STATE OF VERMONT
AGENCY OF TRANSPORTATION

APPROACH	AADT		DHV		%T		%D		ADTT		ESALS	
	2016	2036	2016	2036	2016	2036	2016	2036	2016	2036	(2016-2036)	(2016-2056)
VT100 (SOUTH LEG)	10,000	10,200	1,100	1,100	1.8	3.0	59	59	590	1000	4,730,000	11,242,000
VT100 (LAPORTE RD) (EAST LEG)	5,400	5,500	590	600	2.9	4.9	57	57	270	470	2,025,000	4,838,000
ALT VT100 (NORTH LEG)	6,300	6,400	690	700	1.4	2.5	58	58	410	690	3,437,000	8,117,000
BISHOP MARSHALL DR (WEST LEG)	520	530	40	40	0	0	50	50	20	30	76,000	170,000

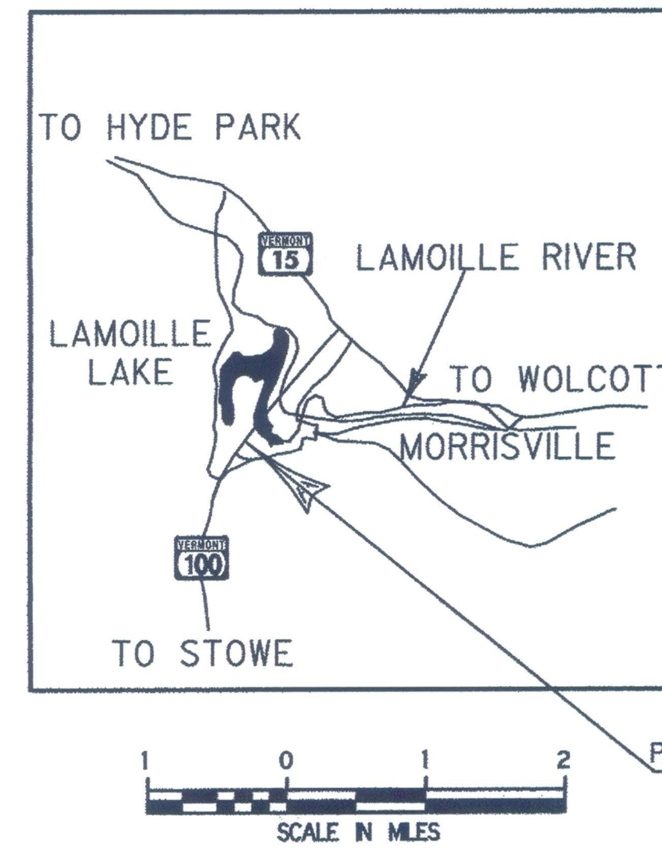
VT100 & ALT VT100

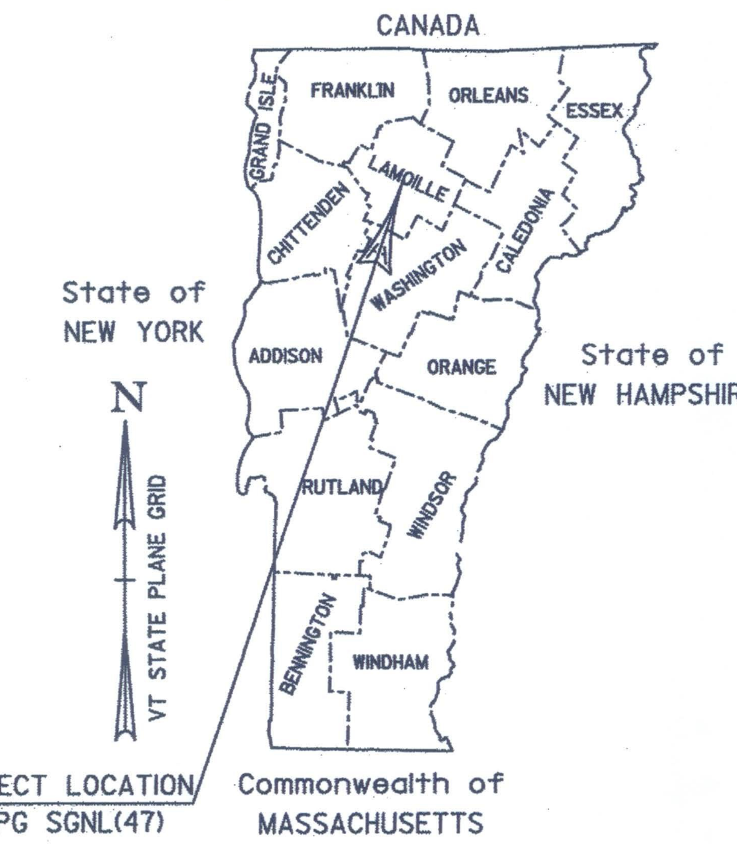
POSTED SPEED =	40 mph
DESIGN SPEED =	50 mph

VT100(LAPORTE RD) & BISHOP MARSHALL DRIVE

POSTED SPEED =	25 mph
DESIGN SPEED =	35 mph

BITUMINOUS CONCRETE PAVEMENT SUPERPAVE MIXTURE DESIGN CRITERIA	
DESIGN LIFE ESALS (DESIGN LANE) (20 YR)	2,790,700
DESIGN NUMBER OF GYRATIONS	65
PERFORMANCE GRADED ASPHALT BINDER	SEE SECTION 490



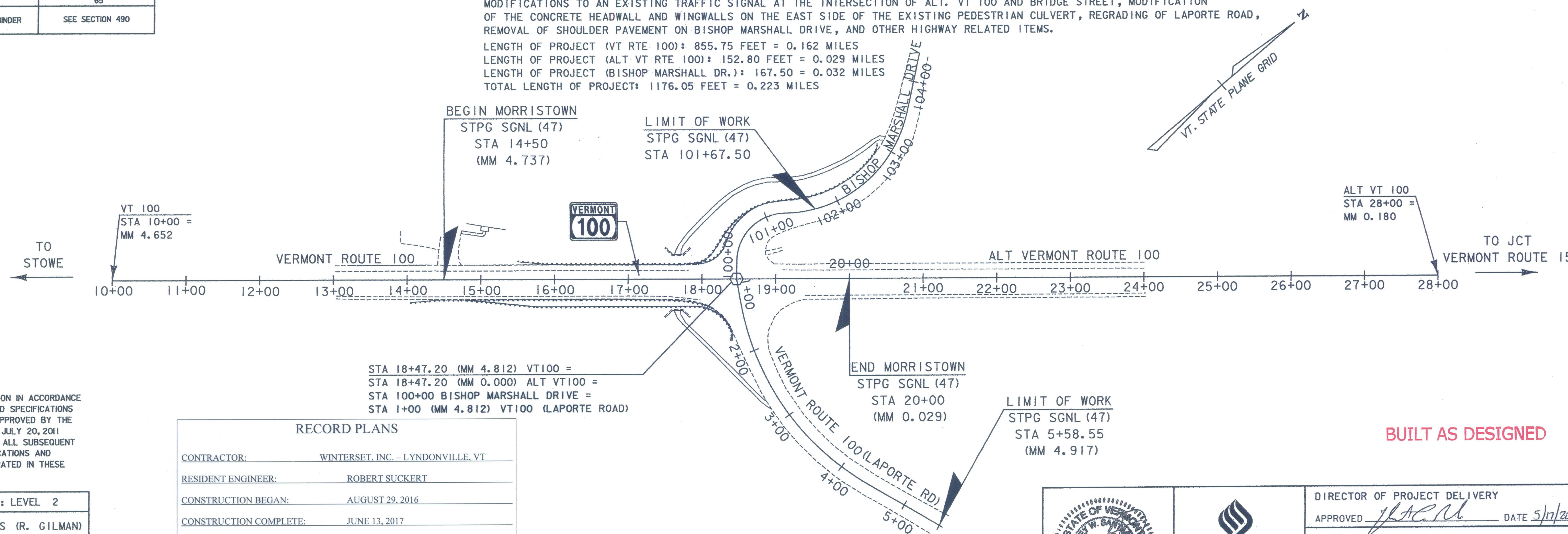


PROPOSED IMPROVEMENT
TOWN OF MORRISTOWN
COUNTY OF LAMOILLE
VT ROUTE 100, ALT VT ROUTE 100 (MAJOR COLLECTOR)

PROJECT LOCATION : BEGINNING AT A POINT ON VT100 IN THE TOWN OF MORRISTOWN AT STA 14+50 (MM 4.737) APPROXIMATELY 400 FEET SOUTHERLY OF THE INTERSECTION OF ALT VT100 AND VT100 (LAPORTE ROAD) EXTENDING NORTHERLY APPROXIMATELY 550 FEET TO STATION 20+00 (MM 0.029) ON ALT VT100

PROJECT DESCRIPTION : WORK TO BE PERFORMED UNDER THIS PROJECT INCLUDES THE INSTALLATION OF A NEW TRAFFIC SIGNAL, ROADWAY WIDENING, MODIFICATIONS TO AN EXISTING TRAFFIC SIGNAL AT THE INTERSECTION OF ALT. VT 100 AND BRIDGE STREET, MODIFICATION OF THE CONCRETE HEADWALL AND WINGWALLS ON THE EAST SIDE OF THE EXISTING PEDESTRIAN CULVERT, REGRADING OF LAPORTE ROAD, REMOVAL OF SHOULDER PAVEMENT ON BISHOP MARSHALL DRIVE, AND OTHER HIGHWAY RELATED ITEMS.

LENGTH OF PROJECT (VT RTE 100): 855.75 FEET = 0.162 MILES
LENGTH OF PROJECT (ALT VT RTE 100): 152.80 FEET = 0.029 MILES
LENGTH OF PROJECT (BISHOP MARSHALL DR.): 167.50 = 0.032 MILES
TOTAL LENGTH OF PROJECT: 1176.05 FEET = 0.223 MILES



BUILT AS DESIGNED

CONSTRUCTION IS TO BE CARRIED ON IN ACCORDANCE WITH THESE PLANS AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION DATED 2011, AS APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION ON JULY 20, 2011 FOR USE ON THIS PROJECT, INCLUDING ALL SUBSEQUENT REVISIONS AND SUCH REVISED SPECIFICATIONS AND SPECIAL PROVISIONS AS ARE INCORPORATED IN THESE PLANS.

QUALITY ASSURANCE PROGRAM : LEVEL 2

SURVEYED BY : VTRANS (R. GILMAN)
SURVEYED DATE : 07/15

DATUM
VERTICAL NAVD 88
HORIZONTAL NAD83 (92)

RECORD PLANS

CONTRACTOR: WINTERSET, INC. – LYNDONVILLE, VT
RESIDENT ENGINEER: ROBERT SUCKERT
CONSTRUCTION BEGAN: AUGUST 29, 2016
CONSTRUCTION COMPLETE: JUNE 13, 2017
RECORD PLANS BY: ROBERT SUCKERT & JESSE IVES

I HEREBY CERTIFY THAT ALL THE CONSTRUCTION REQUIRED BY THIS SET OF DRAWINGS HAS BEEN ACCOMPLISHED AS INDICATED HEREIN.

BY [signature] RESIDENT ENGINEER
DATE 4-27-18

NOTE: Any further information concerning final quantities, amounts or other details relative to this project may be found at Central Files in the electronic archives.

STATE OF VERMONT — STEVEN W. SANTAKUS — NO. 9128 — CIVIL — LICENSED PROFESSIONAL ENGINEER
5/10/16

McFarland Johnson

DIRECTOR OF PROJECT DELIVERY
APPROVED [signature] DATE 5/17/2016

PROJECT MANAGER : ERIN PARIZO, P.E.

PROJECT NAME : MORRISTOWN
PROJECT NUMBER : STPG SGNL (47)

SHEET 1 OF 58 SHEETS

INDEX OF SHEETS

VAOT STANDARDS LIST

D-20	03-03-2003
E-121	08-08-1995
E-127	08-08-1995
E-136B	08-08-1995
E-163	05-20-1999
E-171A	08-09-1995
E-171B	08-09-1995
E-171C	08-09-1995
E-173	08-09-1995
E-175	06-08-2009
E-191	02-01-1999
E-192	10-12-2000
E-193	08-18-1995
F-2	06-01-1994
G-1	11-10-2015
G-19	11-15-2002
T-1	04-25-2016
T-2	04-25-2016
T-10	08-06-2012
T-17	08-06-2012
T-21	08-06-2012
T-30	08-06-2012
T-35	08-06-2012
T-36	08-06-2012
T-40	01-02-2013
T-42	04-09-2014
T-44	04-09-2014
T-45	01-02-2013
T-80	02-12-2016
T-81	02-12-2016
T-134	12-21-2015

VAOT STANDARDS DETAILS

HSD-400.01	03-29-2016

McFarland Johnson

PROJECT NAME: MORRISTOWN
PROJECT NUMBER: STPG SGNL(47)

FILE NAME: z15t047ind.dgn
PROJECT LEADER: J. SANTACRUCE
DESIGNED BY: R. LUCHINI
INDEX OF SHEETS

PLOT DATE: 5/13/2016
DRAWN BY: M. LOVETT
CHECKED BY: B. COLBURN

STATE OF VERMONT
AGENCY OF TRANSPORTATION

PROJECT NOTES

GENERAL

ROADWAY WORK ON VT ROUTE 100 AND A PORTION OF ALT VT ROUTE 100 AT THE INTERSECTION OF BISHOP MARSHALL DRIVE AND VT ROUTE 100 (LAPORTE ROAD) CONSISTS OF THE WIDENING OF VT ROUTE 100 FOR A NORTHBOUND RIGHT-TURN LANE AND THE INSTALLATION OF A NEW TRAFFIC CONTROL SIGNAL. THIS WILL REQUIRE ADDITIONAL WORK ON THE EXISTING PEDESTRIAN CULVERT AND VT ROUTE 100 (LAPORTE ROAD) AS DESCRIBED BELOW.

ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE AGENCY OF TRANSPORTATION'S STANDARD SPECIFICATIONS FOR CONSTRUCTION, DATED 2011, AND ITS LATEST REVISIONS, AND THE AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SEVENTEENTH EDITION, AND ITS LATEST REVISIONS.

ROADWAY WIDENING

VT ROUTE 100 AND ALT VT ROUTE 100 WILL BE WIDENED TO PROVIDE A NORTHBOUND RIGHT-TURN LANE. THIS WORK WILL REQUIRE THE REMOVAL AND RELOCATION OF THE EXISTING GUARDRAIL, EXCAVATION OF THE EXISTING SHOULDER, PLACEMENT OF SUBBASE MATERIAL, SLOPE WORK, AND PAVING. TO FACILITATE THE RESTRIPING OF THE INTERSECTION A PORTION OF VT ROUTE 100 AND ALT VT ROUTE 100 WILL BE COLD PLANED AND OVERLAYED. THE COLD PLANE AND OVERLAY WILL BE THE FULL WIDTH OF THE ROADWAY FROM STA. 14+50 TO STA. 19+75. THE COLD PLANE WILL RUN PAST BISHOP MARSHALL DRIVE AND VT ROUTE 100 (LAPORTE ROAD)ALONG THE EXISTING EDGE OF PAVEMENT LINE OF VT ROUTE 100 AND ALT VT ROUTE 100.

TO FACILITATE THE ROADWAY WIDENING ALONG VT ROUTE 100 IT WILL BE NECESSARY TO MODIFY THE HEADWALL AND WINGWALLS ON THE EAST END OF THE EXISTING PEDESTRIAN CULVERT AS DESCRIBED BELOW UNDER THE WORK ON THE EXISTING PEDESTRIAN CULVERT SECTION.

RECONSTRUCTION OF VT ROUTE 100 (LAPORTE ROAD)

AS PART OF THIS PROJECT A SECTION OF VT ROUTE 100 (LAPORTE ROAD) WILL BE RECONSTRUCTED IN ORDER TO CHANGE THE EXISTING PROFILE AND CROSS SECTIONS AS THE ROADWAY APPROACHES THE INTERSECTION. THE WORK ON VT ROUTE 100 LAPORTE ROAD) WILL START AT STA 1+22.55 AND EXTEND TO STA 5+85.55.
THE WORK WILL CONSIST OF THE REMOVAL OF THE EXISTING PAVEMENT SURFACE, THE SHIMMING OF THE EXISTING DENSE GRADED CRUSHED GRAVEL SUBBASE TO THE GRADES SHOWN ON THE PROFILE AND CROSS SECTIONS. AFTER THE ROADWAY GRADES HAVE BEEN ADJUSTED THE ROADWAY WILL BE PAVED WITH A TOTAL OF 8 INCHES OF BITUMINOUS CONCRETE PAVEMENT AS SHOWN ON THE TYPICAL SECTION.

IN ADDITION, A NEW CONCRETE TRUCK APRON, AS SHOWN ON THE DETAIL SHEET, WILL BE CONSTRUCTED ON THE NORTHEAST CORNER OF THE INTERSECTION, AS SHOWN ON THE LAYOUT PLAN. SEE THE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION.

WORK ON EXISTING PEDESTRIAN CULVERT

TO FACILITATE THE ROADWAY WIDENING IT WILL BE NECESSARY TO MODIFY THE EXISTING HEADWALL AND WINGWALLS (#'s 3&4) ON THE EAST END OF THE EXISTING PEDESTRIAN CULVERT. THIS WORK WILL INCLUDE DRILLING AND GROUTING DOWELS INTO THE EXISTING HEADWALL AND WINGWALLS, PLACING NEW REINFORCING STEEL, AND PLACING NEW CONCRETE AS SHOWN ON THE PEDESTRIAN CULVERT DETAIL SHEET.

IN ADDITION, A NEW VIDEO SURVEILLANCE CAMERA SYSTEM WILL BE INSTALLED ON THE INSIDE OF THE EXISTING PEDESTRIAN CULVERT. SEE THE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION.

LASTLY THE WORK ON THE EXISTING PEDESTRIAN CULVERT WILL INCLUDE MODIFICATIONS TO THE EXISTING LIGHTING SYSTEM IN ORDER TO INSTALL MOTION SENSORS.

NEW TRAFFIC SIGNAL

WORK AT THE INTERSECTION WILL INCLUDE THE INSTALLATION OF A NEW TRAFFIC CONTROL SIGNAL, VEHICLE STOP BAR AND ADVANCED DETECTION, PULLBOXES, CONDUIT INSTALLATION OF NEW SIGNS. CONDUIT RUNS INSTALLED UNDER THE EXISTING ROADWAYS, INCLUDING VT ROUTE 100, BISHOP MARSHALL DRIVE, AND VT ROUTE 100 (LAPORTE ROAD), SHALL BE ACCOMPLISHED USING HORIZONTAL DIRECTIONAL DRILLING USING A 12" CASING. SEE THE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION ON THE HORIZONTAL DIRECTIONAL DRILLING.

MODIFICATION OF EXISTING TRAFFIC SIGNAL SYSTEM, INTERSECTION

THIS WORK INCLUDES MODIFICATIONS TO THE EXISTING TRAFFIC CONTROL SIGNAL AT THE INTERSECTION OF ALT VT ROUTE 100 AND BRIDGE STREET IN THE TOWN OF MORRISTOWN. THE WORK WILL INCLUDE THE REMOVAL OF THE EXISTING 3-SECTION LEFT-TURN SIGNAL HEADS ON ALT VT ROUTE 100 IN BOTH THE NORTHBOUND AND SOUTHBOUND DIRECTION AND THE INSTALLATION OF NEW 4-SECTION SIGNAL HEADS TO FACILITATE CHANGING THE OPERATION OF THE SIGNAL TO ALLOW FOR PERMISSIVE /PROTECTED LEFT-TURN PHASING ON ALT VT ROUTE 100 USING THE FLASHING YELLOW ARROW CONFIGURATION. WORK WILL ALSO INCLUDE MAKING CHANGES TO THE EXISTING SIGNAL CONTROLLER, SIGNAL TIMING, AND PHASINGS TO ACCOMMODATE THE FLASHING YELLOW ARROW SIGNAL OPERATION.

WORK ON BISHOP MARSHALL DRIVE

THE WORK ON BISHOP MARSHALL DRIVE INCLUDES THE REMOVAL OF A PORTION OF THE EXISTING PAVEMENT ALONG THE SHOULDERS IN ORDER TO NARROW THE PAVEMENT APPROACH, THE REMOVAL AND RELOCATION OF THE EXISTING GUARDRAIL FROM STA. 100+21.4 TO STA 100+90.0 AS SHOWN ON THE LAYOUT PLANS(HATCHED AREA), AND THE REMOVAL OF THE EXISTING PAVEMENT MARKINGS WITHIN THE PROJECT LIMITS AND THE PLACEMENT OF NEW PAVEMENT MARKINGS.

GENERAL INFORMATION

SYMBOLOGY LEGEND NOTE

THE SYMBOLOGY ON THIS SHEET IS INTENDED TO COVER STANDARD CONVENTIONAL SYMBOLOGY. THE SYMBOLOGY IS USED FOR EXISTING & PROPOSED FEATURES WITH HEAVIER LINEWEIGHT, IN COMBINATION WITH PROJECT ANNOTATION, AS NOTED ON PROJECT PLAN SHEETS. THIS LEGEND SHEET COVERS THE BASICS. SYMBOLOGY ON PLANS MAY VARY, PLAN ANNOTATIONS AND NOTES SHOULD BE USED TO CLARIFY AS NEEDED.

R.O.W. ABBREVIATIONS (CODES) & SYMBOLS

POINT	CODE	DESCRIPTION
	CH	CHANNEL EASEMENT
	CONST	CONSTRUCTION EASEMENT
	CUL	CULVERT EASEMENT
	D&C	DISCONNECT & CONNECT
	DIT	DITCH EASEMENT
	DR	DRAINAGE EASEMENT
	DRIVE	DRIVEWAY EASEMENT
	EC	EROSION CONTROL
	HWY	HIGHWAY EASEMENT
	I&M	INSTALL & MAINTAIN EASEMENT
	LAND	LANDSCAPE EASEMENT
	R&RES	REMOVE & RESET
	R&REP	REMOVE & REPLACE
	SR	SLOPE RIGHT
	UE	UTILITY EASEMENT
	(P)	PERMANENT EASEMENT
	(T)	TEMPORARY EASEMENT
■	BNDNS	BOUND SET
⊡	BNDNS	BOUND TO BE SET
●	IPNS	IRON PIN SET
◎	IPNS	IRON PIN TO BE SET
⊠	CALC	EXISTING ROW POINT
○	PROW	PROPOSED ROW POINT
[LENGTH]		LENGTH CARRIED ON NEXT SHEET

COMMON TOPOGRAPHIC POINT SYMBOLS

POINT	CODE	DESCRIPTION
	APL	BOUND APPARENT LOCATION
	BM	BENCHMARK
	BND	BOUND
	CB	CATCH BASIN
	COMB	COMBINATION POLE
	DITHR	DROP INLET THROATED DNC
	EL	ELECTRIC POWER POLE
	FPOLE	FLAGPOLE
	GASFIL	GAS FILLER
	GP	GUIDE POST
	GSO	GAS SHUT OFF
	GUY	GUY POLE
	GUYW	GUY WIRE
	GV	GATE VALUE
	H	TREE HARDWOOD
	HCTRL	CONTROL HORIZONTAL
	HVCTRL	CONTROL HORIZ. & VERTICAL
	HYD	HYDRANT
	IP	IRON PIN
	IPIPE	IRON PIPE
	LI	LIGHT - STREET OR YARD
	MB	MAILBOX
	MH	MANHOLE (MH)
	MM	MILE MARKER
	PM	PARKING METER
	PMK	PROJECT MARKER
	POST	POST STONE/WOOD
	RRSIG	RAILROAD SIGNAL
	RRSL	RAILROAD SWITCH LEVER
	S	TREE SOFTWOOD
	SAT	SATELLITE DISH
	SHRUB	SHRUB
	SIGN	SIGN
	STUMP	STUMP
	TEL	TELEPHONE POLE
	TIE	TIE
	TSIGN	SIGN W/DOUBLE POST
	VCTRL	CONTROL VERTICAL
	WELL	WELL
	WSO	WATER SHUT OFF

THESE ARE COMMON VAOT SURVEY POINT SYMBOLS FOR EXISTING FEATURES, ALSO USED FOR PROPOSED FEATURES WITH HEAVIER LINEWEIGHT, IN COMBINATION WITH PROPOSED ANNOTATION.

PROPOSED GEOMETRY CODES

CODE	DESCRIPTION
PC	POINT OF CURVATURE
PI	POINT OF INTERSECTION
CC	CENTER OF CURVE
PT	POINT OF TANGENCY
PCC	POINT OF COMPOUND CURVE
PRC	POINT OF REVERSE CURVE
POB	POINT OF BEGINNING
POE	POINT OF ENDING
STA	STATION PREFIX
AH	AHEAD STATION SUFFIX
BK	BACK STATION SUFFIX
D	CURVE DEGREE OF (100FT)
R	CURVE RADIUS OF
T	CURVE TANGENT LENGTH
L	CURVE LENGTH OF
E	CURVE EXTERNAL DISTANCE

UTILITY SYMBOLOGY

UNDERGROUND UTILITIES

	UTILITY (GENERIC-UNKNOWN)
UT	TELEPHONE
UE	ELECTRIC
UC	CABLE (TV)
UEC	ELECTRIC+CABLE
UET	ELECTRIC+TELEPHONE
UCT	CABLE+TELEPHONE
UECT	ELECTRIC+CABLE+TELEP.
G	GAS LINE
W	WATER LINE
S	SANITARY SEWER (SEPTIC)

ABOVE GROUND UTILITIES (AERIAL)

	UTILITY (GENERIC-UNKNOWN)
T	TELEPHONE
E	ELECTRIC
C	CABLE (TV)
EC	ELECTRIC+CABLE
ET	ELECTRIC+TELEPHONE
AER E&T	ELECTRIC+TELEPHONE
CT	CABLE+TELEPHONE
ECT	ELECTRIC+CABLE+TELEP.
	UTILITY POLE GUY WIRE

PROJECT CONSTRUCTION SYMBOLOGY

PROJECT DESIGN & LAYOUT SYMBOLOGY

CZ	CLEAR ZONE
	PLAN LAYOUT MATCHLINE

PROJECT CONSTRUCTION FEATURES

	TOP OF CUT SLOPE
	TOE OF FILL SLOPE
	STONE FILL
	BOTTOM OF DITCH ℄
	CULVERT PROPOSED
	STRUCTURE SUBSURFACE
PDF	PROJECT DEMARCATION FENCE
BF	BARRIER FENCE
	TREE PROTECTION ZONE (TPZ)
	STRIPING LINE REMOVAL
	SHEET PILES

CONVENTIONAL BOUNDARY SYMBOLOGY

BOUNDARY LINES

TOWN LINE	TOWN BOUNDARY LINE
COUNTY LINE	COUNTY BOUNDARY LINE
STATE LINE	STATE BOUNDARY LINE
	PROPOSED STATE R.O.W. (LIMITED ACCESS)
	PROPOSED STATE R.O.W.
	STATE ROW (LIMITED ACCESS)
	STATE ROW
	TOWN ROW
	PERMANENT EASEMENT LINE (P)
	TEMPORARY EASEMENT LINE (T)
	SURVEY LINE
P/L	PROPERTY LINE (P/L)
SR	SLOPE RIGHTS
6f	6F PROPERTY BOUNDARY
4f	4F PROPERTY BOUNDARY
HAZ	HAZARDOUS WASTE

EPSC LAYOUT PLAN SYMBOLOGY

EPSC MEASURES

	FILTER CURTAIN
	SILT FENCE
	SILT FENCE WOVEN WIRE
	CHECK DAM
	DISTURBED AREAS REQUIRING RE-VEGETATION
	EROSION MATTING

ENVIRONMENTAL RESOURCES

	WETLAND BOUNDARY
	RIPARIAN BUFFER ZONE
	WETLAND BUFFER ZONE
	SOIL TYPE BOUNDARY
T&E	THREATENED & ENDANGERED SPECIES
HAZ	HAZARDOUS WASTE AREA
AG	AGRICULTURAL LAND
HABITAT	FISH & WILDLIFE HABITAT
FLOOD PLAIN	FLOOD PLAIN
OHW	ORDINARY HIGH WATER (OHW)
	STORM WATER
	USDA FOREST SERVICE LANDS
	WILDLIFE HABITAT SUIT/CONN

ARCHEOLOGICAL & HISTORIC

ARCH	ARCHEOLOGICAL BOUNDARY
HISTORIC DIST	HISTORIC DISTRICT BOUNDARY
HISTORIC	HISTORIC AREA
Ⓗ	HISTORIC STRUCTURE

CONVENTIONAL TOPOGRAPHIC SYMBOLOGY

EXISTING FEATURES

	ROAD EDGE PAVEMENT
	ROAD EDGE GRAVEL
	DRIVEWAY EDGE
	DITCH
	FOUNDATION
	FENCE (EXISTING)
	FENCE WOOD POST
	FENCE STEEL POST
	GARDEN
	ROAD GUARDRAIL
	RAILROAD TRACKS
	CULVERT (EXISTING)
	STONE WALL
	WALL
	WOOD LINE
	BRUSH LINE
	HEDGE
	BODY OF WATER EDGE
	LEDGE EXPOSED

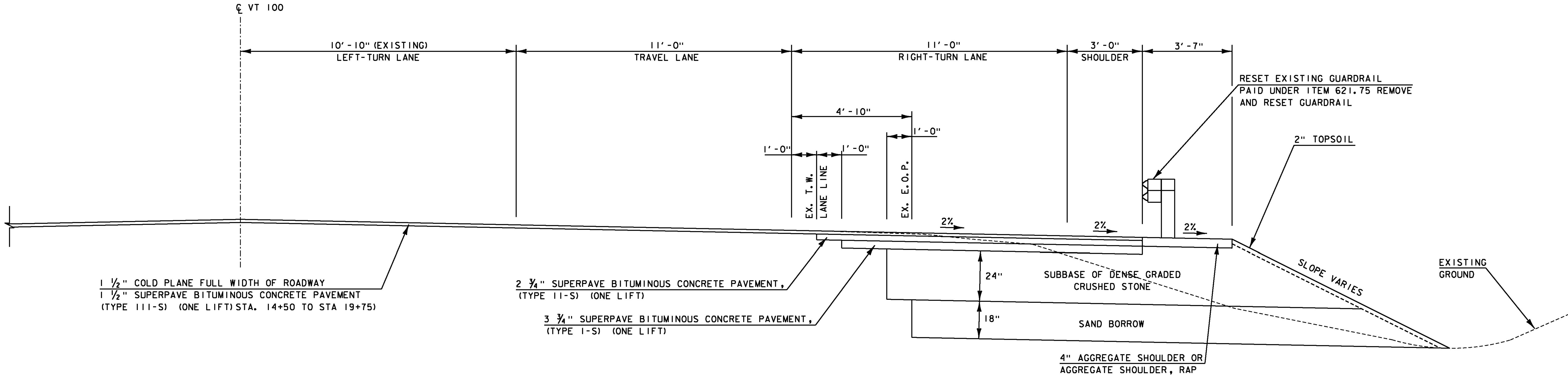
McFarland Johnson

PROJECT NAME: MORRISTOWN

PROJECT NUMBER: STPG SGNL(47)

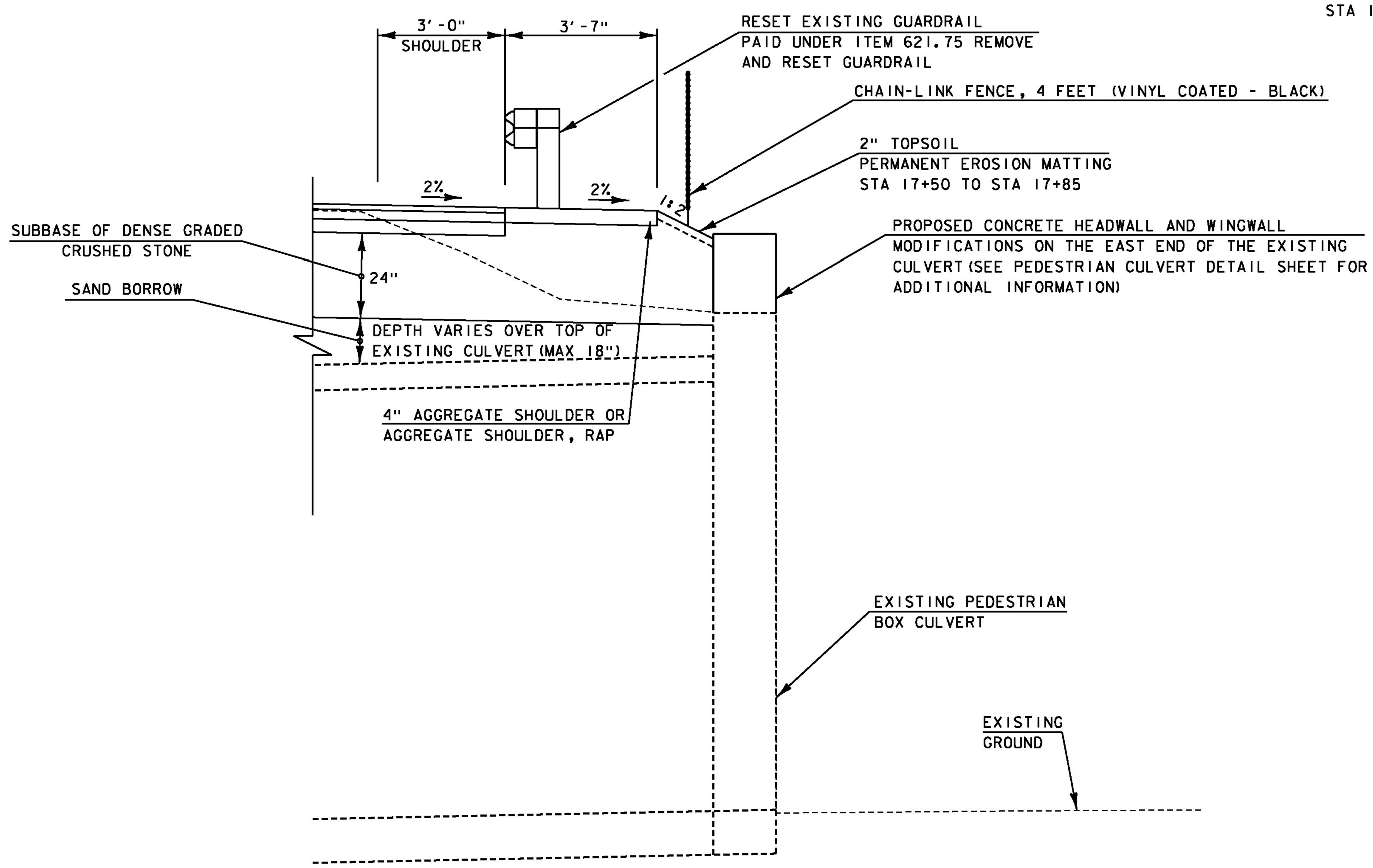
FILE NAME: z15t047leg.dgn
PROJECT LEADER: J. SANTACRUCE
DESIGNED BY: R. LUCHINI
STANDARD CONVENTIONAL SYMBOLS SHEET

PLOT DATE: 5/13/2016
DRAWN BY: R. LUCHINI
CHECKED BY: B. COLBURN
SHEET 4 OF 58



VT ROUTE 100 TYPICAL SECTION

STA 14+50 TO STA 19+75



TYPICAL AT PEDESTRIAN CULVERT

STA 17+67

MATERIAL TOLERANCES

SURFACE	TOTAL DEPTH
- PAVEMENT (TOTAL THICKNESS)	+/- 1/4"
- SUBBASE (TOTAL THICKNESS)	+/- 1"
- SAND BORROW (TOTAL THICKNESS)	+/- 1"

NOTES:

1.) FROM STA 19+00 TO STA 19+50 THE WORK WILL INCLUDE RECONSTRUCTION OF THE EXISTING SHOULDER PORTION OF ALT VT 100 IN ORDER TO MATCH THE PROPOSED GRADING REQUIRED FOR THE RECONSTRUCTION OF VT 100 (LAPORTE ROAD). THE SHOULDER RECONSTRUCTION SHALL CONSIST OF THE SAME SUBBASE AND PAVEMENT LAYERS AS THE OTHER WORK ALONG VT 100 NOTED ABOVE. SEE THE PAVEMENT LAYOUT AND ALIGNMENT SHEET AND CROSS SECTIONS FOR ADDITION INFORMATION.

2.) ALL BITUMINOUS CONCRETE PAVEMENT WILL BE PAID UNDER ITEM 900.680 SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY).

3.) 1 1/2" COLD PLANE WILL BE PAID UNDER ITEM 210.10. BUTT JOINTS WILL BE CONSIDERED INCIDENTAL TO ITEM 210.10.

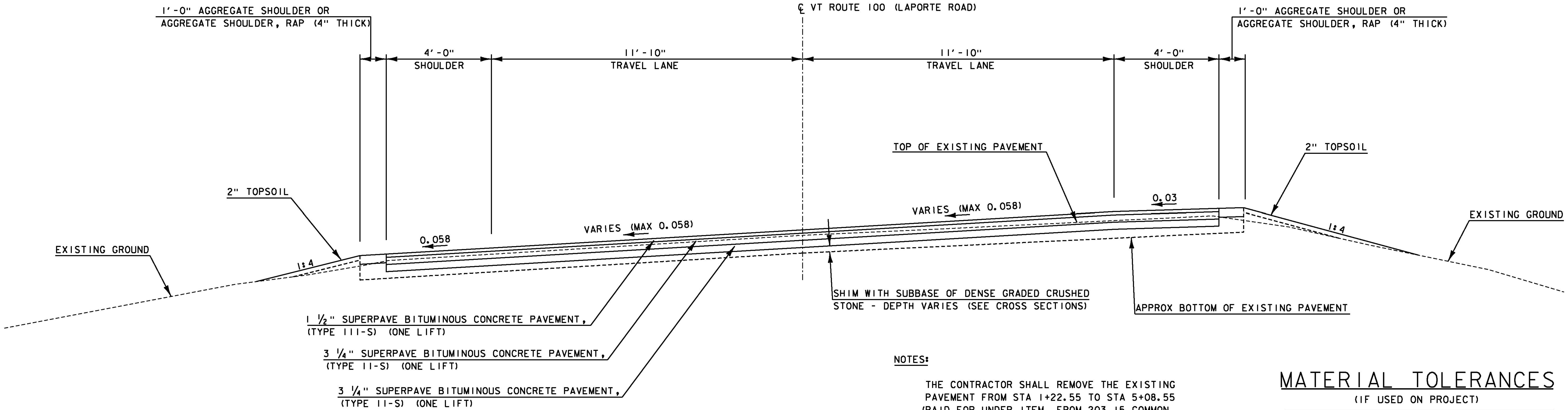
4.) EMULSIFIED ASPHALT SHALL BE APPLIED BETWEEN ALL PAVEMENT LAYERS AT A RATE OF 0.01 TO 0.03 GAL/YD3 AND WILL BE PAID FOR UNDER ITEM 900.683 SPECIAL PROVISION (EMULSIFIED ASPHALT) (RS-1H OR CRS-1H).

