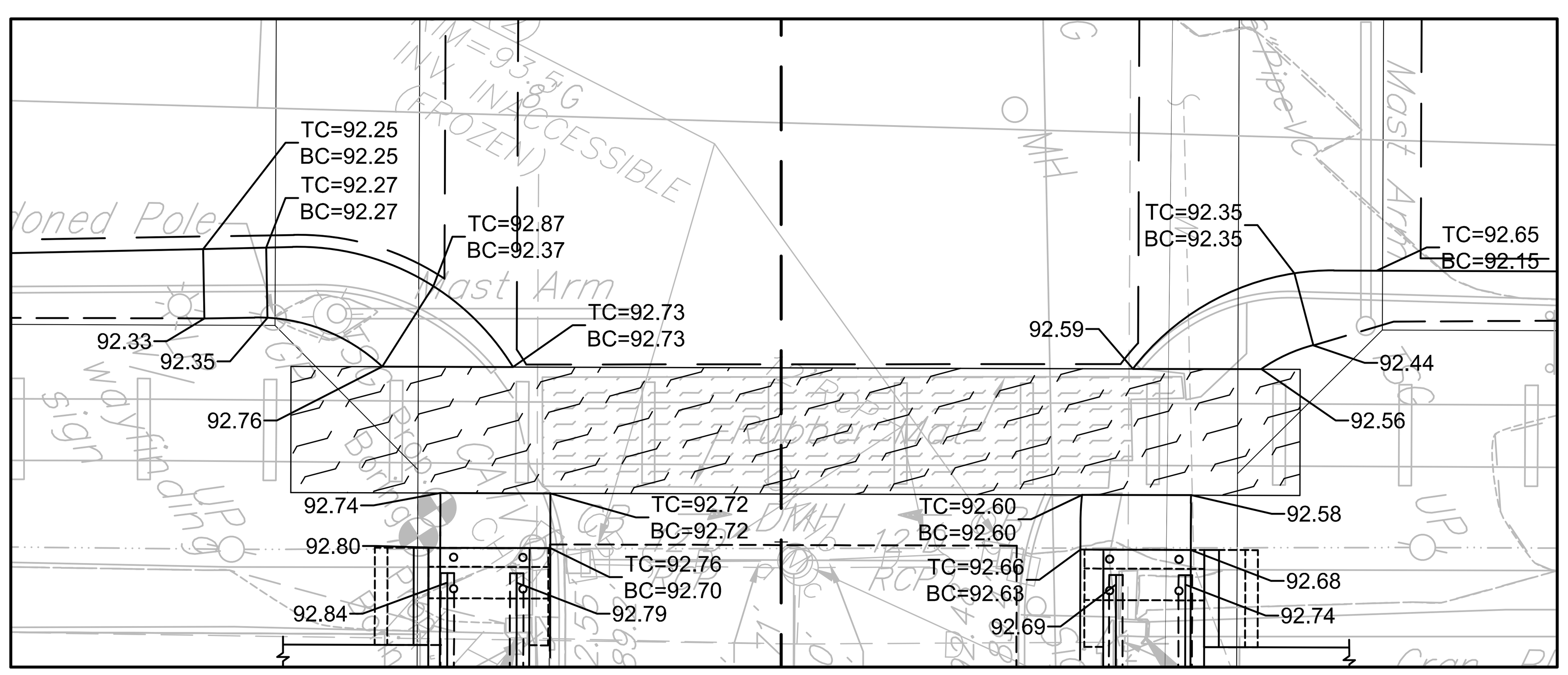
D1 GRADING.DWG



DATE	DESCRIPTION	REV #
6/15/2018	CURB & WALL REVISIONS	6

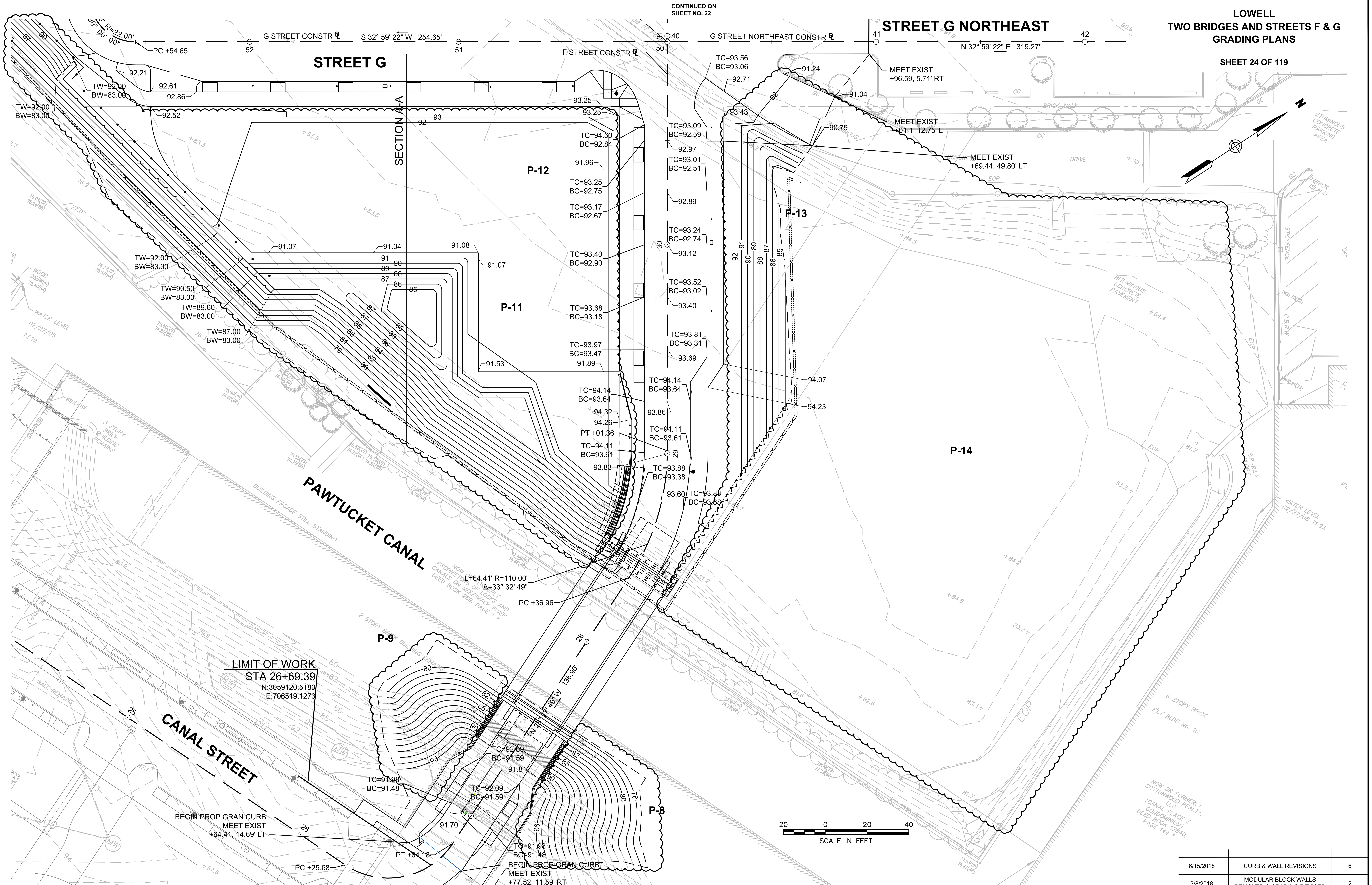
D1 GRADING.DWG Plotted on 9-Oct-2017 7:15 PM





GRADING DETAIL 1
WCR-5 AND WCR-6
SCALE: 1" = 10'

LOWELL
TWO BRIDGES AND STREETS F & G
GRADING PLANS



DATE	DESCRIPTION	REV #
6/15/2018	CURB & WALL REVISIONS	6
3/8/2018	MODULAR BLOCK WALLS REMOVED & GRADING REVISED	2

ADD ALT 2 - D1 GRADING.DWG Plotted on 1-Sep-2020 8:51 PM

LOWELL
TWO BRIDGES AND STREETS F & G
UTILITY PLANS
WATER DRAINAGE & SEWER
SHEET 25 OF 119

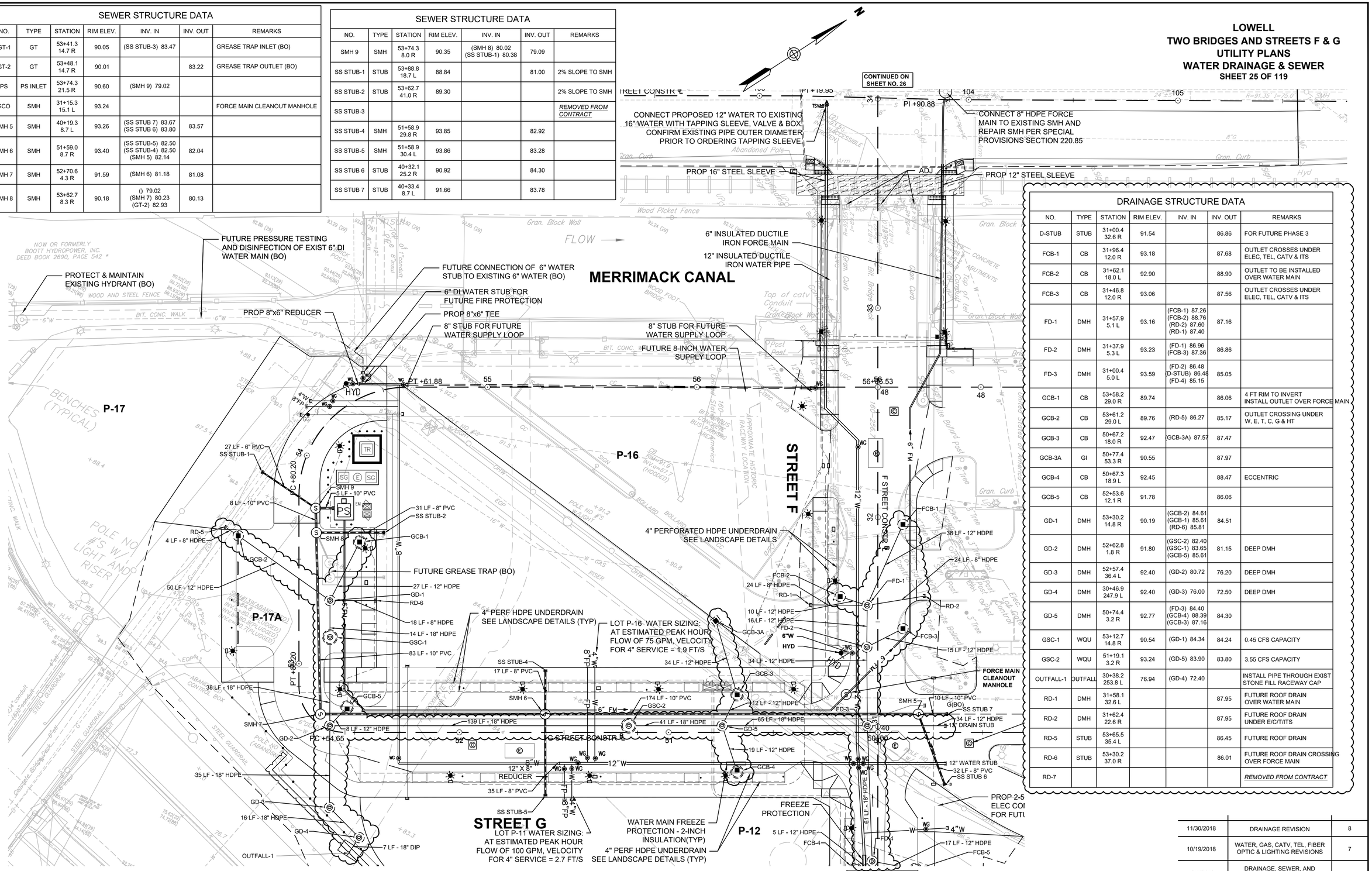
Plotted on 1-Sep-2020 8:39 PM
D1 UTIL COMBINED.DWG