0 2 4
SCALE IN FEET

McFarland Johnson

PROJECT NAME: MORRISTOWN
PROJECT NUMBER: STPG SGNL(47)

FILE NAME: z15t047typl.dgn	PLOT DATE: 5/17/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: R. LUCHINI
DESIGNED BY: R. LUCHINI	CHECKED BY: B. COLBURN
TYPICAL SECTION SHEET 1	SHEET 5 OF 58



NOTES:

THE CONTRACTOR SHALL REMOVE THE EXISTING PAVEMENT FROM STA 1+22.55 TO STA 5+08.55 (PAID FOR UNDER ITEM FROM 203.15 COMMON EXCAVATION) AND SHIM WITH SUBBASE OF DENSE GRADED CRUSHED STONE (PAID FOR UNDER ITEM 301.35) PRIOR TO PLACING NEW PAVEMENT.

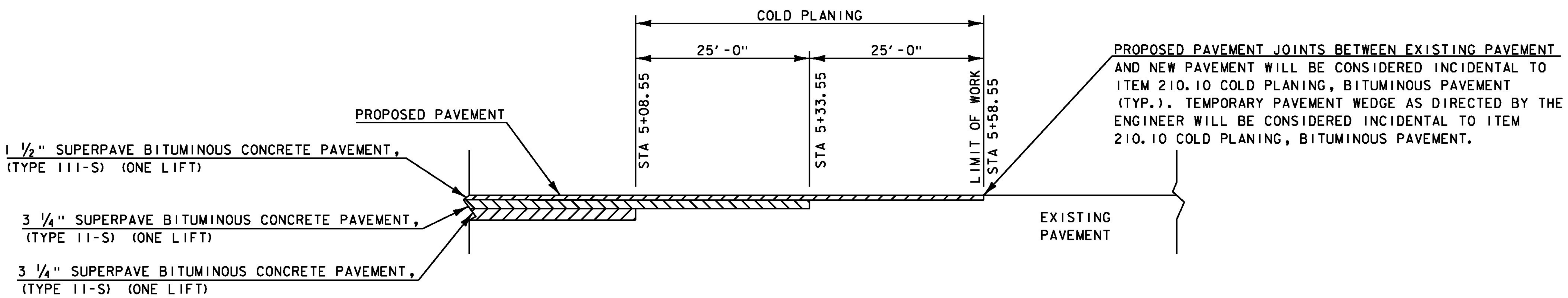
TYPICAL MAXIMUM BANKED SECTION VT ROUTE 100 (LAPORTE RD)

STA 1+22.55 TO STA 5+58.55
(SEE CROSS SECTIONS FOR ADDITIONAL INFORMATION)

MATERIAL TOLERANCES

(IF USED ON PROJECT)

SURFACE	TOTAL DEPTH
- PAVEMENT (TOTAL THICKNESS)	+/- 1/4"
- SUBBASE (TOTAL THICKNESS)	+/- 1"



MATERIAL TRANSITION DETAIL

STA 5+08.55 TO STA 5+58.55
NOT TO SCALE

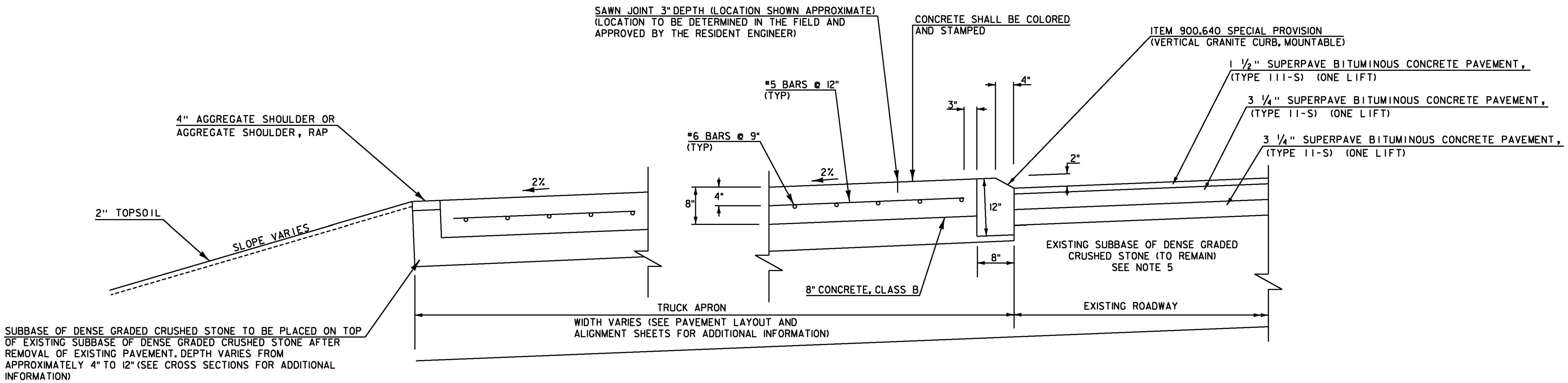
0 2 4
SCALE IN FEET

McFarland Johnson

PROJECT NAME: MORRISTOWN
PROJECT NUMBER: STPG SGNL(47)

FILE NAME: z15t047typ2.dgn
PROJECT LEADER: J. SANTACRUCE
DESIGNED BY: R. LUCHINI
TYPICAL SECTION SHEET 2

PLOT DATE: 5/17/2016
DRAWN BY: R. LUCHINI
CHECKED BY: B. COLBURN
SHEET 6 OF 58



TRUCK APRON DETAIL

NOT TO SCALE

NOTES:

1. ALL REINFORCING STEEL SHALL BE EPOXY COATED AND WILL BE PAID FOR UNDER ITEM 507.11 REINFORCING STEEL, LEVEL I. THE CONTRACTOR SHALL PROVIDE A REINFORCING SCHEDULE TO THE RESIDENT ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ORDERING ANY MATERIAL. PAYMENT FOR THE REINFORCING SCHEDULE WILL BE CONSIDERED INCIDENTAL TO ITEM 507.11.

2. THE COLOR OF THE CONCRETE AGGREGATE SHALL MATCH THAT OF THE COLOR OF THE CONCRETE.

3. PATTERN SHALL MIMIC RANDOM FIELDSTONE WITH A LIGHT GREY COLOR SIMILAR TO THE PATTERN USED AT THE ROUNDABOUT AT INTERSECTION OF VT15 AND ALT VT100 IN MORRISTOWN.

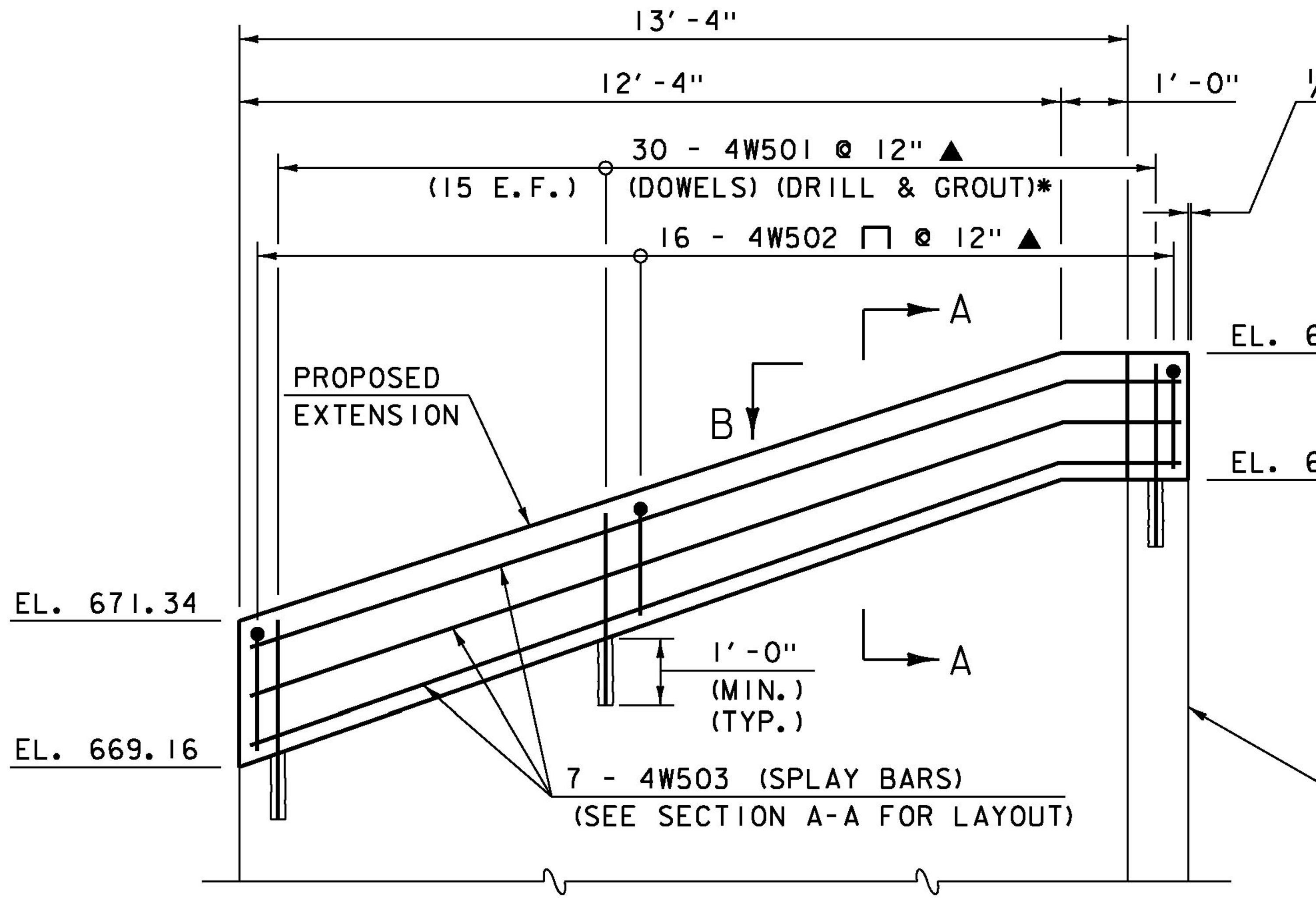
4. CONCRETE FOR THE TRUCK APRON WILL BE PAID FOR UNDER ITEM 900.675 - SPECIAL PROVISION (STAMPED CONCRETE ISLAND, 8")

5. THE SURFACE OF THE GRADED CRUSHED STONE SHALL BE ROUGHENED DURING PREPARATION OF THE APRON INSTALLATION. PAYMENT WILL BE CONSIDERED INCIDENTAL TO ITEM 900.675 - SPECIAL PROVISION (STAMPED CONCRETE ISLAND, 8")

6. 3" SAWN JOINTS IN TRUCK APRON WILL BE CONSIDERED INCIDENTAL TO ITEM 900.675 - SPECIAL PROVISION (STAMPED CONCRETE ISLAND, 8")

McFarland Johnson

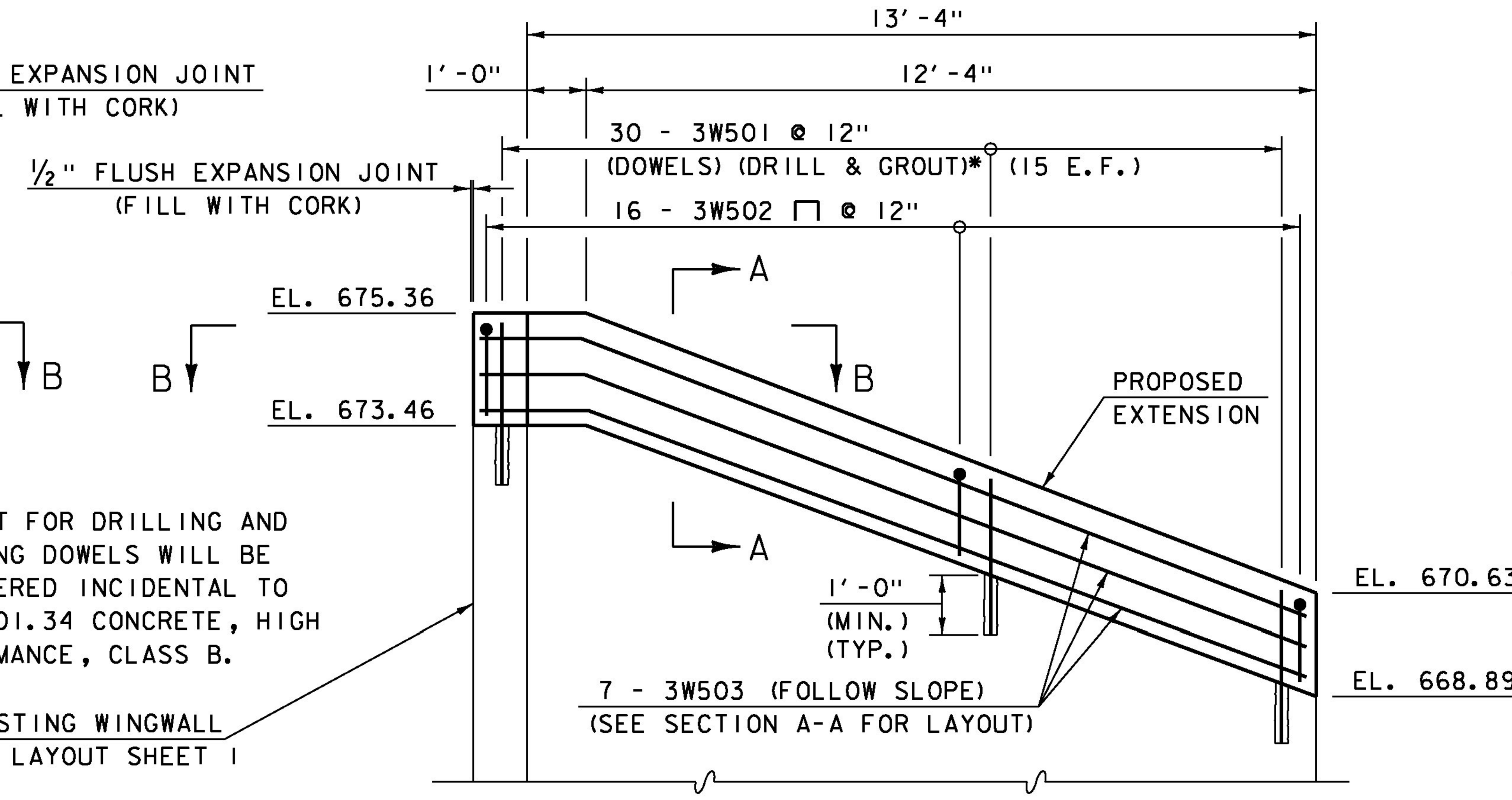
PROJECT NAME: MORRISTOWN	
PROJECT NUMBER: STPG SGNL(47)	
FILE NAME: z15t047det.dgn	PLOT DATE: 5/17/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: R. LUCHINI
DESIGNED BY: R. LUCHINI	CHECKED BY: B. COLBURN
DETAIL SHEET	SHEET 7 OF 58



PARTIAL WINGWALL NO. 4 ELEVATION

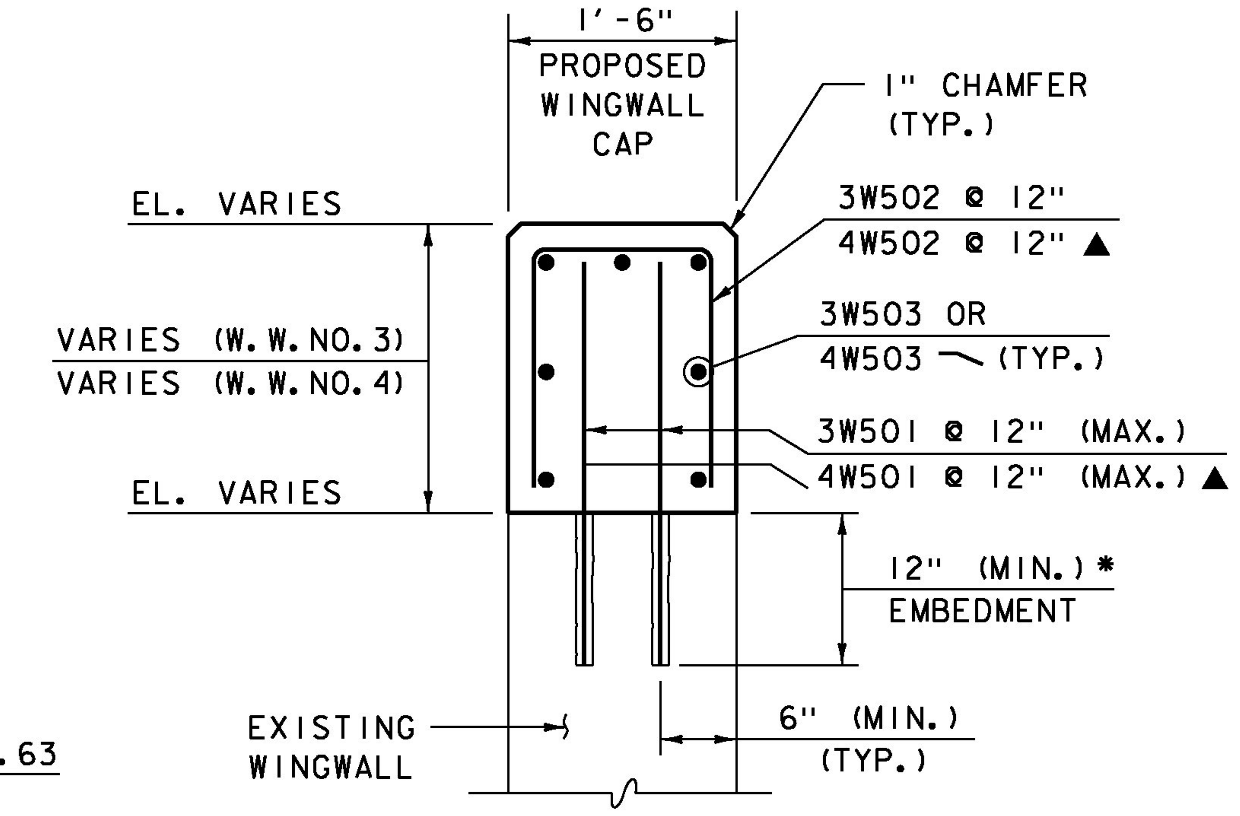
SCALE: 1/2" = 1'-0"

*PAYMENT FOR DRILLING AND GROUTING DOWELS WILL BE CONSIDERED INCIDENTAL TO ITEM 501.34 CONCRETE, HIGH PERFORMANCE, CLASS B.



PARTIAL WINGWALL NO. 3 ELEVATION

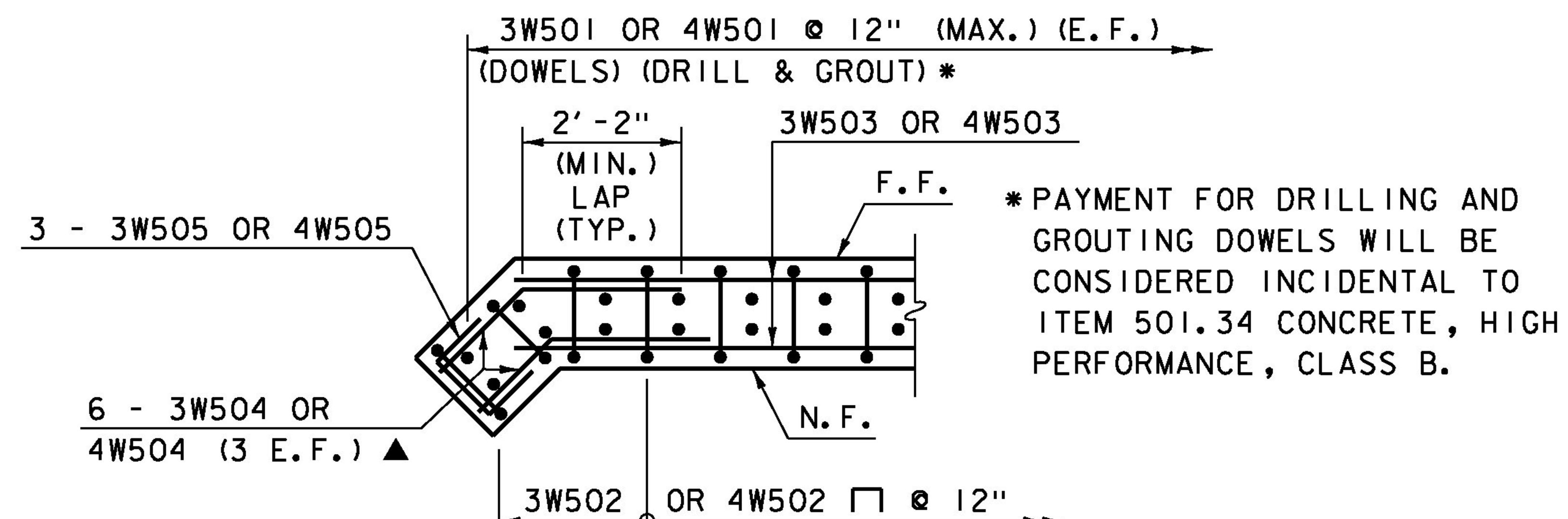
SCALE: 1/2" = 1'-0"



*FIELD DRILL 1 5/8" DIA. HOLES INTO EXISTING WINGWALL. SET DOWELS WITH APPROVED NON-SHRINK EPOXY GROUT. PAYMENT WILL BE CONSIDERED INCIDENTAL TO ITEM 501.34 CONCRETE, HIGH PERFORMANCE, CLASS B.

SECTION A-A

SCALE: 1" = 1'-0"

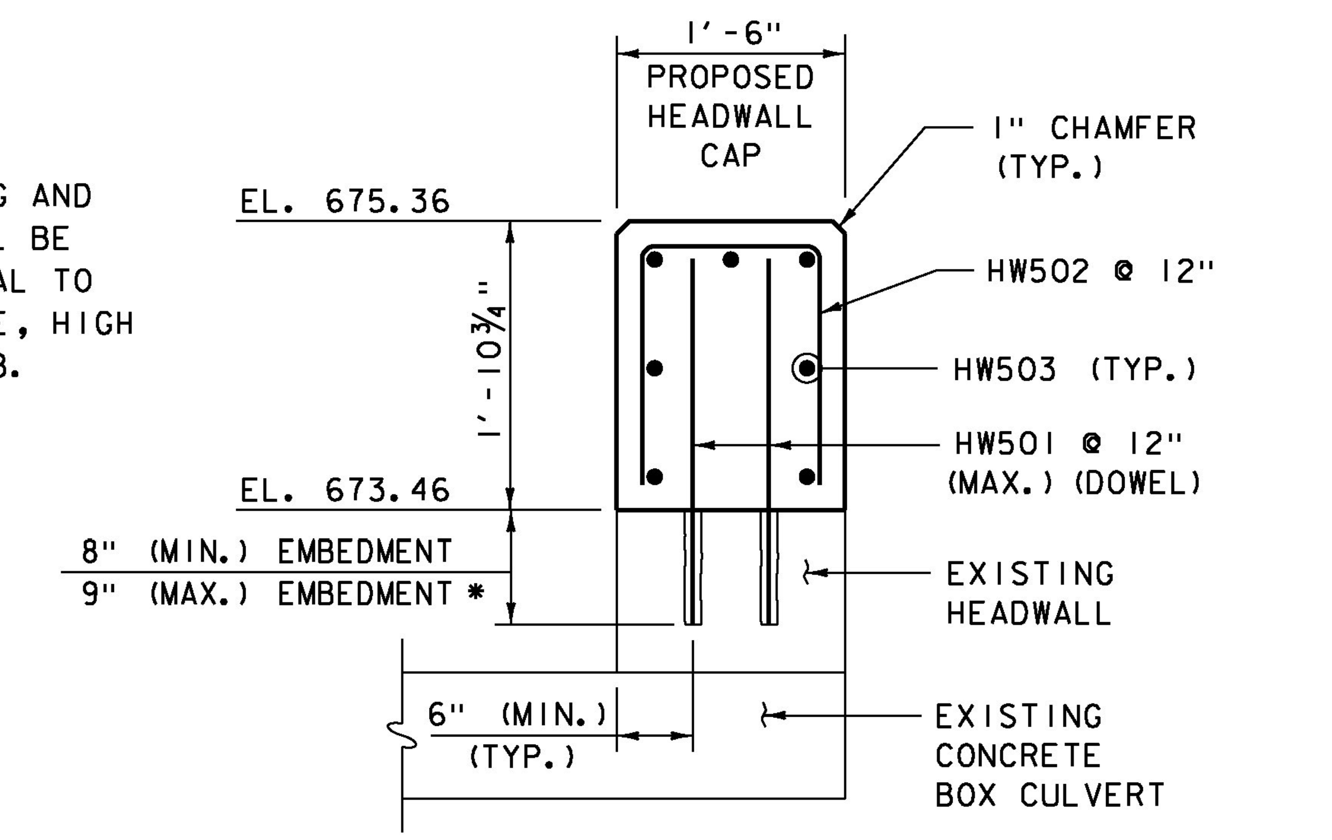


*PAYMENT FOR DRILLING AND GROUTING DOWELS WILL BE CONSIDERED INCIDENTAL TO ITEM 501.34 CONCRETE, HIGH PERFORMANCE, CLASS B.

SECTION B-B

WINGWALL CORNER DETAIL

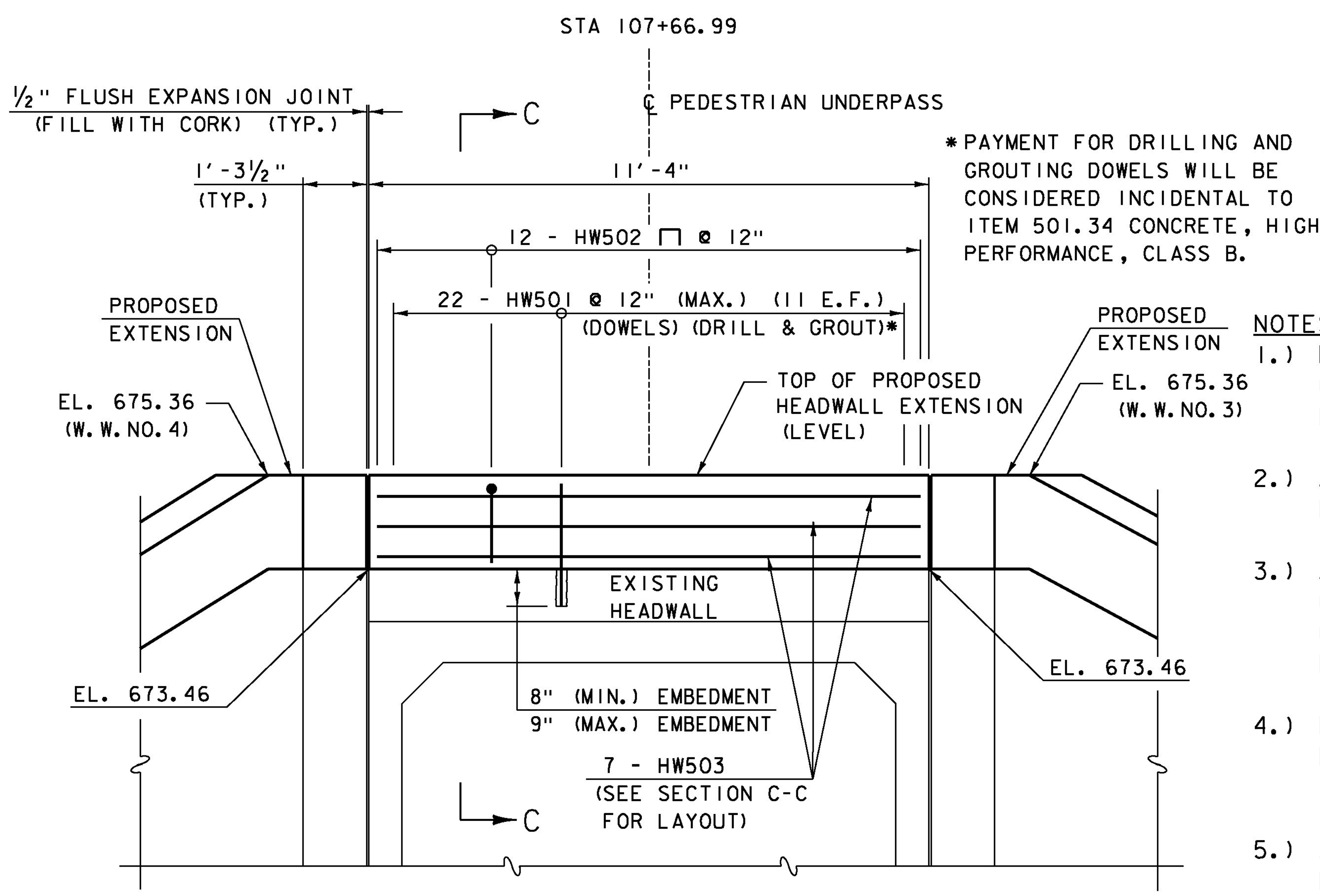
SCALE: 1/2" = 1'-0"



*FIELD DRILL 1 5/8" DIA. HOLES INTO EXISTING WINGWALL. SET DOWELS WITH APPROVED NON-SHRINK EPOXY GROUT. PAYMENT WILL BE CONSIDERED INCIDENTAL TO ITEM 501.34 CONCRETE, HIGH PERFORMANCE, CLASS B.

SECTION C-C

SCALE: 1" = 1'-0"



*PAYMENT FOR DRILLING AND GROUTING DOWELS WILL BE CONSIDERED INCIDENTAL TO ITEM 501.34 CONCRETE, HIGH PERFORMANCE, CLASS B.

PARTIAL PEDESTRIAN CULVERT (EAST ELEVATION)

SCALE: 1/2" = 1'-0"

NOTES:

1.) REINFORCING LENGTHS ARE BASED UPON ORIGINAL PLAN DIMENSIONS. CONTRACTOR TO FIELD VERIFY ALL EXISTING CULVERT AND WINGWALL DIMENSIONS PRIOR TO REBAR FABRICATION.

2.) ALL NEW CONCRETE WILL BE PAID FOR UNDER ITEM 501.34 - CONCRETE, HIGH PERFORMANCE CLASS B.

3.) ALL REINFORCING STEEL SHALL HAVE 2 1/2" CLEAR COVER TO EXPOSED CONCRETE, UNLESS OTHERWISE NOTED. ALL REINFORCING STEEL WILL BE EPOXY COATED, AND WILL BE PAID FOR UNDER ITEM 507.11 REINFORCING STEEL, LEVEL 1.

4.) PRIOR TO PLACING NEW CONCRETE AGAINST EXISTING CONCRETE SURFACES, BLAST CLEAN THE EXISTING CONCRETE SURFACES. PAYMENT WILL BE CONSIDERED INCIDENTAL TO ITEM 501.34 - CONCRETE, HIGH PERFORMANCE CLASS B.

5.) ALL EXPOSED NEW CONCRETE SURFACES SHALL BE CLEANED OF SAND AND DEBRIS. LIGHTLY BLAST CLEAN AS DIRECTED BY THE ENGINEER AND COATED WITH WATER REPELLENT. CLEANING/SAND BLASTING WILL BE CONSIDERED INCIDENTAL TO ITEM 514.10, WATER REPELLENT SILANE. PAYMENT FOR WATER REPELLENT SILANE WILL BE MADE UNDER ITEM 514.10 - WATER REPELLENT, SILANE.

LEGEND

N.F. = NEAR FACE
F.F. = FAR FACE
E.F. = EACH FACE
▲ = CUT TO FIT IN FIELD

0 1 2 SCALE IN FEET

0 2 4 SCALE IN FEET

McFarland Johnson

PROJECT NAME: MORRISTOWN	
PROJECT NUMBER: STPG SGNL(47)	
FILE NAME: z15t047det2.dgn	PLOT DATE: 5/13/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: S. MERKWAN
DESIGNED BY: D. KULL	CHECKED BY: B. COLBURN
PEDESTRIAN CULVERT DETAIL SHEET	SHEET 8 OF 58

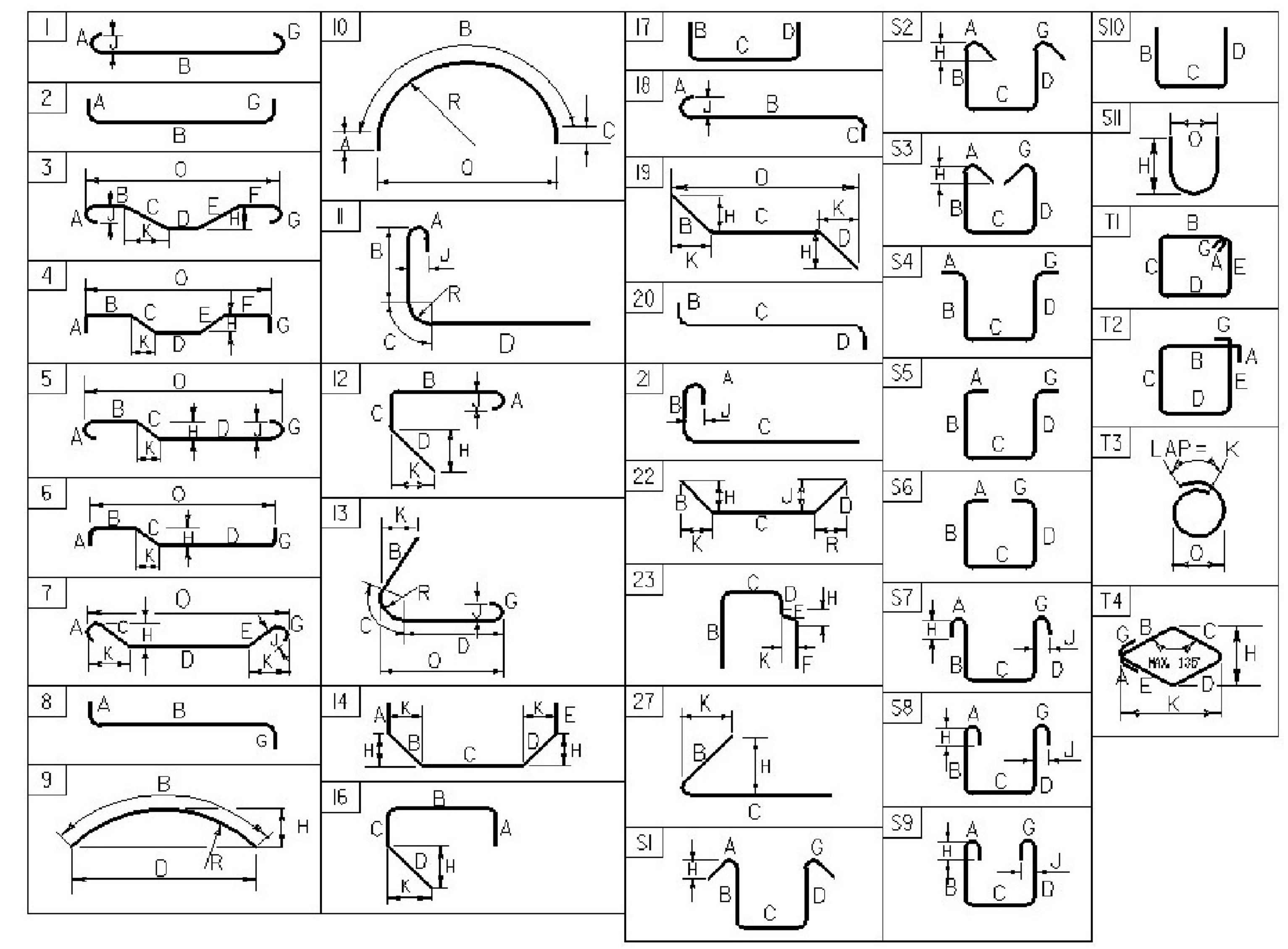
STATE OF VERMONT
AGENCY OF TRANSPORTATION

REINFORCING STEEL SCHEDULE

ITEM	EACH	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	F	G	H	J	K	R	O
	HEADWALL																
✳	23	5	2'- 5"	HW501	STR												
	12	5	4'- 1"	HW502	17		1'- 6"	1'- 1"	1'- 6"								
	7	5	10'- 11"	HW503	STR												
	WINGWALL 3																
✳ ▲	31	5	2'- 8"	3W501	STR												
▲	16	5	4'- 1"	3W502	17		1'- 6"	1'- 1"	1'- 6"								
	7	5	14'- 7"	3W503	22		1'- 7"	13'- 0"	---				0'- 7"	---	1'- 6"	---	
▲	6	5	3'- 9"	3W504	22		1'- 7"	2'- 2"	---				1'- 1"	---	1'- 1"	---	
	3	5	2'- 8"	3W505	17		0'- 10"	1'- 0"	0'- 10"								
	WINGWALL 4																
✳ ▲	31	5	3'- 0"	4W501	STR												
▲	16	5	3'- 9"	4W502	17		1'- 10"	1'- 1"	1'- 10"								
	7	5	14'- 5"	4W503	22		1'- 7"	12'- 10"	---				0'- 6"	---	1'- 6"	---	
▲	6	5	3'- 9"	4W504	22		1'- 7"	2'- 2"	---				1'- 1"	---	1'- 1"	---	
	3	5	2'- 8"	4W505	17		0'- 10"	1'- 0"	0'- 10"								

~ NOTES ~

1. UNLESS OTHERWISE DESIGNATED, ALL BAR REINFORCEMENT FOR CONCRETE IN SIZES UP TO AND INCLUDING NO. 18 SHALL CONFORM TO THE REQUIREMENTS OF THE "SPECIFICATIONS FOR DEFORMED BILLET-STEEL BARS FOR CONCRETE REINFORCEMENT", AASHTO M 31 (ASTM A 615-SI). ALL BARS SHALL BE GRADE 60, UNLESS OTHERWISE DESIGNATED.
2. FOR TYPICAL BENDING DETAILS, RECOMMENDED PIN DIAMETER "D" OF BENDS AND HOOKS, AND OTHER STANDARD PRACTICE, SEE CURRENT CONCRETE REINFORCING STEEL INSTITUTE "MANUAL OF STANDARD PRACTICE".
3. BARS WHICH REQUIRE MORE ACCURATE BENDING THAN STANDARD PRACTICES SHOULD HAVE LIMITS INDICATED.
4. ALL DIMENSIONS ARE OUT TO OUT OF BAR EXCEPT "A" AND "G" ON STANDARD 180 DEGREE AND 135 DEGREE HOOKS.
5. "J" DIMENSION ON 180 DEGREE HOOKS TO BE SHOWN ONLY WHERE NECESSARY TO RESTRICT HOOK SIZE. OTHERWISE, STANDARD HOOKS ARE TO BE USED.
6. "H" DIMENSION ON STIRRUPS TO BE SHOWN ONLY WHEN NECESSARY TO MAINTAIN CLEARANCES.
7. WHERE SLOPE DIFFERS FROM 45 DEGREES, DIMENSIONS "H" AND "K" MUST BE SHOWN.
8. ▲ DENOTES BARS TO BE CUT IN FIELD.
9. ✳ DENOTES ONE EXTRA BAR ADDED FOR TESTING PURPOSES.
10. △ DENOTES TWO EXTRA BARS ADDED FOR TESTING PURPOSES.
11. E IN BAR MARK PREFIX DENOTES EPOXY COATED REINFORCING STEEL.



ASTM STANDARD REINFORCING BARS

BAR SIZE DESIGNATION	WEIGHT POUNDS PER FOOT	NOMINAL DIMENSIONS ROUND SECTION: DIAMETER INCHES	AREA INCHES^2	PERIMETER INCHES
#3	0.376	0.375	0.11	1.178
#4	0.668	0.500	0.20	1.571
#5	1.043	0.625	0.31	1.963
#6	1.502	0.750	0.44	2.356
#7	2.044	0.875	0.60	2.749
#8	2.670	1.000	0.79	3.142
#9	3.400	1.128	1.00	3.544
#10	4.303	1.270	1.27	3.990
#11	5.313	1.410	1.56	4.430
#14	7.65	1.693	2.25	5.32
#18	13.60	2.257	4.00	7.09

PROJECT NAME: **MORRISTOWN**
PROJECT NUMBER: **STPG SGNL(47)**

FILE NAME: z15t047reinf.xls — PLOT DATE: 4/13/2016
PROJECT MANAGER: J. SANTACRUCE — DRAWN BY: S. MERKWAN
DESIGNED BY: D. KULL — CHECKED BY: B. COLBURN
REINFORCING STEEL SCHEDULE SHEET — SHEET 9 OF 58

CONTROL POINTS

HVCTRL 16

LANGDELL
NORTH = 756311.397
EAST = 1617352.447
ELEV. = 789.670

TO REACH FROM THE INTERSECTION OF ROUTES 15 AND 100 IN MORRISVILLE GO EAST ALONG ROUTE 15 FOR 0.1 MI (0.2 KM) TO OLD FARM BUILDINGS ON THE LEFT, TURN LEFT INTO FARM YARD AND PARK VEHICLE, WALK NORTHEAST THROUGH BARNYARD AND PASTURE FOR ABOUT 170 M (557.7 FT) TO THE SITE OF THE MARK IN A LANE BETWEEN 2.5 M (8.2 FT) HIGH WOVEN WIRE FENCES FOR FALLOW DEER, IN THE TOP OF A 0.15 M (0.49 FT) SQUARE CONCRETE MONUMENT WHICH PROJECTS 0.1 M (0.3 FT) ABOVE THE GROUND, 19.2 M (63.0 FT) NORTH OF THE CENTER OF A STEEL GATE AT THE SOUTH END OF THE LANE, 34.5 M (113.2 FT) SOUTH OF THE SOUTHEAST CORNER OF A PATCH OF WOODS, 1.9 M (6.2 FT) WEST OF THE FENCE ON THE EAST SIDE OF THE LANE, 2.3 M (7.5 FT) EAST OF THE FENCE ON THE WEST SIDE OF THE LANE.

HVCTRL 10812

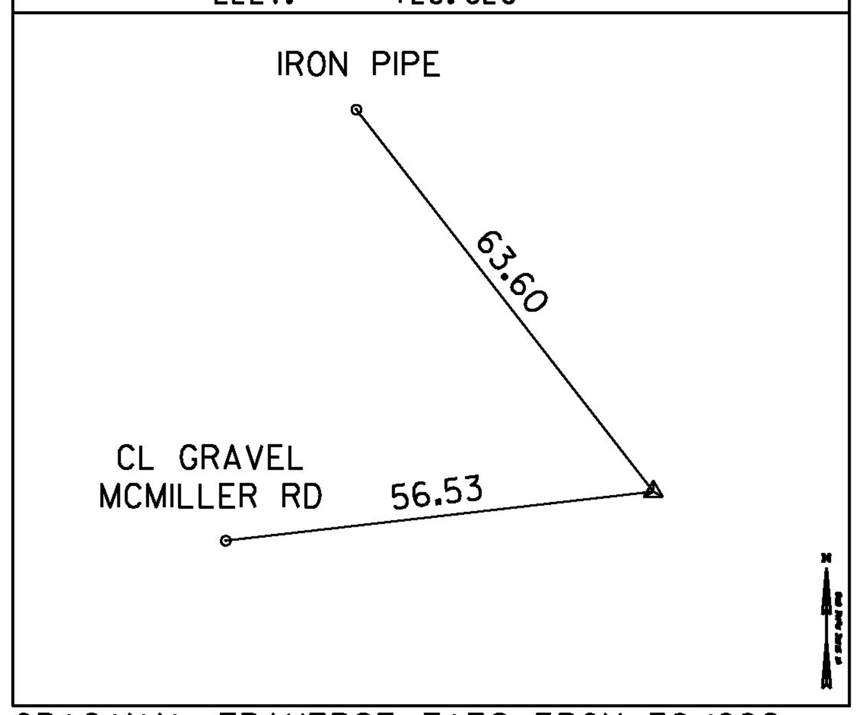
A94020
NORTH = 752795.722
EAST = 1612551.188
ELEV. = 599.342

GENERAL LOCATION, MORRISTOWN, VT. TO REACH FROM THE CIVIL WAR MONUMENT AT THE INTERSECTION OF MAIN ST, ROUTE 12 AND 15A GO WEST ALONG MAIN ST FOR 0.15 MI (0.24 KM) TO THE TRAFFIC LIGHT AT THE INTERSECTION OF ROUTE 100, TURN RIGHT AND GO NORTH ALONG ROUTE 100 FOR 0.3 MI (0.5 KM) TO THE INTERSECTION OF BRIDGE ST CONTINUE STRAIGHT AHEAD AND GO WEST ALONG BRIDGE ST FOR 0.25 MI (0.40 KM) TO THE EAST END OF THE BRIDGE ST BRIDGE OVER THE LAMOILLE RIVER AND THE MARK ON THE RIGHT IN THE TOP OF THE WINGWALL AT THE NORTHEAST CORNER OF THE BRIDGE. THE MARK IS 5.2 M (17.1 FT) NORTH OF AND ABOUT LEVEL WITH THE CENTERLINE OF BRIDGE STREET.

TRAVERSE TIES

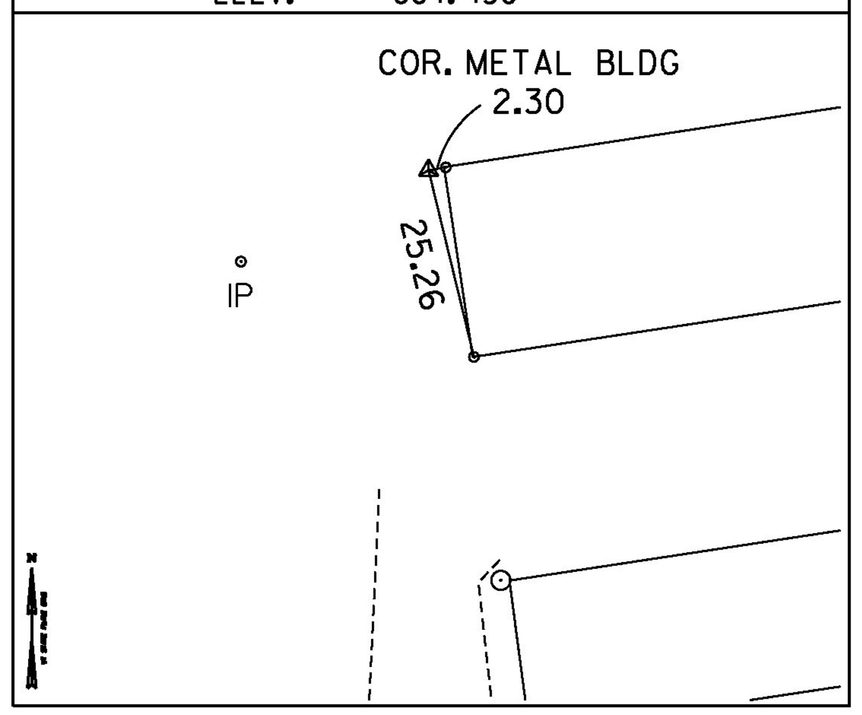
HVCTRL #30

NORTH = 749138.3200
EAST = 1609341.5000
ELEV. = 728.620



HVCTRL #31

NORTH = 750733.1500
EAST = 1612290.0400
ELEV. = 664.430



NORTH =
EAST =
ELEV. =

NORTH =
EAST =
ELEV. =

NORTH =
EAST =
ELEV. =

ORIGINAL TRAVERSE TIES FROM 78d082

ALIGNMENT TIES

NORTH =
EAST =
ELEV. =

NORTH =
EAST =
ELEV. =

NORTH =
EAST =
ELEV. =

NORTH =
EAST =
ELEV. =

NORTH =
EAST =
ELEV. =

DATUM	
VERTICAL	NAVD 88
HORIZONTAL	NAD83(92)
ADJUSTMENT	COMPASS

McFarland Johnson

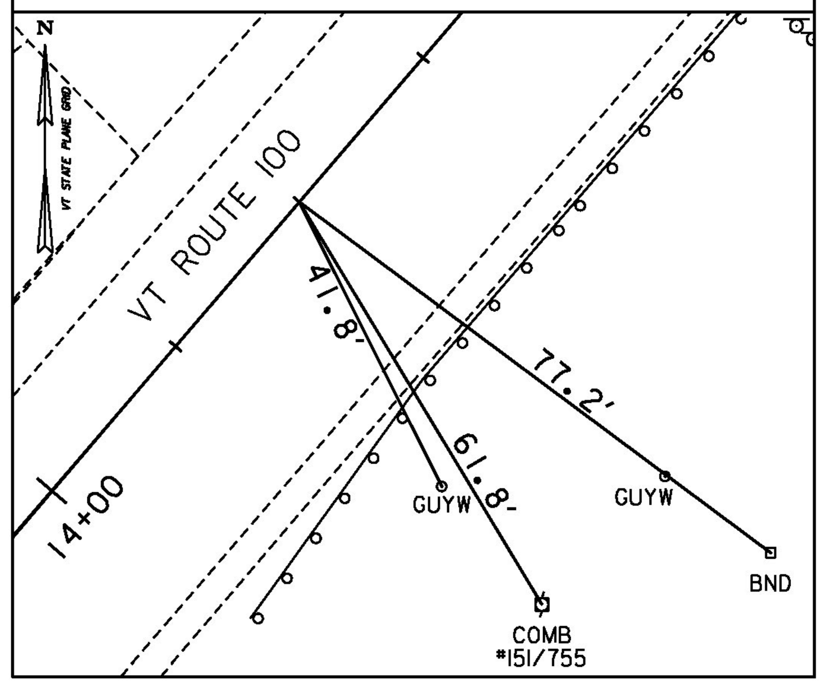
PROJECT NAME: MORRISTOWN
PROJECT NUMBER: STPG SGNL(47)

FILE NAME: z15t047t1.dgn
PROJECT LEADER: J. SANTACRUCE
DESIGNED BY: VTRANS
TIE SHEET 1

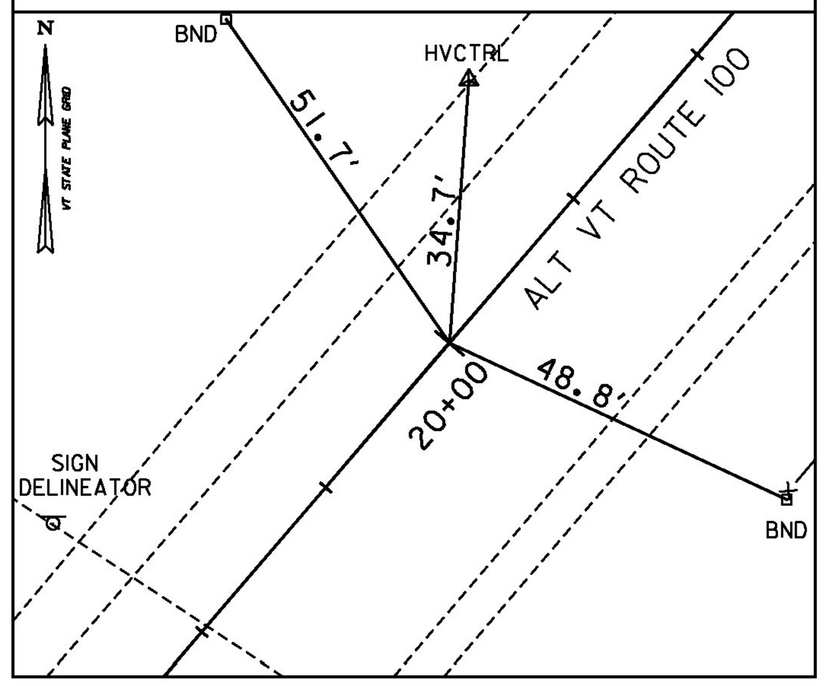
PLOT DATE: 5/13/2016
DRAWN BY: C. CYR
CHECKED BY: P. BEYOR
SHEET 10 OF 58

ALIGNMENT TIES

BEGIN PROJECT
NORTH = 749710.95
EAST = 1611304.23

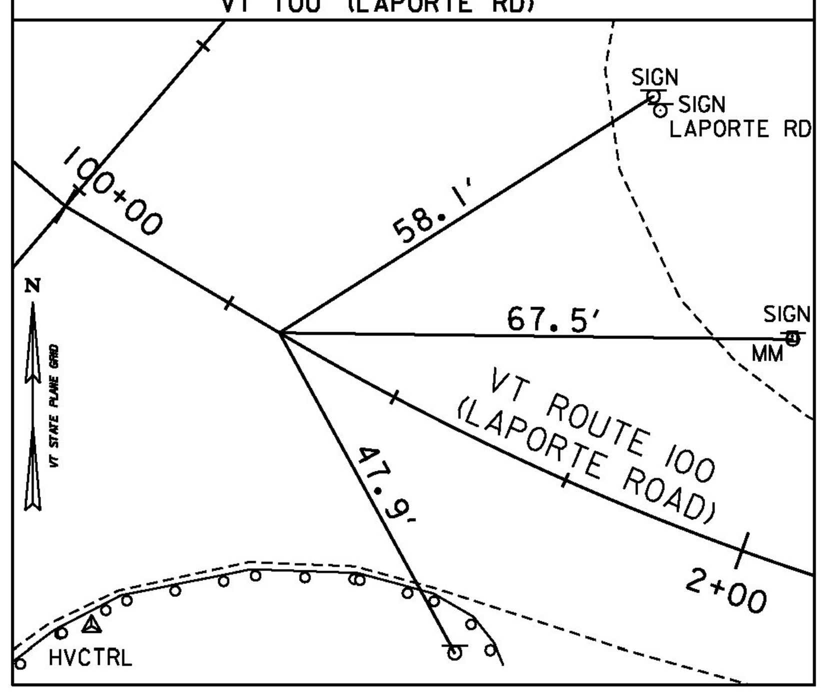


END PROJECT
NORTH = 750128.5028
EAST = 1611662.2105

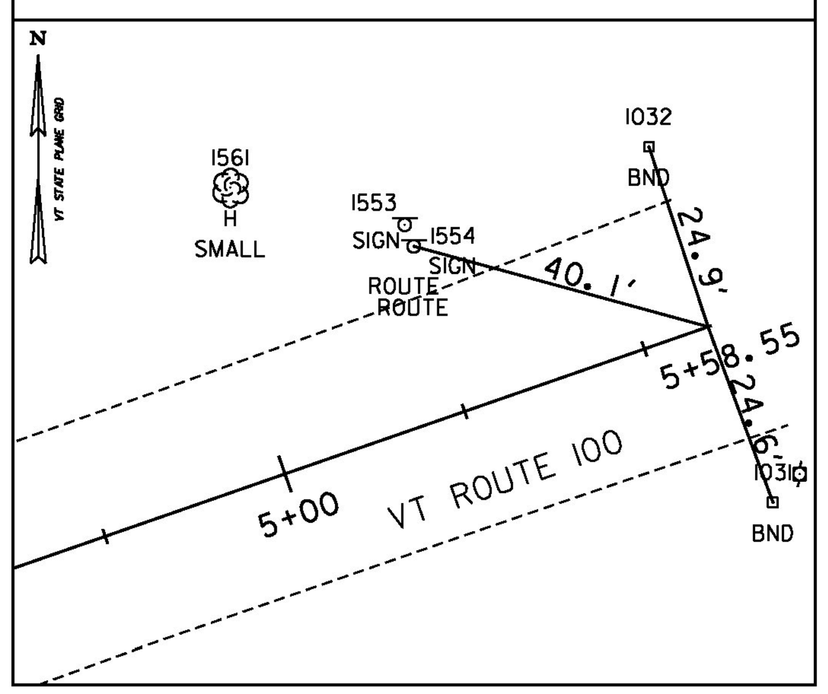


ALIGNMENT TIES

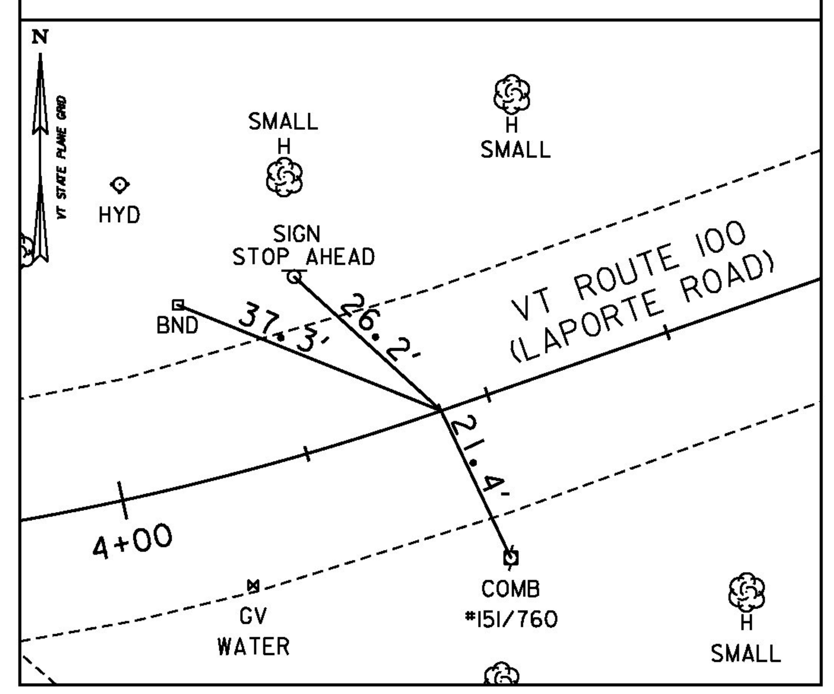
PC STA 1+32.68
NORTH = 749995.86
EAST = 1611590.88
VT 100 (LAPORTE RD)



LIMIT OF WORK
NORTH = 750003.74
EAST = 1611999.17

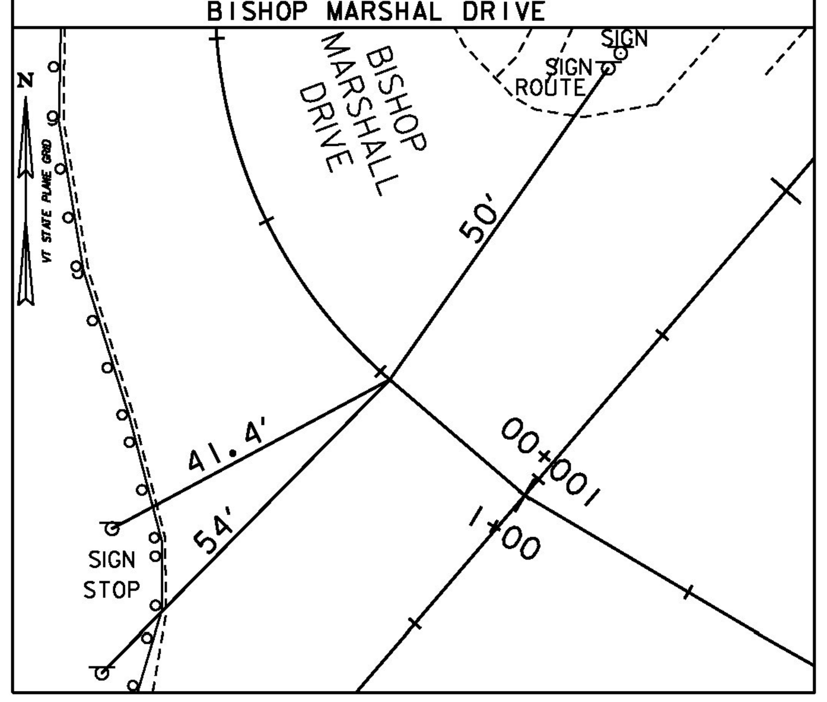


PT STA 4+43.54
NORTH = 749965.92
EAST = 1611890.56

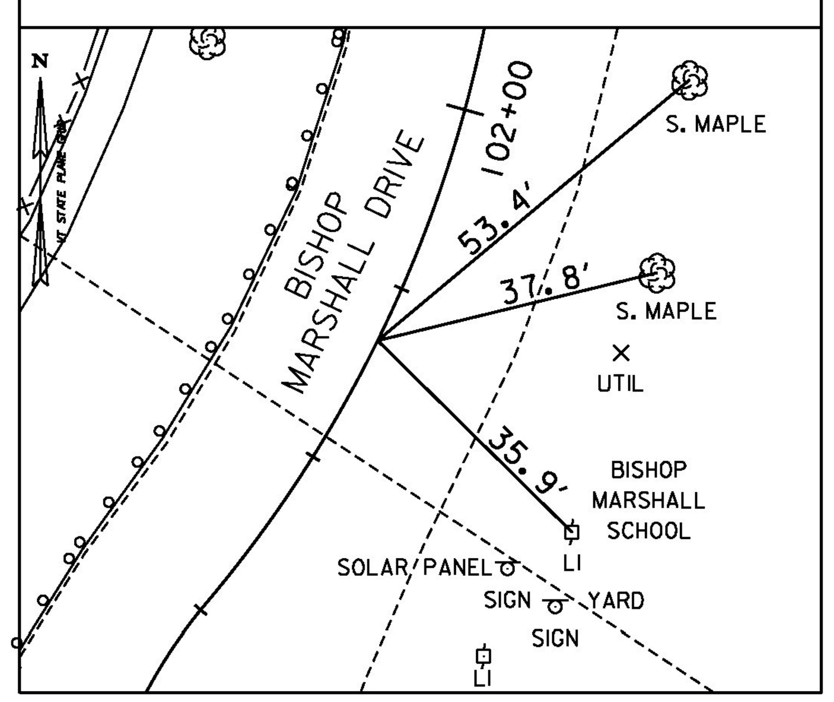


ALIGNMENT TIES

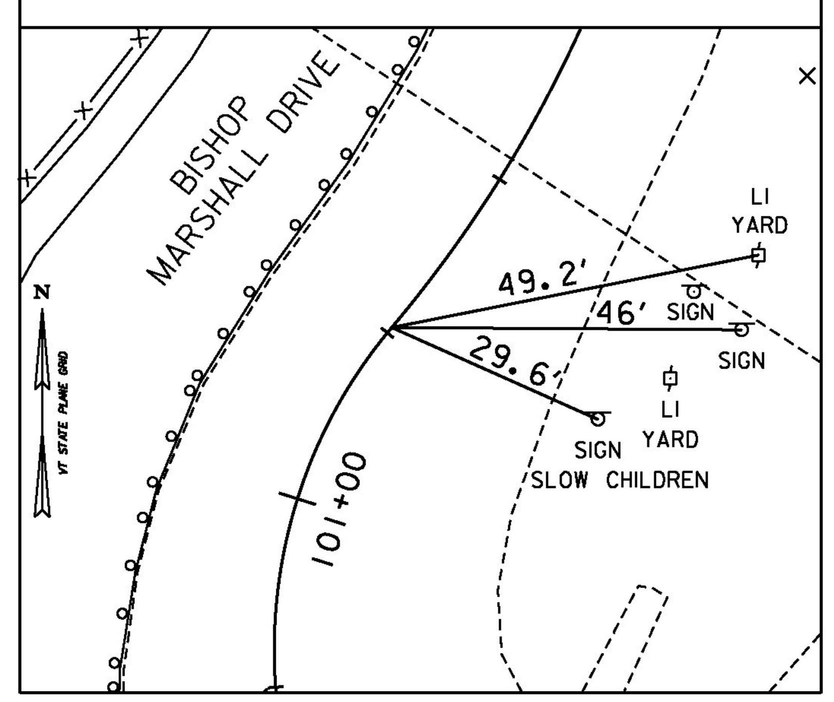
PC STA 100+23.38
NORTH = 750027.72
EAST = 1611545.00
BISHOP MARSHAL DRIVE



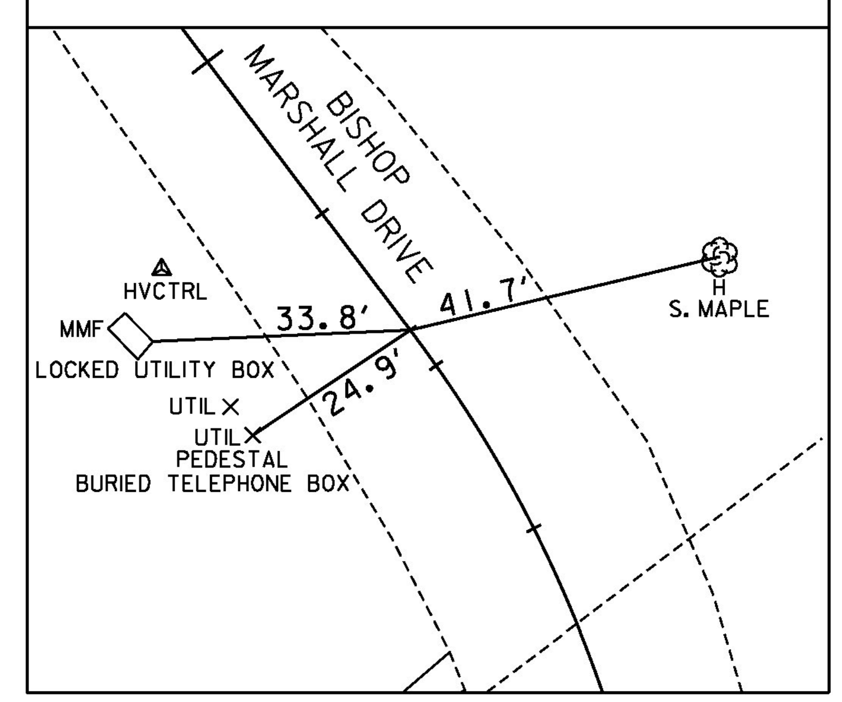
LIMIT OF WORK
NORTH = 750154.57
EAST = 1611560.23



PRC STA 101+25.91
NORTH = 750119.83
EAST = 1611537.54



PT STA 103+55.78
NORTH = 750332.63
EAST = 1611543.23



DATUM	
VERTICAL	NAVD 88
HORIZONTAL	NAD 83(92)
ADJUSTMENT	COMPASS

McFarland Johnson

PROJECT NAME: MORRISTOWN
PROJECT NUMBER: STPG SGNL(47)

FILE NAME: z15+047t1.dgn	PLOT DATE: 5/13/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: M. LOVETT
DESIGNED BY: R. LUCHINI	CHECKED BY: B. COLBURN
TIE SHEET 2	SHEET 11 OF 58

SOIL CLASSIFICATION

AASHTO

Gravel and Sand
Fine Sand
Silty or Clayey Gravel and Sand
Silty Soil - Low Compressibility
Silty Soil - Highly Compressible
Clayey Soil - Low Compressibility
Clayey Soil - Highly Compressible

ROCK QUALITY DESIGNATION

R.Q.D. (%)	ROCK DESCRIPTION
<25	Very Poor
25 to 50	Poor
51 to 75	Fair
76 to 90	Good
>90	Excellent

SHEAR STRENGTH

UNDRAINED SHEAR STRENGTH IN P.S.F.	CONSISTENCY
<250	Very Soft
250-500	Soft
500-1000	Med. Stiff
1000-2000	Stiff
2000-4000	Very Stiff
>4000	Hard

CORRELATION GUIDE OF "N" TO DENSITY/CONSISTENCY

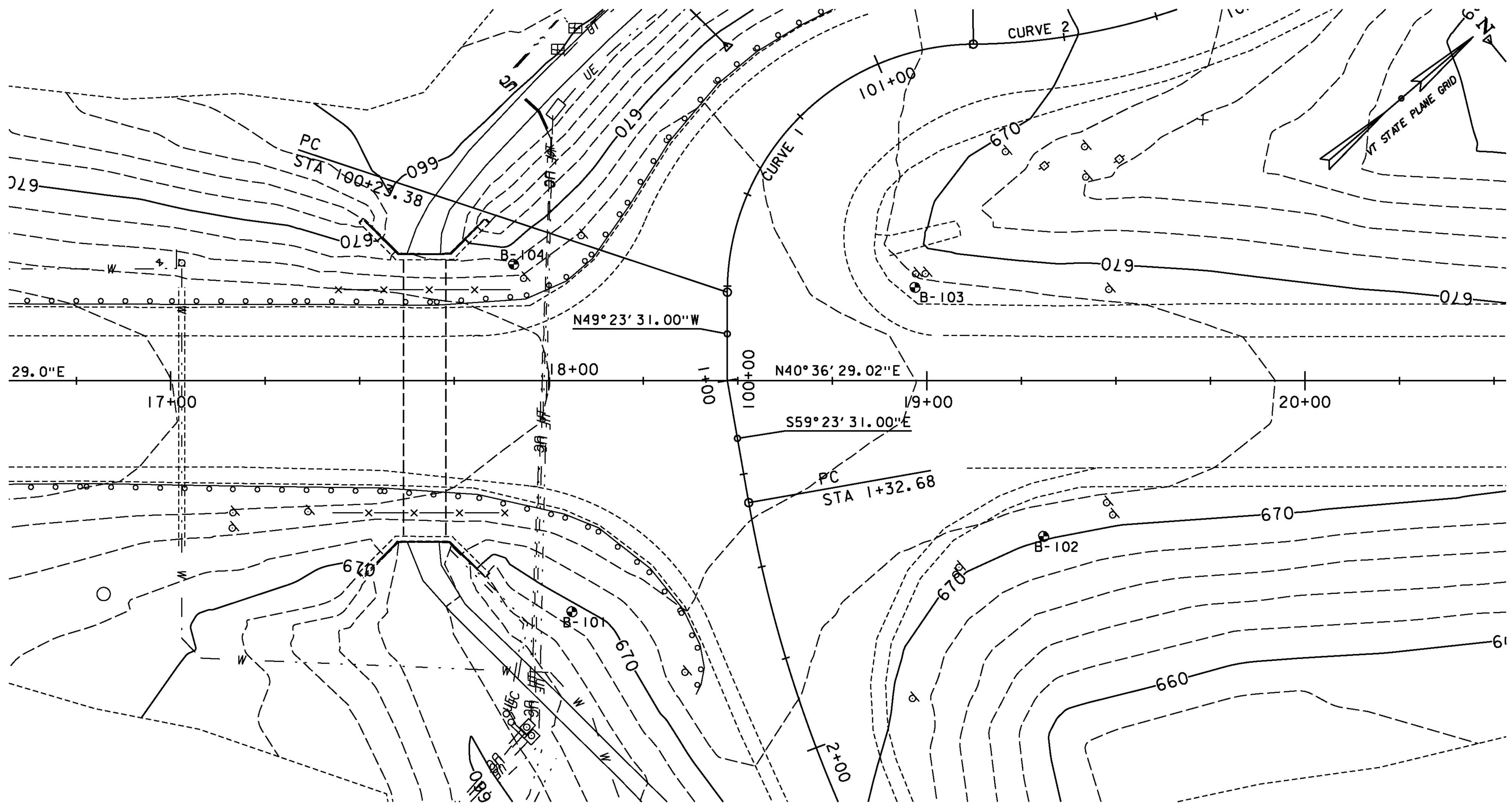
DENSITY (GRANULAR SOILS)		CONSISTENCY (COHESIVE SOILS)	
	DESCRIPTIVE TERM	N	DESCRIPTIVE TERM
<5	Very Loose	<2	Very Soft
5-10	Loose	2-4	Soft
11-24	Med. Dense	5-8	Med. Stiff
25-50	Dense	9-15	Stiff
>50	Very Dense	16-30	Very Stiff
		31-60	Hard
		>60	Very Hard

COMMONLY USED SYMBOLS

▼	Water Elevation
⊗	Standard Penetration Boring
⊕	Auger Boring
⊙	Rod Sounding
S	Sample
N	Standard Penetration Test Blow Count Per Foot For: 2" O.D. Sampler 1 3/8" I.D. Sampler Hammer Weight Of 140 Lbs. Hammer Fall Of 30"
VS	Field Vane Shear Test
US	Undisturbed Soil Sample
B	Blast
DC	Diamond Core
MD	Mud Drill
WA	Wash Ahead
HSA	Hollow Stem Auger
AX	Core Size 1 1/8"
BX	Core Size 1 5/8"
NX	Core Size 2 1/8"
M	Double Tube Core Barrel Used
LL	Liquid Limit
PL	Plastic Limit
PI	Plasticity Index
NP	Non Plastic
w	Moisture Content (Dry Wgt. Basis)
D	Dry
M	Moist
MTW	Moist To Wet
W	Wet
Sat	Saturated
Bo	Boulder
Gr	Gravel
Sa	Sand
Si	Silt
Cl	Clay
HP	Hardpan
Le	Ledge
NLTD	No Ledge To Depth
CNPF	Can Not Penetrate Further
TLOB	Top of Ledge Or Boulder
NR	No Recovery
Rec.	Recovery
%Rec.	Percent Recovery
RQD	Rock Quality Designation
CBR	California Bearing Ratio
<	Less Than
>	Greater Than
R	Refusal (N > 100)
VTSPG	NAD83 - See Note 7

COLOR

blk	Black	pnk	Pink
bl	Blue	pu	Purple
brn	Brown	rd	Red
dk	Dark	tn	Tan
gry	Gray	wh	White
gn	Green	yel	Yellow
lt	Light	mltc	Multicolored
or	Orange		



BORING LAYOUT

20 0 20

SCALE: 1" = 20'-0"

HOLE NO.	SURV. STATION	OFFSET	GROUND ELEV.	DEPTH TLOB (FT.)	NORTHING	EASTING
B-101	18+06	61 RT.	670.0	-	749947.54	1611582.47
B-102	19+31	41 RT.	675.5	-	749989.72	1611510.79
B-103	18+97	26 LT.	671.8	-	750066.88	1611575.33
B-104	17+91	30 LT.	667.0	-	750048.84	1611653.66

LEGEND

- BORING
- ● LEDGE PROBE (LP)
- ☐ TEST PIT (TP)

DEFINITIONS (AASHTO)

BEDROCK (LEDGE) - Rock in its native location of indefinite thickness.

BOULDER - A rock fragment with an average dimension > 12 inches.

COBBLE - Rock fragments with an average dimension between 3 and 12 inches.

GRAVEL - Rounded particles of rock < 3" and > 0.0787" (#10 sieve).

SAND - Particles of rock < 0.0787" (#10 sieve) and > 0.0029" (#200 sieve).

SILT - Soil < 0.0029" (#200 sieve), non or slightly plastic and exhibits no strength when air-dried.

CLAY - Fine grained soil, exhibits plasticity when moist and considerable strength when air-dried.

VARVED - Alternate layers of silt and clay.

HARDPAN - Extremely dense soil, cemented layer, not softened when wet.

MUCK - Soft organic soil (containing > 10% organic material.

MOISTURE CONTENT - Weight of water divided by dry weight of soil.

FLOWING SAND - Granular soil so saturated (loose) that it flows into drill casing during extraction of wash rod.

STRIKE - Angle from magnetic north to line of intersection of bed with a horizontal plane.

DIP - Inclination of bed with a horizontal plane.

GENERAL NOTES

1. The subsurface explorations shown herein were made between August 31 and September 3, 2015 by VTrans.
2. Soil and rock classifications, properties and descriptions are based on engineering interpretation from available subsurface information by the Agency and may not necessarily reflect actual variations in subsurface conditions that may be encountered between individual boring or sample locations.
3. Observed water levels and/or conditions indicated are as recorded at the time of exploration and may vary according to the prevailing rainfall, methods of exploration and other factors.
4. Engineering judgment was exercised in preparing the subsurface information presented herein. Analysis and interpretation of subsurface data was performed and interpreted for Agency design and estimating purposes. Presentation of the information in the Contract is intended to provide the Contractor access to the same data available to the Agency. The subsurface information is presented in good faith and is not intended as a substitute for personal investigation, independent interpretation, independent analysis or judgment by the Contractor.
5. Pictorial structure details shown on the boring plan layout or soils profile are for illustrative purposes only and may not accurately portray final contract details.
6. Terminology used on boring logs to describe the hardness, degree of weathering, and spacing of fractures, joints and other discontinuities in the bedrock is defined in the AASHTO Manual on Subsurface Investigations, 1988.
7. Northing and Easting coordinates are shown in Vermont State Plane Grid North American Datum 1983 in meters and survey feet.

PROJECT NAME: MORRISTOWN	
PROJECT NUMBER: STPG SGNL(47)	
FILE NAME: z15t047bor.dgn	PLOT DATE: 2/5/2015
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: J. SANTACRUCE
DESIGNED BY: J. SANTACRUCE	CHECKED BY: B. COLBURN
BORING INFORMATION SHEET	SHEET 12 OF 58

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

MORRISTOWN
STP SGNL(47)
VT-100 MAST ARMS

Boring No.: **B-101**
Page No.: 1 of 1
Pin No.: 15T047
Checked By: MJB

Boring Crew: JUDKINS, GARROW, NIETO
Date Started: 9/02/15 Date Finished: 9/02/15
VTSPG NAD83: N 749947.54 ft E 1611582.47 ft
Station: 7+458 Offset: 58.00
Ground Elevation: 670.0 ft

	Casing	Sampler
Type:	WB	SS
I.D.:	4 in	1.5 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:	Auto/AWJ	
Rig:	CME 45C TRACK	C_E = 1.34

Groundwater Observations

Date	Depth (ft)	Notes
09/02/15	6.3	After drilling.

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		A-2-4, GrSiSa, brn, Moist, Rec. = 1.1 ft, Lab Note: Small pieces of Wood were within sample.	1-1-2-3 (3)	22.8	21.1	54.9	24.0
		A-2-4, SiSa, brn, Moist, Rec. = 0.7 ft, Lab Note: Small pieces of Wood were within sample.	3-5-6-6 (11)	11.9	19.1	46.2	34.7
5		A-1-b, GrSa, brn, Moist, Rec. = 1.1 ft, Lab Note: Small pieces of Wood were within sample.	6-6-10-19 (16)	9.6	36.6	44.8	18.6
		A-2-4, SiGrSa, brn-gry, Moist, Rec. = 1.6 ft, NXDC. Lab Note: A very thin layer of clay was noticeable. Sample tested (NP).	15-13-10-11 (23)	11.7	24.6	52.6	22.8
		A-1-b, GrSa, Lt/brn-gry, Moist, Rec. = 0.7 ft	32-16-15-36 (31)	14.6	39.0	42.0	19.0
10		A-1-b, SaGr, brn-gry, Moist, Rec. = 1.2 ft	33-35-R@2.5" (R)	13.6	40.8	40.7	18.5
		Field Note:, NXDC, Cleaned out casing.					
15		A-4, Si, brn, Moist, Rec. = 0.9 ft	11-10-10-11 (20)	24.8	5.5	19.1	75.4
20		Field Note:, No Recovery	4-5-6-5 (11)				
25		A-4, Si, brn, Moist, Rec. = 1.1 ft, NXDC. Lab Note: A trace of clay was noticeable. Sample tested (NP).	3-2-3-3 (5)	30.8	14.8	8.5	76.7
		Hole stopped @ 27.0 ft					
30		Remarks: Hole collapsed at 13.6 ft.					