SEWER STRUCTURE DATA

NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
GT-1	GT	53+41.3 14.7 R	90.05	(SS STUB-3) 83.47		GREASE TRAP INLET (BO)
GT-2	GT	53+48.1 14.7 R	90.01		83.22	GREASE TRAP OUTLET (BO)
PS	PS INLET	53+74.3 21.5 R	90.60	(SMH 9) 79.02		
SCO	SMH	31+15.3 15.1 L	93.24			FORCE MAIN CLEANOUT MANHOLE
SMH 5	SMH	40+19.3 8.7 L	93.26	(SS STUB 7) 83.67 (SS STUB 6) 83.80	83.57	
SMH 6	SMH	51+59.0 8.7 R	93.40	(SS STUB-5) 82.50 (SS STUB-4) 82.50 (SMH 5) 82.14	82.04	
SMH 7	SMH	52+70.6 4.3 R	91.59	(SMH 6) 81.18	81.08	
SMH 8	SMH	53+62.7 8.3 R	90.18	() 79.02 (SMH 7) 80.23 (GT-2) 82.93	80.13	

SEWER STRUCTURE DATA

NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
SMH 9	SMH	53+74.3 8.0 R	90.35	(SMH 8) 80.02 (SS STUB-1) 80.38	79.09	
SS STUB-1	STUB	53+88.8 18.7 L	88.84		81.00	2% SLOPE TO SMH
SS STUB-2	STUB	53+62.7 41.0 R	89.30			2% SLOPE TO SMH
SS STUB-3						*REMOVED FROM CONTRACT*
SS STUB-4	SMH	51+58.9 29.8 R	93.85		82.92	
SS STUB-5	SMH	51+58.9 30.4 L	93.86		83.28	
SS STUB 6	STUB	40+32.1 25.2 R	90.92		84.30	
SS STUB 7	STUB	40+33.4 8.7 L	91.66		83.78	



DRAINAGE STRUCTURE DATA

NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
D-STUB	STUB	31+00.4 32.6 R	91.54		86.86	FOR FUTURE PHASE 3
FCB-1	CB	31+96.4 12.0 R	93.18		87.68	OUTLET CROSSES UNDER ELEC, TEL, CATV & ITS
FCB-2	CB	31+62.1 18.0 L	92.90		88.90	OUTLET TO BE INSTALLED OVER WATER MAIN
FCB-3	CB	31+46.8 12.0 R	93.06		87.56	OUTLET CROSSES UNDER ELEC, TEL, CATV & ITS
FD-1	DMH	31+57.9 5.1 L	93.16	(FCB-1) 87.26 (FCB-2) 88.76 (RD-2) 87.60 (RD-1) 87.40	87.16	
FD-2	DMH	31+37.9 5.3 L	93.23	(FD-1) 86.96 (FCB-3) 87.36	86.86	
FD-3	DMH	31+00.4 5.0 L	93.59	(FD-2) 86.48 D-STUB) 86.48 (FD-4) 85.15	85.05	
GCB-1	CB	53+58.2 29.0 R	89.74		86.06	4 FT RIM TO INVERT INSTALL OUTLET OVER FORCE MAIN
GCB-2	CB	53+61.2 29.0 L	89.76	(RD-5) 86.27	85.17	OUTLET CROSSING UNDER W, E, T, C, G & HT
GCB-3	CB	50+67.2 18.0 R	92.47	(GCB-3A) 87.57	87.47	
GCB-3A	GI	50+77.4 53.3 R	90.55		87.97	
GCB-4	CB	50+67.3 18.9 L	92.45		88.47	ECCENTRIC
GCB-5	CB	52+53.6 12.1 R	91.78		86.06	
GD-1	DMH	53+30.2 14.8 R	90.19	(GCB-2) 84.61 (GCB-1) 85.61 (RD-6) 85.81	84.51	
GD-2	DMH	52+62.8 1.8 R	91.80	(GSC-2) 82.40 (GSC-1) 83.65 (GCB-5) 85.61	81.15	DEEP DMH
GD-3	DMH	52+57.4 36.4 L	92.40	(GD-2) 80.72	76.20	DEEP DMH
GD-4	DMH	30+46.9 247.9 L	92.40	(GD-3) 76.00	72.50	DEEP DMH
GD-5	DMH	50+74.4 3.2 R	92.77	(FD-3) 84.40 (GCB-4) 88.39 (GCB-3) 87.16	84.30	
GSC-1	WQU	53+12.7 14.8 R	90.54	(GD-1) 84.34	84.24	0.45 CFS CAPACITY
GSC-2	WQU	51+19.1 3.2 R	93.24	(GD-5) 83.90	83.80	3.55 CFS CAPACITY
OUTFALL-1	OUTFALL	30+38.2 253.8 L	76.94	(GD-4) 72.40		INSTALL PIPE THROUGH EXIST STONE FILL RACEWAY CAP
RD-1	DMH	31+58.1 32.6 L			87.95	FUTURE ROOF DRAIN OVER WATER MAIN
RD-2	DMH	31+62.4 22.6 R			87.95	FUTURE ROOF DRAIN UNDER E/C/T/ITS
RD-5	STUB	53+65.5 35.4 L			86.45	FUTURE ROOF DRAIN
RD-6	STUB	53+30.2 37.0 R			86.01	FUTURE ROOF DRAIN CROSSING OVER FORCE MAIN
RD-7						*REMOVED FROM CONTRACT*

DATE	DESCRIPTION	REV #
11/30/2018	DRAINAGE REVISION	8
10/19/2018	WATER, GAS, CATV, TEL, FIBER OPTIC & LIGHTING REVISIONS	7
5/16/2018	DRAINAGE, SEWER, AND WATER MODIFICATIONS.	5
2/27/2018	DRAINAGE, SEWER, AND WATER MODIFICATIONS. MOUNTABLE CURB ADDED	1

LOWELL
TWO BRIDGES AND STREETS F & G
UTILITY PLANS
WATER DRAINAGE & SEWER
SHEET 26 OF 119

D1 UTIL COMBINED.DWG Plotted on 1-Sep-2020 8:40 PM

DRAINAGE STRUCTURE DATA						
NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
20	CB	103+78.6 59.8 L	91.78		90.12	SCUPPER DRAIN (SEE DETAIL)
21	EXIST CB	103+79.1 44.4 L	91.42	(20) 87.66 (23) 88.80		R&S F&G PROP F&C
2:	CB	103+20.6 37.7 L	91.92		89.80	R&R F&G GUTTER INLET
23	EXIST CB	103+35.1 46.9 L	91.35	(22) 89.20	89.10	

LIMIT OF PAVING
STA 35+92.82
N:3059701.7877
E:705835.4651

LIMIT OF PAVING
STA 101+85.75
N:3059452.5524
E:705901.6683

LIMIT OF PAVING
STA 105+57.15
N:3059762.5957
E:706106.1151

DUTTON STREET

BROADWAY STREET

MERRIMACK CANAL

DUTTON STREET CONSTR ℄

CONNECT PROPOSED 12" WATER TO EXISTING 16".WATER WITH TAPPING SLEEVE, VALVE & BOX. CONFIRM EXISTING PIPE OUTER DIAMETER PRIOR TO ORDERING TAPPING SLEEVE.

CONNECT 8" HDPE FORCE MAIN TO EXISTING SMH AND REPAIR SMH PER SPECIAL PROVISIONS SECTION 220.85

PROP 16" STEEL SLEEVE

PROP 12" STEEL SLEEVE

6" INSULATED DUCTILE IRON FORCE MAIN

12" INSULATED DUCTILE IRON WATER PIPE

13 LF - 8" DIP

10 LF - 8" DIP

CONTINUED ON SHEET NO. 25

20 0 20 40
SCALE IN FEET

DATE	DESCRIPTION	REV #
8/22/2019	CB-20 REVISION	10
4/23/2018	CONNECTION TO EXISTING WATER MAIN REVISION	4

LOWELL
TWO BRIDGES AND STREETS F & G
UTILITY PLANS
WATER DRAINAGE & SEWER
SHEET 27 OF 119

D1 UTIL COMBINED.DWG Plotted on 1-Sep-2020 8:40 PM

CONTINUED ON SHEET NO. 25

DRAINAGE STRUCTURE DATA

NO.	TYPE	STATION	RIM ELEV.	INV. IN	INV. OUT	REMARKS
FCB-4	CB	30+31.7 10.8 L	92.66		88.68	OUTLET TO BE INSTALLED OVER WATER MAIN ECCENTRIC
FCB-5	CB	30+31.6 18.0 R	92.52		87.02	INSTALL OUTLET UNDER G/E/T/C/ITS
FCB-6	CB	28+78.8 11.0 L	94.75		92.75	OUTLET TO BE INSTALLED OVER WATER MAIN ECCENTRIC
FCB-7	CB	28+69.1 9.8 R	93.34		87.84	INSTALL OUTLET UNDER G/E/T/C
FD-4	DMH	30+35.6 2.7 L	92.83	(FD-4a) 85.90 (FCB-4) 88.37 (FCB-5) 86.51	85.80	
FD-4a	DMH	30+12.5 2.7 L	92.92	(FD-5) 86.50 (RD-3) 86.49 (RD-4) 86.80	86.00	
FD-5	DMH	29+13.7 4.0 L	93.79	(FD-6) 87.25 (SD-1) 87.50	87.15	
FD-6	DMH	28+85.1 2.8 L	93.66	(FCB-6) 89.24 (FCB-7) 87.58	87.48	
FD-7						*REMOVED FROM CONTRACT*
FD-9						*REMOVED FROM CONTRACT*
FSC-1						*REMOVED FROM CONTRACT*
INLET-1						*REMOVED FROM CONTRACT*
OUTFALL-2	OUTFALL	29+26.4 138.7 L		(PCB-4) 73.40		INSTALL PIPE THROUGH EXIST STONE FILL RACEWAY CAP
OUTFALL-3						*REMOVED FROM CONTRACT*
PCB-4	CB	29+57.8 117.6 L	85.17		76.10	DEEP SUMP CB, INSTALL 2-INCHES ABOVE SURFACE
RD-3	STUB	30+12.5 28.3 R			86.80	INSTALL FUTURE ROOF DRAIN OUTLET UNDER G/E/T/C/ITS
RD-4	STUB	30+20.6 24.0 L			88.01	FUTURE OPEN SPACE PARCEL DRAIN OVER WATER MAIN
SD-1	STUB	29+13.8 21.6 R			87.80	FUTURE GARAGE SITE DRAIN

STREET G

LOT P-11 WATER SIZING:
AT ESTIMATED PEAK HOUR FLOW OF 100 GPM, VELOCITY FOR 4" SERVICE = 2.7 FT/S

WATER MAIN FREEZE PROTECTION - 2-INCH INSULATION(TYP)
4" PERF HDPE UNDERDRAIN SEE LANDSCAPE DETAILS (TYP)

FREEZE PROTECTION

4" PERFORATED HDPE UNDERDRAIN SEE LANDSCAPE DETAILS

2" X 4' X 8' INSULATION BOARD FOR WATER PIPE ADJACENT TO CATCH BASIN & DMH

CONNECT PROP 12" WATER TO EXISTING 12" WATER WITH DI COUPLING

NOTE:
PROVIDE FREEZE PROTECTION FOR WATER MAINS WITHIN 3 FEET OF DRAINAGE STRUCTURES

STREET F

STREET G NORTHEAST

PAWTUCKET CANAL

CANAL STREET

LIMIT OF WORK
STA 26+69.39
N:3059120.5180
E:706519.1273

PC +54.65
PC +25.68
PT +84.18

P-11 P-12 P-13 P-14

DATE	DESCRIPTION	REV #
10/19/2018	WATER, GAS, CATV, TEL, FIBER OPTIC & LIGHTING REVISIONS	7
5/16/2018	DRAINAGE, SEWER, AND WATER MODIFICATIONS.	5
2/27/2018	DRAINAGE, SEWER, AND WATER MODIFICATIONS. MOUNTABLE CURB ADDED	1