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 2 MORRISTOWN STP SGNL(47).GPJ VERMONT AOT.GDT 9/16/15

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

MORRISTOWN
STP SGNL(47)
VT-100 MAST ARMS

Boring No.: **B-102**
Page No.: 1 of 1
Pin No.: 15T047
Checked By: MJB

Boring Crew: JUDKINS, GARROW, NIETO
Date Started: 9/01/15 Date Finished: 9/01/15
VTSPG NAD83: N 749989.72 ft E 1611510.79 ft
Station: 7+454 Offset: -25.00
Ground Elevation: 675.5 ft

	Casing	Sampler
Type:	WB	SS
I.D.:	4 in	1.5 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:	Auto/AWJ	
Rig:	CME 45C SKID	C_E = 1.33

Groundwater Observations

Date	Depth (ft)	Notes
09/01/15	8.2	While drilling.

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %	LL %	PI %
		A-1-a, SaGr, gry, Moist, Rec. = 1.0 ft, Lab Note: Lots of Broken Rock was within sample.	5-7-10-10 (17)	4.7	63.1	23.3	13.6		
		A-1-b, GrSa, gry, Moist, Rec. = 1.5 ft, Lab Note: Asphalt Pavement and Broken Rock were within sample.	10-9-13-10 (22)	5.9	40.6	43.1	16.3		
5		A-1-a, SaGr, gry, Moist, Rec. = 1.0 ft, Lab Note: Lots of Broken Rock was within sample.	7-11-25-18 (36)	3.0	66.3	20.4	13.3		
		A-2-4, SiGrSa, brn, Moist, Rec. = 1.7 ft, Cleaned out casing.	15-14-12-14 (26)	10.0	33.0	35.8	31.2		
		A-1-b, SaGr, brn, Moist, Rec. = 0.5 ft, Lab Note: A large chunk of Wood was within sample and was removed before gradation.	9-9-6-12 (15)	24.2	46.6	36.8	16.6		
10		A-1-b, SiGrSa, brn, Moist, Rec. = 0.7 ft	12-11-14-20 (25)	12.4	30.0	49.7	20.3		
		Field Note:, Cleaned out casing.							
15		A-2-4, SaSiGr, brn, Moist, Rec. = 1.2 ft	15-13-12-24 (25)	11.2	44.0	25.2	30.8		
		Field Note:, Cleaned out casing.							
20		A-4, SaSi, brn, Moist, Rec. = 1.1 ft	5-4-5-8 (9)	20.1	0.3	49.1	50.6		
25		A-2-4, Sa, brn, Moist, Rec. = 1.0 ft	3-4-5-4 (9)	20.3	10.0	72.2	17.8		
		A-4, Si, gry-brn, Moist, Rec. = 0.7 ft		37.4		1.8	98.2	32	6
		Hole stopped @ 27.0 ft							
30		Remarks: Hole collapsed at 15.5 ft.							

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 2 MORRISTOWN STP SGNL(47).GPJ VERMONT AOT.GDT 9/16/15

McFarland Johnson

PROJECT NAME: MORRISTOWN	
PROJECT NUMBER: STPG SGNL(47)	
FILE NAME: z15t047esdl.dgn	PLOT DATE: 5/13/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: R. LUCHINI
DESIGNED BY: M. HASKINS	CHECKED BY: B. COLBURN
BORING LOG SHEET 1	SHEET 13 OF 58

BORING LOG B-103

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

MORRISTOWN
STP SGNL(47)
VT-100 MAST ARMS

Boring No.: **B-103**
Page No.: 1 of 1
Pin No.: 15T047
Checked By: MJB

Boring Crew: JUDKINS, GARROW, NIETO
Date Started: 9/03/15 Date Finished: 9/03/15
VTSPG NAD83: N 750066.88 ft E 1611575.33 ft
Station: 7+485 Offset: 30.00
Ground Elevation: 671.8 ft

	Casing	Sampler
Type:	WB	SS
I.D.:	4 in	1.5 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:	Auto/AWJ	
Rig:	CME 45C TRACK	C_E = 1.34

Groundwater Observations

Date	Depth (ft)	Notes
09/03/15	8.5	After drilling.

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		A-1-b, SaGr, gry, Moist, Rec. = 1.3 ft, Lab Note: Grass & Roots were within sample. Broken Rock was also within sample.	2-4-7-5 (11)	6.7	44.3	37.0	18.7
		A-2-4, GrSiSa, brn, Moist, Rec. = 1.1 ft	3-6-8-12 (14)	10.9	21.7	44.9	33.4
5		A-1-b, GrSa, brn-white, Moist, Rec. = 1.8 ft, NXDC, Cleaned out casing.	14-14-28-24 (42)	7.4	36.6	44.5	18.9
		A-4, GrSaSi, brn, Moist, Rec. = 1.4 ft, NXDC, Cleaned out casing.	15-15-18-30 (33)	12.2	23.4	33.5	43.1
		A-2-4, SiSa, brn, Moist, Rec. = 0.6 ft	6-18-32-34 (50)	12.0	18.5	58.4	23.1
10		A-2-4, GrSiSa, brn-gry, Moist, Rec. = 1.5 ft	15-18-18-15 (36)	14.6	22.5	50.1	27.4
		Field Note:, NXDC, Cleaned out casing					
15		A-1-b, SaGr, brn, Moist, Rec. = 1.1 ft	18-35-R@5.0" (R)	10.8	42.0	40.4	17.6
		Field Note:, NXDC, Cleaned out casing					
20		A-4, GrSaSi, brn-Lt/brn, Moist, Rec. = 0.8 ft, NXDC. Lab Note: A trace of clay was noticeable. Sample tested (NP).	14-12-12-13 (24)	18.9	20.7	31.5	47.8
25		A-2-4, Sa, Lt/brn, Moist, Rec. = 0.3 ft	6-8-11-13 (19)	16.1	5.5	76.8	17.7
		Hole stopped @ 27.0 ft					
30		Remarks: Hole collapsed at 10.5 ft.					

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 2 MORRISTOWN STP SGNL(47).GPJ VERMONT AOT.GDT 9/16/15

BORING LOG B-104

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

MORRISTOWN
STP SGNL(47)
VT-100 MAST ARMS

Boring No.: **B-104**
Page No.: 1 of 1
Pin No.: 15T047
Checked By: MJB

Boring Crew: JUDKINS, GARROW, NIETO
Date Started: 8/31/15 Date Finished: 9/01/15
VTSPG NAD83: N 750048.84 ft E 1611653.66 ft
Station: 7+496 Offset: 45.00
Ground Elevation: 667.0 ft

	Casing	Sampler
Type:	WB	SS
I.D.:	4 in	1.5 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:	Auto/AWJ	
Rig:	CME 45C TRACK	C_E = 1.34

Groundwater Observations

Date	Depth (ft)	Notes
08/31/15	12.8	While drilling.

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		A-1-b, SiGrSa, brn, Moist, Rec. = 0.8 ft, Lab Note: Pieces of Wood were within sample.	2-2-3-3 (5)	26.2	33.4	43.6	23.0
		A-4, SaSi, Lt/brn, Moist, Rec. = 1.5 ft, Cleaned out casing.	4-4-5-6 (9)	18.5	10.3	26.0	63.7
5		A-4, SaSi, brn, Moist, Rec. = 1.4 ft	5-12-20-17 (32)	19.9	14.8	42.5	42.7
		A-2-4, SiSa, brn, Moist, Rec. = 1.0 ft, Cleaned out casing.	12-13-11-14 (24)	15.8	19.5	46.7	33.8
		A-1-b, GrSa, brn, Moist, Rec. = 0.4 ft, Cleaned out casing.	8-10-6-11 (16)	12.1	40.8	41.7	17.5
10		A-1-b, SaGr, gry, Moist, Rec. = 0.9 ft, Lab Note: Broken Rock was within sample.	18-40-R@3.5" (R)	10.5	43.7	38.0	18.3
		Field Note:, Cleaned out casing					
15		A-1-b, SaGr, gry, Moist, Rec. = 1.0 ft, Lab Note: Broken Rock was within sample.	44-40-R@3.5" (R)	8.7	57.0	27.3	15.7
		Field Note:, Cleaned out casing					
20		Field Note:, No Recovery	5-6-5-4 (11)				
25		A-4, SiSa, gry, MTW, Rec. = 1.0 ft	3-4-4-R@2.5" (8)	22.9	3.1	61.2	35.7
		Field Note:, Went down with clean out barrel and broke through at 28.5 ft					
		Hole stopped @ 28.5 ft					
30		Remarks: Hole collapsed at 11.2 ft.					

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
2. N Values have not been corrected for hammer energy. C_E is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 2 MORRISTOWN STP SGNL(47).GPJ VERMONT AOT.GDT 9/16/15

STATE OF VERMONT
AGENCY OF TRANSPORTATION

QUANTITY SHEET 1

SUMMARY OF ESTIMATED QUANTITIES / TOTALS / DESCRIPTIONS

ROADWAY	EROSION CONTROL	FULL C.E.	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND
805			805		CY	COMMON EXCAVATION	203.15	2
15			15		CY	EXCAVATION OF SURFACES AND PAVEMENTS	203.28	0.3
155			155		CY	EARTH BORROW	203.30	0.3
340			340		CY	SAND BORROW	203.31	19.6
10			10		CY	TRENCH EXCAVATION OF EARTH, EXPLORATORY (N.A.B.I.)	204.22	EST
3250			3250		SY	COLD PLANING, BITUMINOUS PAVEMENT	210.10	14.7
620			620		CY	SUBBASE OF DENSE GRADED CRUSHED STONE	301.35	61.7
						BEGIN OPTION AA		
55			55		TON	AGGREGATE SHOULDERS	402.12	3.1
55			55		TON	AGGREGATE SHOULDERS, RAP	402.13	3.1
						END OPTION AA		
1			1		LU	PRICE ADJUSTMENT, ASPHALT CEMENT (N.A.B.I.)	406.50	-
4			4		CY	CONCRETE, HIGH PERFORMANCE CLASS B	501.34	1.03
3800			3800		LB	REINFORCING STEEL, LEVEL I	507.11	76
2			2		GAL	WATER REPELLENT, SILANE	514.10	1
12			12		LF	8 INCH UNDERDRAIN CARRIER PIPE	605.21	1
2			2		TON	BITUMINOUS CONCRETE SIDEWALK	618.15	0.4
87			87		LF	CHAIN-LINK FENCE, 4 FEET (VINYL COATED - BLACK)(PAINT POSTS - BLACK)	620.11	0.4
4			4		EACH	BRACING ASSEMBLY FOR CHAIN-LINK FENCE, 4 FEET (PAINT - BLACK)	620.20	-
93			93		LF	REMOVAL OF EXISTING FENCE	620.55	-
50			50		LF	STEEL BEAM GUARDRAIL, GALVANIZED	621.20	EST
3			3		EACH	ENERGY ABSORPTION ATTENUATOR	621.56	-
505			505		LF	REMOVE AND RESET GUARDRAIL	621.75	3.2
470			470		LF	TEMPORARY TRAFFIC BARRIER	621.90	3
480			480		HR	UNIFORMED TRAFFIC OFFICERS	630.10	-
800			800		HR	FLAGGERS	630.15	-
		1	1		LS	FIELD OFFICE, ENGINEERS	631.10	-
		1	1		LS	TESTING EQUIPMENT, CONCRETE	631.16	-
		1	1		LS	TESTING EQUIPMENT, BITUMINOUS	631.17	-
		3000	3000		DL	FIELD OFFICE TELEPHONE (N.A.B.I.)	631.26	-
1			1		LS	MOBILIZATION/DEMOBILIZATION	635.11	-
1			1		LS	TRAFFIC CONTROL	641.10	-
3			3		EACH	PORTABLE CHANGEABLE MESSAGE SIGN	641.15	-
2750			2750		LF	DURABLE 4 INCH WHITE LINE, RECESSED POLYUREA	646.406	60
1700			1700		LF	DURABLE 4 INCH YELLOW LINE, RECESSED POLYUREA	646.416	24
82			82		LF	DURABLE 24 INCH STOP BAR, RECESSED POLYUREA	646.486	-
51			51		EACH	DURABLE LETTER OR SYMBOL, RECESSED TYPE C TAPE	646.4973	-
1600			1600		LF	TEMPORARY 4 INCH WHITE LINE, PAINT	646.602	126
900			900		LF	TEMPORARY 4 INCH YELLOW LINE, PAINT	646.612	64
30			30		LF	TEMPORARY 24 INCH STOP BAR, PAINT	646.682	4

DETAILED SUMMARY OF QUANTITIES

QUANTITIES	UNIT	ITEMS
		900.680 SPECIAL PROVISION (BITMUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY)
		VT100/ALT VT100
		WEARING COURSE
261.7	TON	TYPE III-S
		BINDER COURSE
67.3	TON	TYPE II-S
		BASE COURSE
84.2	TON	TYPE I-S
413.2	TON	SUBTOTAL
		VT100(LAPORTE ROAD)
		WEARING COURSE
141.9	TON	TYPE III-S
		BINDER COURSE
623.4	TON	TYPE II-S
		BASE COURSE
765.3	TON	SUBTOTAL
1178.5	TON	SUBTOTAL
21.5	TON	ROUNDING
1200	TON	TOTAL

McFarland Johnson

PROJECT NAME: MORRISTOWN
PROJECT NUMBER: STPG SGNL(47)

FILE NAME: z15t047qyl.dgn
PROJECT LEADER: J. SANTACRUCE
DESIGNED BY: J. SANTACRUCE
QUANTITY SHEET 1

PLOT DATE: 5/13/2016
DRAWN BY: J. SANTACRUCE
CHECKED BY: B. COLBURN

STATE OF VERMONT
AGENCY OF TRANSPORTATION

QUANTITY SHEET 2

SUMMARY OF ESTIMATED QUANTITIES			TOTALS		DESCRIPTIONS			
ROADWAY	EROSION CONTROL	FULL C.E.	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND
120			120		EACH	LINE STRIPING TARGETS	646.76	11
60			60		SF	REMOVAL OF EXISTING PAVEMENT MARKINGS	646.85	1
	32		32		LB	SEED	651.15	0.6
	135		135		LB	FERTILIZER	651.18	4
	1		1		TON	AGRICULTURAL LIMESTONE	651.20	0.5
	1		1		TON	HAY MULCH	651.25	0.5
	75		75		CY	TOPSOIL	651.35	4.5
	1		1		LS	EPSC PLAN	652.10	-
	48		48		HR	MONITORING EPSC PLAN	652.20	-
	1		1		LU	MAINTENANCE OF EPSC PLAN (N.A.B.I.)	652.30	-
	295		295		SY	TEMPORARY EROSION MATTING	653.20	2.7
	325		325		SY	PERMANENT EROSION MATTING	653.21	4.8
	4		4		CY	VEHICLE TRACKING PAD	653.35	0.9
	1550		1550		LF	PROJECT DEMARCATION FENCE	653.55	30.7
	1200		1200		LF	EROSION LOG	653.60	20.6
1			1		EACH	TRANSPLANTING TREES	656.45	-
11			11		EACH	TRANSPLANTING SHRUBS	656.50	-
230			230		SY	TRANSPLANTING GROUNDCOVER	656.55	4.7
1			1		LS	TREE PROTECTION	656.85	-
59			59		SF	TRAFFIC SIGNS, TYPE A	675.20	0.25
300			300		LB	TUBULAR STEEL SIGN POST	675.33	30
35			35		LF	SQUARE TUBE SIGN POST AND ANCHOR	675.341	5
2			2		EACH	FOUNDATION FOR TUBULAR STEEL POST	675.43	-
13			13		EACH	REMOVING SIGNS	675.50	-
8			8		EACH	ERECTING SALVAGED SIGNS	675.60	-
11			11		EACH	SETTING SALVAGED POSTS	675.61	-
1			1		EACH	DELINEATOR WITH STEEL POST	676.10	-
1			1		EACH	REMOVAL OF EXISTING DELINEATOR	676.12	-
1			1		EACH	TRAFFIC CONTROL SIGNAL SYSTEM, INTERSECTION (ALT VT100 & VT100 (LAPORTE RD))	678.15	-
705			705		LF	ELECTRICAL CONDUIT (2")(PVC)(SCH. 80)	678.21	3
1650			1650		LF	WIRED CONDUIT (2")(PVC)(SCH. 80)	678.23	19
5			5		EACH	PULL BOX, DOUBLE	678.27	-
2			2		EACH	BRACKET ARM	679.47	-
2			2		EACH	LUMINAIRE	679.50	-
1			1		LU	PRICE ADJUSTMENT, FUEL (N.A.B.I.)	690.50	-
4			4		EACH	SPECIAL PROVISION (CPM SCHEDULE)	900.620	-
3			3		EACH	SPECIAL PROVISION (TEMPORARY PORTABLE LIGHTING UNIT)	900.620	-
260			260		LF	SPECIAL PROVISION (HORIZONTAL DIRECTION DRILLING, 12" CASING)	900.640	4
135			135		LF	SPECIAL PROVISION (VERTICAL GRANITE CURB, MOUNTABLE)	900.640	1.2

DETAILED SUMMARY OF QUANTITIES		
QUANTITIES	UNIT	ITEMS

McFarland Johnson

PROJECT NAME: MORRISTOWN
PROJECT NUMBER: STPG SGNL(47)

FILE NAME: z15t047qy2.dgn
PLOT DATE: 5/13/2016
PROJECT LEADER: J. SANTACRUCE
DRAWN BY: J. SANTACRUCE
DESIGNED BY: J. SANTACRUCE
CHECKED BY: B. COLBURN
QUANTITY SHEET 2

STATE OF VERMONT
AGENCY OF TRANSPORTATION

QUANTITY SHEET 3

SUMMARY OF ESTIMATED QUANTITIES			TOTALS		DESCRIPTIONS			
ROADWAY	EROSION CONTROL	FULL C.E.	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND
1			1		LS	SPECIAL PROVISION (MODIFY EXISTING TRAFFIC SYSTEM, INTERSECTION)(ALT VT 100 AND BRIDGE ST)	900.645	-
1			1		LS	SPECIAL PROVISION (MODIFYING EXISTING PEDESTRIAN CULVERT LIGHTING)	900.645	-
1			1		LS	SPECIAL PROVISION (VIDEO SURVEILLANCE CAMERA SYSTEM)	900.645	-
1			1		LU	SPECIAL PROVISION (MAT DENSITY PAY ADJUSTMENT, SMALL QUANTITY)(N.A.B.I.)	900.650	-
1			1		LU	SPECIAL PROVISION (MIXTURE PAY ADJUSTMENT)(N.A.B.I.)	900.650	-
120			120		SY	SPECIAL PROVISION (STAMPED CONCRETE ISLAND, 8")	900.675	5
1200			1200		TON	SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY)	900.680	21.5
30			30		CWT	SPECIAL PROVISION (EMULSIFIED ASPHALT)(RS-1H OR CRS-1H)	900.683	0.4

DETAILED SUMMARY OF QUANTITIES

QUANTITIES	UNIT	ITEMS

McFarland Johnson

PROJECT NAME: MORRISTOWN
PROJECT NUMBER: STPG SGNL(47)

FILE NAME: z15t047qy3.dgn
PROJECT LEADER: J. SANTACRUCE
DESIGNED BY: J. SANTACRUCE
QUANTITY SHEET 3
PLOT DATE: 5/13/2016
DRAWN BY: J. SANTACRUCE
CHECKED BY: B. COLBURN
SHEET 17 OF 58

STATE OF VERMONT
AGENCY OF TRANSPORTATION

ITEM DETAIL SHEET

CURB

BEGIN STATION	END STATION	POSITION LEFT FT	POSITION RIGHT FT	REMARKS
ITEM 900.640 SPECIAL PROVISION (VERTICAL GRANITE CURB, MOUNTABLE)				
2+17	1+70	45.1		R=340
1+70	1+70	49.8		R=28
1+40	1+50	38.9		STRAIGHT
	SUBTOTAL =	133.8		
	ROUNDING =	1.2		
	ITEM TOTAL =	135.0		

GUARD RAIL

BEGIN STATION	END STATION	POSITION LEFT FT	POSITION RIGHT FT	END TREATMENT BEGIN EA	END TREATMENT END EA
ITEM 621.75 REMOVE AND RESET GUARDRAIL					
14+81.25	18+39.42		387.5		ANCHOR
100+21.40	100+90.00	114.3			
	SUBTOTAL =	501.8			
	ROUNDING =	3.2			
	ITEM TOTAL =	505.0			
ITEM 621.20 STEEL BEAM GUARDRAIL, GALVANIZED					
ESTIMATED QUANTITY TO ACCOUNT FOR ANY DAMAGE DURING REMOVAL AND RESETTING OF EXISTING GUARDRAIL					
	ITEM TOTAL =	50.0	EST		

UNDERDRAIN

BEGIN STATION	END STATION	TYPE	POSITION	DIA. IN	LENGTH FT	TRENCH EARTH CY	TRENCH ROCK CY	GRAN BKFILL CY	FB EA	MKR PST EA
ITEM 605.21 8 INCH UNDERDRAIN CARRIER PIPE										
16+89.42	17+00.15	U	RT	8	11	-	-	-	-	-
	SUBTOTAL =	11								
	ROUNDING =	1								
	ITEM TOTAL =	12								

McFarland Johnson

PROJECT NAME: MORRISTOWN
PROJECT NUMBER: STPG SGNL(47)
FILE NAME: z15t047idt.dgn
PROJECT LEADER: J. SANTACRUCE
DESIGNED BY: R. LUCHINI
ITEM DETAIL SHEET
PLOT DATE: 5/13/2016
DRAWN BY: R. LUCHINI
CHECKED BY: B. COLBURN
SHEET 18 OF 58

STATE OF VERMONT
AGENCY OF TRANSPORTATION

EARTHWORKS

STATION	DIST FT.	TOTAL EXCAVATION EARTH AND ROCK AREA S.F.	TOTAL EXCAVATION EARTH AND ROCK VOLUME C.Y.	ROCK EXCAVATION AREA S.F.	ROCK EXCAVATION VOLUME C.Y.	EMBANKMENT AREA S.F.	EMBANKMENT VOLUME C.Y.	AREA S.F.	VOLUME C.Y.
COMMON EXCAVATION									
VT100/ ALT VT100									
14+84		0.0				0.00			
	16.12		10.39						
15+00		34.8				0.00			
	50.00		69.17						
15+50		39.9				0.00			
	50.00		72.96						
16+00		38.9				0.00			
	50.00		67.87				0.19		
16+50		34.4				0.20			
	50.00		62.59				1.67	CUT	421
17+00		33.2				1.60		ROCK	0
	50.00		58.15				16.76	R.FAC	.495
17+50		29.6				16.50		FILL	46
	50.00		57.13				17.59	F.FAC	1.15
18+00		32.1				2.50		EX. C	369
			0.00				0.00		
19+00		21.2							
	50.00		23.24			10.30			
19+50		3.9					9.54		
VT100 (LAPORTE ROAD)									
1+21		66.7				0.00			
	29.00		61.65						
1+50		48.1				1.80			
	50.00		67.50				12.59		
2+00		24.8				11.80			
	50.00		43.15				41.76		
2+50		21.8				33.30			
	50.00		41.67				39.26	CUT	382
3+00		23.2				9.10		ROCK	0
	50.00		41.11				9.91	R.FAC	.495
3+50		21.20				1.60		FILL	108
	50		40.65				2.13	F.FAC	1.15
4+00		22.70				0.70		EX. C	258
	50.00		43.52				1.48		
4+50		24.30				0.90			
	50.00		42.50				0.83		
5+00		21.60							

STATION	DIST FT.	TOTAL EXCAVATION EARTH AND ROCK AREA S.F.	TOTAL EXCAVATION EARTH AND ROCK VOLUME C.Y.	ROCK EXCAVATION AREA S.F.	ROCK EXCAVATION VOLUME C.Y.	EMBANKMENT AREA S.F.	EMBANKMENT VOLUME C.Y.	AREA S.F.	VOLUME C.Y.

STATION	DIST FT.	TOTAL EXCAVATION EARTH AND ROCK AREA S.F.	TOTAL EXCAVATION EARTH AND ROCK VOLUME C.Y.	ROCK EXCAVATION AREA S.F.	ROCK EXCAVATION VOLUME C.Y.	EMBANKMENT AREA S.F.	EMBANKMENT VOLUME C.Y.	AREA S.F.	VOLUME C.Y.

SUMMARY AND BALANCES

STATION TO STATION		TOT EXC. EARTH & ROCK C.Y.	ROCK EXCAV C.Y.	EMBANK C.Y.	EXCESSES CUT	EXCESSES FILL	ACUMULATIVE EXCESSES CUT	ACUMULATIVE EXCESSES FILL
COMMON EXCAVATION								
14+84	19+50	421	0	52	369		369	
1+21	5+00	382	0	124	258		627	
	SUBTOTAL	803						
	ROUNDING	2						
	TOTAL	805						

REMARKS

EARTH AND ROCK EXCAVATION	805
SOLID ROCK EXCAVATION	0
EARTH EXCAVATION	805
PLANIMETERED FILL	155
LESS FACTORED SOLID ROCK	0
LESS DISPLACEMENT OF ANY LARGE STRUCTURES	0
NET PLANIMETERED FILL	155
FACTOR	23
PLANIMETERED FILL INCLUDING FACTOR	178
MATERIALS AVAILABLE FOR FILLS	
EARTH EXCAVATION	805
CHANNEL EXCAVATION	0
UNDERDRAIN EXCAVATION	0
STRUCTURE EXCAVATION	0
TOTAL MATERIAL AVAILABLE FOR FILL	805
TOTAL FILL INCLUDING FACTOR	178
TOTAL MATERIAL FOR FILL	805
BORROW	155
EXCESS EXCAVATION	627

McFarland Johnson

PROJECT NAME: MORRISTOWN
PROJECT NUMBER: STPG SGNL(47)

FILE NAME: z15t047ewl.dgn
PROJECT LEADER: J. SANTACRUCE
DESIGNED BY: J. SANTACRUCE
EARTHWORK SHEET

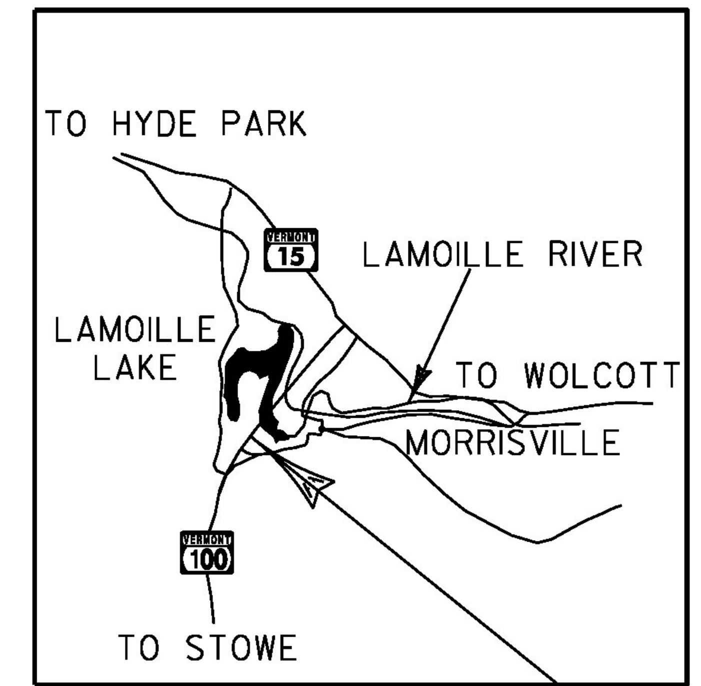
PLOT DATE: 5/13/2016
DRAWN BY: J. SANTACRUCE
CHECKED BY: B. COLBURN
SHEET 19 OF 58

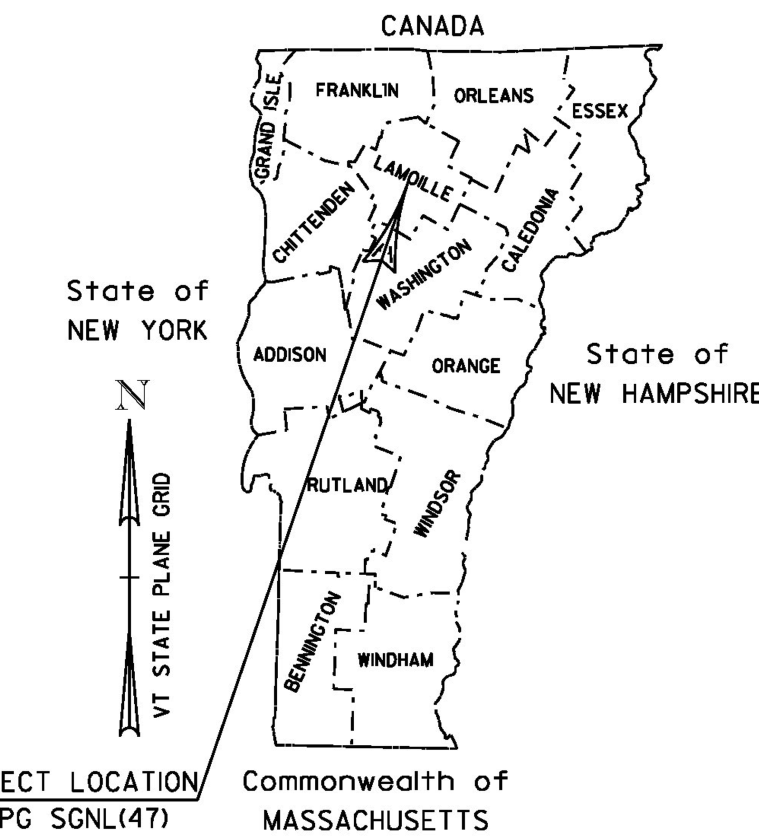
R. O. W. PLANS

INDEX OF SHEETS

1 TITLE
2 LEGEND
3 DETAIL
4 LAYOUT
5 TYPICAL
6 TIE
7 PAVEMENT & ALIGNMENT
8 EPSC CONSTRUCTION
9 PAVEMENT MARKING & SIGNING

STATE OF VERMONT
AGENCY OF TRANSPORTATION





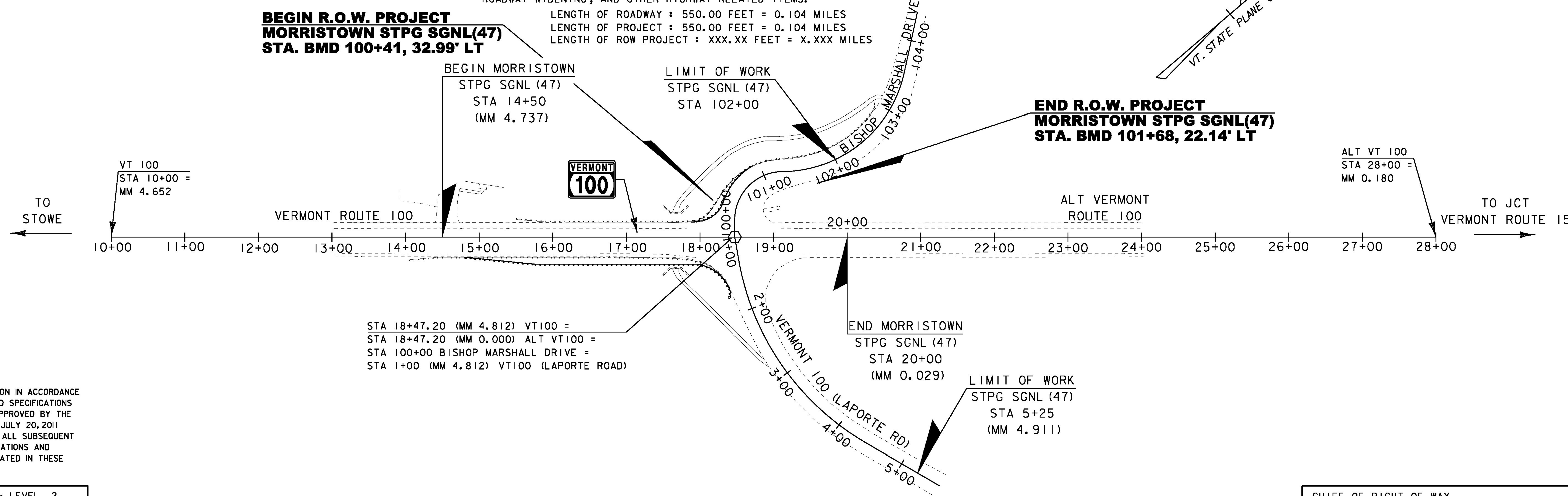
1 0 1 2
SCALE IN MILES

PROPOSED IMPROVEMENT
TOWN OF MORRISTOWN
COUNTY OF LAMOILLE
VT ROUTE 100, ALT VT ROUTE 100 (MAJOR COLLECTOR)

PROJECT LOCATION : BEGINNING AT A POINT ON VT100 IN THE TOWN OF MORRISTOWN AT STA 14+50 (MM 4.737) APPROXIMATELY 400 FEET SOUTHERLY OF THE INTERSECTION OF ALT VT100 AND VT100 (LAPORTE ROAD) EXTENDING NORTHERLY APPROXIMATELY 550 FEET TO STATION 20+00 (MM 4.841) ON VT100 (LAPORTE ROAD)

PROJECT DESCRIPTION : WORK TO BE PERFORMED UNDER THIS PROJECT INCLUDES THE INSTALLATION OF A NEW TRAFFIC SIGNAL, ROADWAY WIDENING, AND OTHER HIGHWAY RELATED ITEMS.

LENGTH OF ROADWAY : 550.00 FEET = 0.104 MILES
LENGTH OF PROJECT : 550.00 FEET = 0.104 MILES
LENGTH OF ROW PROJECT : XXX.XX FEET = X.XXX MILES



CONSTRUCTION IS TO BE CARRIED ON IN ACCORDANCE WITH THESE PLANS AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION DATED 2011, AS APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION ON JULY 20, 2011 FOR USE ON THIS PROJECT, INCLUDING ALL SUBSEQUENT REVISIONS AND SUCH REVISED SPECIFICATIONS AND SPECIAL PROVISIONS AS ARE INCORPORATED IN THESE PLANS.

QUALITY ASSURANCE PROGRAM : LEVEL 2	
SURVEYED BY :	VTRANS (R. GILMAN)
SURVEYED DATE :	07/15
DATUM	
VERTICAL	NAVD 88
HORIZONTAL	NAD83 (92)

ALL DRIVES AS INDICATED ON PLANS ARE SUBJECT TO PERMITS PURSUANT TO TITLE 19 V.S.A. § 1111.

0 75 150
SCALE IN FEET

For Right-Of-Way Use Only

CHIEF OF RIGHT OF WAY
APPROVED ROBERT M. WHITE DATE 01-04-16
PROJECT MANAGER : PATRICIA COBURN, P.E.
PROJECT NAME : MORRISTOWN
PROJECT NUMBER : STPG SGNL (47)
SHEET 20 OF 58 SHEETS

STATE OF VERMONT
AGENCY OF TRANSPORTATION

RIGHT - OF - WAY DETAIL SHEET

TABLE OF PROPERTY ACQUISITION

PARCEL NO.	PROPERTY OWNER	ROW LAYOUT NO.	BEGINNING STATION	ENDING STATION	TAKE	REMAINDER	RIGHT			RECORDING DATA					REMARKS
					AREA±	AREA±	TYPE	T / P	AREA ±	TITLE	DATE	TOWN / CITY	BOOK	PAGE	
1	BISHOP JOHN A. MARSHALL SCHOOL, INC.	1	BMD 100+41 LT	BMD 101+68 RT			CONSTRUCTION	T	0.12 A						INCL. PDF; 5,123 SF±
			BMD 100+42 LT	BMD 100+90 LT			REMOVE & RESET	T							GUARDRAIL
			BMD 100+42 LT	BMD 101+27 LT			REMOVE	T	352 SF						PAVEMENT; TOPSOIL & SEED
			BMD 100+67 RT	BMD 101+46 RT			REMOVE	T	240 SF						PAVEMENT; TOPSOIL & SEED
2	MORRISVILLE WATER & LIGHT		BMD 100+41 LT	BMD 101+68 RT											UTILITY
3	TELEPHONE OPERATING COMPANY OF VERMONT LLC		BMD 100+41 LT	BMD 101+68 RT											UTILITY
4	COMCAST OF CONNECTICUT/GEORGIA/ MASSACHUSETTS/NEW HAMPSHIRE/ NEW YORK/NORTH CAROLINA/VIRGINIA/ VERMONT, LLC		BMD 100+41 LT	BMD 101+68 RT											UTILITY
5	VERMONT TELEPHONE COMPANY, INC.		BMD 100+41 LT	BMD 101+68 RT											UTILITY

BMD = BISHOP MARSHALL DRIVE

TABLE OF REVISIONS

REVISION NO.	ROW SET SHEET #	DESCRIPTION	DATE

For Right-Of-Way Use Only

APPROVED: RYAN CLOUTIER DATE: 01-04-16
CHIEF, PLANS & TITLES

PROJECT NAME: **MORRISTOWN**
PROJECT NUMBER: **STPG SGNL(47)**

FILE NAME: r15t047detail.xls
PLOT DATE: 04-JAN-2016
PROJECT LEADER: P. COBURN
DRAWN BY: M. TROTTIER
DESIGNED BY: T. POLK
CHECKED BY: R. CLOUTIER
R.O.W. DETAIL SHEET #1

CHAIN-LINK FENCE, 4FT (VINYL COATED)
STA 17+42 TO STA 17+90, RT
STA 17+42 TO STA 17+83, LT

SPECIAL PROVISION (STAMPED CONCRETE ISLAND 8')
STA 1+38.8 TO STA 2+15.6, LT

EXCAVATION OF SURFACES AND PAVEMENTS
STA 100+19.7 TO STA 101+26.3, LT
STA 100+20.4 TO STA 101+45.4, RT

REMOVE AND RESET GUARD RAIL
STA 14+81.25 TO STA 18+39.44, RT
STA 100+21.4 TO STA 100+90.0, RT

8 INCH UNDERDRAIN PIPE
STA 16+89.42, 44.61 RT TO
STA 17+00.15, 47.88 RT

DELINEATOR
STA 16+23, RT

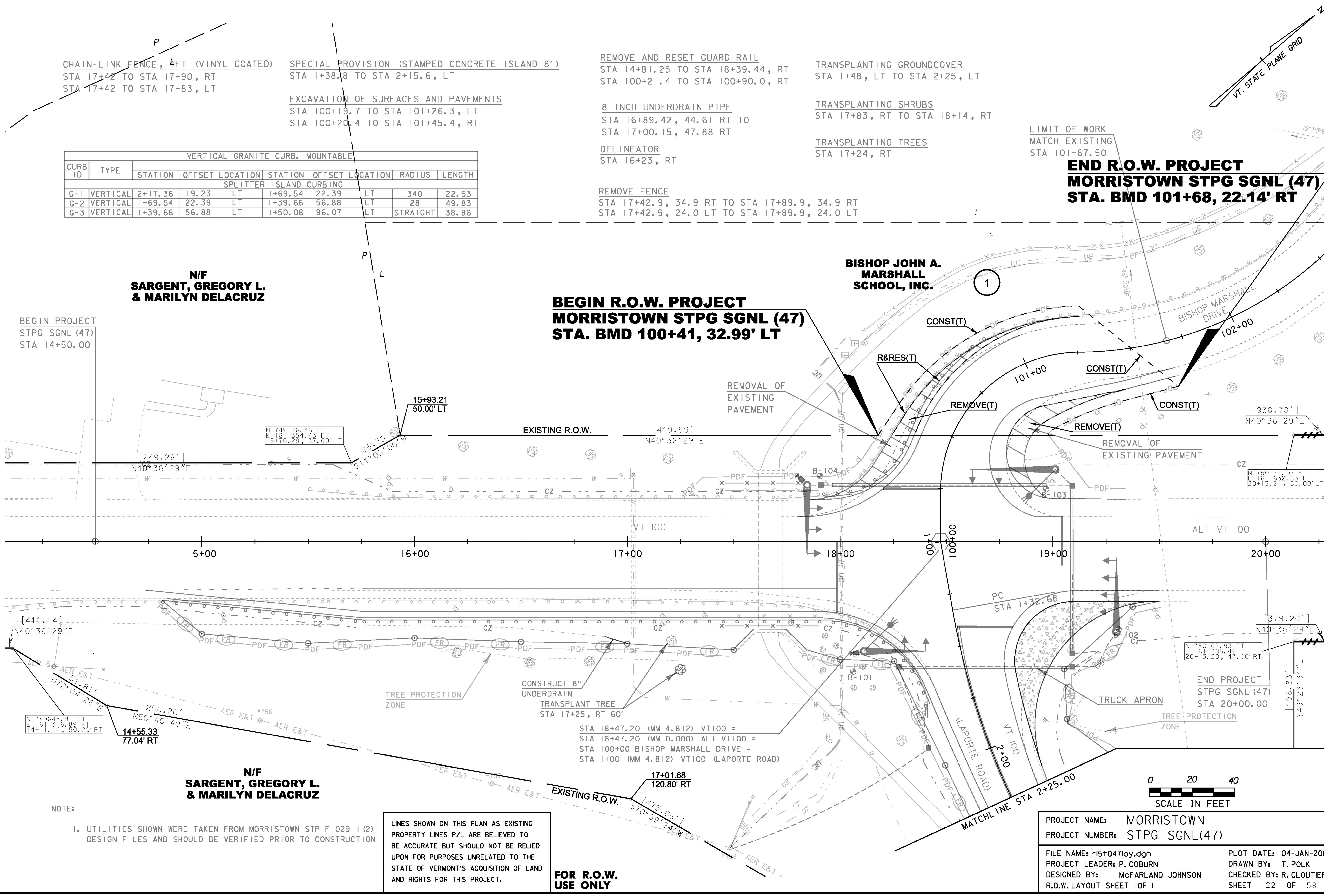
REMOVE FENCE
STA 17+42.9, 34.9 RT TO STA 17+89.9, 34.9 RT
STA 17+42.9, 24.0 LT TO STA 17+89.9, 24.0 LT

TRANSPLANTING GROUNDCOVER
STA 1+48, LT TO STA 2+25, LT

TRANSPLANTING SHRUBS
STA 17+83, RT TO STA 18+14, RT

TRANSPLANTING TREES
STA 17+24, RT

VERTICAL GRANITE CURB, MOUNTABLE									
CURB ID	TYPE	STATION	OFFSET	LOCATION	STATION	OFFSET	LOCATION	RADIUS	LENGTH
SPLITTER ISLAND CURBING									
G-1	VERTICAL	2+17.36	19.23	LT	1+69.54	22.39	LT	340	22.53
G-2	VERTICAL	1+69.54	22.39	LT	1+39.66	56.88	LT	28	49.83
G-3	VERTICAL	1+39.66	56.88	LT	1+50.08	96.07	LT	STRAIGHT	38.86



NOTE:

1. UTILITIES SHOWN WERE TAKEN FROM MORRISTOWN STP F 029-1(2) DESIGN FILES AND SHOULD BE VERIFIED PRIOR TO CONSTRUCTION

LINES SHOWN ON THIS PLAN AS EXISTING PROPERTY LINES P/L ARE BELIEVED TO BE ACCURATE BUT SHOULD NOT BE RELIED UPON FOR PURPOSES UNRELATED TO THE STATE OF VERMONT'S ACQUISITION OF LAND AND RIGHTS FOR THIS PROJECT.

FOR R.O.W. USE ONLY

PROJECT NAME:	MORRISTOWN
PROJECT NUMBER:	STPG SGNL(47)
FILE NAME: r15t047lay.dgn	PLOT DATE: 04-JAN-2016
PROJECT LEADER: P. COBURN	DRAWN BY: T. POLK
DESIGNED BY: McFARLAND JOHNSON	CHECKED BY: R. CLOUTIER
R.O.W. LAYOUT SHEET 1 OF 1	SHEET 22 OF 58

CHAIN-LINK FENCE, 4FT (VINYL COATED - BLACK)
(PAINT POSTS - BLACK)
STA 17+42, 39.6' RT TO STA 17+90, 39.6' RT
STA 17+42, 27.5' LT TO STA 17+83, 27.5' LT

COLD PLANING, BITUMINOUS PAVEMENT
STA 14+50 TO STA 19+75

SPECIAL PROVISION (STAMPED CONCRETE ISLAND, 8')
STA 1+38.8, LT TO STA 2+15.6, LT

EXCAVATION OF SURFACES AND PAVEMENTS
STA 100+19., LT TO STA 101+26.3, LT
STA 100+20.4, RT TO STA 101+45.4, RT

REMOVE AND RESET GUARD RAIL
STA 14+81.25, RT TO STA 18+39.44, RT
STA 100+21.4, LT TO STA 100+90.0, LT

8 INCH UNDERDRAIN PIPE
STA 16+89.42, 44.6' RT TO
STA 17+00.15, 47.9' RT

DELINEATOR
STA 16+23, RT

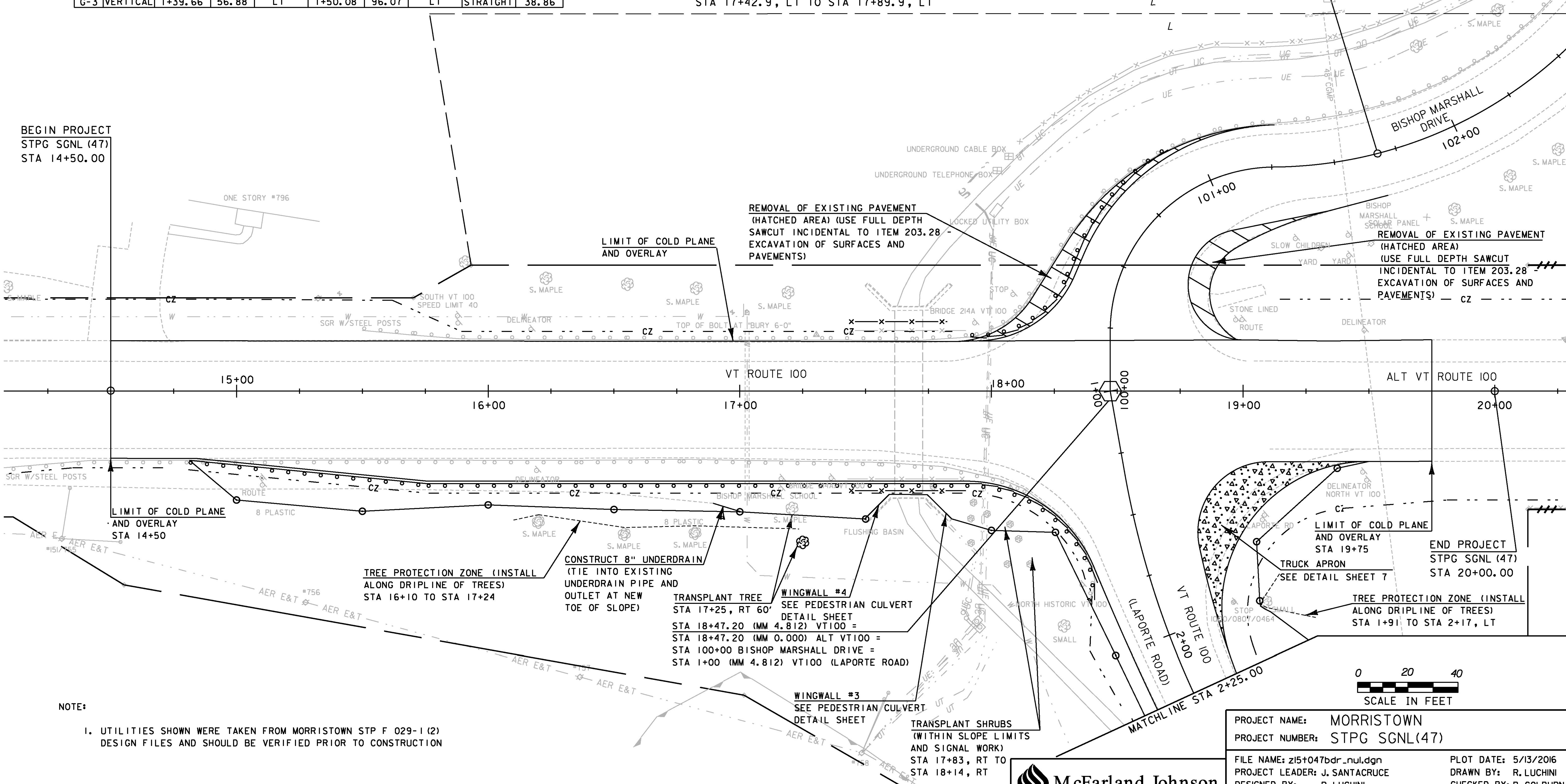
REMOVAL OF EXISTING FENCE
STA 17+42.9, RT TO STA 17+89.9, RT
STA 17+42.9, LT TO STA 17+89.9, LT

TRANSPLANTING GROUNDCOVER
(WITHIN SLOPE LIMITS)
STA 1+48, LT TO STA 2+25, LT

TRANSPLANTING SHRUBS
(WITHING SLOPE LIMITS)
STA 17+83, RT TO STA 18+14, RT

TRANSPLANTING TREES
STA 17+25, 60.0' RT

SPECIAL PROVISION (VERTICAL GRANITE CURB. MOUNTABLE)									
CURB ID	TYPE	STATION	OFFSET	LOCATION	STATION	OFFSET	LOCATION	RADIUS	LENGTH
SPLITTER ISLAND CURBING									
G-1	VERTICAL	2+17.36	19.23	LT	1+69.54	22.39	LT	340	22.53
G-2	VERTICAL	1+69.54	22.39	LT	1+39.66	56.88	LT	28	49.83
G-3	VERTICAL	1+39.66	56.88	LT	1+50.08	96.07	LT	STRAIGHT	38.86



NOTE:

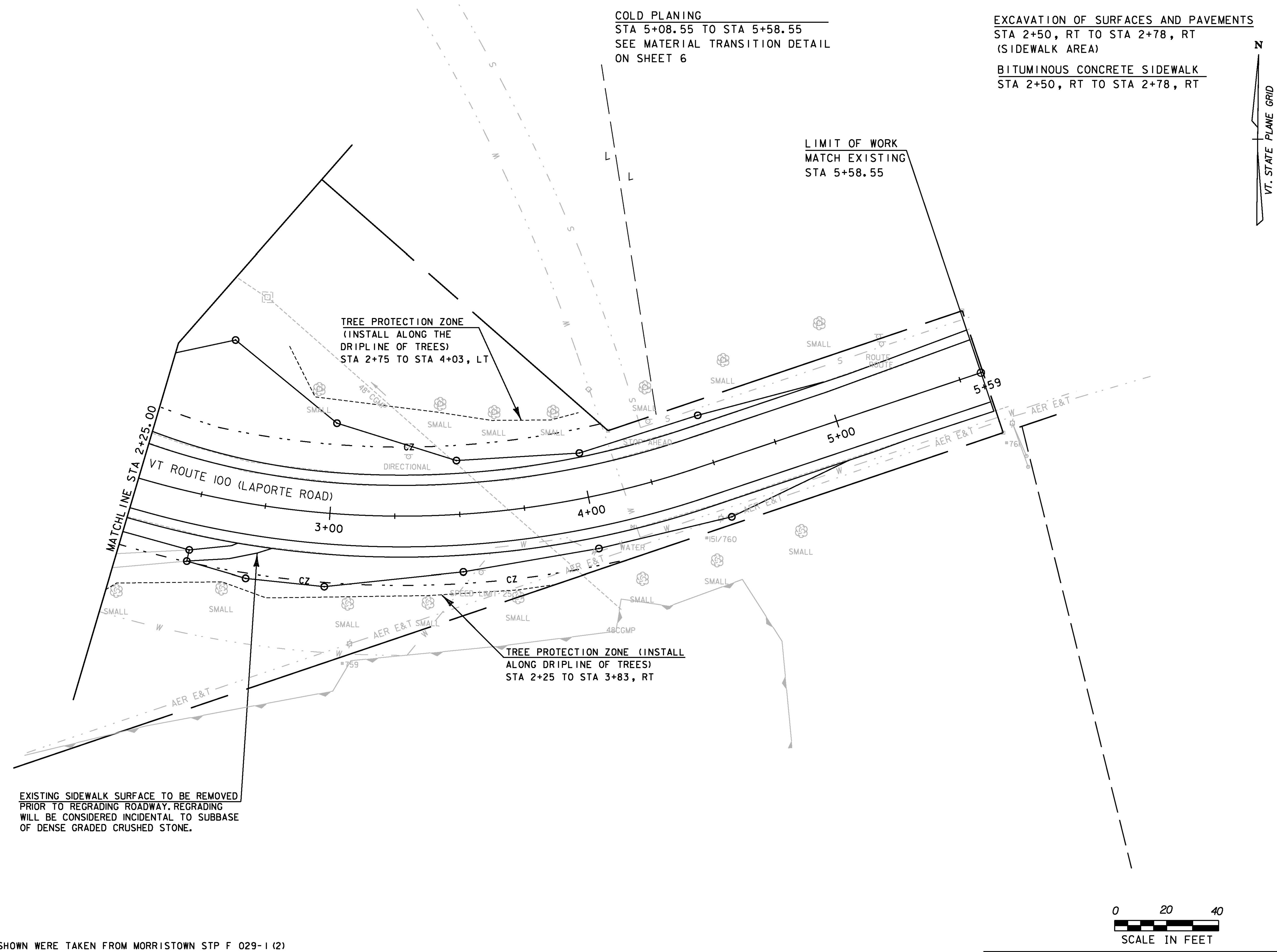
1. UTILITIES SHOWN WERE TAKEN FROM MORRISTOWN STP F 029-1(2) DESIGN FILES AND SHOULD BE VERIFIED PRIOR TO CONSTRUCTION

McFarland Johnson

PROJECT NAME: MORRISTOWN
PROJECT NUMBER: STPG SGNL(47)

FILE NAME: z15t047bdr_nul.dgn
PROJECT LEADER: J. SANTACRUCE
DESIGNED BY: R. LUCHINI
LAYOUT SHEET 1

PLOT DATE: 5/13/2016
DRAWN BY: R. LUCHINI
CHECKED BY: B. COLBURN
SHEET 23 OF 58

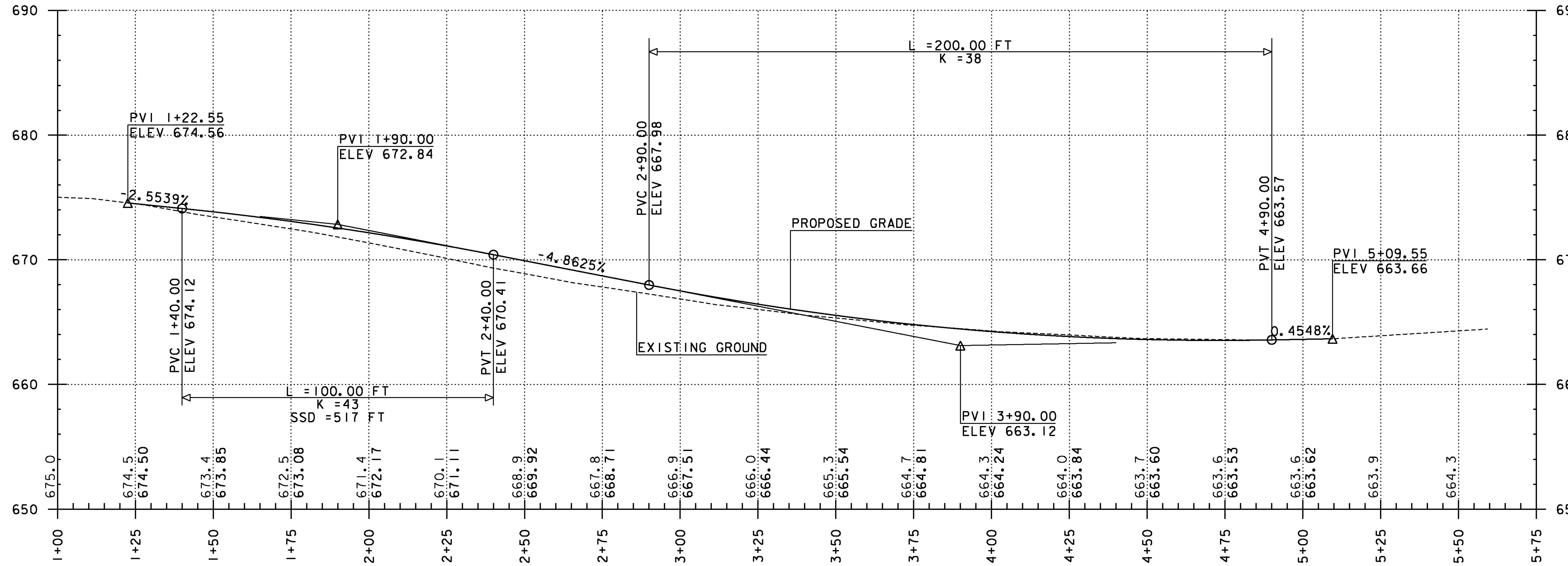


NOTE:

1. UTILITIES SHOWN WERE TAKEN FROM MORRISTOWN STP F 029-1(2) DESIGN FILES AND SHOULD BE VERIFIED PRIOR TO CONSTRUCTION

PROJECT NAME: MORRISTOWN	
PROJECT NUMBER: STPG SGNL(47)	
FILE NAME: z15t047bdr_nul.dgn	PLOT DATE: 5/13/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: R. LUCHINI
DESIGNED BY: R. LUCHINI	CHECKED BY: B. COLBURN
LAYOUT SHEET 2	SHEET 24 OF 58

McFarland Johnson



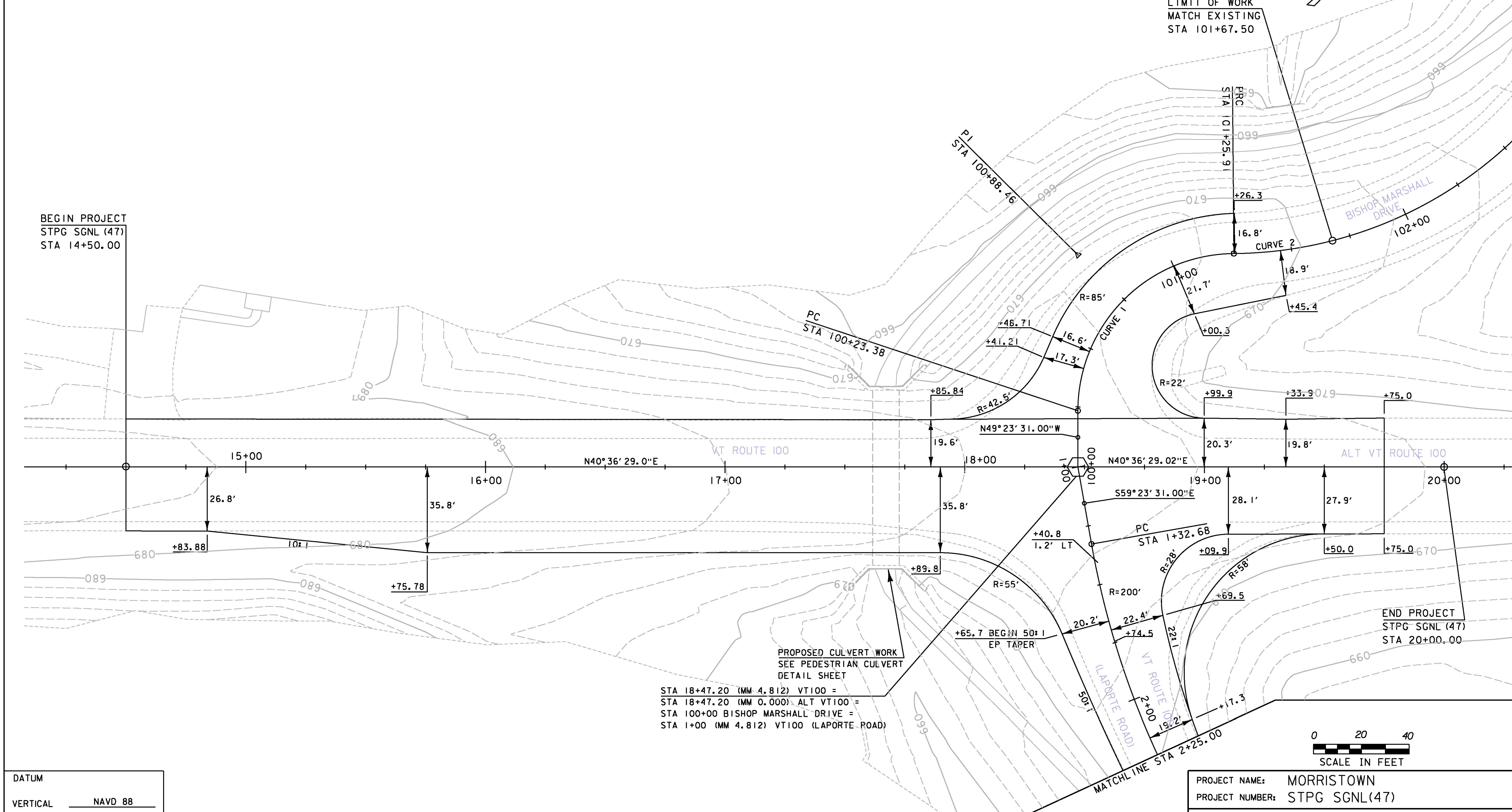
VT. ROUTE 100 (LAPORTE RD) PROFILE

SCALE : HORIZONTAL - 1" = 20'
VERTICAL - 1" = 5'

McFarland Johnson

PROJECT NAME: MORRISTOWN	
PROJECT NUMBER: STPG SGNL(47)	
FILE NAME: z15+047xs_hst100.dgn	PLOT DATE: 5/13/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: M. LOVETT
DESIGNED BY: R. LUCHINI	CHECKED BY: B. COLBURN
PROFILE SHEET - VT 100 (LAPORTE RD)	SHEET 25 OF 58

BISHOP MARSHALL DRIVE CURVE (1)	BISHOP MARSHALL DRIVE CURVE (2)
DELTA = 89°31'21"	DELTA = 77°12'07"
D = 87°19'08"	D = 33°35'03"
R = 65.62'	R = 170.60'
T = 65.07'	T = 136.20'
L = 102.52'	L = 229.88'
E = 26.80'	E = 47.70'

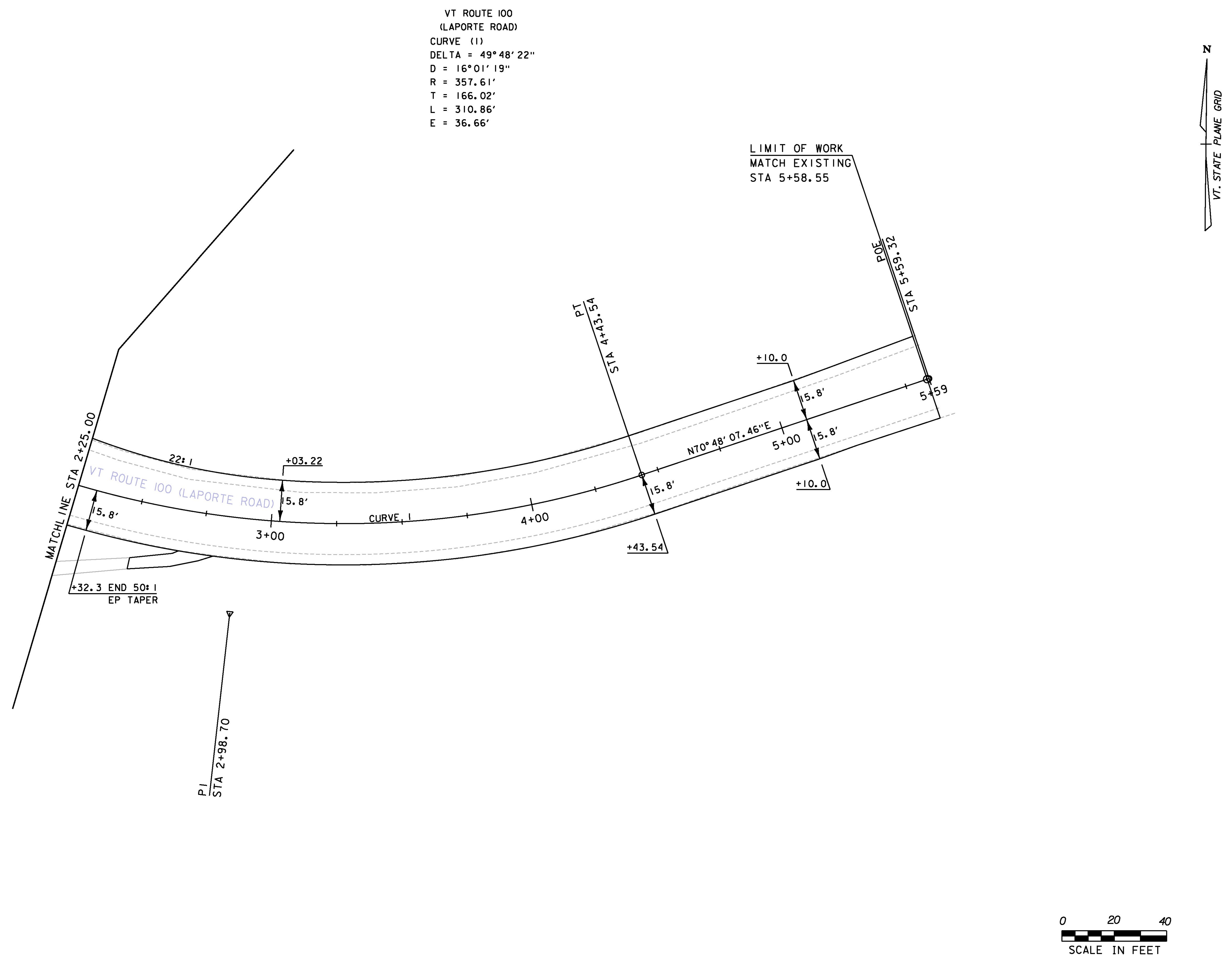


DATUM	
VERTICAL	NAVD 88
HORIZONTAL	NAD 83(92)
ADJUSTMENT	COMPASS

PROJECT NAME: MORRISTOWN
PROJECT NUMBER: STPG SGNL(47)

McFarland Johnson

FILE NAME: z15t047bdr_nul.dgn	PLOT DATE: 5/13/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: R. LUCHINI
DESIGNED BY: R. LUCHINI	CHECKED BY: B. COLBURN
PAVEMENT LAYOUT AND ALIGNMENT SHEET 1	SHEET 26 OF 58

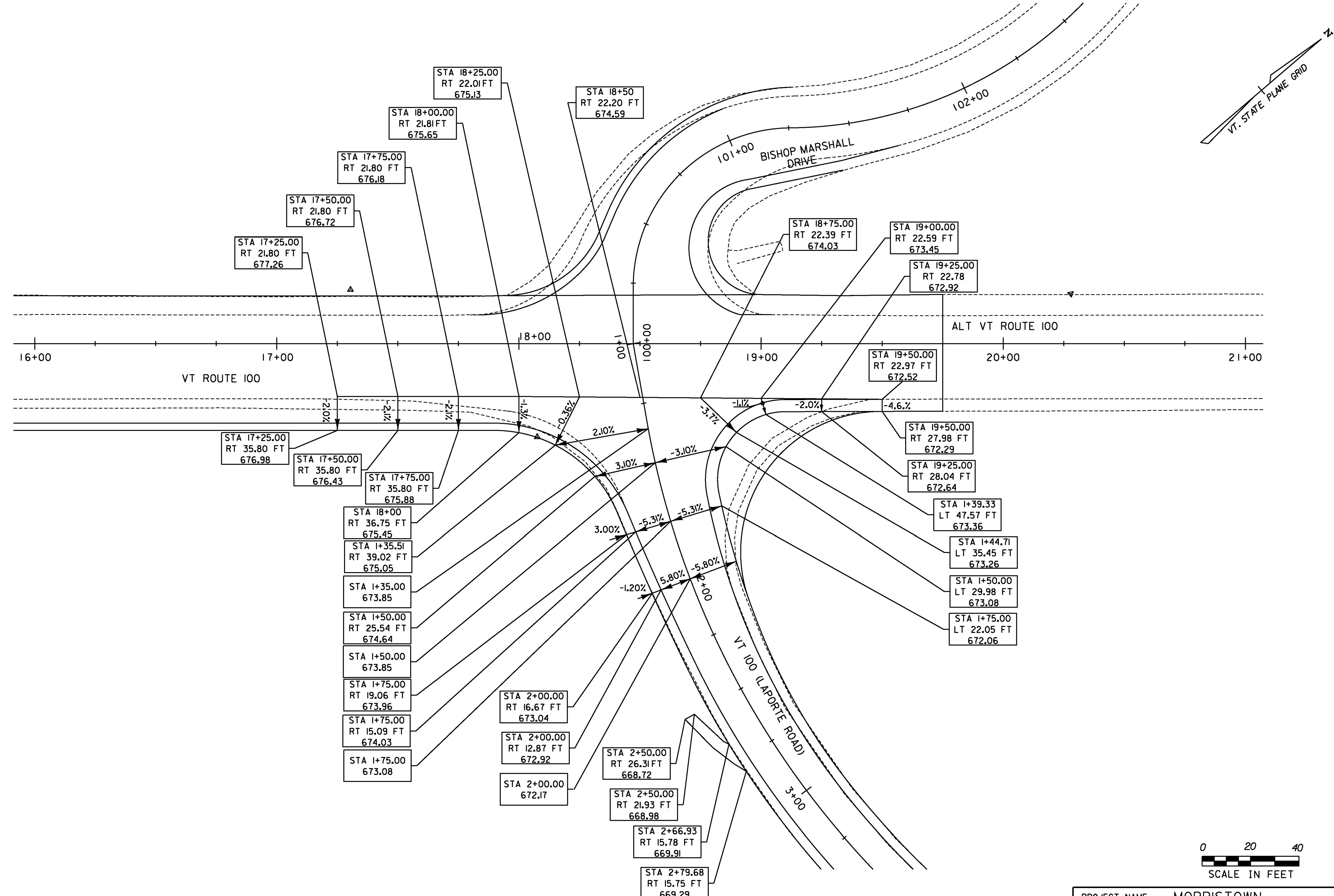


DATUM	
VERTICAL	NAVD 88
HORIZONTAL	NAD 83(92)
ADJUSTMENT	COMPASS

McFarland Johnson

PROJECT NAME: MORRISTOWN
PROJECT NUMBER: STPG SGNL(47)

FILE NAME: z15t047bdr_nul.dgn	PLOT DATE: 5/13/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: R. LUCHINI
DESIGNED BY: R. LUCHINI	CHECKED BY: B. COLBURN
PAVEMENT LAYOUT AND ALIGNMENT SHEET 2	SHEET 27 OF 58



PROJECT NAME:	MORRISTOWN
PROJECT NUMBER:	STPG SGNL(47)

McFarland Johnson

FILE NAME: z15t047grd.dgn	PLOT DATE: 5/13/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: M. HASKINS
DESIGNED BY: M. HASKINS	CHECKED BY: B. COLBURN
INTERSECTION GRADING SHEET	SHEET 28 OF 58

EPSC PLAN NARRATIVE

1.1 PROJECT DESCRIPTION

THIS PROJECT INVOLVES WIDENING VT ROUTE 100 TO CONSTRUCT A NORTHBOUND RIGHT-TURN LANE AND INSTALLING A TRAFFIC CONTROL SIGNAL AT THE INTERSECTION. THE WORK ALSO INCLUDES REMOVING EXISTING PAVEMENT ALONG BISHOP MARSHALL DRIVE AND THE RELOCATION OF EXISTING GUARDRAIL. THE WORK ALSO INCLUDES REMOVING ALL OF THE PAVEMENT ON VT ROUTE 100(LAPORTE ROAD) WITHIN THE PROJECT LIMITS, AND REGRADING THE ROAD TO ADJUST THE PROFILE AND REPAVING. THE PROJECT IS LOCATED IN THE TOWN OF MORRISTOWN, ON VT ROUTE 100, AT THE INTERSECTION OF VT ROUTE 100, ALT VT ROUTE 100, VT ROUTE 100 (LAPORTE ROAD), AND BISHOP MARSHALL DRIVE.

NOTE: AREA OF DISTURBANCE INCLUDES LIMITS OF EARTH DISTURBANCE AND PAVEMENT REMOVAL WITHIN THE PROJECT AREA AS SHOWN ON THE ATTACHED EPSC PLAN. TOTAL AREA OF DISTURBANCE AS SHOWN ON THE ATTACHED EPSC PLAN IS APPROXIMATELY 0.59 ACRES.

IT IS ANTICIPATED THAT THIS PROJECT WILL BE COMPLETED IN TWO CONSTRUCTION SEASON.

1.2 SITE INVENTORY

1.2.1 TOPOGRAPHY

THE TOPOGRAPHY OF THE AREA IS HILLY WITH VEGETATED SLOPES AND FORESTED UPLANDS. ROADWAY SIDE SLOPES CONSISTS OF VEGETATED UNDERGROWTH AND LANDSCAPED AREAS.

1.2.2 DRAINAGE, WATERWAYS, BODIES OF WATER, AND PROXIMITY TO NATURAL OR MAN-MADE WATER FEATURES

THE UNNAMED STREAM IS THE ONLY MAJOR WATERBODY ON THE PROJECT SITE WHICH IS A TRIBUTARY OF THE LAMOILLE RIVER. THE UNNAMED STREAM CROSSES UNDER VT ROUTE 100 IN A 48 INCH CONCRETE PIPE WITHIN THE PROJECT LIMITS AND WOULD BE CLASSIFIED AS FLAT, WITH A NARROW, SOIL LINED CHANNEL. THE STREAM BED CONSISTS OF GRAVEL AND SOIL.

1.2.3 VEGETATION

THE VEGETATION IN THE PROJECT AREA CONSISTS OF MOSTLY GRASS AND SMALL LANDSCAPE TREES INCLUDING HARD AND SOFTWOODS. THE IMPACT TO VEGETATION WILL BE LIMITED TO THAT WHICH IS DIRECTLY AFFECTED BY THE PROPOSED SIDE SLOPE CONSTRUCTION WITHIN THE WIDENING AREA AND THE REGRADED AREA ALONG VT ROUTE 100(LAPORTE ROAD). DISTURBED VEGETATION WILL BE REESTABLISHED WITH STANDARD SEED AND MULCH PRACTICES. CLEARING SHALL BE KEPT TO A MINIMUM.

1.2.4 SOILS

ALL SOIL DATA CAME FROM THE U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE FOR THE COUNTY OF LAMOILLE, VERMONT. SOILS ON THE PROJECT SITE ARE:
SALMON VERY FINE SANDY LOAM, 15% TO 25% SLOPES, "K FACTOR" = 0.32. THIS SOIL IS CONSIDERED MODERATLEY ERODIBLE,
ADAMS LOAMY FINE SAND, 2% TO 8% SLOPES, "K FACTOR" = 0.20. THIS SOIL IS NOT CONSIDERED HIGHLY ERODIBLE,
ADAMS LOAMY FINE SAND, 8% TO 15% SLOPES, "K FACTOR" = 0.20. THIS SOIL IS NOT CONSIDERED HIGHLY ERODIBLE,
ADAMS LOAMY FINE SAND, 15% TO 25% SLOPES, "K FACTOR" = 0.20. THIS SOIL IS NOT CONSIDERED HIGHLY ERODIBLE,
SWANVILLE SILT LOAM, 0% TO 3% SLOPES, "K FACTOR" = 0.28. THIS SOIL IS CONSIDERED MODERATELY ERODIBLE.
BOOTHBAY SILT LOAM, 8% TO 15% SLOPES, "K FACTOR" = 0.43. THIS SOIL IS CONSIDERED HIGHLY ERODIBLE.

NOTE: K-VALUES GENERALLY INDICATE THE FOLLOWING:
0.0-0.23 = LOW EROSION POTENTIAL
0.24-0.36 = MODERATE EROSION POTENTIAL
0.37 AND HIGHER = HIGH EROSION POTENTIAL

1.2.5 SENSITIVE RESOURCE AREAS

CRITICAL HABITATS: NO
HISTORICAL OR ARCHEOLOGICAL AREAS: NO
PRIME AGRICULTURAL LAND: NO
THREATENED AND ENDANGERED SPECIES: SEE ENVIRONMENTAL COMMITTMENTS MEMO
WATER RESOURCE: UNNAMED STREAM (TRIBUTARY OF LAMOILLE RIVER)
WETLANDS: YES (NO IMPACT)

1.3 RISK EVALUATION

THIS PROJECT DOES NOT FALL UNDER THE JURISDICTION OF GENERAL PERMIT 3-9020 FOR STORMWATER RUNOFF FROM CONSTRUCTION SITES. ANY MODIFICATIONS TO THE PROJECT THAT INCREASE THE RISK TO ENVIRONMENTAL RESOURCES SHALL BE EVALUATED IN ACCORDANCE WITH THE PERMIT REQUIREMENTS. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY ADDITIONAL PERMITTING.

1.4 EROSION PREVENTION AND SEDIMENT CONTROL

THE EROSION CONTROL PLANS ARE MEANT AS A GUIDELINE FOR PREVENTING EROSION AND CONTROLLING SEDIMENT TRANSPORT. THE PRINCIPLES OUTLINED IN THIS NARRATIVE CONSIST OF APPLYING MEASURES THROUGHOUT CONSTRUCTION OF THE PROJECT IN ORDER TO MINIMIZE SEDIMENT TRANSPORT TO THE RECEIVING WATERS. THE MEASURES INCLUDE STABILIZATION AND STRUCTURAL PRACTICES, STORM WATER CONTROLS AND OTHER POLLUTION PREVENTION PRACTICES. THEY HAVE BEEN PROPOSED BY THE DESIGNER AS A BASIS FOR PROTECTING RESOURCES AND WILL NEED TO BE BUILT UPON BASED ON THE SPECIFIC MEANS AND METHODS OF THE CONTRACTOR. REFER TO THE LOW RISK SITE HANDBOOK AND APPROPRIATE DETAIL SHEETS FOR SPECIFIC GUIDANCE AND CONSTRUCTION DETAILING.