SCALE IN FEET 20 0 20 40

LOWELL
BROADWAY BRIDGE AND STREETS F&G
PLANTING PLANS

SHEET 31 OF 111

D1 PLANTING.DWG Plotted on 9-Oct-2017 3:45 PM

MERRIMACK CANAL

STREET G

STREET F

STREET G NORTHEAST

LIMIT OF PAVING
STA 54+64.99
N:3059334.1355
E:705990.9556

LIMIT OF PAVING
STA 40+96.55
N:3059511.0999
E:706302.5471

PROP LOAM & SEED

PROP AGED PINE BARK MULCH

PROP LOAM & SEED

60 EF

1 AR

60 EF (TYP)

5 AR

PROP AGED PINE BARK MULCH

PROP LOAM & SEED

2 AR

60 EF (TYP)

PROP AGED PINE BARK MULCH

PROP LOAM & SEED

60 EF (TYP)

6 AR

PROP AGED PINE BARK MULCH

PROP AGED PINE BARK MULCH

PROP AGED PINE BARK MULCH

PROP LOAM & SEED

PLANTING SCHEDULE

	SYM	QUANTITY	BOTANICAL NAME	COMMON NAME	SIZE	CALIPER	ROOT
DECIDUOUS TREES	AR	14	ACER RUBRUM 'RED SUNSET'	RED SUNSET RED MAPLE		3" - 3 1/2" CAL.	B&B
GROUND COVER	EF	840	EUONYMUS FORTUNEI 'COLORATUS'	PURPLE LEAF WINTERCREEPER	QUART POT	8" O.C.	CONT

CONTINUED ON SHEET NO. 32

SCALE IN FEET
20 0 20 40

LOWELL
TWO BRIDGES AND STREETS F & G
PLANTING PLANS

SHEET 32 OF 119

ADD ALT 2 - D1 PLANTING.DWG Plotted on 9-Oct-2017 3:46 PM

CONTINUED ON SHEET NO. 31

PLANTING SCHEDULE

	SYM	QUANTITY	BOTANICAL NAME	COMMON NAME	SIZE	CALIPER	ROOT
DECIDUOUS TREES	AR	4	ACER RUBRUM 'RED SUNSET'	RED SUNSET RED MAPLE		3" - 3 ½" CAL.	B&B
GROUND COVER	EF	240	EUONYMUS FORTUNEI 'COLORATUS'	PURPLE LEAF WINTERCREEPER	QUART POT	8" O.C.	CONT

STREET G

G STREET CONSTR ℄

G STREET NORTHEAST CONSTR ℄

STREET G NORTHEAST

STREET F

F STREET CONSTR ℄

CANAL STREET

PAWTUCKET CANAL

PC +54.65

PT +84.18

PC +25.68

PROP LOAM & SEED

PROP LOAM & MULCH

4 AR

60 EF (TYP)

60 EF

1 AR

LIMIT OF WORK
STA 26+69.39
N:3059120.5180
E:706519.1273

APPROXIMATE HISTORIC RACEWAY LOCATION

"SACO LOWELL SHOPS" BUILDING NO. 14

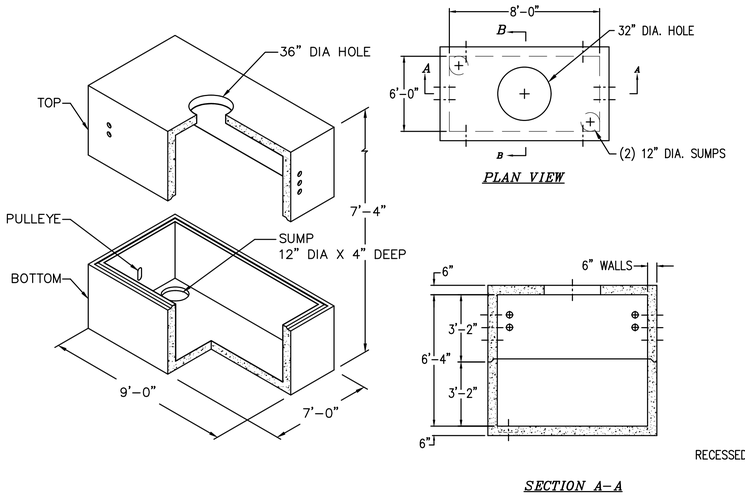
2 STORY BRICK BUILDING REMAINS

6 STORY BRICK F'LY BLDG No. 16

NOW OR FORMERLY PROPRIETORS OF LOCKS AND CANALS ON MERRIMACK RIVER DEED BOOK 268, PAGE 1 *

NOW OR FORMERLY COTTONWOOD REALTY, LLC (CANAL PLACE, 3 CONDOMINIUM) DEED BOOK 17640, PAGE 144 *

SCALE IN FEET
20 0 20 40



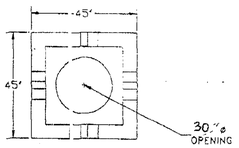
Notes:

1. 32" MANHOLE FRAME AND COVER SET IN FULL MORTAR BED, ADJUSTED TO GRADE.
2. STRUCTURE SHALL BE SET 24" BELOW FINISHED GRADE.
3. COVER SHALL BE IMPRINTED WITH "TELEPHONE" OR "FIBER OPTIC"

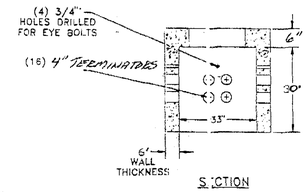
PRECAST MANHOLE (TELEPHONE & FIBER OPTIC)

SCALE: NOT TO SCALE
DATE: 4-30-2009
DWG: –

FE-33 HEAVY DUTY HANDHOLE- 45" X 45" X 36"



PLAN VIEW



SECTION

OPEN BOTTOM

SPECIFICATIONS

CONCRETE MINIMUM STRENGTH- 5,000 P.S.I. @ 28 DAYS
STEEL REINFORCEMENT- ASTM A 615, GRADE 60, 1" MIN. COVER
DESIGN LOADING - AASHTO H2-20-44
EARTH COVER - 0 TO 5 FEET
* OPENINGS CAN BE ARRANGED TO MEET CUSTOMER REQUIREMENTS - BY SPECIAL ORDER. *

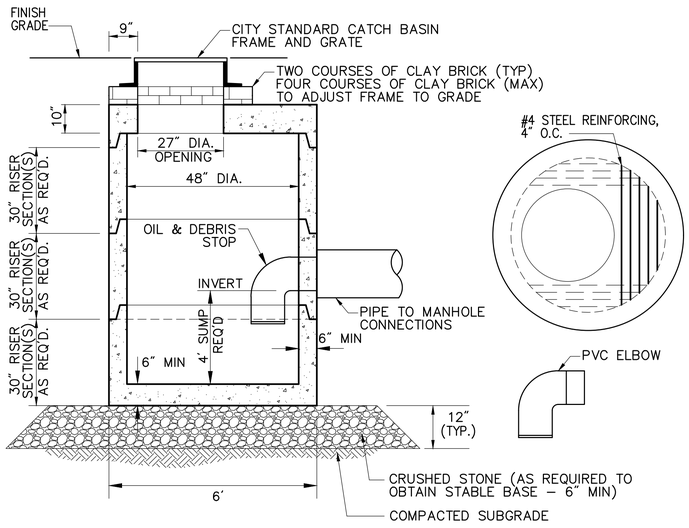
UTILITY PRECAST CONCRETE & SUPPLY CO., INC.
153 CRANBERRY HIGHWAY ROCHESTER, MA. 02770
P.O. BOX 157 WEST WAREHAM, MA. 02576
PHONE: (508)291-1314
FAX: (508)295-8019

Notes:

1. CONTRACTOR TO PROVIDE EXCAVATION, BACKFILL AND INSTALLATION LABOR.
2. HANDHOLE FRAME AND COVER SHALL BE SET IN FULL MORTAR BED, ADJUST TO GRADE.
3. COVER SHALL BE IMPRINTED WITH "FO".

PRECAST PULLBOX (TELEPHONE & FIBER OPTIC)

SCALE: NOT TO SCALE
DATE: 5-2009
DWG: –

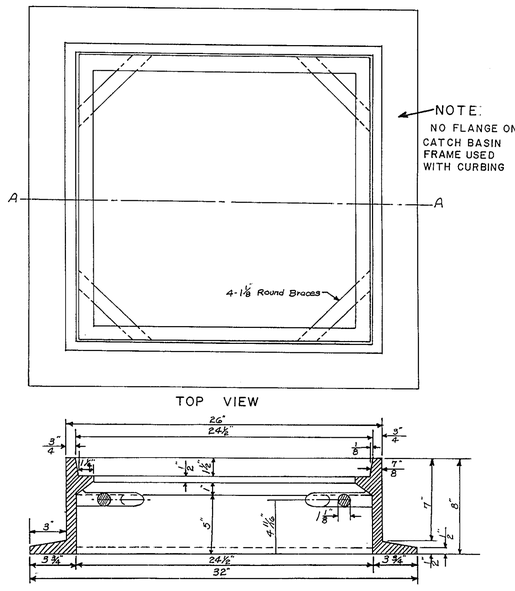


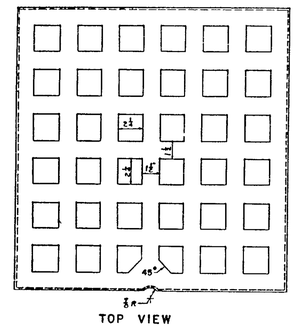
CITY OF LOWELL STANDARD CATCH BASIN

SCALE: NOT TO SCALE
DATE: 01-22-2016
DWG: –

Notes:

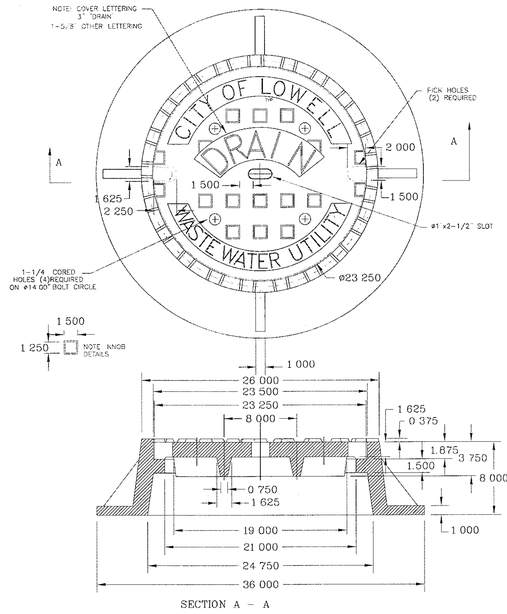
1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.
2. H-20 DESIGN LOADING PER AASHTO HS-20-44; ASTM C478 SPEC FOR "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS.





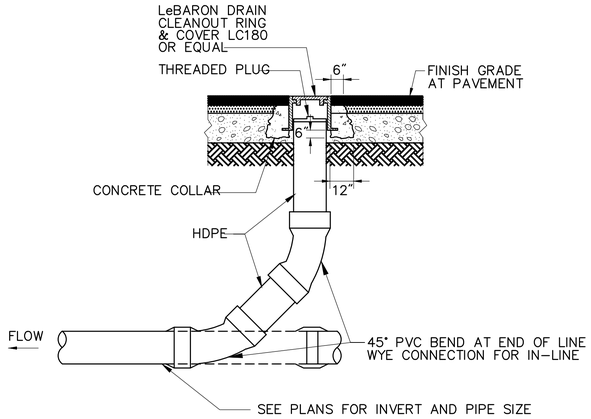
CITY OF LOWELL STANDARD CATCH BASIN FRAME AND GRATE

SCALE: NOT TO SCALE
DATE: 4-30-2009
DWG: –



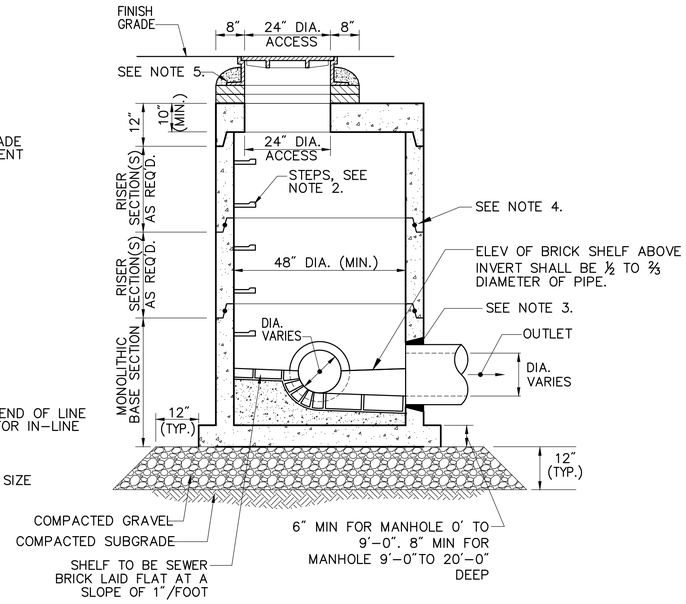
CITY OF LOWELL STANDARD DRAIN FRAME & COVER