ALL MEASURES SHALL BE REGULARLY MAINTAINED AND SHALL BE CHECKED FOR SEDIMENT BUILD-UP. SEDIMENT SHALL BE DISPOSED OF AT AN APPROVED SITE WHERE IT WILL NOT BE SUBJECT TO EROSION.

1.4.1 MARK SITE BOUNDARIES

SITE BOUNDARIES AND AREAS CONSTRUCTION EQUIPMENT CAN ACCESS SHALL BE DELINEATED. PROJECT DEMARCATION FENCING (PDF) SHALL BE PLACED 1.5 FEET FROM THE TOE OF SLOPE TO PHYSICALLY MARK SITE BOUNDARIES. PDF CAN BE LOCATED CLOSER TO THE PROPOSED SLOPE LIMITS IN SENSITIVE AREAS OR AS DIRECTED BY THE ENGINEER. PDF SHALL BE INSTALLED PRIOR TO THE BEGINNING OF ANY EARTHWORK ON THE PROJECT.

1.4.2 LIMIT DISTURBANCE AREA

PREVENTING INITIAL SOIL EROSION BY MINIMIZING THE EXPOSED AREA IS MUCH MORE EFFECTIVE THAN TREATING ERODED SEDIMENT. EARTH DISTURBANCE CAN BE MINIMIZED THROUGH CONSTRUCTION PHASING BY ONLY OPENING UP EARTH AS NECESSARY. THIS CAN LIMIT THE AREA THAT WILL BE DISTURBED AND EXPOSED TO EROSION. EMPLOY TEMPORARY CONSTRUCTION STABILIZATION PRACTICES IN INCREMENTAL STAGES AS CONSTRUCTION CHANGES.

MAINTAINING VEGETATED BUFFERS ALONG STREAM BANKS, WETLANDS OR OTHER SENSITIVE AREAS IS A CRUCIAL EROSION AND SEDIMENT CONTROL MEASURE THAT SHOULD BE ESTABLISHED WHEREVER POSSIBLE.

1.4.3 SITE ENTRANCE/EXIT STABILIZATION

TRACKING OF SEDIMENT ONTO PUBLIC HIGHWAYS SHALL BE MINIMIZED TO REDUCE THE POTENTIAL FOR RUNOFF ENTERING RECEIVING WATERS.

FOR THIS PROJECT IT IS ASSUMED THAT WORK OUTSIDE THE PAVED SURFACE WILL BE REQUIRED BUT WILL BE KEPT TO A MINIMUM. STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AS PROPOSED ON THE EPSC PLANS AND ANYWHERE CONSTRUCTION EQUIPMENT MAY BE GOING FROM AREAS OF EXPOSED SOIL TO PAVED SURFACES.

1.4.4 INSTALL SEDIMENT BARRIERS

SEDIMENT BARRIERS SHALL BE UTILIZED TO INTERCEPT RUNOFF AND ALLOW SUSPENDED SEDIMENT TO SETTLE OUT. THEY SHALL BE INSTALLED PRIOR TO ANY UP SLOPE EARTHWORK IN ACCORDANCE WITH THE EROSION PREVENTION AND CONTROL PLANS.

EROSION LOG(FIBER ROLL) WILL BE INSTALLED AT THE TOE OF SLOPE AS PROPOSED ON THE EPSC PLAN.

1.4.5 DIVERT UPLAND RUNOFF

THE PROJECT AREA IS RELATIVELY FLAT THEREFORE THERE ARE NO UPLAND RUNOFF AREAS THAT CONTRIBUTE TO THE PROJECT AREA SO NO SPECIFIC DIVERSION MEASURES ARE ANTICIPATED TO BE REQUIRED.

1.4.6 SLOW DOWN CHANNELIZED RUNOFF

THERE ARE NO CHANNELIZED SWALES WITHIN THE PROJECT AREA THAT NEED TO BE PROTECTED SO NO SPECIFIC EROSION PREVENTION AND SEDIMENT CONTROLS ARE REQUIRED.

1.4.7 CONSTRUCT PERMANENT CONTROLS

PERMANENT STORMWATER TREATMENT DEVICES, SUCH AS EROSION MATTING, SHALL BE INSTALLED AS SHOWN ON THE PLANS.

1.4.8 STABILIZE EXPOSED SOILS DURING CONSTRUCTION

ALL AREAS OF DISTURBANCE MUST HAVE TEMPORARY STABILIZATION IN PLACE WITHIN 48 HOURS OF DISTURBANCE.

TEMPORARY MULCHING, SHALL BE UTILIZED ON A REGULAR BASIS ON EXPOSED SOIL AREAS. BIODEGRADABLE EROSION CONTROL MATTING OR AN EQUIVALENT SHALL BE USED TO STABILIZE ALL SOIL SLOPES STEEPER THAN 1:3 AS SHOWN ON THE PLANS.

THE FORECAST OF RAINFALL EVENTS SHALL TRIGGER IMMEDIATE PROTECTION OF EXPOSED SOILS.

1.4.9 WINTER STABILIZATION

VARIOUS MEASURES SPECIFIC TO WINTER MAY BE NECESSARY SHOULD THE PROJECT EXTEND INTO WINTER (OCTOBER 15 THROUGH APRIL 15). REFER TO THE LOW RISK SITE HANDBOOK FOR GUIDANCE.

1.4.10 STABILIZE SOIL AT FINAL GRADE

EXPOSED SOIL MUST BE STABILIZED WITHIN 48 HOURS OF REACHING FINAL GRADE. SEEDING AND MULCHING SHALL BE USED TO STABILIZE SOIL. SEE THE EROSION CONTROL DETAILS FOR SEED TYPES AND APPLICATION RATES.

SEED, MULCH, FERTILIZER AND LIME SHALL BE USED TO ESTABLISH PERMANENT VEGETATION. FOR SLOPES STEEPER THAN 1:3, BIODEGRADABLE EROSION CONTROL MATTING OR AN EQUIVALENT SHALL BE USED INSTEAD OF MULCH.

1.4.11 DE-WATERING ACTIVITIES

NO DEWATERING ACTIVITIES ARE EXPECTED AS PART OF THIS PROJECT.

1.4.12 INSPECT YOUR SITE

INSPECT THE PROJECT SITE BASED ON SPECIAL PROVISION REQUIREMENTS OR AFTER ANY RAINFALL EVENT THAT RESULTS IN DISCHARGE FROM THE SITE.

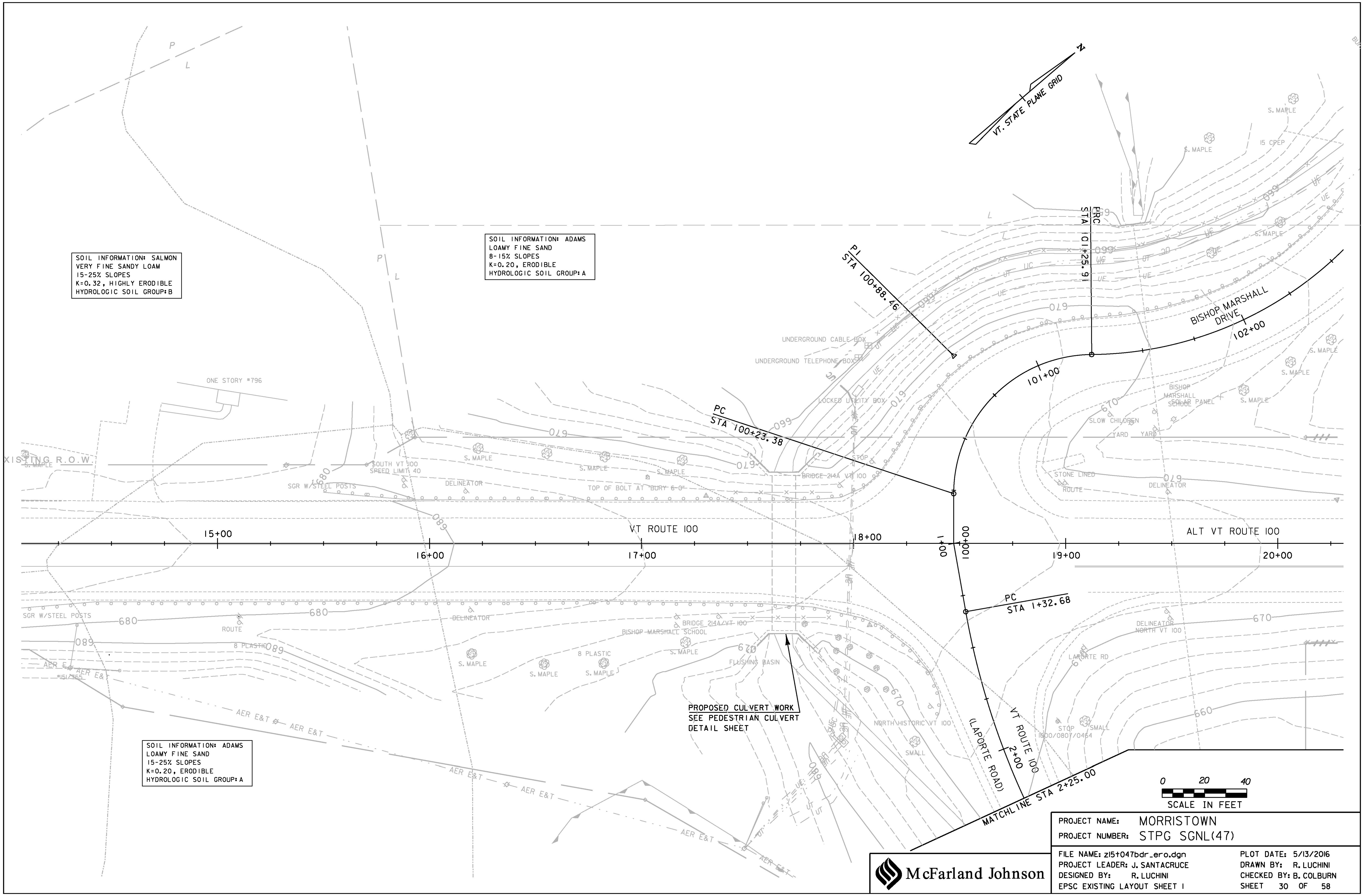
1.5 SEQUENCE AND STAGING

THIS SECTION WILL BE DEVELOPED BY THE CONTRACTOR USING THE GUIDANCE OUTLINED IN THE VTRANS EPSC PLAN CONTRACTOR CHECKLIST.

1.5.1 CONSTRUCTION SEQUENCE

1.5.2 OFFSITE ACTIVITIES

IN ADDITION TO THE CONTRACTOR CHECKLIST ANY ACTIVITIES OUTSIDE THE CONSTRUCTION LIMITS INCLUDING, BUT NOT LIMITED TO, STAGING AREAS SHALL FOLLOW SUBSECTIONS 105.25-105.29 OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION.



SOIL INFORMATION: SALMON
VERY FINE SANDY LOAM
15-25% SLOPES
K=0.32, HIGHLY ERODIBLE
HYDROLOGIC SOIL GROUP:B

SOIL INFORMATION: ADAMS
LOAMY FINE SAND
8-15% SLOPES
K=0.20, ERODIBLE
HYDROLOGIC SOIL GROUP:A

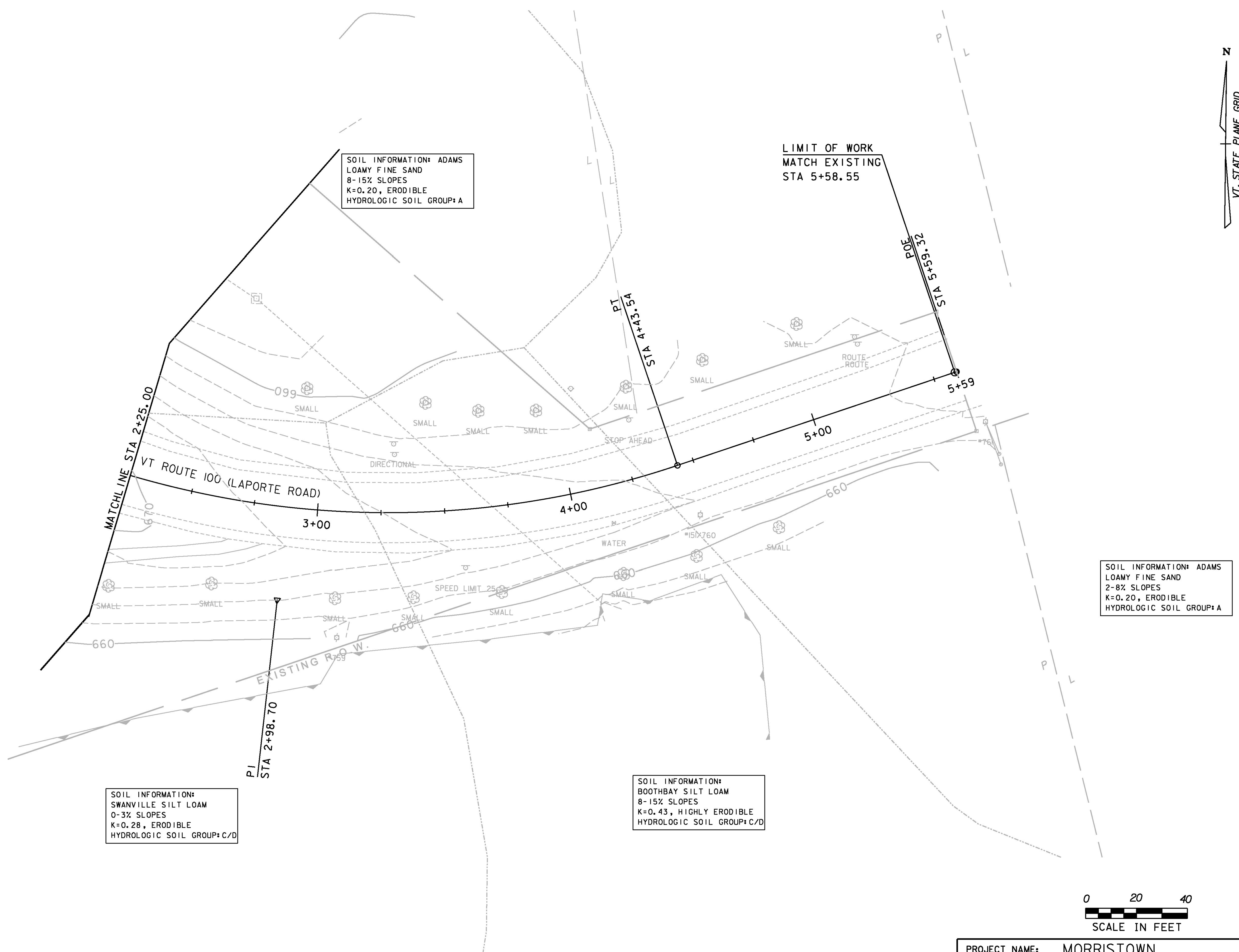
SOIL INFORMATION: ADAMS
LOAMY FINE SAND
15-25% SLOPES
K=0.20, ERODIBLE
HYDROLOGIC SOIL GROUP:A

PROJECT NAME: MORRISTOWN
PROJECT NUMBER: STPG SGNL(47)

McFarland Johnson

FILE NAME: z15+047bdr_ero.dgn
PROJECT LEADER: J. SANTACRUCE
DESIGNED BY: R. LUCHINI
EPSC EXISTING LAYOUT SHEET 1

PLOT DATE: 5/13/2016
DRAWN BY: R. LUCHINI
CHECKED BY: B. COLBURN
SHEET 30 OF 58



PROJECT NAME: MORRISTOWN	
PROJECT NUMBER: STPG SGNL(47)	
FILE NAME: z15t047bdr_ero.dgn	PLOT DATE: 5/13/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: R. LUCHINI
DESIGNED BY: R. LUCHINI	CHECKED BY: B. COLBURN
EPSC EXISTING LAYOUT SHEET 2	SHEET 31 OF 58

McFarland Johnson

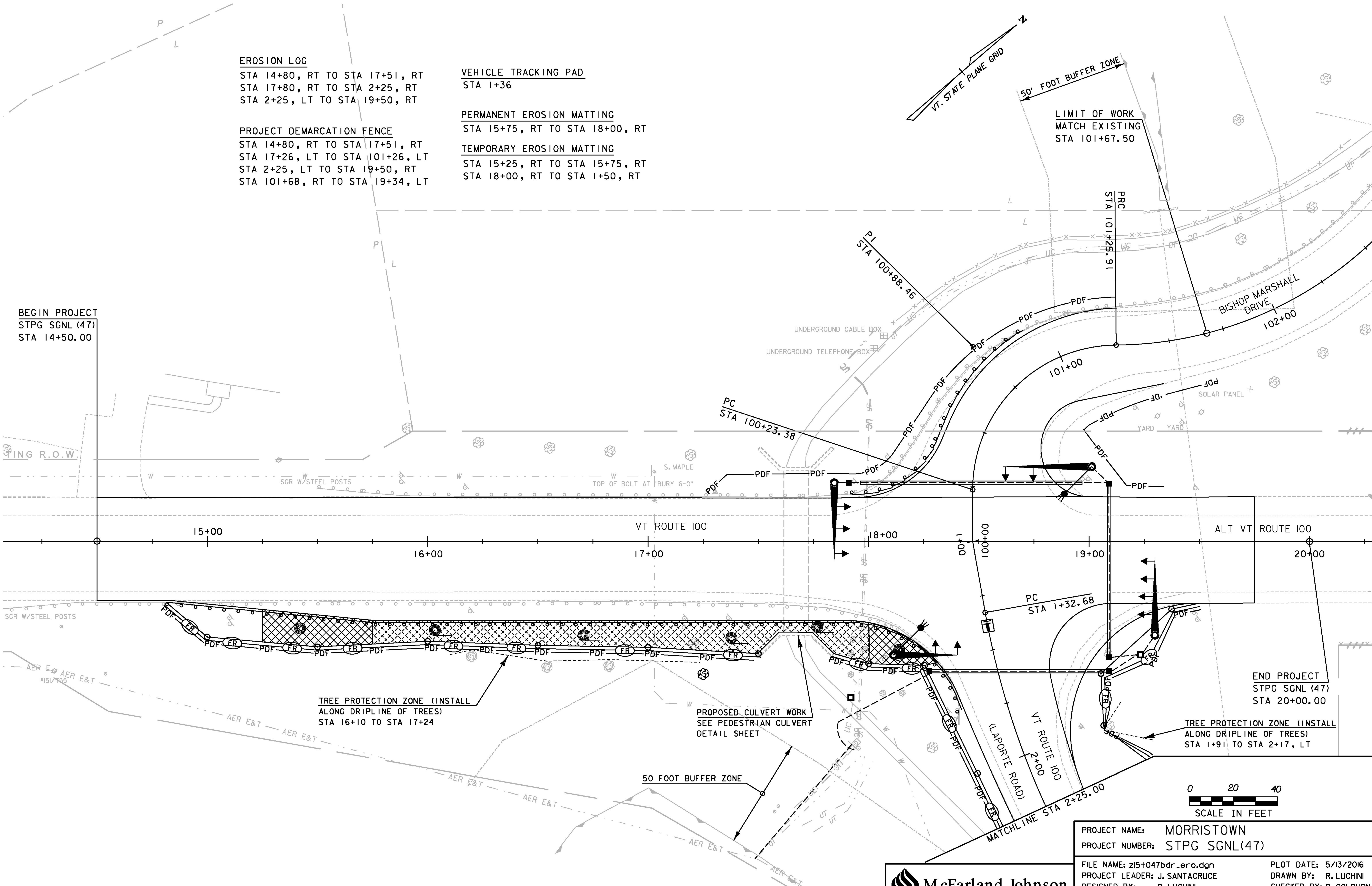
EROSION LOG
STA 14+80, RT TO STA 17+51, RT
STA 17+80, RT TO STA 2+25, RT
STA 2+25, LT TO STA 19+50, RT

PROJECT DEMARCATION FENCE
STA 14+80, RT TO STA 17+51, RT
STA 17+26, LT TO STA 101+26, LT
STA 2+25, LT TO STA 19+50, RT
STA 101+68, RT TO STA 19+34, LT

VEHICLE TRACKING PAD
STA 1+36

PERMANENT EROSION MATTING
STA 15+75, RT TO STA 18+00, RT

TEMPORARY EROSION MATTING
STA 15+25, RT TO STA 15+75, RT
STA 18+00, RT TO STA 1+50, RT



PROJECT NAME:	MORRISTOWN
PROJECT NUMBER:	STPG SGNL(47)

McFarland Johnson

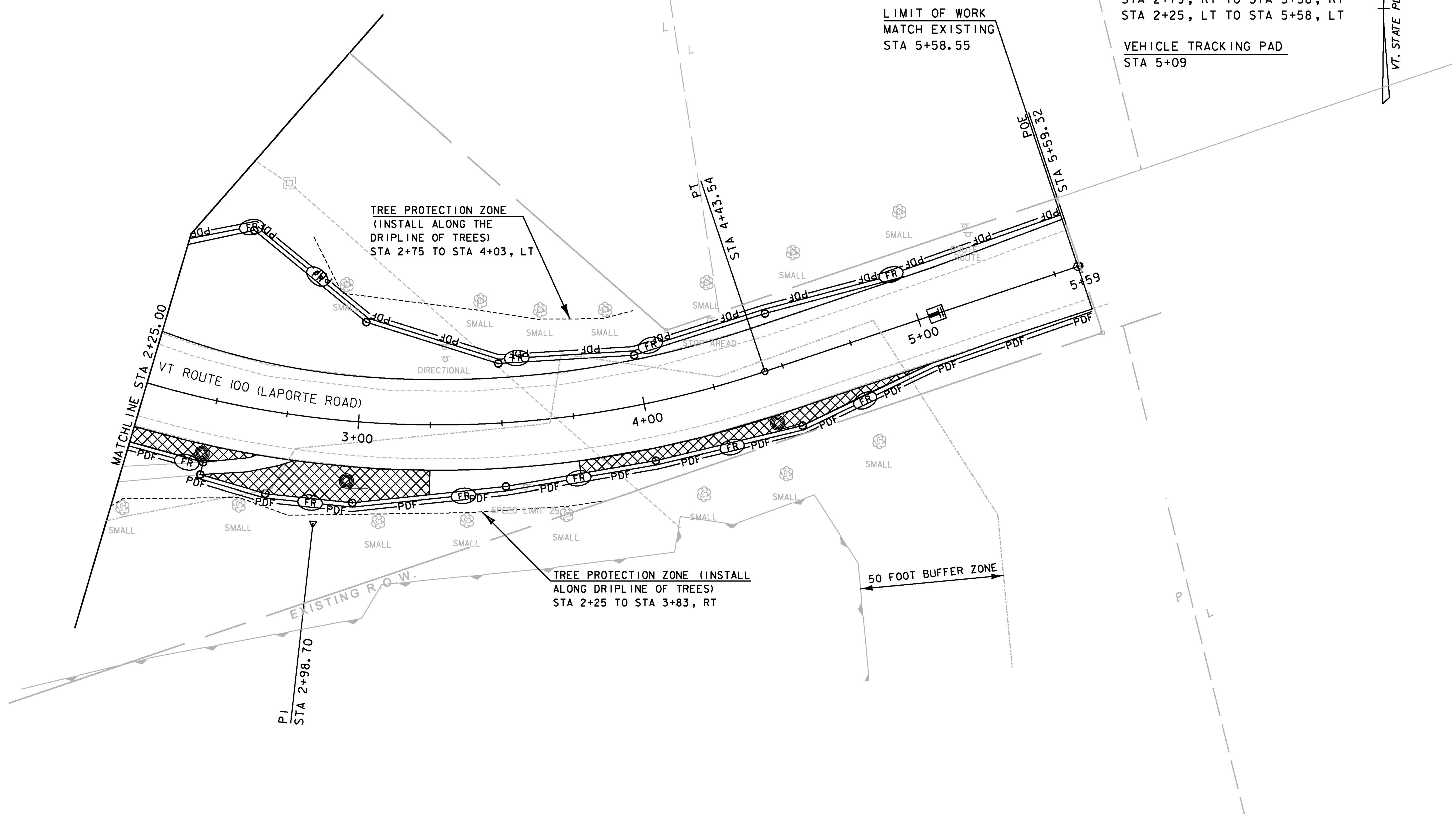
FILE NAME: z15t047bdr_ero.dgn	PLOT DATE: 5/13/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: R. LUCHINI
DESIGNED BY: R. LUCHINI	CHECKED BY: B. COLBURN
EPSC CONSTRUCTION LAYOUT SHEET 1	SHEET 32 OF 58

TEMPORARY EROSION MATTING
STA 2+25, RT TO STA 2+67, RT
STA 2+79, RT TO STA 3+25, RT
STA 3+75, RT TO STA 5+00, RT

EROSION LOG
STA 2+25, RT TO STA 2+67, RT
STA 2+79, RT TO STA 5+58, RT
STA 2+25, LT TO STA 5+58, LT

PROJECT DEMARCATION FENCE
STA 2+25, RT TO STA 2+67, RT
STA 2+79, RT TO STA 5+58, RT
STA 2+25, LT TO STA 5+58, LT

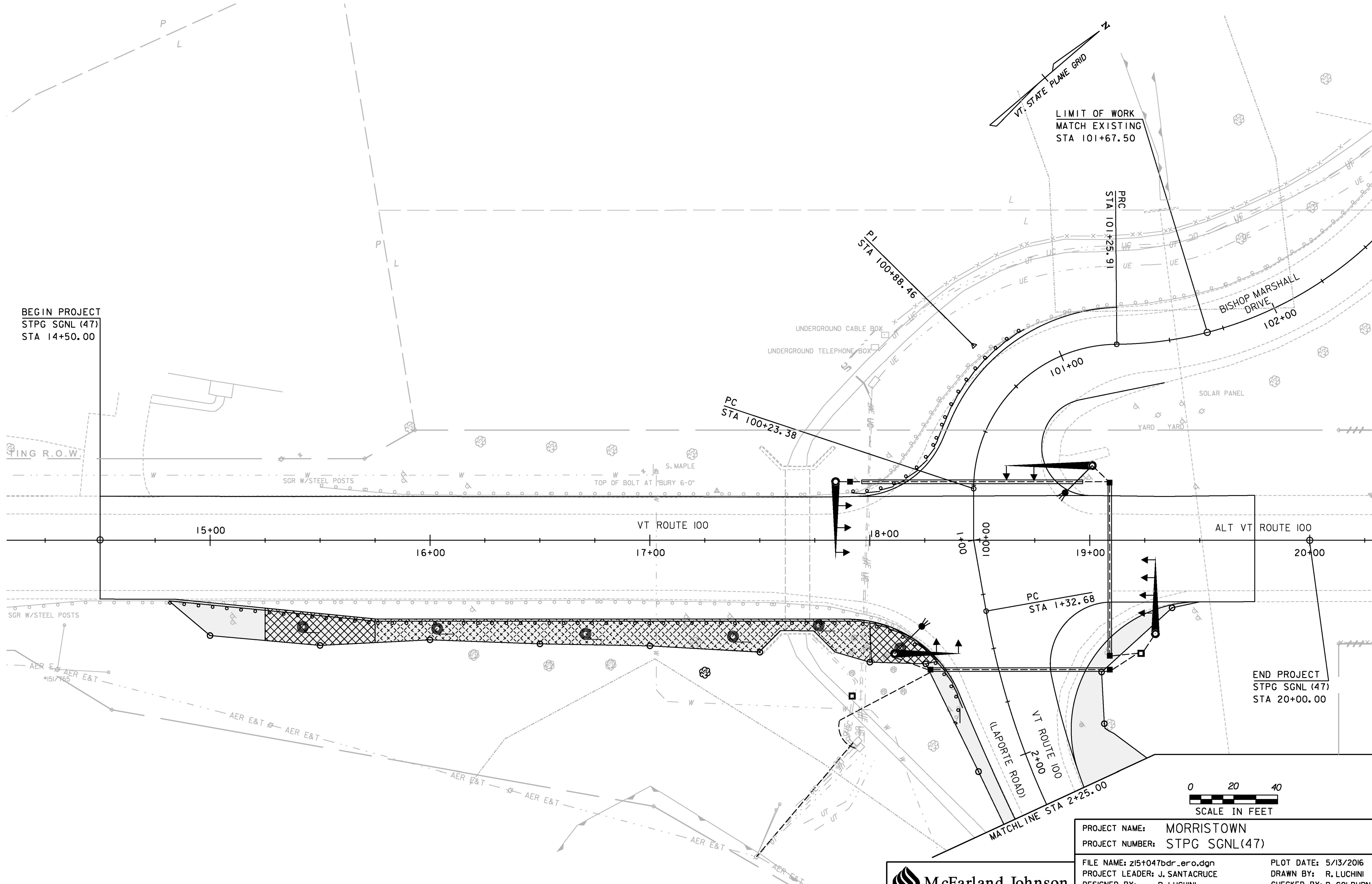
VEHICLE TRACKING PAD
STA 5+09



PROJECT NAME:	MORRISTOWN
PROJECT NUMBER:	STPG SGNL(47)

McFarland Johnson

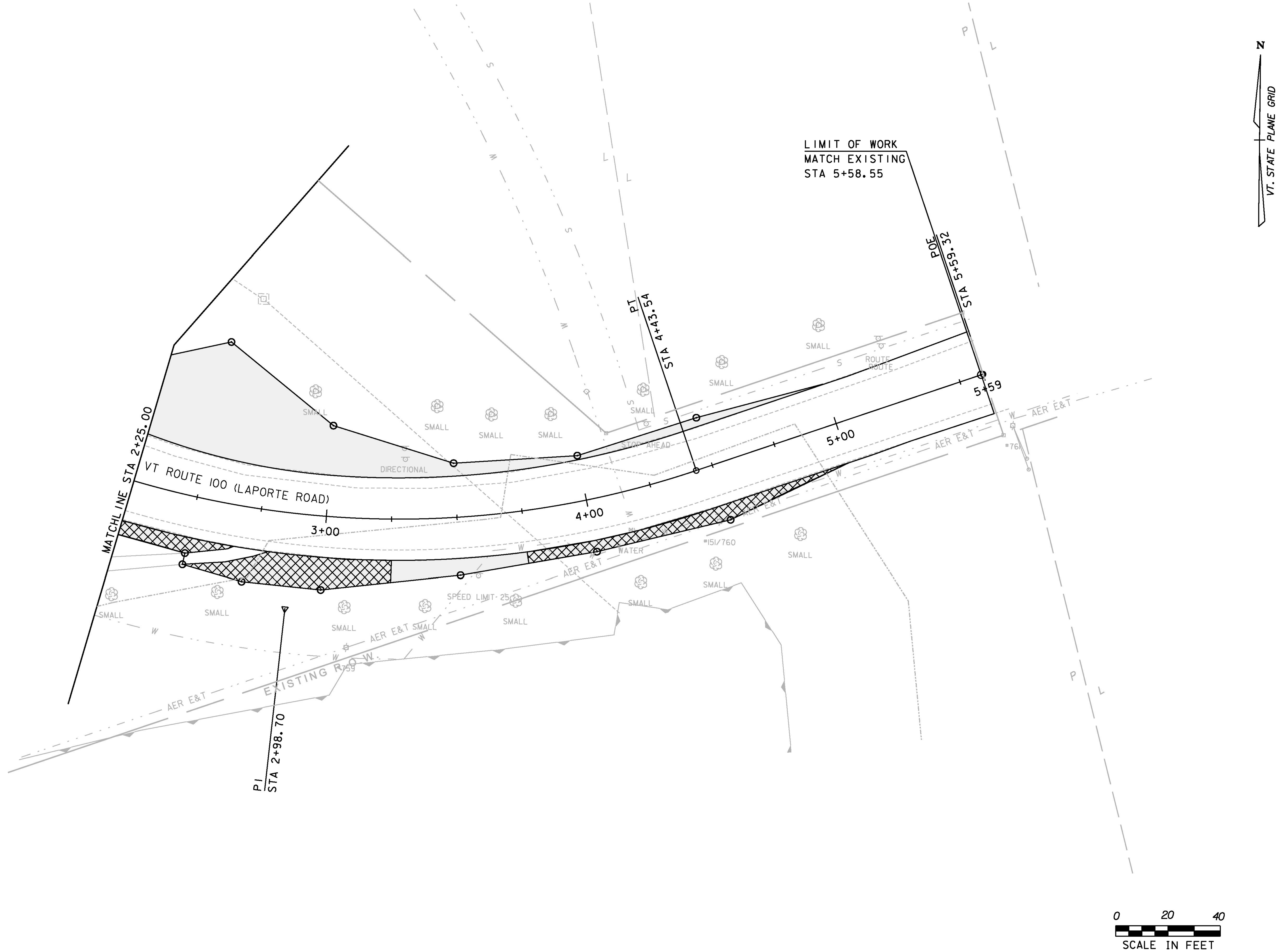
FILE NAME: z15t047bdr_ero.dgn	PLOT DATE: 5/13/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: R. LUCHINI
DESIGNED BY: R. LUCHINI	CHECKED BY: B. COLBURN
EPSC CONSTRUCTION LAYOUT SHEET 2	SHEET 33 OF 58



PROJECT NAME:	MORRISTOWN
PROJECT NUMBER:	STPG SGNL(47)

McFarland Johnson

FILE NAME: z15t047bdr_ero.dgn	PLOT DATE: 5/13/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: R. LUCHINI
DESIGNED BY: R. LUCHINI	CHECKED BY: B. COLBURN
EPSC FINAL LAYOUT SHEET 1	SHEET 34 OF 58

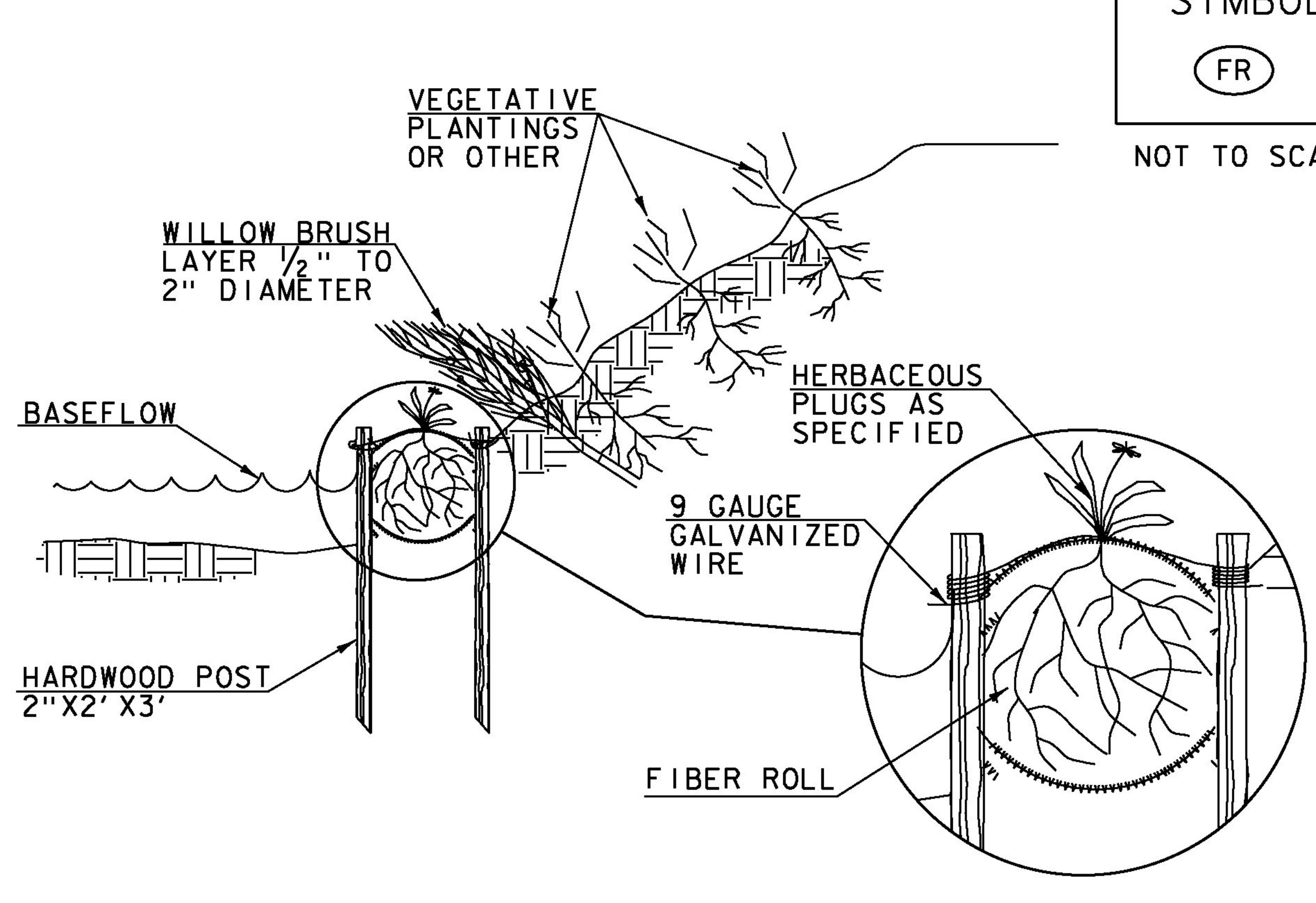


PROJECT NAME:	MORRISTOWN
PROJECT NUMBER:	STPG SGNL(47)

McFarland Johnson

FILE NAME: z15t047bdr_ero.dgn
PROJECT LEADER: J. SANTACRUCE
DESIGNED BY: R. LUCHINI
EPSC FINAL LAYOUT SHEET 2

PLOT DATE: 5/13/2016
DRAWN BY: R. LUCHINI
CHECKED BY: B. COLBURN
SHEET 35 OF 58



CONSTRUCTION SPECIFICATIONS

1. EXCAVATE A SHALLOW TRENCH SLIGHTLY BELOW BASEFLOW OR A 4" TRENCH ON SLOPE CONTOURS
2. PLACE THE ROLL IN THE TRENCH AND ANCHOR WITH 2"X2" POSTS PLACED ON BOTH SIDES FO THE ROLL AND SPACED LATERALLY ON 2' TO 4' CENTERS. TRIM THE TOP OF THE POSTS EVEN WITH THE EDGE OF THE ROLL, IF NECESSARY.
3. NOTCH THE POSTS AND TIE TOGETHER, ACROSS THE ROLL, WITH 9 GAUGE GALVANIZED WIRE OR ⅛" DIAMETER BRAIDED NYLON ROPE.
4. PLACE SOIL EXCAVATED FROM THE TRENCH BEHIND THE ROLL AND HAND TAMP. PLANTWITH SUITABLE HERBACEOUS OR WOODY VEGETATION AS SPECIFIED ELSEWHERE IN THE CONTRACT DOCUMENTS. VEGETATION SHALL BE PLACED IMMEDIATELY ADJACENT TO THE ROLL TO PROMOTE ROOT GROWTH INTO THE FIBER. HERBACEOUS VEGETATION, IF SPECIFIED, SHALL BE PLANTED INTO THE FIBER ROLL.