SCALE: NOT TO SCALE
DATE: 10-22-2008
DWG: -



CLEANOUT - PAVED AREA

SCALE: NOT TO SCALE
DATE: 10-22-2008
DWG: -

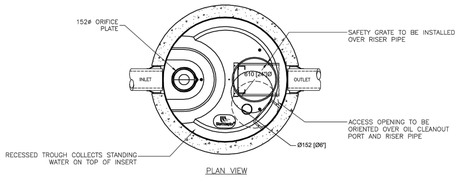


DRAIN MANHOLE

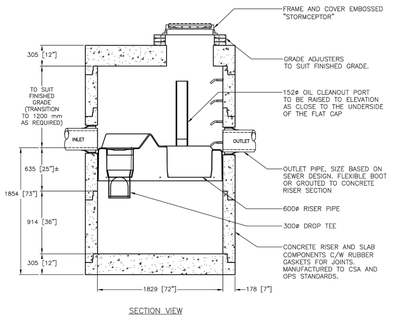
SCALE: NOT TO SCALE
DATE: 10-22-2008
DWG: -

Notes:

1. ALL SECTIONS SHALL BE DESIGNED FOR HS-20 LOADING.
2. COPOLYMER MANHOLE STEPS SHALL BE INSTALLED AT 12" O.C. FOR THE FULL DEPTH OF THE STRUCTURE.
3. PROVIDE OPENINGS FOR PIPES WITH 2" MAX. CLEARANCE TO OUTSIDE OF PIPE. MORTAR ALL PIPE CONNECTIONS.
4. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PREFORMED BUTYL RUBBER.
5. DRAIN MANHOLE FRAME AND COVER SHALL BE SET IN FULL MORTAR BED. ADJUST TO GRADE WITH CLAY BRICK AND MORTAR (2 BRICK COURSES TYPICALLY, 4 BRICK COURSES MAXIMUM. NO GRADE RING FOR ADJUSTMENT)



PLAN VIEW



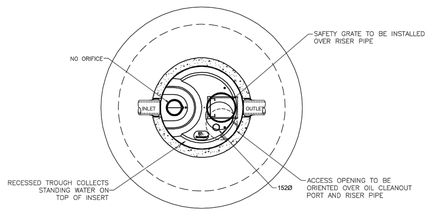
SECTION VIEW

Notes:

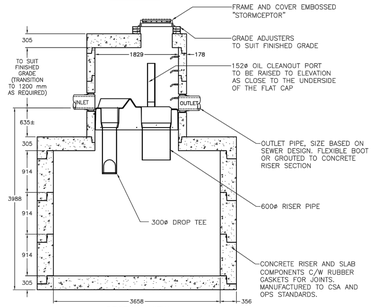
1. THE USE OF FLEXIBLE CONNECTION IS RECOMMENDED AT THE INLET AND OUTLET WHERE APPLICABLE.
2. THE COVER SHOULD BE POSITIONED OVER THE OUTLET DROP PIPE AND THE OIL PORT.
3. JOINT SEALANT BETWEEN PRECAST SECTIONS SHALL BE PREFORMED BUTYL RUBBER.

STORMWATER QUALITY UNIT (GSC-1) 0.45 CFS WQ FLOW RATE CAPACITY

SCALE: NOT TO SCALE
DATE:
DWG: -



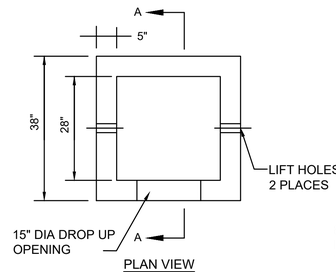
PLAN VIEW



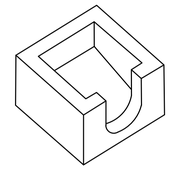
SECTION VIEW

STORMWATER QUALITY UNIT (GSC-2) 3.55 CFS WQ FLOW RATE CAPACITY

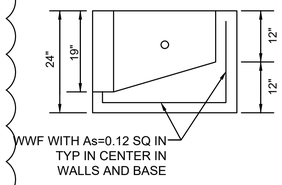
SCALE: NOT TO SCALE
DATE:
DWG: -



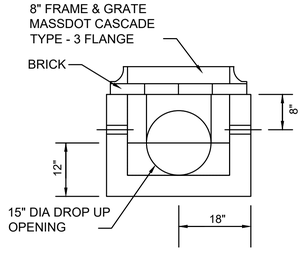
PLAN VIEW



ISOMETRIC



SECTION A-A



ELEVATION

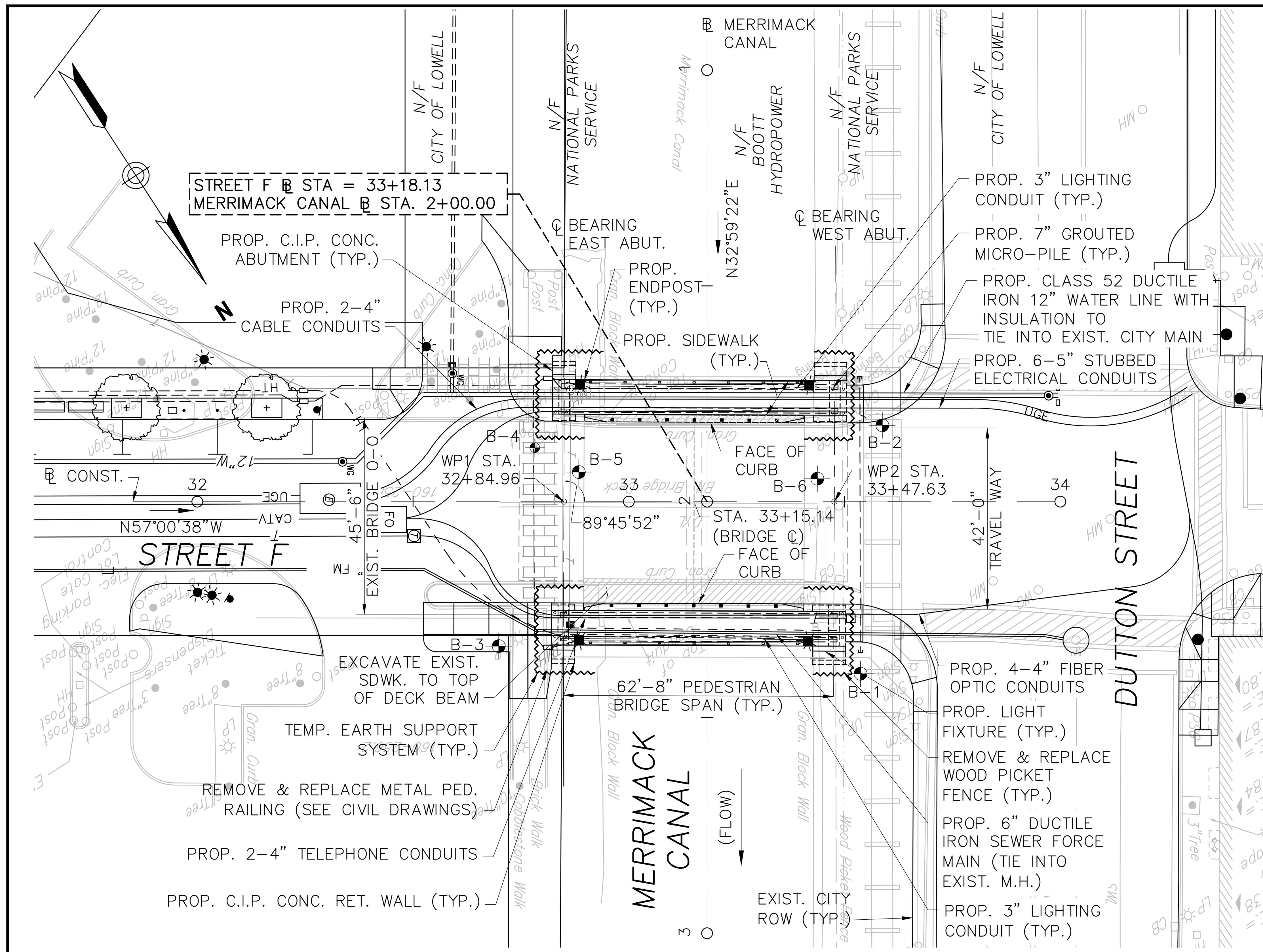
NOTES:
1. DESIGNED FOR AASHTO HS25-44 LOADING.
2. CONCRETE STRENGTH f'c=4000 PSI
3. REINFORCING STEEL: ASTM A185 (wwf) fy=60,000 PSI
4. CURB INLETS ARE REQUIRED WHEN GUTTER INLETS ARE INSTALLED AGAINST CURBING.