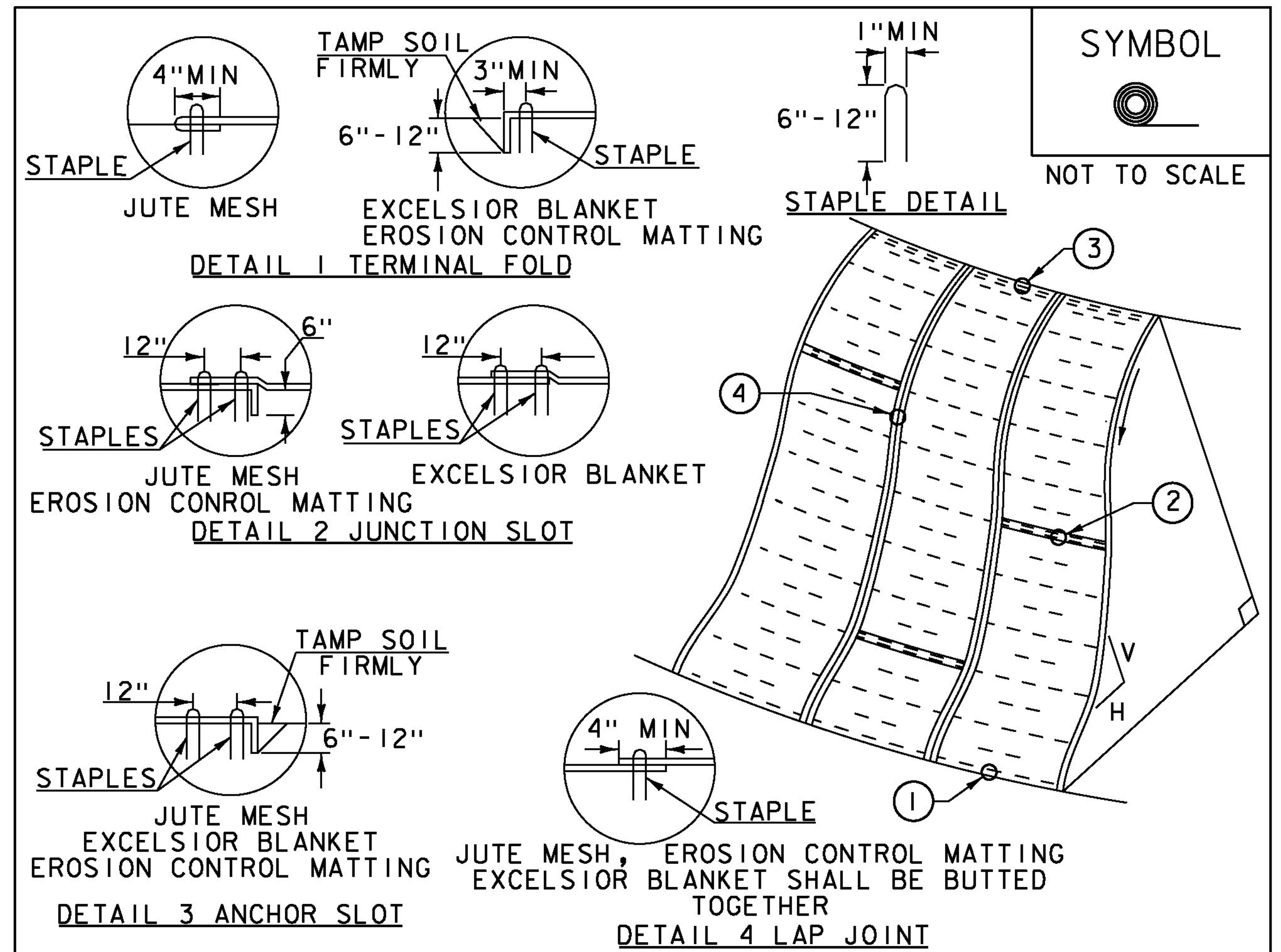
ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC ORIGINALLY DEVELOPED BY USDA-NRCS VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION	FIBER ROLL (EROSION LOG)

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- "FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 FOR EROSION LOG (PAY ITEM 653.60)

REVISIONS	
MARCH 21, 2008	WHF
JANUARY 13, 2009	WHF

NOTE: THIS DETAIL IS ONE EXAMPLE OF HOW FIBER ROLLS CAN BE INSTALLED. THE CONTRACTOR SHALL INSTALL ALL FIBER ROLLS PER THE MANUFACTURERS INSTALLATION GUIDELINES.



CONSTRUCTION SPECIFICATIONS

1. APPLY TO SLOPES GREATER THAN 3H:1V OR WHERE NECESSARY TO AID IN ESTABLISHING VEGETATION.
2. APPLY FERTILIZER, LIME SEED PRIOR TO PLACING MATTING.
3. STAPLES ARE TO BE PLACED ALTERNATELY, IN COLUMNS APPROXIMATELY 2' APART AND IN ROWS APPROXIMATELY 3' APART. APPROXIMATELY 175 STAPLES ARE REQUIRED PER 4'X225' ROLL OF MATERIAL AND 125 STAPLES ARE REQUIRED PER 4'X150' ROLL OF MATERIAL.
4. DISTURBED AREAS SHALL BE SMOOTHLY GRADED. EROSION CONTROL MATERIAL SHALL BE PLACED LOOSELY OVER GROUND SURFACE. DO NOT STRETCH.
5. ALL TERMINAL ENDS AND TRANSVERSE LAPS SHALL BE STAPLED AT APPROXIMATELY 12" INTERVALS.

ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC ORIGINALLY DEVELOPED BY USDA-NRCS VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION	ROLLED EROSION CONTROL PRODUCT (RECP) SIDE SLOPE

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- "FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.
THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 AND AS SHOWN IN THE PLANS FOR PERMANENT EROSION MATTING (PAY ITEM 653.21).TEMPORARY EROSION MATTING (PAY ITEM 653.20)

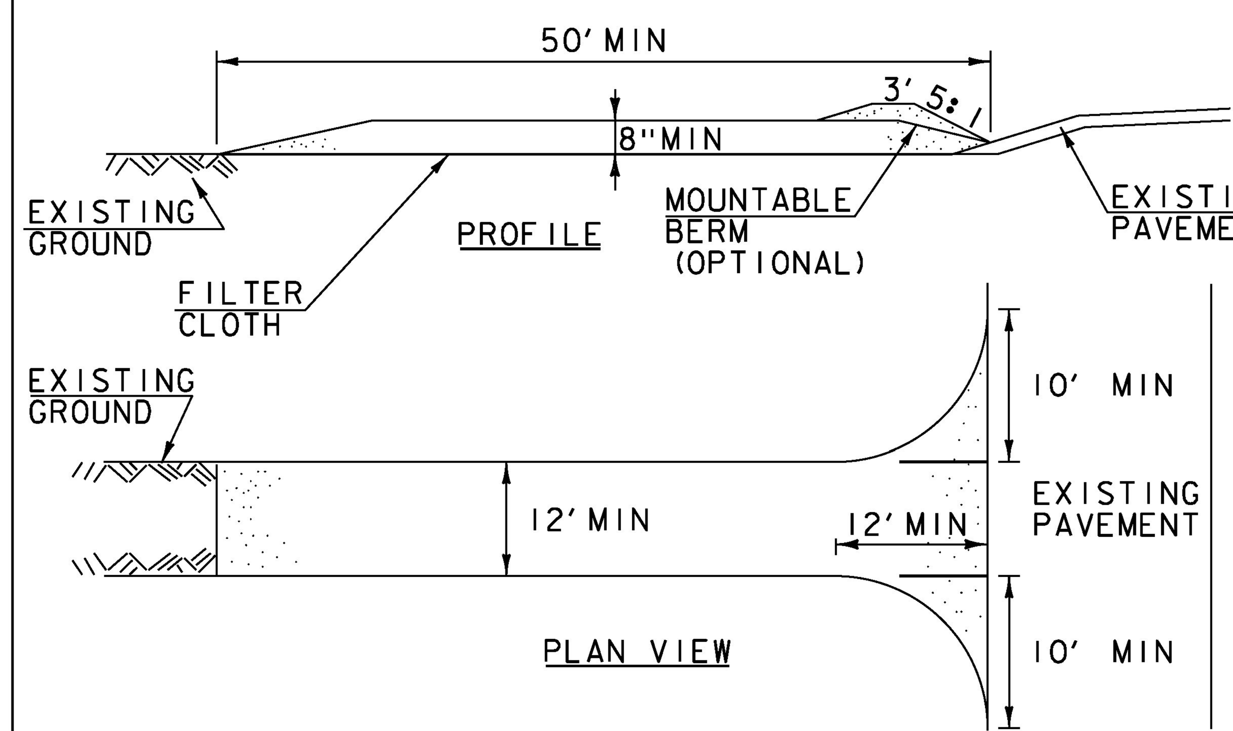
REVISIONS	
APRIL 16, 2007	JMF
JANUARY 13, 2009	WHF

McFarland Johnson

PROJECT NAME: MORRISTOWN	
PROJECT NUMBER: STPG SGNL(47)	
FILE NAME: z15t047esdl.dgn	PLOT DATE: 5/13/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: M. LOVETT
DESIGNED BY: M. HASKINS	CHECKED BY: B. COLBURN
EPSC DETAIL SHEET 1	SHEET 36 OF 58

SYMBOL

NOT TO SCALE



CONSTRUCTION SPECIFICATIONS

1. STONE SIZE- USE 1-4" STONE, RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH- NOT LESS THAN 50' (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30' MINIMUM LENGTH APPLIES).
3. THICKNESS- NOT LESS THAN 8".
4. WIDTH- 12' MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. 24' IF SINGLE ENTRANCE TO SITE.
5. GEOTEXTILE MUST BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.
6. SURFACE WATER- ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE- THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY, ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED ACCORDING TO PERMIT REQUIREMENTS.

ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

STABILIZED CONSTRUCTION ENTRANCE

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- "FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 FOR VEHICLE TRACKING PAD (PAY ITEM 653.35) OR AS SPECIFIED IN THE CONTRACT.

REVISIONS	
MARCH 24, 2008	WHF
JANUARY 13, 2009	WHF

VAOT RURAL AREA MIX

	LBS/AC				
% WEIGHT	BROADCAST	HYDROSEED	NAME	GERM %	PURITY %
37.5%	22.5	45	CREEPING RED FESCUE	85%	98%
37.5%	22.5	45	TALL FESCUE	90%	95%
5.0%	3	6	RED TOP	90%	95%
15.0%	9	18	BIRDSFOOT TREFOIL	85%	98%
5.0%	3	6	ANNUAL RYE GRASS	85%	95%
100%	60	120			

VAOT URBAN AREA MIX

	LBS/AC				
% WEIGHT	BROADCAST	HYDROSEED	NAME	GERM %	PURITY %
42.5%	34	68	CREEPING RED FESCUE	85%	98%
10.0%	8	16	PERENNIAL RYE GRASS	90%	95%
42.5%	34	68	KENTUCKY BLUE GRASS	85%	85%
5.0%	4	8	ANNUAL RYE GRASS	85%	95%
100%	80	160			

SOIL AMENDMENT GUIDANCE

FERTILIZER		LIME	
BROADCAST	HYDROSEED	BROADCAST	HYDROSEED
10-20-10	*FOLLOW*	PELLETIZED	*FOLLOW*
500 LBS/AC	*MANUFACTURER*	2 TONS/AC	*MANUFACTURER*

CONSTRUCTION GUIDANCE

1. RURAL SEED MIX: USE AS INDICATED IN THE PLANS AND/OR FOR ALL ESTABLISHED UPLAND (NON WETLAND) AREAS DISTURBED BY THE CONTRACTOR.
2. URBAN SEED MIX: USE AS INDICATED IN THE PLANS AND/OR FOR ALL ESTABLISHED LAWN AREAS DISTURBED BY THE CONTRACTOR.
3. ALL SEED MIXTURES: SHALL NOT HAVE A WEED CONTENT EXCEEDING 0.40% BY WEIGHT AND SHALL BE FREE OF ALL NOXIOUS SEED.
4. FERTILIZER AND LIMESTONE: SHALL FOLLOW RATES SHOWN ON PLAN OR AS DIRECTED BY THE ENGINEER
5. HAY MULCH: TO BE PLACED ON EARTH SLOPES AT THE RATE OF 2 TONS/ACRE, ACHIEVE 90% GROUND COVER OR AS DIRECTED BY THE ENGINEER.
6. TOPSOIL: TO BE USED WITH SEED AS INDICATED ON THE PLANS, OR AS DIRECTED BY THE ENGINEER.
7. HYDROSEEDING: ALTHOUGH GUIDANCE IS GIVEN ABOVE THE SITE CONDITIONS AND THE TYPE OF HYDROSEED WILL ULTIMATELY DICTATE THE AMOUNTS AND TYPES OF SOIL AMENDMENTS TO BE APPLIED
8. TURF ESTABLISHMENT: PLACING SEED, FERTILIZER, LIME AND MULCH PRIOR TO SEPTEMBER 15 AND AFTER APRIL 15 CAN BETTER ENSURE A VIGOROUS GROWTH OF GRASS.

ADAPTED FROM VTRANS TECHNICAL LANDSCAPE MANUAL FOR ROADWAYS AND TRANSPORTATION FACILITIES

TURF ESTABLISHMENT

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 651 FOR SEED (PAY ITEM 651.15)

REVISIONS	
JUNE 23, 2009	WHF
JANUARY 15, 2010	WHF
FEBRUARY 16, 2011	WHF

McFarland Johnson

PROJECT NAME: MORRISTOWN
PROJECT NUMBER: STPG SGNL(47)

FILE NAME: z15t047esd2.dgn
PROJECT LEADER: J. SANTACRUCE
DESIGNED BY: M. HASKINS
EPSC DETAIL SHEET 2

PLOT DATE: 5/13/2016
DRAWN BY: M. LOVETT
CHECKED BY: B. COLBURN

DURABLE 4 INCH WHITE LINE, RECESSED POLYUREA
BISHOP MARSHALL DRIVE STA 100+12, RT TO STA 101+67, RT (EDGE LINE) (SOLID)
BISHOP MARSHALL DRIVE STA 100+12, LT TO STA 101+02, LT (EDGE LINE) (SOLID)
VT ROUTE 100 STA 14+50, RT TO STA 17+90, RT (EDGE LINE) (SOLID)
VT ROUTE 100 STA 14+50, LT TO STA 17+80, LT (EDGE LINE) (SOLID)
VT ROUTE 100 STA 15+76, RT TO STA 17+99, RT (LANE LINE) (SOLID)
VT ROUTE 100 STA 14+50, RT TO STA 17+99, RT (LANE LINE) (SOLID)
VT ROUTE 100 (LAPORTE RD) STA 1+25, RT TO STA 2+25, RT (EDGE LINE) (SOLID)
VT ROUTE 100 (LAPORTE RD) STA 1+34, LT TO STA 2+25, LT (EDGE LINE) (SOLID)
VT ROUTE 100 STA 19+10, RT TO STA 19+75, RT (EDGE LINE) (SOLID)
VT ROUTE 100 STA 18+91, LT TO STA 19+75, LT (EDGE LINE) (SOLID)
VT ROUTE 100 STA 19+04, LT TO STA 19+75, LT (LANE LINE) (SOLID)

DURABLE LETTER OR SYMBOL, RECESSED TYPE C TAPE
VT ROUTE 100 STA 15+76, RT RIGHT TURN ARROW
VT ROUTE 100 STA 16+80, RT "ONLY"
VT ROUTE 100 STA 17+74, RT RIGHT TURN ARROW
VT ROUTE 100 STA 9+83, RT "SIGNAL"
VT ROUTE 100 STA 10+23, RT "AHEAD"
VT ROUTE 100 STA 27+76, LT "AHEAD"
VT ROUTE 100 STA 28+16, LT "SIGNAL"
VT ROUTE 100 STA 14+98, RT LEFT TURN ARROW
VT ROUTE 100 STA 15+68, RT "ONLY"
VT ROUTE 100 STA 16+38, RT LEFT TURN ARROW
VT ROUTE 100 STA 17+09, RT "ONLY"
VT ROUTE 100 STA 17+24, RT LEFT TURN ARROW
VT ROUTE 100 STA 19+24, RT LEFT TURN ARROW

THESE PAVEMENT MARKINGS ARE LOCATED OUTSIDE SURVEY LIMITS AND WILL BE PLACED CONSISTENT WITH THE SIGNAL AHEAD SIGNS AT STA 27+96 LT AND STA 10+03 RT.

DURABLE 4 INCH WHITE LINE, RECESSED POLYUREA
VT ROUTE 100 STA 14+74 TO STA 15+76 (DOTTED)

VT. STATE PLANE GRID

N

STA 10+03 RT STA 10+03 RT

THIS W2-1 SIGN IS LOCATED OUTSIDE SURVEY LIMIT BUT SHALL BE REPLACED WITH A NEW W3-3 SIGN ON EXISTING POST

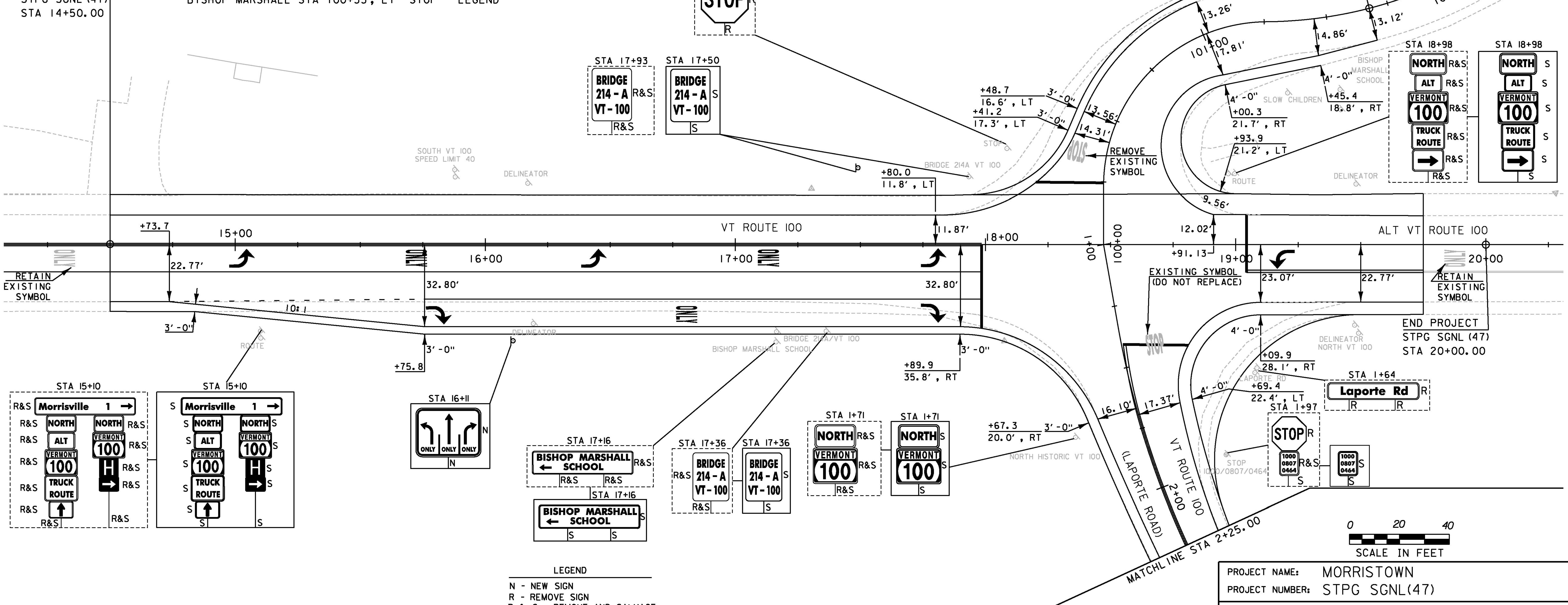
DURABLE 4 INCH YELLOW LINE, RECESSED POLYUREA
VT ROUTE 100 (LAPORTE RD) STA 1+41 TO STA 2+25 (CENTER LINE) (DOUBLE SOLID)
VT ROUTE 100 STA 14+50 TO STA 17+99 (CENTER LINE) (DOUBLE SOLID)
VT ROUTE 100 STA 19+04 TO STA 19+75 (CENTER LINE) (DOUBLE SOLID)

DURABLE 24 INCH STOP BAR, RECESSED POLYUREA
VT ROUTE 100 STA 17+99, RT
VT ROUTE 100 STA 19+04, LT
VT ROUTE 100 (LAPORTE RD) STA 1+41, LT

REMOVAL OF EXISTING PAVEMENT MARKING
BISHOP MARSHALL STA 100+12, LT TO STA 100+24, LT (4" LINE)
BISHOP MARSHALL STA 100+72, LT TO STA 101+04, LT (4" LINE)
BISHOP MARSHALL STA 100+12, RT TO STA 100+50, RT (4" LINE)
BISHOP MARSHALL STA 100+95, RT TO STA 101+68, RT (4" LINE)
BISHOP MARSHALL STA 100+35, LT "STOP" LEGEND

STA 27+96 LT STA 27+96 LT

THIS W2-1 SIGN IS LOCATED OUTSIDE SURVEY LIMIT BUT SHALL BE REPLACED WITH A NEW W3-3 SIGN ON EXISTING POST



0 20 40
SCALE IN FEET

LEGEND
N - NEW SIGN
R - REMOVE SIGN
R & S - REMOVE AND SALVAGE
S - SALVAGE SIGN

McFarland Johnson

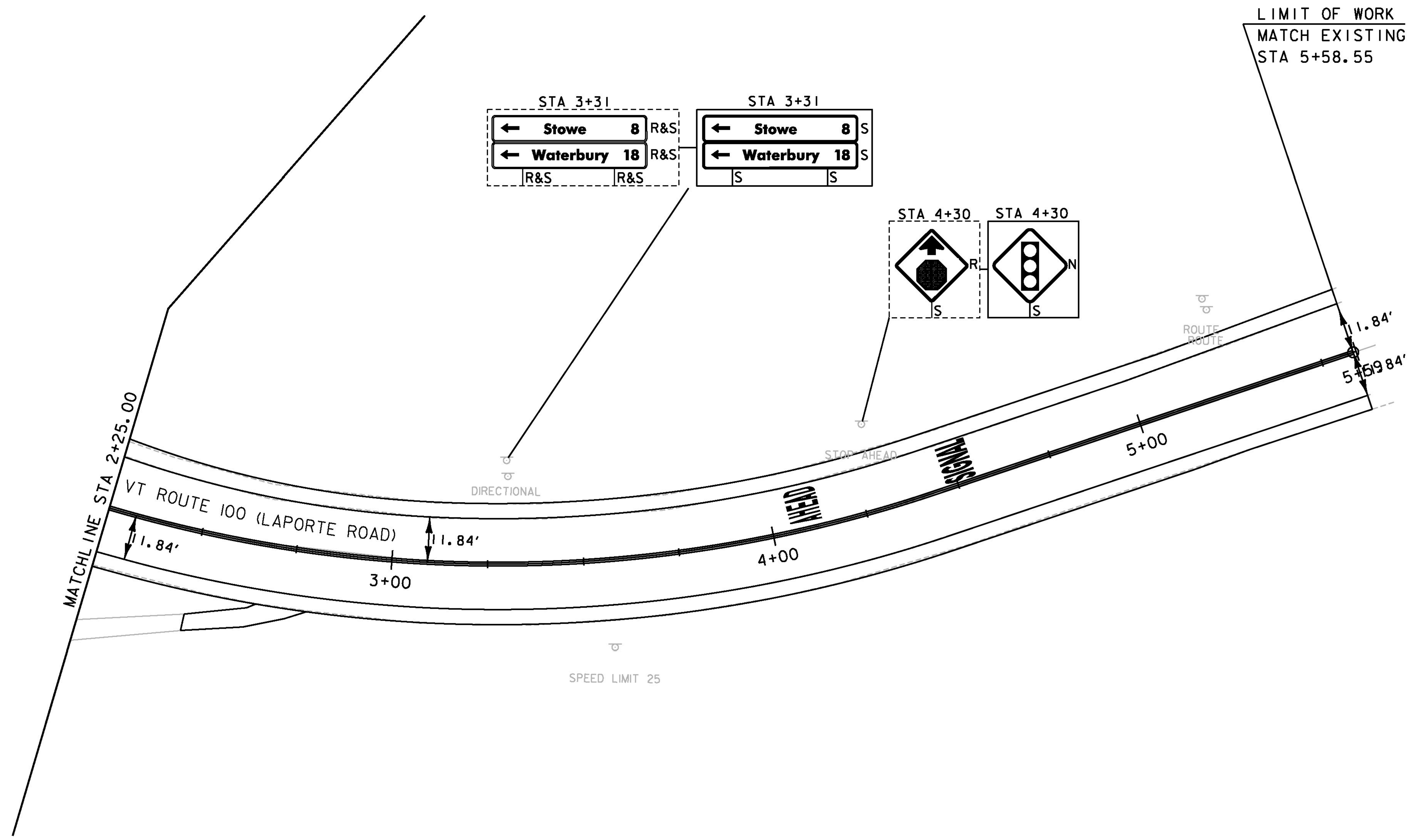
PROJECT NAME: MORRISTOWN
PROJECT NUMBER: STPG SGNL(47)

FILE NAME: z15r047bdr_sgn.dgn
PROJECT LEADER: J. SANTACRUCE
DESIGNED BY: R. LUCHINI
PAVEMENT MARKING AND SIGNING SHEET 1

PLOT DATE: 5/13/2016
DRAWN BY: R. LUCHINI
CHECKED BY: B. COLBURN
SHEET 38 OF 58

JRABLE 4 INCH WHITE LINE, RECESSED POLYUREA
' ROUTE 100 (LAPORTE RD) STA 2+25, RT TO STA 5+58.55, RT (EDGE LINE) (SOLID)
' ROUTE 100 (LAPORTE RD) STA 2+25, LT TO STA 5+58.55, LT (EDGE LINE) (SOLID)
JRABLE 4 INCH YELLOW LINE, RECESSED POLYUREA
' ROUTE 100 (LAPORTE RD) STA 2+25 TO STA 5+58.55 (CENTER LINE) (DOUBLE SOLID)

DURABLE LETTER OR SYMBOLS, RECESSED TYPE C TAPE
STA 4+13.5, LT "AHEAD"
STA 4+55, LT "SIGNAL"



N
VT. STATE PLANE GRID

LEGEND
N - NEW SIGN
R - REMOVE SIGN
R & S - REMOVE AND SALVAGE
S - SALVAGE SIGN

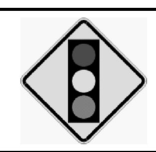
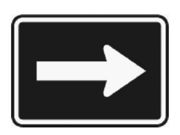
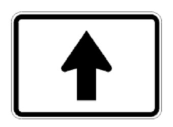
0 20 40
SCALE IN FEET

McFarland Johnson

PROJECT NAME: MORRISTOWN
PROJECT NUMBER: STPG SGNL(47)
FILE NAME: z15t047bdr_sgn.dgn
PROJECT LEADER: J. SANTACRUCE
DESIGNED BY: R. LUCHINI
PAVEMENT MARKING AND SIGNING SHEET 2
PLOT DATE: 5/13/2016
DRAWN BY: R. LUCHINI
CHECKED BY: B. COLBURN
SHEET 39 OF 58

STATE OF VERMONT
AGENCY OF TRANSPORTATION

TRAFFIC SIGN SUMMARY SHEET

MILE MARKER, STATION OR SIGN NUMBER	SIGN LEGEND	SIGN DIMENSIONS EACH	SIGN DIMENSIONS WIDTH (in)	SIGN DIMENSIONS HEIGHT (in)	NEW & SALVAGED SIGNS "A"	NEW & SALVAGED SIGNS "B"	NEW & SALVAGED SIGNS SALV SIGN	NEW & SALVAGED SIGNS SALV TIS	EXIST POST RETAIN	EXIST POST SALVAGE	NEW SIGN POSTS NO. OF POST	FLANGED CHANNEL (LB / FT) 1.12	FLANGED CHANNEL (LB / FT) 2.00	FLANGED CHANNEL (LB / FT) 3.00	SQUARE STEEL (in) 1.75 (LB / FT) 1.88	SQUARE STEEL (in) 2.00 (LB / FT) 2.42	SQUARE STEEL (in) 2.50 (LB / FT) 3.35	ANCHOR	SLEEVE	TUBULAR ALUMINUM Ø (IN) 3.00 (LB / FT) 1.30	TUBULAR ALUMINUM Ø (IN) 4.00 (LB / FT) 1.70	TUBULAR ALUMINUM Ø (IN) 4.0 MOD (LB / FT) 1.70	FOUNDATION	TUBULAR STEEL Ø (IN) 3.00 (LB / FT) 7.60	TUBULAR STEEL Ø (IN) 3.50 (LB / FT) 9.00	TUBULAR STEEL Ø (IN) 4.00 (LB / FT) 10.80	TUBULAR STEEL Ø (IN) 5.00 (LB / FT) 14.60	W-SHAPE STEEL FTG. SIZE 24"	W-SHAPE STEEL FTG. SIZE 30"	W-SHAPE STEEL WEIGHT	W-SHAPE STEEL POST SIZE	SIGN FRAME REQUIRED	REMARKS	SIGN DETAIL STANDARD HIGHWAY SIGNS AND MARKINGS (SHSM)	SIGN DETAIL SIGN DETAIL SHEET NUMBER
OPTION ITEMS																																			
10+03, RT		1	30.00	30.00	6.25				1																								INSTALL NEW W3-3 ON EXISTING POST	X	
16+11 RT	ONLY ONLY ONLY	1	48.00	24.00	8.00						2					30.00		2															INSTALL NEW R3-8b WITH A MINIMUM SPACING OF 100 FT BETWEEN EXISTING SIGNS	X	
15+10, RT	Morrisville 1 →	1					1																										SALVAGED SIGN TO BE INSTALLED ON NEW STEEL TUBE POSTS WITH BREAK AWAY MOUNTS		
	NORTH / NORTH	2					2																												
	ALT / VERMONT 100	2					2																												
	VERMONT 100 / 	2					2																												
	TRUCK ROUTE / 	2					2																												
		1					1				2												2		270.00										
17+16, RT	BISHOP MARSHALL ← SCHOOL	1					1			2																							SALVAGED SIGN TO BE REINSTALLED		
17+36, RT	BRIDGE 214-A VT-100	1					1			1																							SALVAGED SIGN TO BE REINSTALLED		
17+50, LT	BRIDGE 214-A VT-100	1					1			1																							SALVAGED SIGN TO BE REINSTALLED		
19+30, RT	Laporte Rd →	1	24.00	96.00	16.00																												D3-1a MOUNT ON MAST ARM (MA-3)		42
17+84, LT	← Laporte Rd	1	24.00	96.00	16.00																												D3-1b MOUNT ON MAST ARM (MA-1)		42

FINAL POST LENGTHS ARE TO BE DETERMINED IN THE FIELD. POST SIZES ARE COMPUTED BASED ON INFORMATION FURNISHED ON THE STANDARD SHEETS AND THE VTRANS "SIGN POST DESIGN GUIDELINE."

	FC 1.12	FC 2.00	FC 3.00	SS 1.75	SS 2.00	SS 2.50	ANCHOR	SLEEVE	TA 3.00	TA 4.00	TA 4.0 MOD	TS 3.00	TS 3.50	TS 4.00	TS 5.00
Units	FT	FT	FT	FT	FT	FT	XXXXX	EA	LB	LB	LB	LB	LB	LB	LB
Subtotal	.	.	.	.	30.00	.	XXXXX	.	.	.	.	.	270.00	.	.

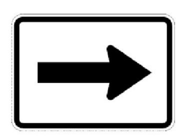
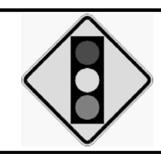
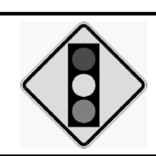
TOTALS	"A"	"B"	SALV SIGN	SALV TIS	EXIST POST	FLANGED CHANNEL	SQUARE STEEL	TUBULAR ALUMINUM	FOUNDATION	TUBULAR STEEL	24"	30"	WEIGHT
Units	SF	SF	EA.	SF	XXXXXXXXXXX	FT	FT	LB	EA.	LB	EA.	EA.	LB
Total	46.25	.	13	.	XXXXXXXXXXX	.	30.00	.	2	270.00	.	.	.

PROJECT NAME:	MORRISTOWN
PROJECT NUMBER:	STPG SGNL(47)
FILE NAME: z15T047tssl.dgn	PLOT DATE: 5/13/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: R. LUCHINI
DESIGNED BY: R. LUCHINI	CHECKED BY: B. COLBURN
TRAFFIC SIGN SUMMARY SHEET 1	SHEET 40 OF 58

McFarland Johnson

STATE OF VERMONT
AGENCY OF TRANSPORTATION

TRAFFIC SIGN SUMMARY SHEET

MILE MARKER, STATION OR SIGN NUMBER	SIGN LEGEND	SIGN DIMENSIONS			NEW & SALVAGED SIGNS				EXIST POST		NEW SIGN POSTS: NO. OF	FLANGED CHANNEL (LB / FT)			SQUARE STEEL (in) (LB / FT)					TUBULAR ALUMINUM Ø (IN) (LB / FT)				TUBULAR STEEL Ø (IN) (LB / FT)				W-SHAPE STEEL					REMARKS	SIGN DETAIL	
		EACH	WIDTH (in)	HEIGHT (in)	"A"	"B"	SALV SIGN	SALV TIS	RETAIN	SALVAGE	POST	1.12	2.00	3.00	1.75 / 1.88	2.00 / 2.42	2.50 / 3.35	ANCHOR	SLEEVE	3.00 / 1.30	4.00 / 1.70	4.0 MOD / 1.70	FOUNDATION	3.00 / 7.60	3.50 / 9.00	4.00 / 10.80	5.00 / 14.60	FTG. SIZE 24"	FTG. SIZE 30"	WEIGHT	POST SIZE	SIGN FRAME REQUIRED		STANDARD HIGHWAY SIGNS AND MARKINGS (SHSM)	SIGN DETAIL SHEET NUMBER
	OPTION ITEMS																																		
18+98, RT	NORTH	1					1																												
	ALT	1					1																												
	VERMONT 100	1					1																												
	TRUCK ROUTE	1					1																												
		1					1			1																							SALVAGED SIGN TO BE REINSTALLED		
27+96, LT		1	30.00	30.00	6.25				1																								W3-3 INSTALLED ON EXISTING POST	X	
1+71, RT	NORTH	1					1																												
	VERMONT 100	1					1			1																							SALVAGED SIGN TO BE REINSTALLED		
1+97, LT	1000 0807 0464	1					1			1																							SALVAGED SIGN TO BE REINSTALLED		
3+31, LT	← Stowe 8	1					1																												
	← Waterbury 18	1					1			1																							SALVAGED SIGN TO BE REINSTALLED		
4+30, LT		1	30.00	30.00	6.25				1																								W3-3 INSTALLED ON EXISTING POST	X	
	SUBTOTAL THIS SHEET				12.50		10					0.00	0.00	0.00	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
	SUBTOTAL SHEET 1				46.25		13					0.00	0.00	0.00	0.00	30.00	0.00	2	0	0.00	0.00	0.00	2	0.00	270.00	0.00	0.00								
												FT	FT	FT	FT	FT	FT	XXXXX	EA	LB	LB	LB		LB	LB	LB	LB								
												.	.	.	.	30.00	.	XXXXX XXXXX XXXXX	.	.	.	.		.	270.00	.	.								
	ROUNDING				0.25																														
	TOTALS				SF 59.00	SF 0.00	EA. 23	SF .	XXXXXXXXXXX	XXXXXXXXXXX	XXXXXXXXXXX	FT .			FT 30.00					LB .			EA. 2	LB 270.00				EA. .	EA. .	LB .					

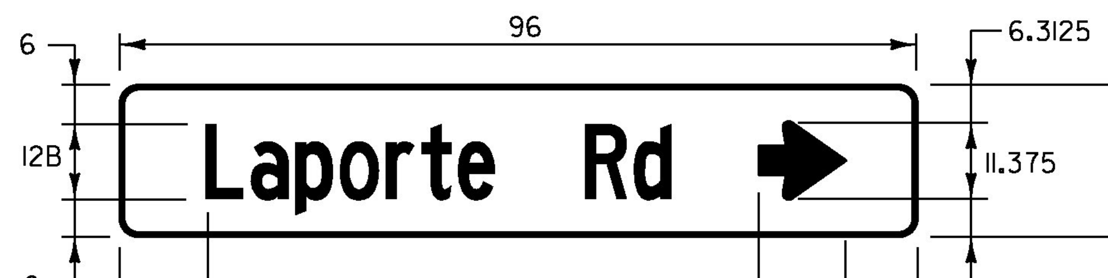
FINAL POST LENGTHS ARE TO BE DETERMINED IN THE FIELD. POST SIZES ARE COMPUTED BASED ON INFORMATION FURNISHED ON THE STANDARD SHEETS AND THE VTRANS "SIGN POST DESIGN GUIDELINE."

McFarland Johnson

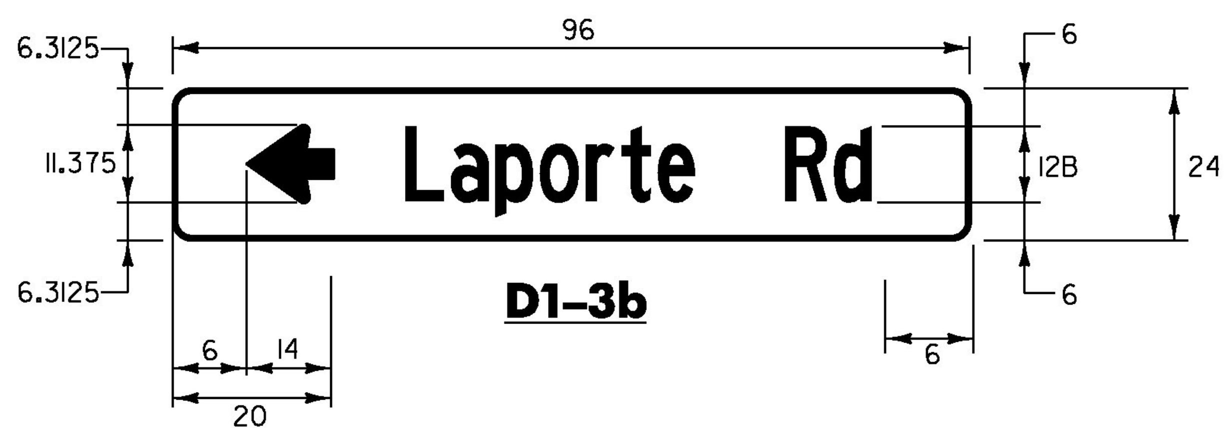
PROJECT NAME: MORRISTOWN
PROJECT NUMBER: STPG SGNL(47)

FILE NAME: z15T047tss2.dgn
PROJECT LEADER: J. SANTACRUCE
DESIGNED BY: R. LUCHINI
TRAFFIC SIGN SUMMARY SHEET 2

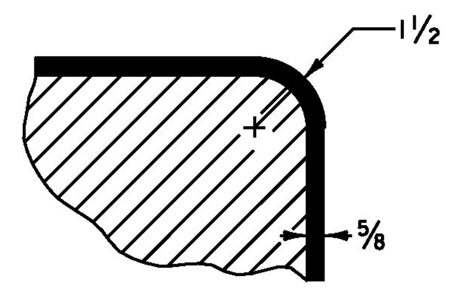
PLOT DATE: 5/13/2016
DRAWN BY: R. LUCHINI
CHECKED BY: B. COLBURN
SHEET 41 OF 58



D1-3a

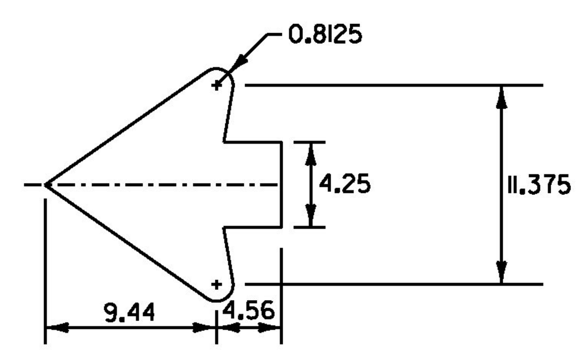


D1-3b



BORDER DETAIL

TRIM CORNERS



STANDARD SHS 4.5" ARROW WITH SHORT SHAFT

SIGN NOTES

NOTES:

DESIGN

LETTERS, DIGITS, ARROWS, SYMBOLS, SPACING, AND TEXT DIMENSIONS SHALL CONFORM WITH THE STANDARD HIGHWAY SIGN BOOK AND DESIGNS PRESCRIBED IN THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) ADOPTED BY THE U.S DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION (FHWA) DATED 2009 WITH LATEST REVISIONS.