GUTTER INLET

SCALE: NOT TO SCALE
DATE:
DWG: -

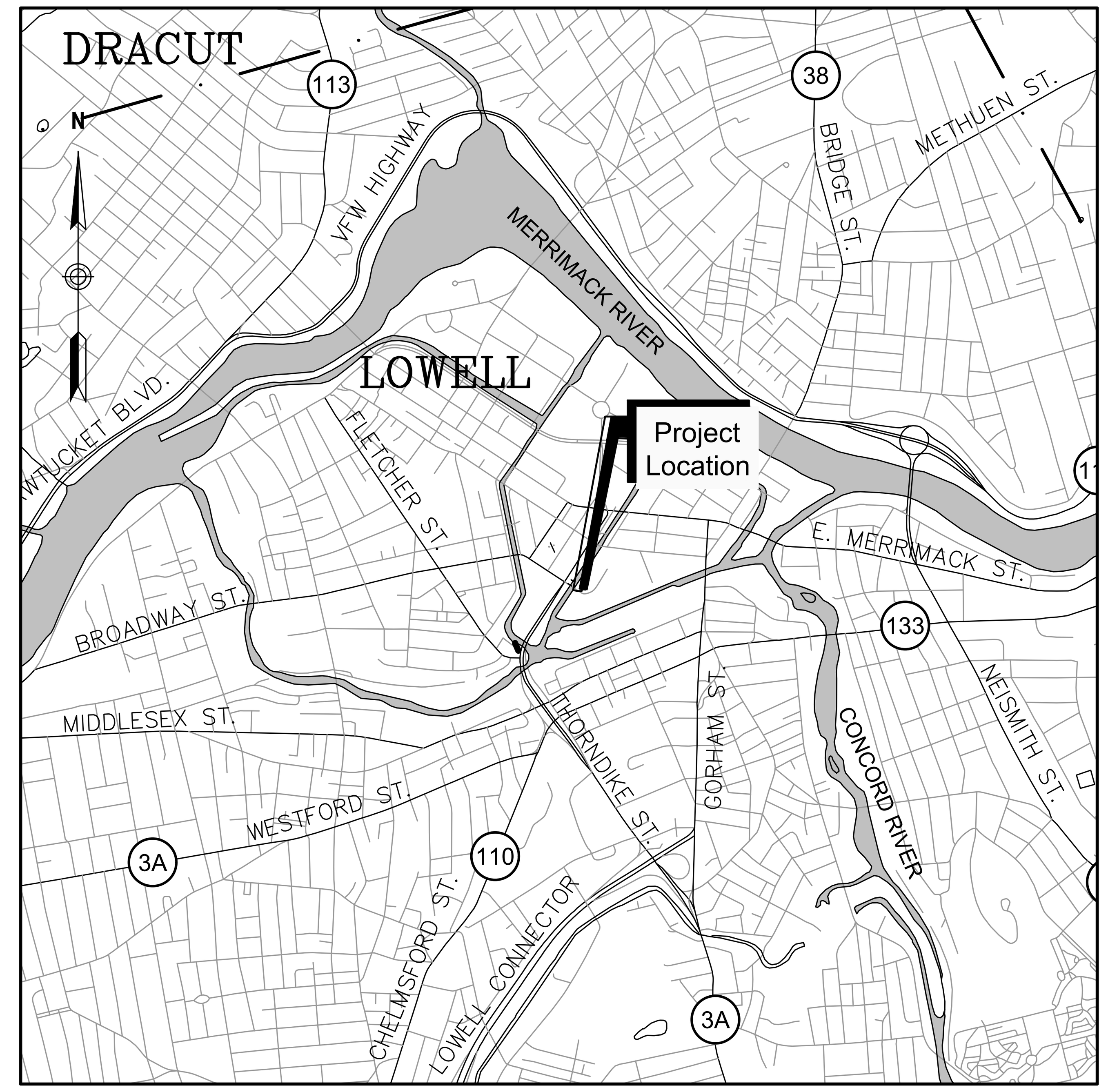
LOWELL
TWO BRIDGES AND STREETS F & G
KEY PLAN & PROFILES

SHEET 78 OF 119



KEY PLAN

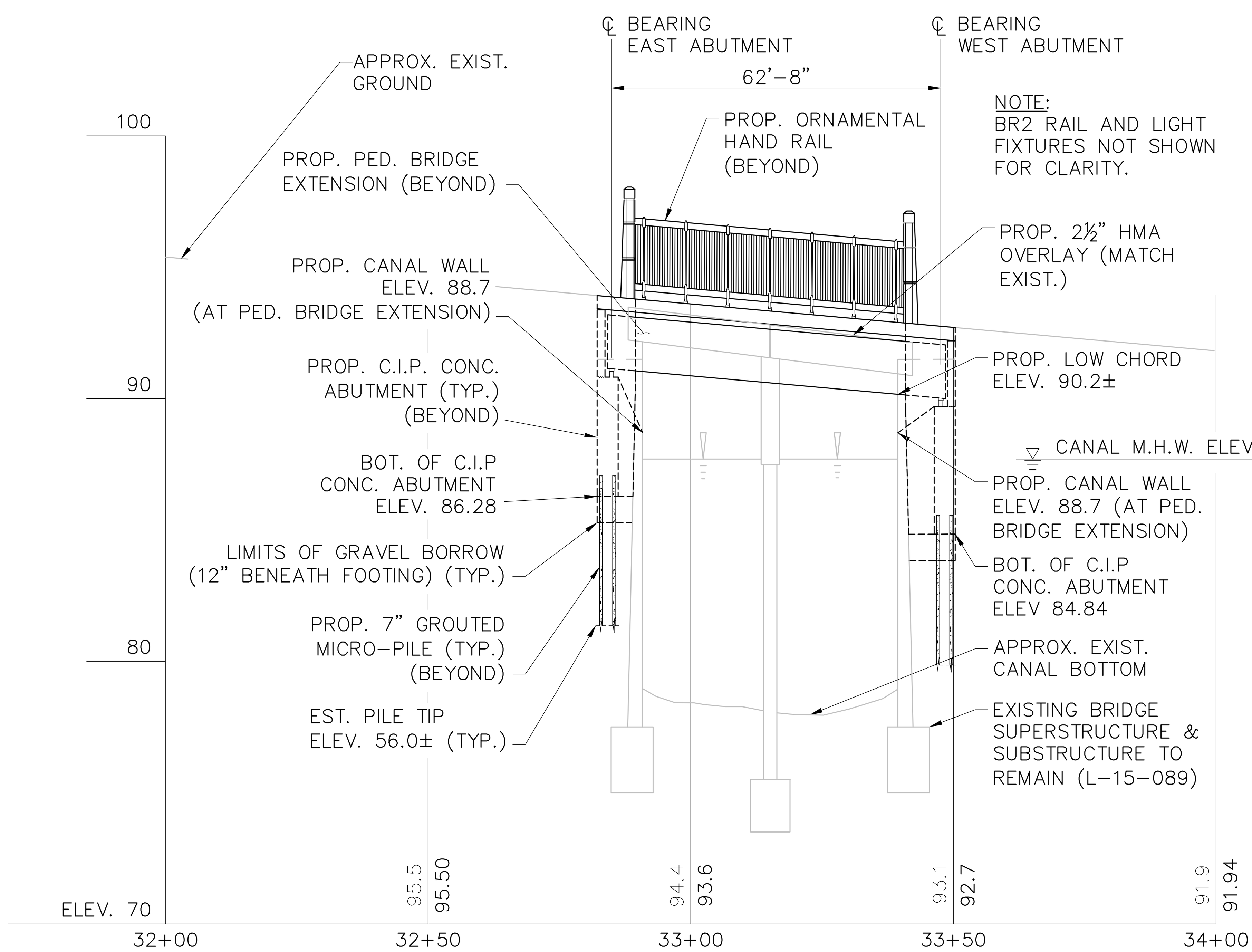
SCALE: 1"=20'



LOCUS MAP

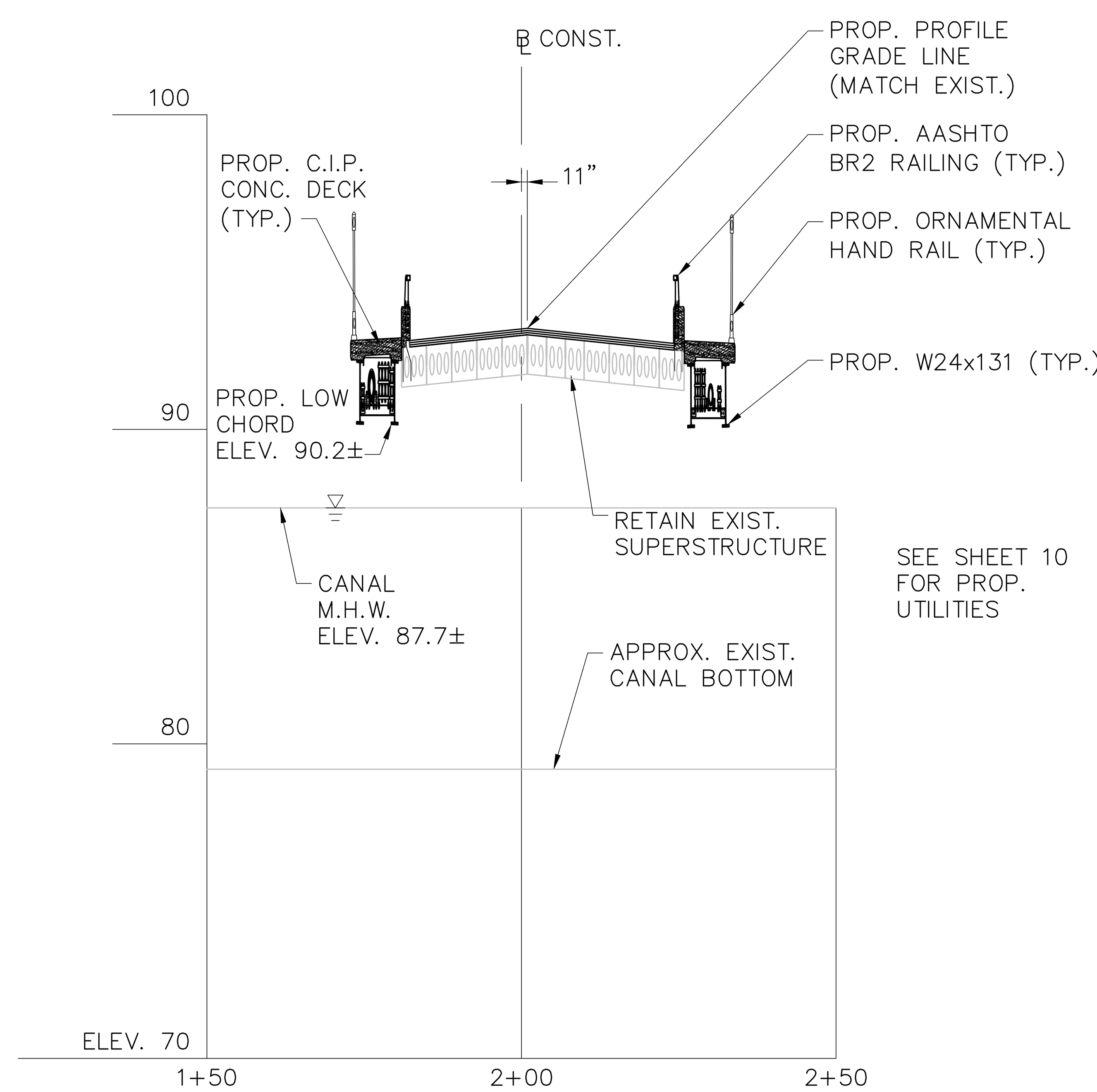
SCALE: 1"=1500'

INDEX OF SHEETS



STREET F PROFILE

SCALE: HORIZONTAL 1"=20'
VERTICAL 1"=4'



MERRIMACK CANAL PROFILE

SCALE: HORIZONTAL 1"=20'
VERTICAL 1"=4'

OCT. 17, 2017	ISSUED FOR CONSTRUCTION

PROPOSED BRIDGE REHABILITATION
LOWELL
STREET F
OVER MERRIMACK CANAL

THE CITY OF LOWELL
375 MERRIMACK ST.
LOWELL, MA 01852

COMMONWEALTH OF MASSACHUSETTS JODY F. TRUNFIO STRUCTURAL No. 40075 REGISTERED PROFESSIONAL ENGINEER
10-13-17

TEC
LAWRENCE, MA
HAMPTON, NH
www.TheEngineeringCorp.com

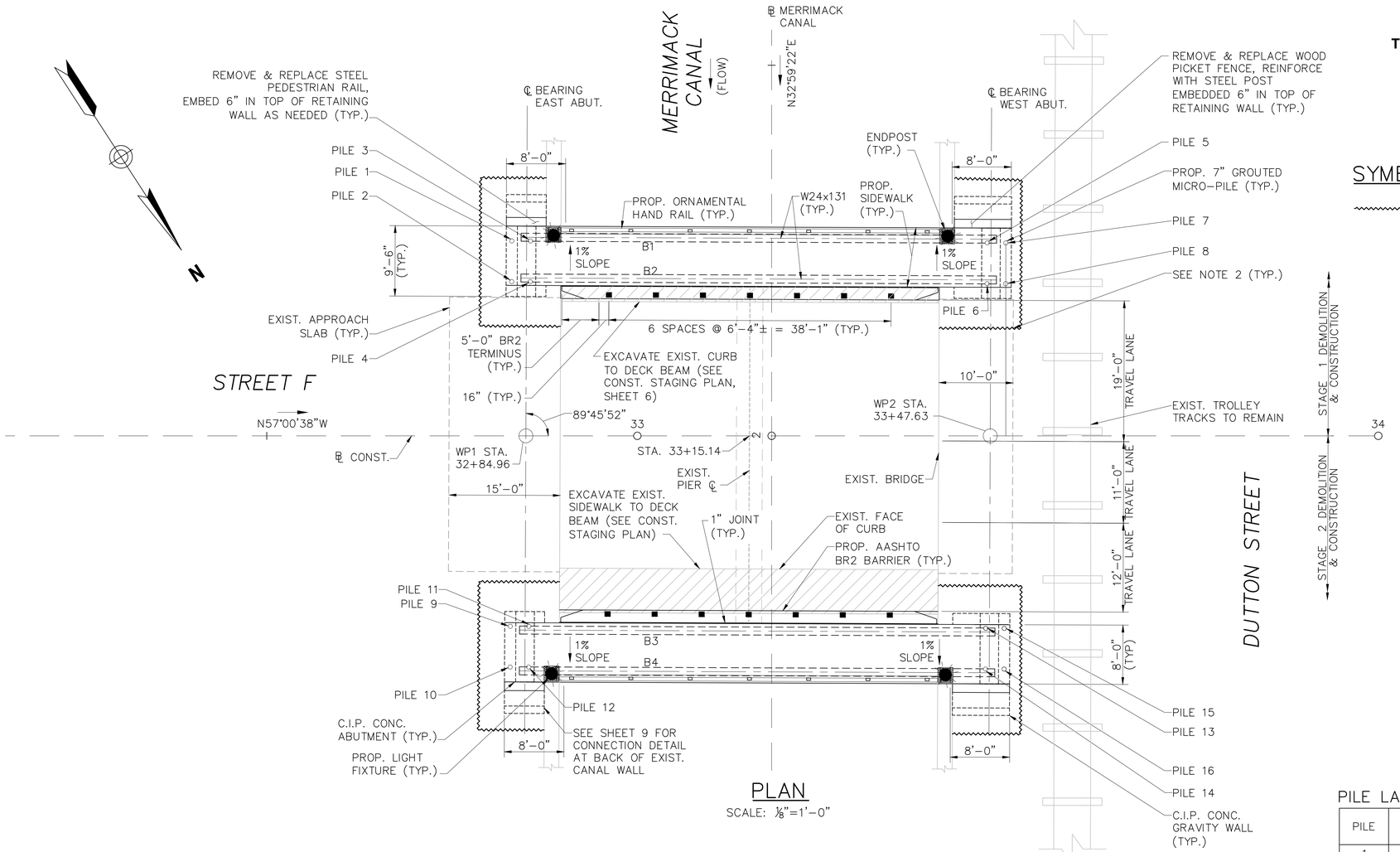
SHEET 1 OF 15 SHEETS BRIDGE NO. L-15-089 (2D1)

T0340.060_S1_COVER.DWG Plotted on 17-Oct-2017 8:54 AM

LOWELL
TWO BRIDGES AND STREETS F & G
PLAN & ELEVATION

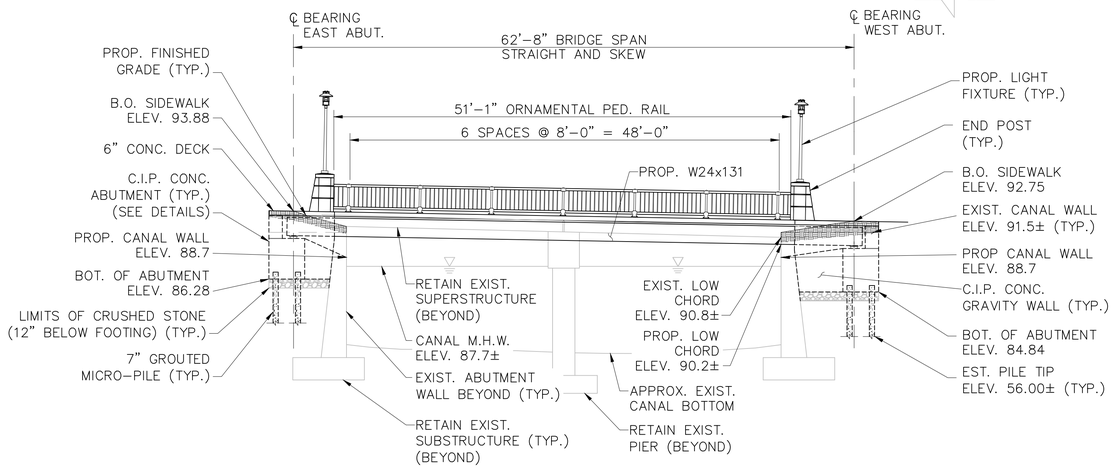
SHEET 82 OF 119

T0340.060_S4_PLAN&ELEV.DWG Plotted on 17-Oct-2017 8:55 AM



PLAN

SCALE: ⅛"=1'-0"



NORTH ELEVATION

SCALE: ⅛"=1'-0"

SYMBOLS

TEMPORARY EARTH SUPPORT SYSTEM

NOTES:

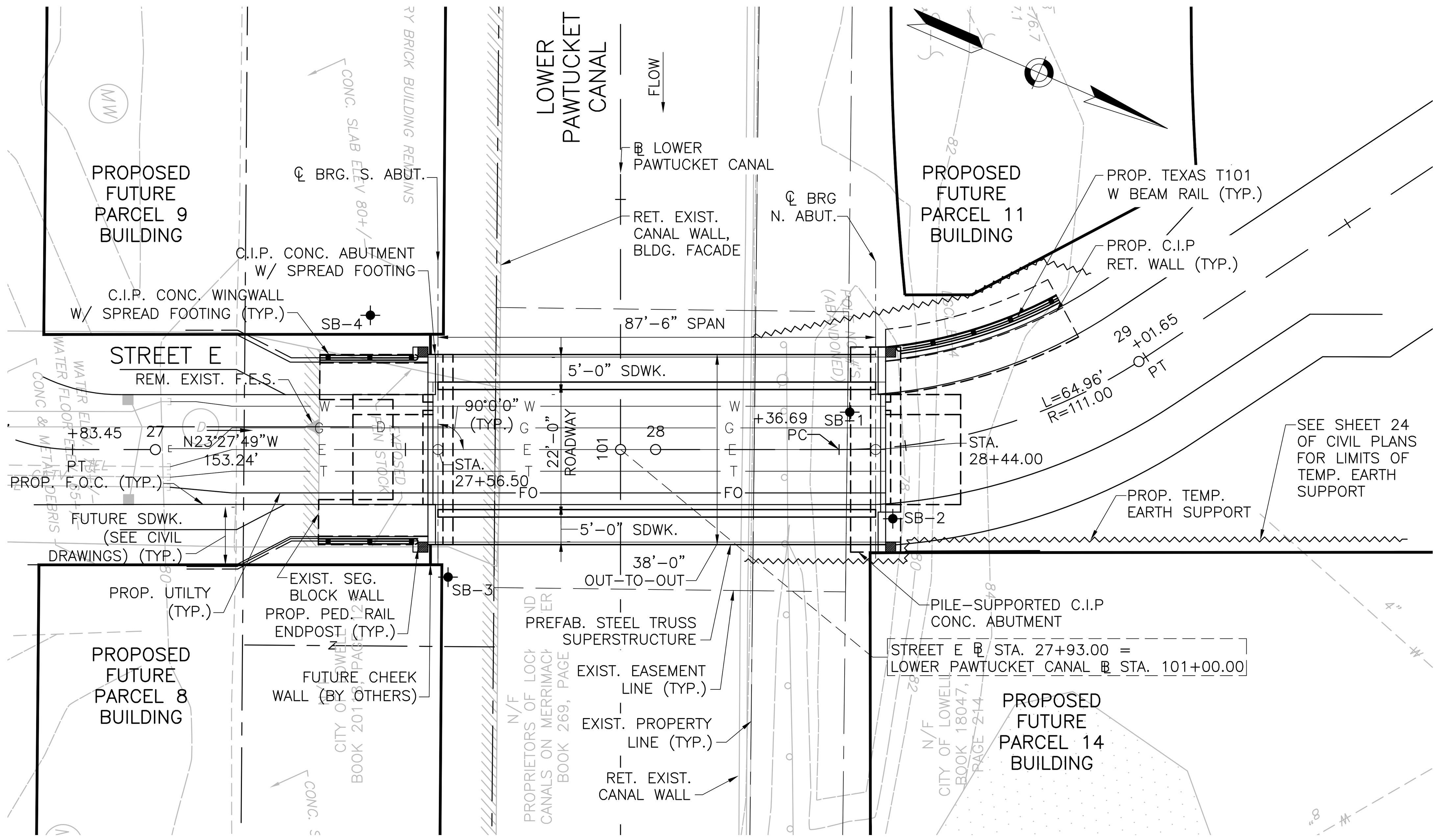
1. THE APPROXIMATE LIMITS OF THE TEMPORARY EARTH SUPPORT SYSTEM ARE SHOWN. THE EXACT LIMITS AND DETAILS SHALL BE DESIGNED BY THE CONTRACTOR PER THE PROJECT SPECIFICATIONS.
2. CONTRACTOR TO REMOVE AND REPLACE APPROACH SLAB AS REQUIRED TO INSTALL TEMPORARY EARTH SUPPORT SYSTEM. DETAILS TO BE INCLUDED IN TEMPORARY EARTH SUPPORT SYSTEM SUBMITTAL DESIGNED BY THE CONTRACTOR.
3. REFER TO THE CIVIL DRAWINGS FOR THE PROPOSED GRADES TO TIE INTO THE SIDEWALK OFF OF THE LIMITS OF THE BRIDGE.

PILE LAYOUT TABLE

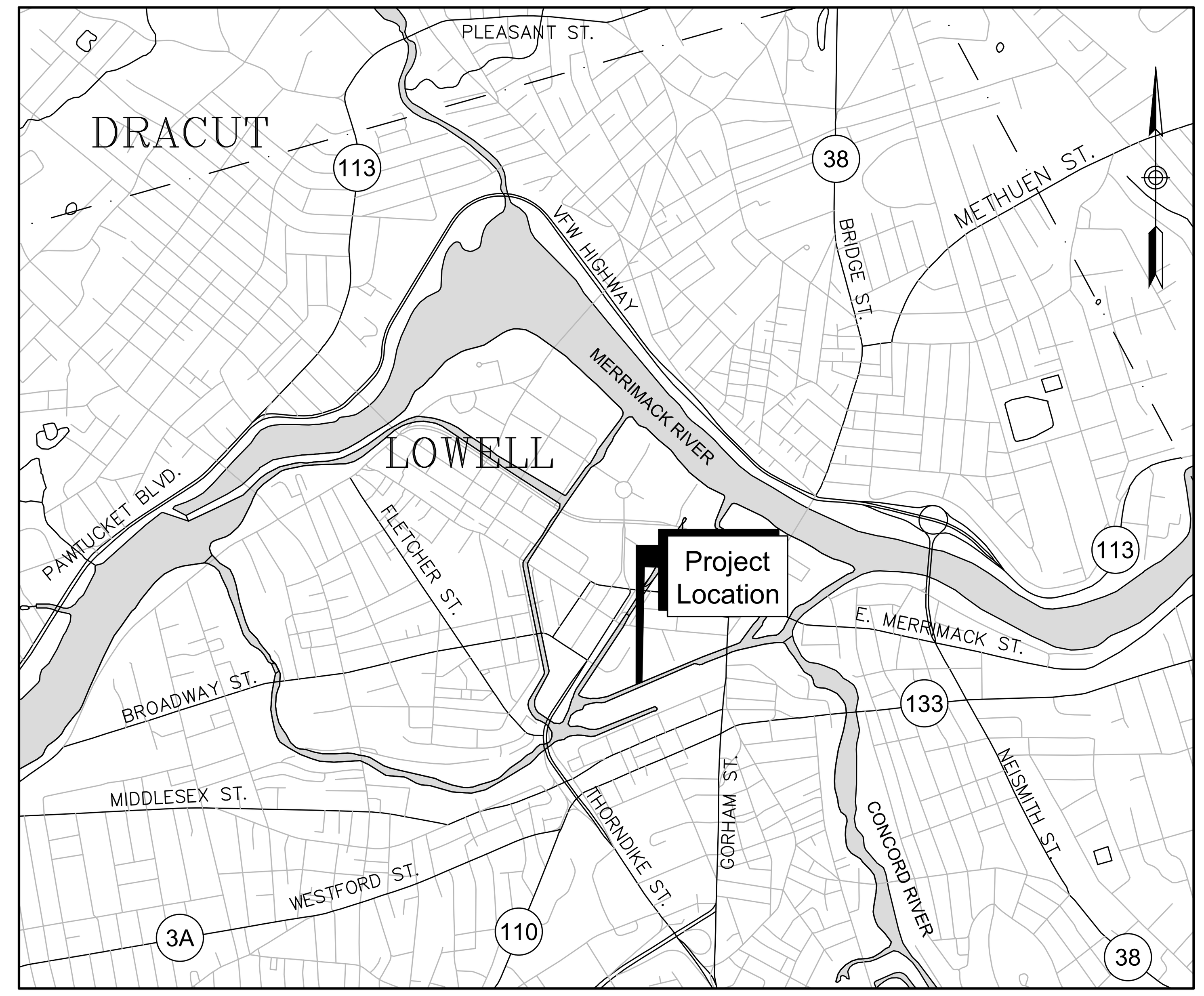
PILE	STREET F ℄ STATION	OFFSET (CENTER)
1	32+83.07	26.30' LT
2	32+83.05	20.80' LT
3	32+85.57	26.29' LT
4	32+85.55	20.80' LT
5	33+47.24	26.03' LT
6	33+47.22	20.54' LT
7	33+49.74	26.03' LT
8	33+49.72	20.53' LT
9	32+82.86	25.70' RT
10	32+82.83	31.20' RT
11	32+85.35	25.71' RT
12	32+85.33	31.21' RT
13	33+47.03	25.96' RT
14	33+47.00	31.46' RT
15	33+49.53	25.98' RT
16	33+49.50	31.47' RT

LOWELL
TWO BRIDGES AND STREETS F & G
KEY PLAN & PROFILE

SHEET 93 OF 119



KEY PLAN
SCALE: 1"=20'



LOCUS MAP
SCALE: 1"=1500'

GENERAL NOTES

DESIGN:
IN ACCORDANCE WITH THE 2010 AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS LRFD BRIDGE DESIGN SPECIFICATIONS FOR HL-93 LOADING.

SURVEY BENCHMARKS:

TBM #4: CUT SPIKE IN U.P., UP 1.0'	TBM #8: WEST END OF STEEL PIPE SUPPORT
N=3059017.3281	N=3059344.7839
E=706018.0629	E=706657.3202
EL.=88.83	EL.=77.79

ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988.

FOUNDATIONS:
FOUNDATIONS MAY BE ALTERED, IF NECESSARY, TO SUIT CONDITIONS ENCOUNTERED DURING CONSTRUCTION, WITH APPROVAL OF THE ENGINEER. SEE THE GEOTECHNICAL REPORT PREPARED BY MCPHAIL ASSOCIATES, INC. DATED MAY 3, 2011 AND SUPPLEMENTED WITH A MEMORANDUM DATED JULY 22, 2011 FOR GEOTECHNICAL INFORMATION.

UNSUITABLE MATERIAL:
ALL UNSUITABLE MATERIAL SHALL BE REMOVED WITHIN THE LIMITS OF THE FOUNDATIONS OF THE STRUCTURE, AS DIRECTED BY THE ENGINEER.

SEISMIC GROUND SHAKING HAZARD:
DESIGN SPECTRA:
$A_S = 0.128$
$S_{DS} = 0.256$
$S_{D1} = 0.096$
SITE CLASS = D
SEISMIC DESIGN CATERGORY (SDC) = A

SUPERSTRUCTURE:
WITH THE EXCEPTION OF THE CONCRETE DECK, ALL SUPERSTRUCTURE ELEMENTS SHALL BE DESIGNED BY THE CONTRACTOR. ELEMENTS INCLUDE, BUT ARE NOT LIMITED TO, THE STEEL TRUSS, FLOOR BEAMS AND STRINGERS, BEARINGS THE ORNAMENTAL PEDESTRIAN RAILING, AND SIDEWALKS.

CONCRETE:
5000 PSI, $\frac{3}{4}$", 585 HP CEMENT CONCRETE SHALL USED TO CONSTRUCT THE CAST-IN-PLACE SIDEWALKS AND SAFETY CURBS.

4000 PSI, $\frac{3}{4}$", 610 CEMENT CONCRETE SHALL BE USED TO CONSTRUCT THE CAST-IN-PLACE ABUTMENT BACKWALL.

4000 PSI, $\frac{3}{4}$" 585 HP CEMENT CONCRETE SHALL BE USED TO CONSTRUCT THE CAST-IN-PLACE DECK SLABS.

4000 PSI, $1\frac{1}{2}$", 565 CEMENT CONCRETE SHALL BE USED TO CONSTRUCT THE CAST-IN-PLACE ABUTMENT STEMS AND FOOTINGS, THE CAST-IN-PLACE RETAINING WALL STEMS AND FOOTINGS, AND THE CAST-IN-PLACE APPROACH SLABS.

ANCHOR BOLTS:
ALL ANCHOR BOLTS SHALL BE SET BY TEMPLATE BEFORE THE CONCRETE IS PLACED, EXCEPT AT ABUTMENTS, WHERE CORING AND GROUTING MAY BE USED AT THE CONTRACTOR'S OPTION, PROVIDED THAT THE METHOD OF INSTALLATION WILL NOT CUT REINFORCING STEEL.

REINFORCEMENT STEEL:
REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M 31 GRADE 60, EPOXY COATED. UNLESS OTHERWISE NOTED ON THE CONSTRUCTION DRAWINGS, ALL BARS SHALL BE LAPPED AS FOLLOWS:

MODIFICATION CONDITION	#4 BARS	#5 BARS
1. NONE	21"	26"
2. 12" OF CONCRETE BELOW BARS	29"	36"
3. COATED BARS, COVER<3db, OR CLEAR SPACING<6db	31"	39"
4. COATED BARS, ALL OTHER CASES	25"	31"
5. CONDITION 2. AND 3.	35"	44"
6. CONDITION 2. AND 4.	34"	43"

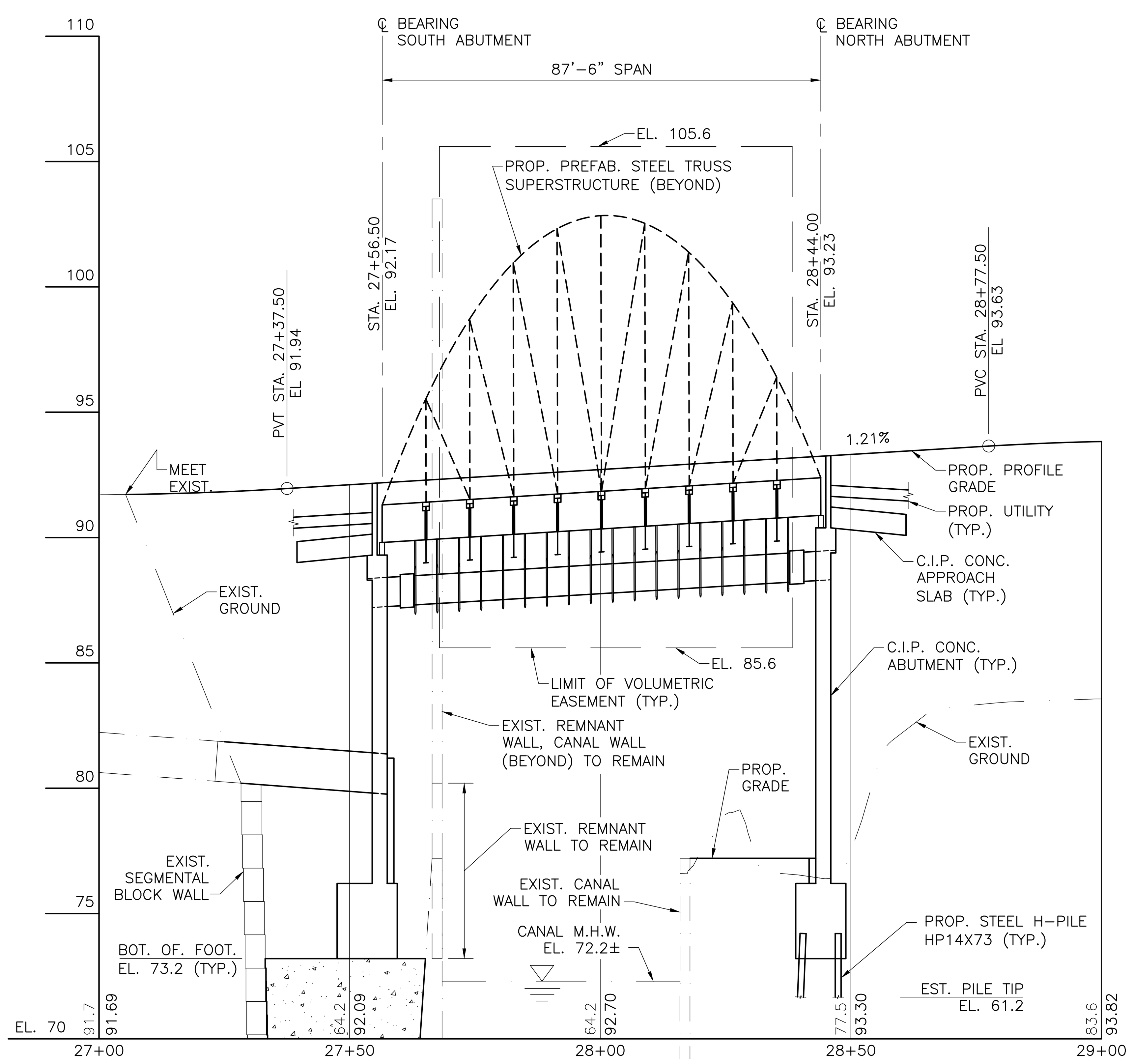
IF THE ABOVE BARS ARE SPACED 6" OR MORE ON CENTER, THE LAP LENGTH SHALL BE 80% OF THE LAP LENGTH GIVEN ABOVE. ALL OTHER BARS SHALL BE LAPPED AS SHOWN ON THE CONSTRUCTION DRAWINGS.

STRUCTURAL STEEL:
SEE SHEET 11 FOR STRUCTURAL STEEL NOTES.

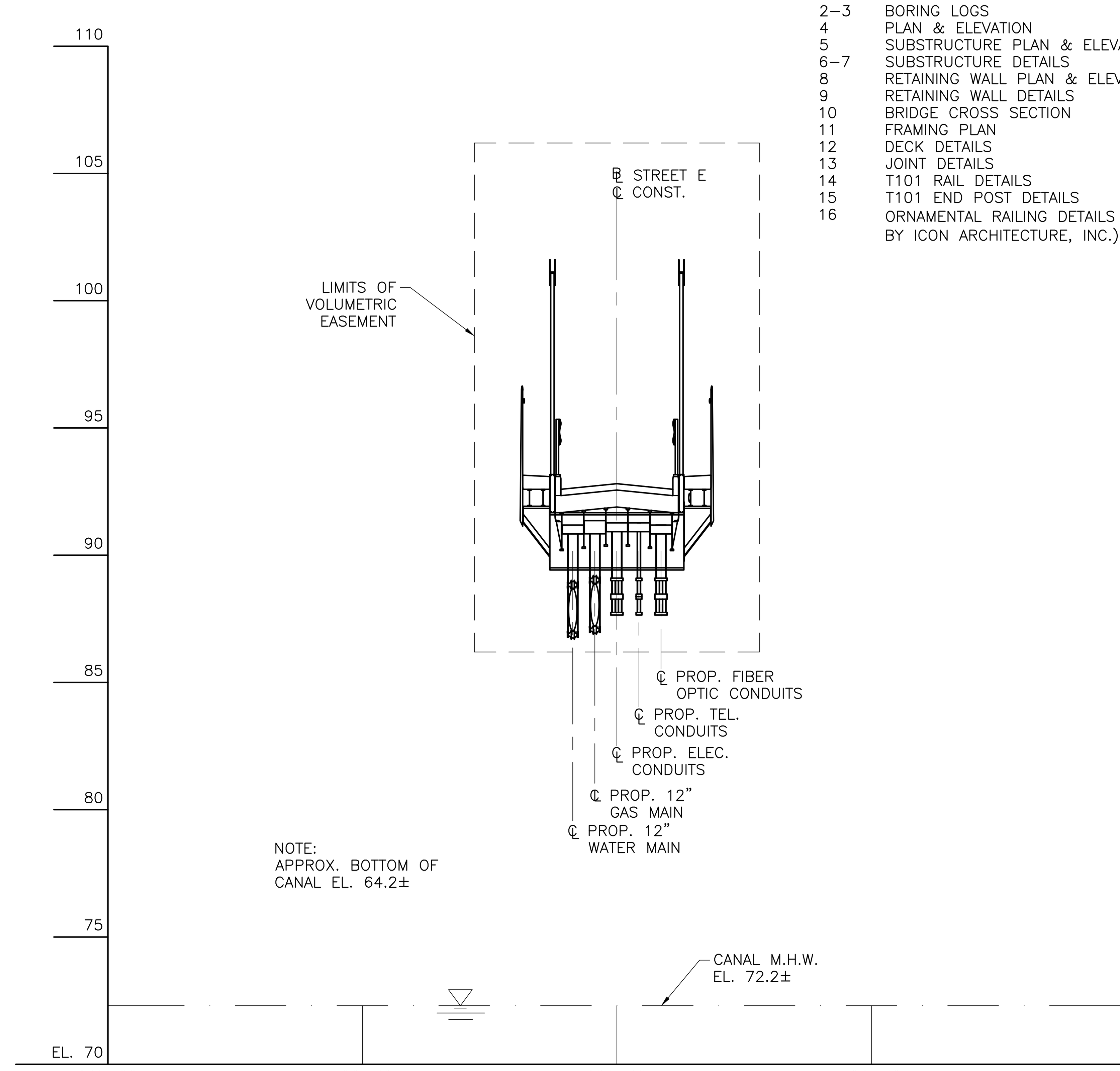
HYDRAULIC DATA

DRAINAGE AREA:	N/A (REGULATED CANAL)
DESIGN DISCHARGE:	UNKNOWN
DESIGN FREQUENCY:	N/A (REGULATED CANAL)
DESIGN VELOCITY:	UNKNOWN
DESIGN HIGH WATER ELEVATION:	72.2 FEET
BASIC FLOOD DATA	
Q (100 YEAR):	N/A (REGULATED CANAL)
WATER SURFACE ELEVATION:	N/A (REGULATED CANAL)
FLOOD OF RECORD	
Q =:	UNKNOWN
FREQUENCY:	UNKNOWN
DATE:	UNKNOWN
HISTORY OF ICE FLOWS:	NONE DOCUMENTED
EVIDENCE OF SCOUR AND EROSION:	NONE DOCUMENTED

INDEX OF SHEETS



STREET E PROFILE
SCALE: HORIZONTAL 1"=20'
VERTICAL 1"=4'



LOWER PAWTUCKET CANAL PROFILE
SCALE: HORIZONTAL 1"=20'
VERTICAL 1"=4'

October 17, 2017	ISSUED FOR CONSTRUCTION

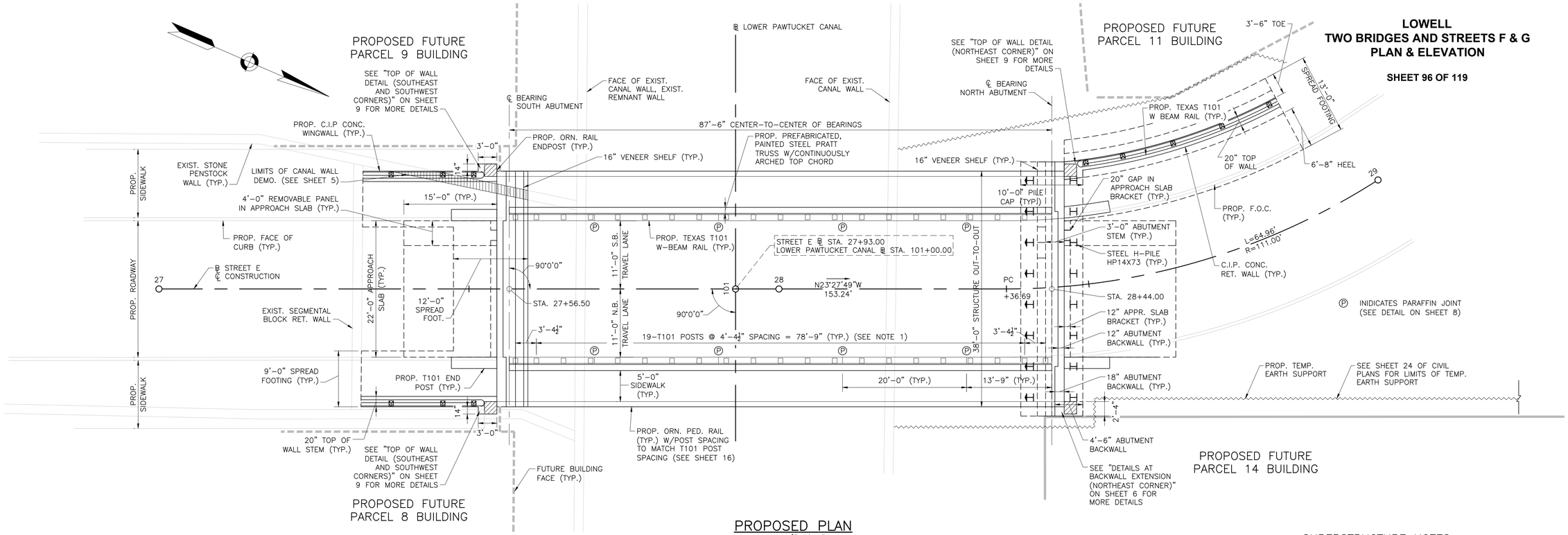
PROPOSED BRIDGE
LOWELL
STREET E OVER
LOWER PAWTUCKET CANAL

CITY OF LOWELL
375 MERRIMACK STREET
LOWELL, MA 01852

TEC
TEC, INC.
65 GLENN STREET
LAWRENCE, MA 01843

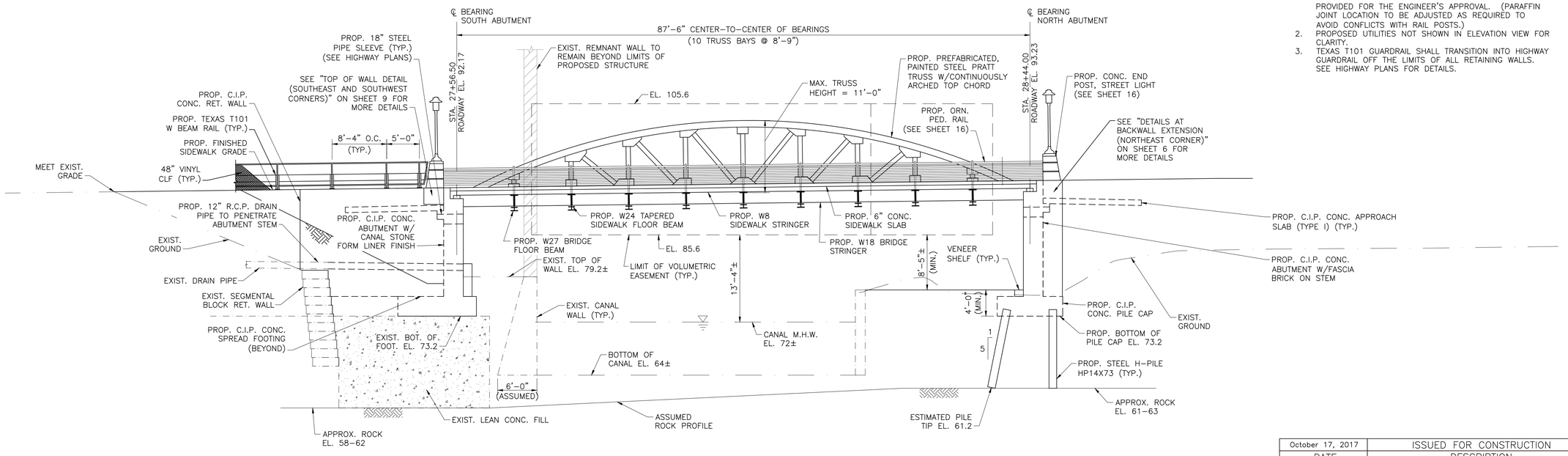
LOWELL
TWO BRIDGES AND STREETS F & G
PLAN & ELEVATION

SHEET 96 OF 119



PROPOSED PLAN

SCALE: ⅛"=1'-0"



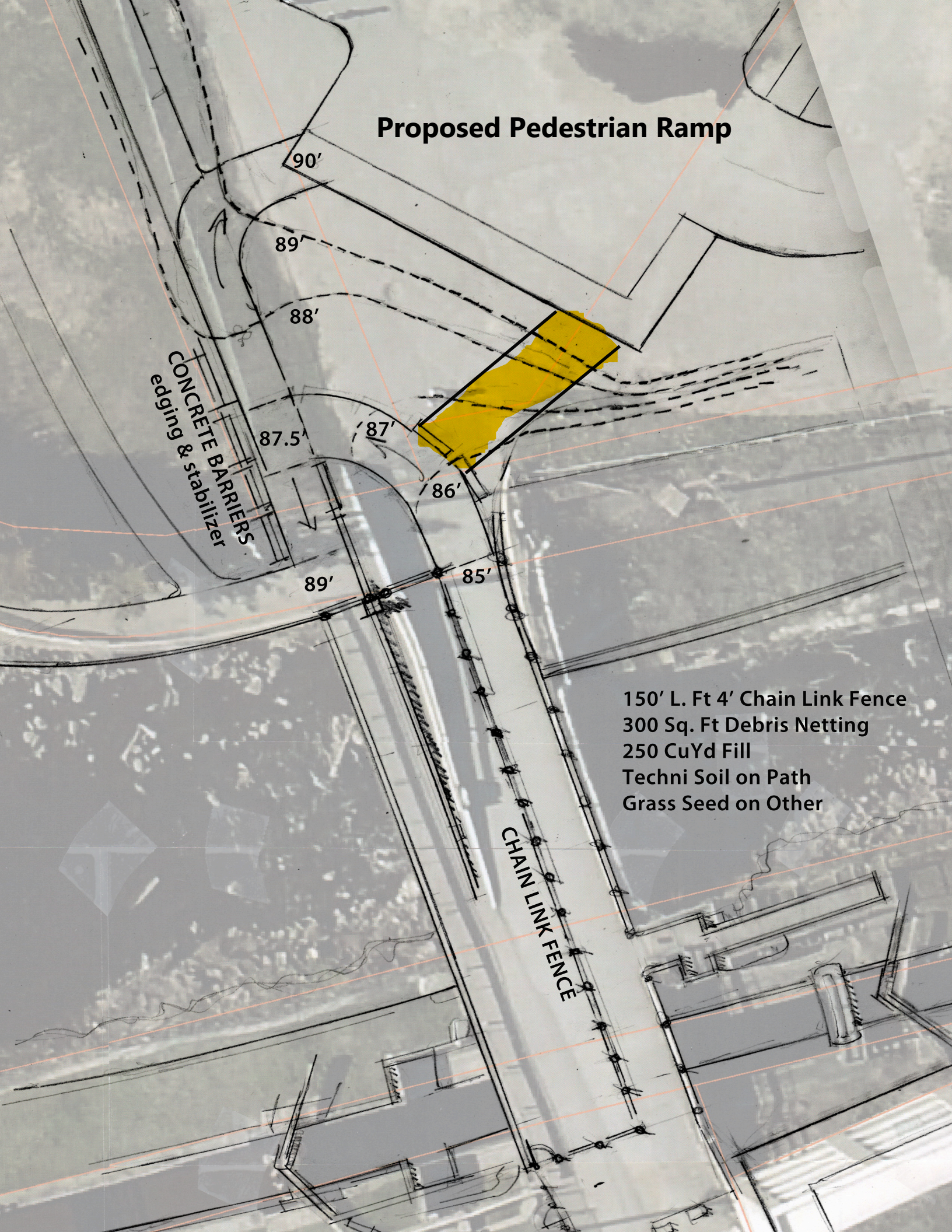
PROPOSED EAST ELEVATION (LOOKING WEST)

SCALE: ⅛"=1'-0"

SUPERSTRUCTURE NOTES:

1. THE PROPOSED T101 RAIL POST SPACING IS PROVIDED ASSUMING 8'-9" TRUSS VERTICAL MEMBER SPACING. IF THE ACTUAL SPACING VARIES, PROVIDE ONE POST AT EACH TRUSS VERTICAL AND ONE POST AT THE MIDPOINT BETWEEN EACH VERTICAL. THE MAXIMUM T101 RAIL POST SPACING SHALL BE 8'-4" AND SHALL BE SPECIFIED ON THE T101 RAILING SHOP DRAWINGS PROVIDED FOR THE ENGINEER'S APPROVAL. (PARAFFIN JOINT LOCATION TO BE ADJUSTED AS REQUIRED TO AVOID CONFLICTS WITH RAIL POSTS.)
2. PROPOSED UTILITIES NOT SHOWN IN ELEVATION VIEW FOR CLARITY.
3. TEXAS T101 GUARDRAIL SHALL TRANSITION INTO HIGHWAY GUARDRAIL OFF THE LIMITS OF ALL RETAINING WALLS. SEE HIGHWAY PLANS FOR DETAILS.

DATE	DESCRIPTION
October 17, 2017	ISSUED FOR CONSTRUCTION
USE ONLY PRINTS OF LATEST DATE	


Proposed Pedestrian Ramp
90′
89′
88′
87.5′
87′
86′
89′
85′
CONCRETE BARRIERS
edging & stabilizer
150′ L. Ft 4′ Chain Link Fence
300 Sq. Ft Debris Netting
250 CuYd Fill
Techni Soil on Path
Grass Seed on Other
CHAIN LINK FENCE