MATERIALS

THE SIGN BASE MATERIALS USED FOR THESE GUIDE SIGNS SHALL BE 0.100" FLAT SHEET ALUMINUM.

REFLECTORIZATION

THE BACKGROUND RETROREFLECTIVE MATERIAL SHALL BE ASTM VIII OR TYPE IX RETROREFLECTIVE SHEETING APPLIED TO THE ENTIRE SIGN. THE TEXT, BORDERS, AND SYMBOLS SHALL BE LETTERING FILM OR SILK SCREENED.

COLORS

GUIDE SIGNS SHALL HAVE WHITE TEXT, BORDERS, AND SYMBOLS ON RETROREFLECTIVE GREEN BACKGROUND. COLOR SHALL CONFORM TO THE COLORS ADOPTED BY AASHTO AND APPROVED BY FHWA SPECIFICATIONS. GUIDE SIGNS SHALL MEET THE VERMONT STANDARD SPECIFICATIONS.

SPECIFICATIONS

GUIDE SIGNS SHALL MEET THE VERMONT STANDARD SPECIFICATIONS FOR CONSTRUCTION "TRAFFIC SIGNS"

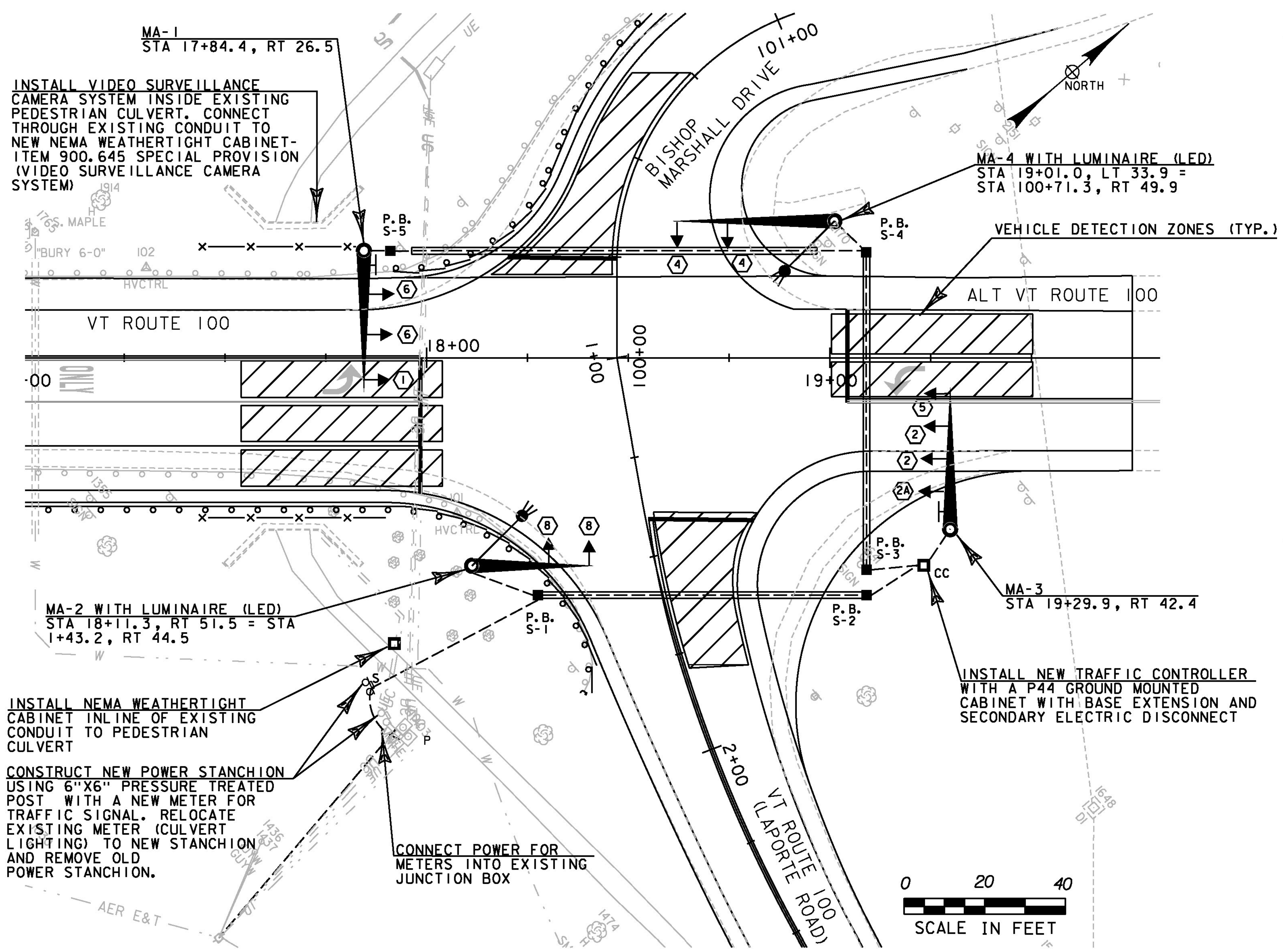
MOUNTING

ALL MAST ARM MOUNTED SIGNS SHALL BE MOUNTED ON THE ARM USING A FIXED MOUNT SYSTEM.
ALL MAST ARM MOUNTED SIGNS SHALL HAVE SAFETY CABLES.

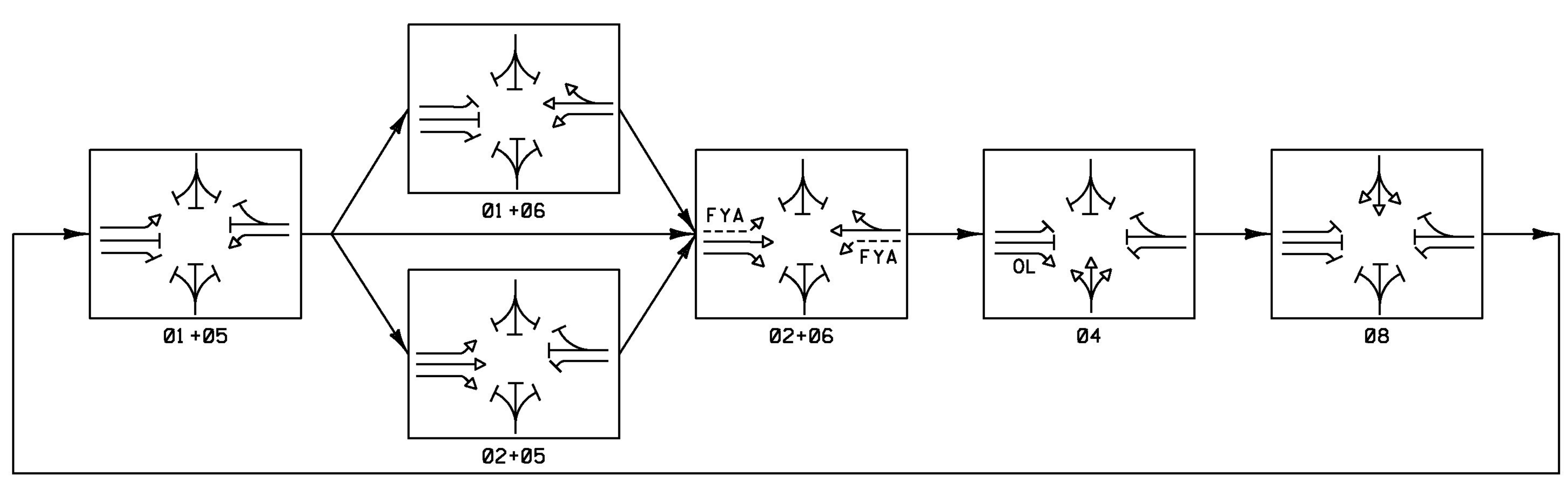
McFarland Johnson

PROJECT NAME: MORRISTOWN
PROJECT NUMBER: STPG SGNL(47)

FILE NAME: z15t047sdt.dgn	PLOT DATE: 5/13/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: J. SANTACRUCE
DESIGNED BY: J. SANTACRUCE	CHECKED BY: B. COLBURN
SIGN DETAIL SHEET	SHEET 42 OF 58



VT ROUTE 100, ALT VT ROUTE 100, AND BISHOP MARSHALL DRIVE



·---- = PERMISSIVE MOVEMENT   OL = OVERLAP   FYA = FLASHING YELLOW ARROW

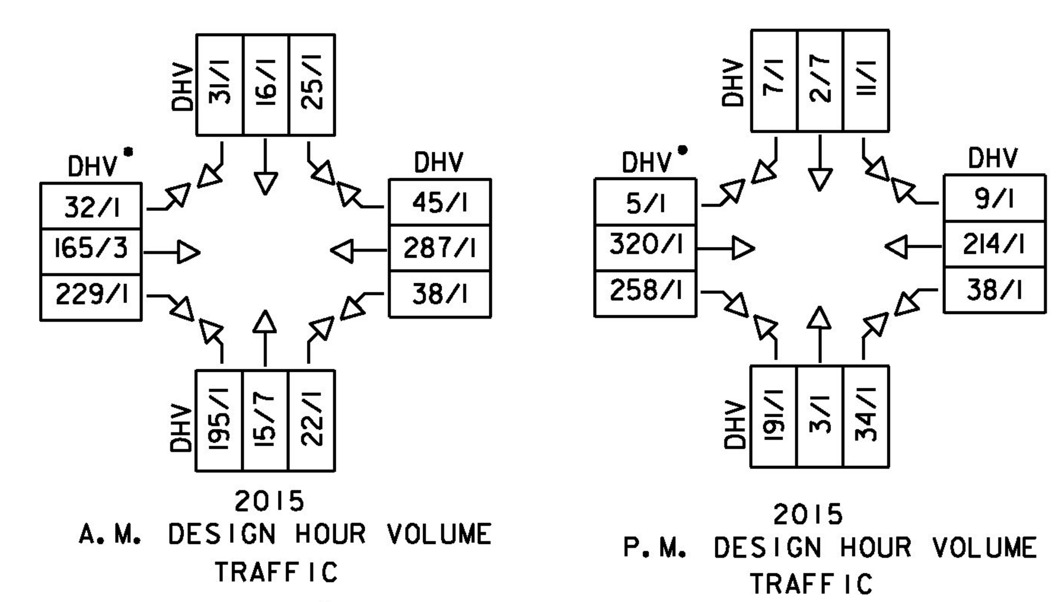
TABLE OF CHANGE SEQUENCE																			
FACE	Ø1 & Ø5			Ø1 & Ø6			Ø2 & Ø5			Ø2 & Ø6			Ø4			Ø8			FLASHING OPERATION
	CLEAR TO			CLEAR TO			CLEAR TO			CLEAR TO			CLEAR TO			CLEAR TO			
	R/W	ALL OTHERS		R/W	ALL OTHERS		R/W	ALL OTHERS		R/W	ALL OTHERS		R/W	ALL OTHERS		R/W	ALL OTHERS		
1	←G	←Y	←R	←G	←Y	←R	←R	←R	←R	FYA	←Y	←R	←R	←R	←R	←R	←R	←R	FR
2	R	R	R	R	R	R	G	Y	R	G	Y	R	R	R	R	R	R	R	FY
2a	R	R	R	R	R	R	G/G→	Y/Y→	R	G/G→	Y/Y→	R	G/G→	Y/Y→	R	R	R	R	FY
4	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	FR
5	←G	←Y	←R	←R	←R	←R	←G	←Y	←R	FYA	←Y	←R	←R	←R	←R	←R	←R	←R	FR
6	R	R	R	G	Y	R	R	R	R	G	Y	R	R	R	R	R	R	R	FY
8	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	FR

LIST OF MAJOR EQUIPMENT

EQUIPMENT ITEM 678.15	QUANTITY
12-PHASE TS-2 TYPE 1 TRAFFIC SIGNAL CONTROLLER IN P44 CABINET WITH EXTENSION BASE/ FOUNDATION AND SECONDARY POWER DISCONNECT	1
SIGNAL POLE WITH 35' MAST ARM (MA-1)	1
SIGNAL POLE WITH 30' MAST ARM (MA-2)	1
SIGNAL POLE WITH 35' MAST ARM (MA-3)	1
SIGNAL POLE WITH 40' MAST ARM (MA-4)	1
NEW 12" POLYCARBONATE, 3-SECTION LED SIGNAL HEAD (ONE WAY) W/TUNNEL VISORS, LOUVERED BACKPLATES, AND MOUNTING HARDWARE	8
NEW 12" POLYCARBONATE, 4-SECTION LED SIGNAL HEAD (ONE WAY) W/TUNNEL VISORS, LOUVERED BACKPLATES, AND MOUNTING HARDWARE	2
NEW 12" POLYCARBONATE, 5-SECTION LED SIGNAL HEAD (ONE WAY) W/TUNNEL VISORS, LOUVERED BACKPLATES, AND MOUNTING HARDWARE	1
CAMERA ASSEMBLY (VIDEO MONITORING)	1
VIDEO CAMERA CARD AND RACK	1
ADVANCED VEHICLE DETECTION (EA)	2
VEHICLE STOP BAR DETECTION (EA)	4
POWER METER ON STANCHION	1

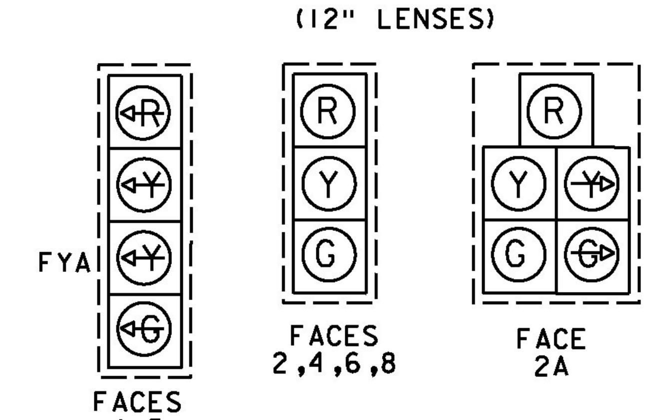
ALL OTHER WIRING AND INCIDENTALS REQUIRED TO PROVIDE A FULLY FUNCTIONAL TRAFFIC SIGNAL SYSTEM WILL BE CONSIDERED INCIDENTAL TO ITEM 678.15.

EXISTING	NEW	LEGEND
		UTILITY POLE
		LUMINAIRE
		LIGHT OR WOOD POLE
		STRAIN POLE
		CONTROLLER CABINET
		PULLBOX/JUNCTION BOX
		SIGNAL HEAD
— EX —		CONDUIT
		VEHICLE LOOPS
		PEDESTAL POST
		STANCHION
	—S	SWEEP
		STREET NAME SIGN
		VEHICLE DETECTION ZONE



*DESIGN HOUR VOLUME / % TRUCK

SIGNAL FACE ARRANGEMENT
(12" LENSES)



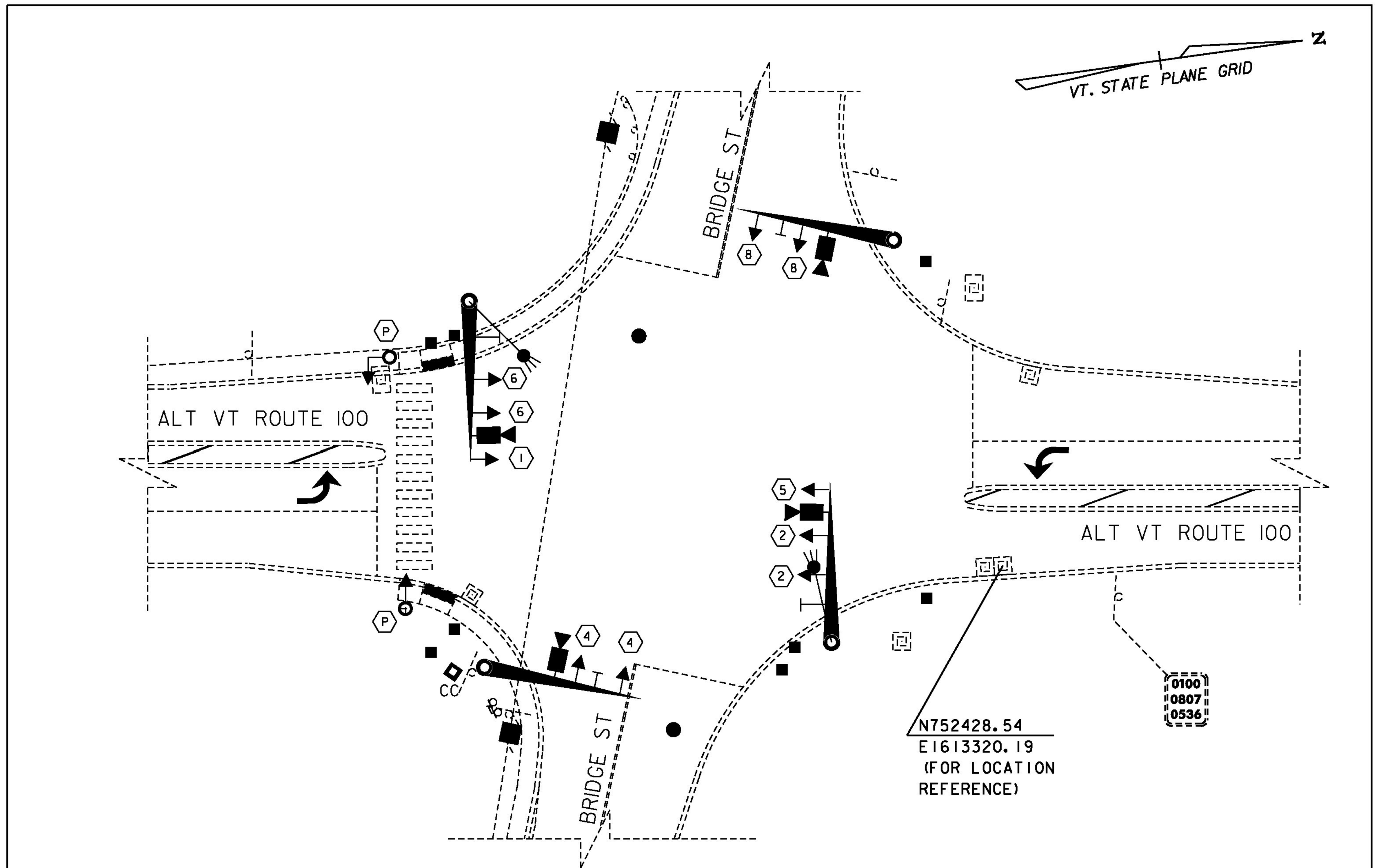
FYA = FLASHING YELLOW ARROW

CONTROLLER TIMING CHART									
LOCAL PROGRAMMING	PHASES								
	1	2	3	4	5	6	7	8	9
MINIMUM GREEN	5	8	--	5	5	8	--	5	--
EXTENSION	3	3	--	3	3	3	--	3	--
YELLOW CLEARANCE	4	4	--	4	4	4	--	4	--
ALL RED CLEARANCE	2	2	--	2	2	2	--	2	--
DHV	--	--	--	--	--	--	--	--	--
MAX GREEN I 6:00-9:00 AM	10	30	--	16	10	30	--	10	--
MAX GREEN II 3:00-6:00 PM	10	33	--	13	10	33	--	10	--
MAX GREEN 10:00AM-3:00PM	10	25	--	15	10	25	--	10	--
FLASH MODE 10:00PM-6:00AM	FR	FY	--	FR	FR	FY	--	FR	--
WALK	--	--	--	--	--	--	--	--	--
FLASHING DON'T WALK	--	--	--	--	--	--	--	--	--
RECALL	OFF	MIN	--	OFF	OFF	MIN	--	OFF	--

SIGNAL CONDUIT & SLEEVE LENGTHS					
FROM	TO	2" WIRED CONDUIT SIGNAL	2" CONDUIT SIGNAL (SPARE)	2" CONDUIT POWER	12" SLEEVE
EX. POLE	EX. JB		2 x 81 FT		
P	S		2 x 22 FT	2 x 22 FT	
S	PB S-1	1 x 54 FT	1 x 54 FT	1 x 54 FT	
PB S-1	MA-2	3 x 22 FT	1 x 22 FT		
PB S-1	PB S-2	4 x 87 FT	1 x 87 FT	1 x 87 FT	1 x 79 FT
PB S-2	CC	4 x 20 FT	1 x 20 FT	1 x 20 FT	
CC	MA-3	2 x 15 FT	1 x 15 FT		
CC	PB S-3	4 x 18 FT	1 x 18 FT		
PB S-3	PB S-4	4 x 84 FT	1 x 84 FT		1 x 76 FT
PB S-4	MA-4	2 x 16 FT	1 x 16 FT		
PB S-4	PB S-5	3 x 124 FT	1 x 124 FT		1 x 101 FT
PB S-5	MA-1	3 x 12 FT	1 x 12 FT		

NOTES:

1. ALL EQUIPMENT NECESSARY TO PROVIDE A FULLY FUNCTIONAL VEHICLE STOP BAR DETECTION SYSTEM AND ADVANCED VEHICLE DETECTION WILL BE PAID FOR UNDER ITEM 678.15 TRAFFIC CONTROL SIGNALS.
2. ALL PULLBOXES SHOWN ON THE PLANS SHALL BE ITEM 678.27 PULLBOX, DOUBLE.
3. ALL TRAFFIC SIGNAL CONDUIT PROPOSED IN THE ROADWAY WILL BE INSTALLED IN THE SAME SLEEVE AS THE LIGHTING CONDUIT.
4. PHASE 1 AND PHASE 5 WILL CONSIST OF A PROTECTED GREEN ARROW INDICATION, FLASHING YELLOW ARROW CONDITION SHALL OPERATE DURING PHASE 2 AND PHASE 6 AND SHALL TERMINATE CONCURRENT WITH PHASE 2 AND PHASE 6 OPERATION IN CONFORMANCE WITH THE CURRENT MUTCD MANUAL.
5. CONTRACTOR SHALL INSTALL ADVANCED VEHICLE DETECTION ON THE MAINLINE APPROACHES AS DIRECTED IN THE TRAFFIC SIGNAL SYSTEM NOTES.
6. THE CONTRACTOR SHALL USE CAUTION TO PROTECT ALL UNDERGROUND UTILITIES FROM DAMAGE DURING THE INSTALLATION OF ELECTRIC CONDUIT. ANY DAMAGE TO THE EXISTING UNDERGROUND UTILITIES WILL BE REPAIRED AT THE COST OF THE CONTRACTOR, AT NO COST TO THE STATE OR THE UTILITY OWNER. SEE UTILITY SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
7. THE CONTRACTOR SHALL MODIFY THE EXISTING PEDESTRIAN CULVERT LIGHTING SYSTEM TO INCLUDE MOTION SENSORS AT EACH END OF THE CULVERT UNDER ITEM 900.645 SPECIAL PROVISION (MODIFYING EXISTING PEDESTRIAN CULVERT LIGHTING).
8. SEE SHEET 45 AND 46 FOR ADDITIONAL SIGNAL NOTES.



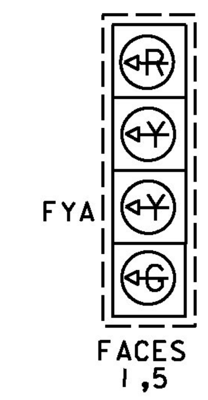
ALTERNATE VERMONT ROUTE 100 AND BRIDGE STREET (EXISTING SIGNALIZED INTERSECTION)

NOT TO SCALE

-------- = EXISTING FEATURES

NOTE: INTERSECTION INFORMATION TAKEN FROM PLANS OF VT 100 (MORRISTOWN STP F029-1(2))

SIGNAL FACE ARRANGEMENT
(12" LENSES)



FYA = FLASHING YELLOW ARROW

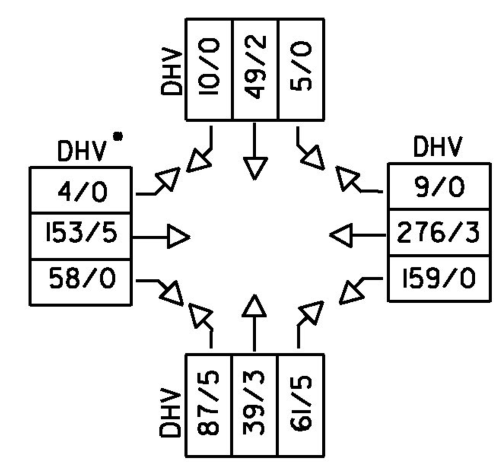
CONTROLLER TIMING CHART									
LOCAL PROGRAMMING	PHASES								
	1	2	3	4	5	6	7	8	9
MINIMUM GREEN	5	8	--	8	5	8	--	8	--
EXTENSION	3	3	--	3	3	3	--	3	--
YELLOW CLEARANCE	4	4	--	4	4	4	--	4	--
ALL RED CLEARANCE	2	2	--	2	2	2	--	2	--
DHV	--	--	--	--	--	--	--	--	--
MAX GREEN I 6:00-9:00 AM	20	40	--	30	15	45	--	30	--
MAX GREEN II 3:00-6:00 PM	15	40	--	35	15	40	--	35	--
MAX GREEN (FREE)	15	30	--	20	15	30	--	20	--
WALK	--	--	--	--	--	--	--	--	7
FLASHING DON'T WALK	--	--	--	--	--	--	--	--	14
RECALL	OFF	SOFT	--	OFF	OFF	SOFT	--	OFF	LOCK

NOTE: Ø9 IS AN EXCLUSIVE PEDESTRIAN PHASE

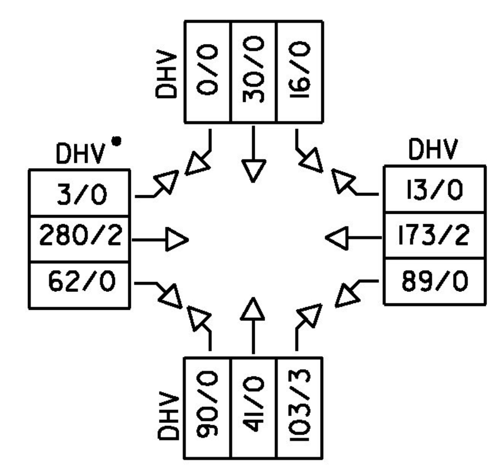
LIST OF MAJOR EQUIPMENT

EQUIPMENT ITEM 900.645 SPECIAL PROVISION (MODIFY EXISTING TRAFFIC SIGNAL, INTERSECTION)(ALT VT100 & BRIDGE ST)	QUANTITY
NEW 12" POLYCARBONATE, 4-SECTION LED SIGNAL HEADS (ONE WAY) W/TUNNEL VISORS, LOUVERED BACKPLATES, AND MOUNTING HARDWARE	2

ALL OTHER WIRING AND INCIDENTALS REQUIRED TO PROVIDE A FULLY FUNCTIONAL TRAFFIC SIGNAL SYSTEM WILL BE CONSIDERED INCIDENTAL TO ITEM 900.645 SPECIAL PROVISION (MODIFY EXISTING TRAFFIC SIGNAL, INTERSECTION)(ALT VT ROUTE 100 & BRIDGE ST)



2015
A.M. DESIGN HOUR VOLUME
TRAFFIC

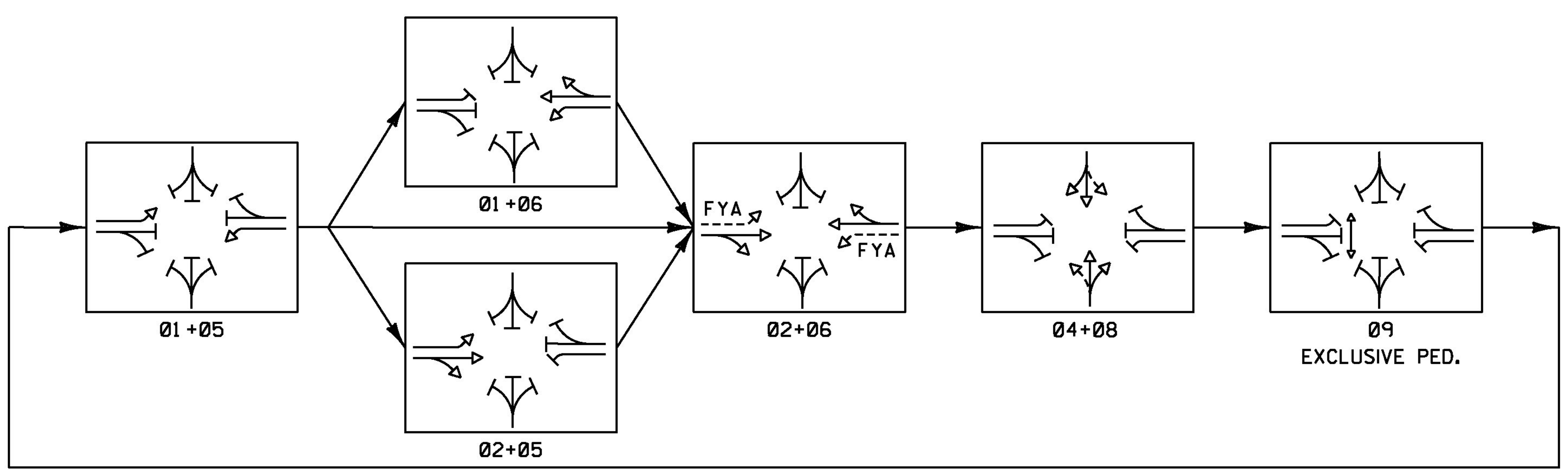


2015
P.M. DESIGN HOUR VOLUME
TRAFFIC

* DESIGN HOUR VOLUME / % TRUCK

NOTES:

1. THE WORK AT THIS LOCATION SHALL CONSIST OF CHANGING THE EXISTING EXCLUSIVE LEFT-TURN PHASING TO PROTECTED/PERMITTED PHASING USING FLASHING YELLOW ARROW SIGNAL HEADS.
2. WORK WILL INCLUDE REPLACING THE EXISTING 3-SECTION LEFT-TURN SIGNAL HEADS ON THE ALT VT ROUTE 100 NORTHBOUND AND SOUTHBOUND APPROACHES (PHASE 1 & 5) AND REPLACING THEM WITH NEW 4-SECTION, ONE-WAY, POLYCARBONATE SIGNAL HEADS WITH LOUVERED BACKPLATES.
3. WORK SHALL ALSO CONSIST OF MAKING CHANGES TO THE EXISTING TIMING AND SIGNAL PHASING IN THE EXISTING TRAFFIC SIGNAL CONTROLLER TO ACCOMODATE THE FLASHING YELLOW ARROW SIGNAL OPERATION AS SHOWN ON THIS SHEET.
4. PHASE 1 AND PHASE 5 WILL CONSIST OF A PROTECTED GREEN ARROW INDICATION, FLASHING YELLOW ARROW CONDITION SHALL OPERATE DURING PHASE 2 AND PHASE 6 AND SHALL TERMINATE CONCURRENT WITH PHASE 2 AND PHASE 6 OPERATION IN CONFORMANCE WITH THE CURRENT MUTCD MANUAL.
5. EXISTING 3-SECTION LEFT-TURN SIGNAL HEADS THAT ARE BEING REMOVED SHALL BE SALVAGED TO THE DISTRICT 5 OFFICE. THE CONTRACTOR SHALL CALL STEVE GUYETTE AT 802-655-1580 TO COORDINATE.



----- = PERMISSIVE MOVEMENT
FYA = FLASHING YELLOW ARROW
OL = OVERLAP

PROJECT NAME: MORRISTOWN	
PROJECT NUMBER: STPG SGNL(47)	
FILE NAME: z15t047s1g02.dgn	PLOT DATE: 5/13/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: J. SANTACRUCE
DESIGNED BY: J. SANTACRUCE	CHECKED BY: B. COLBURN
TRAFFIC SIGNAL LAYOUT SHEET 2	SHEET 44 OF 58

McFarland Johnson

TRAFFIC SIGNAL SYSTEM NOTES

A. NEW SIGNAL EQUIPMENT

1. ALL SIGNAL HEADS SHALL BE 12" POLYCARBONATE. THE SIGNAL HEADS SHALL HAVE FLAT BLACK HOUSINGS AND VISORS.
2. ALL SIGNAL HEADS SHALL HAVE FLAT BLACK LOUVERED BACK PLATES WITH A 2" RETROREFLECTIVE TAPE BORDER.
3. THE TRAFFIC SIGNAL CONTROLLER AND RELATED EQUIPMENT SHALL BE AN ECONOLITE ASC/3-2100 (NEMA TS2) IN A NEMA P44 TRAFFIC CONTROL CABINET WITH 15-INCH BASE EXTENSION INSTALLED AT THE LOCATION SHOWN ON THE PLANS. TRAFFIC CONTROL CABINET SHALL BE ORIENTED SUCH THAT THE DOOR DOES NOT FACE THE ROADWAY.
4. ALL SIGNAL HEADS SHALL HAVE RED, YELLOW, AND GREEN L.E.D. SIGNALS WITH A VISIBLE BEAM SPREAD OF 80 DEGREES OFF AXIS.
5. ALL SIGNAL HEADS SHALL BE MOUNTED ON THE BRACKET SUCH THAT THE MIDDLE ONE-THIRD OF THE SIGNAL HEAD ALIGNS WITH THE MAST ARM.
6. ALL SIGNAL EQUIPMENT INCLUDING MAST ARMS SHALL BE PAINTED FLAT BLACK.
7. ALL SIGNAL EQUIPMENT AND MAST ARM MOUNTED SIGNS SHALL HAVE SAFETY CABLES.
8. A DISCONNECT BREAKER FOR EACH CIRCUIT SHALL BE INSTALLED IN A RAINPROOF (NEMA 3R), LOCKED CABINET ON A STANCHION NEXT TO OR BELOW THE METER SOCKET.

B. SIGNAL OPERATION

1. SWITCH-OVER TO NEW SIGNAL SYSTEM SHALL NOT OCCUR DURING PEAK TRAFFIC OPERATING PERIODS. UNIFORMED TRAFFIC OFFICERS SHALL CONTROL TRAFFIC DURING SWITCH-OVER.
2. ALL SIGNALS SHALL DWELL ON MAINLINE PHASE 2 & 6 UNLESS OTHERWISE NOTED.
3. THE MAINLINE PHASE 2 & 6 THRU PHASE SHALL BE USED FOR THE START-UP PHASE FOLLOWING FLASHING OPERATION.
4. SIGNAL TIMING SHOWN ON THE PLANS MAY REQUIRE FINE-TUNING IN THE FIELD BASED ON TRAFFIC OBSERVATION AND/OR ADDITIONAL FIELD STUDIES.

C. PULLBOXES AND JUNCTION BOXES

1. PULLBOXES AND JUNCTION BOXES ARE DETAILED ON VTRANS STANDARD E-173. MINIMUM JUNCTION BOX SIZE SHALL BE 18" x 12" x 12", OR LARGER AS REQUIRED BY THE ELECTRICAL CODE.
2. THE LOGO ON PULLBOXES AND JUNCTION BOXES SHALL BE "TRAFFIC SIGNAL".
3. ALL PULLBOXES AND JUNCTION BOXES SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 678.

D. TRAFFIC SIGNAL CONDUIT

1. ALL TRAFFIC SIGNAL CONDUITS SHALL BE SCHEDULE 80 PVC.
2. WHEN CONDUIT IS PLACED BELOW THE ROADWAY OR ACROSS SIDE ROADS. IT SHALL BE PLACED IN A STEEL OR HDPE SLEEVE, SIZE AS SHOWN ON PLANS.
3. ALL CONDUIT SHALL BE FILLED WITH STEEL WOOL PRIOR TO BEING CAPPED.
4. ALL TRAFFIC SIGNAL CONDUIT WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 678.

E. VEHICLE DETECTION

1. STOP BAR AND ADVANCED VEHICLE DETECTOR LOCATIONS SHALL BE DETERMINED BY THE CONTRACTOR IN ACCORDANCE WITH THE MANUFACTURER'S GUIDANCE FOR THE TYPE OF DETECTOR SUPPLIED. THE CONTRACTOR SHALL SUBMIT PROPOSED MOUNTING LOCATIONS AND DOCUMENTATION OF CONFORMANCE WITH THE MANUFACTURER'S GUIDANCE TO THE ENGINEER FOR APPROVAL.
2. ALL VEHICLE DETECTORS SHALL BE PLACED SUCH THAT OCCLUSION IS MINIMIZED AND PHASING IS NOT AFFECTED.
3. STOP BAR VEHICLE DETECTION AREAS SHALL EXTEND FIVE FEET PAST THE FINAL, PERMANENT STOP BAR.
4. ADVANCED VEHICLE DETECTION AREAS SHALL BE A MINIMUM OF 350 TO 400 FEET UPSTREAM OF THE FINAL, PERMANENT STOP BAR.
5. IF DILEMMA ZONE DETECTION BY ADVANCED VEHICLE DETECTION SYSTEMS IS SPECIFIED ON THE PLAN, IT SHALL PROVIDE DETECTION OF RANGE, SPEED, AND ESTIMATED TIME OF ARRIVAL OF APPROACHING VEHICLES IN A CONTINUOUS RANGE OF 200 TO 600 FEET FROM THE FINAL LOCATION OF THE DETECTOR UNIT.
6. VEHICLE DETECTION SYSTEM SHALL BE ECONOLITE ACCUSCAN BRAND, WAVETRONIX BRAND, OR SMARTMICRO TRAFFIC RADAR.
7. THERE SHALL BE NO WIRING SPLICES BETWEEN THE SIGNAL CONTROLLER EQUIPMENT AND THE VEHICLE DETECTERS.
8. SEE THE PLANS OR THE SPECIAL PROVISIONS FOR A DETAILED LIST OF EQUIPMENT.

F. MAST ARM POLE FOUNDATIONS

1. FOUNDATIONS SHALL BE DESIGNED IN ACCORDANCE WITH VTrans' MATERIALS & RESEARCH ENGINEERING INSTRUCTIONS GEOTECHNICAL DESIGN PROCEDURES FOR MAST ARM AND OVERHEAD SIGN SUPPORT FOUNDATIONS (MRE110-01), DATED MARCH 9, 2010, A COPY OF WHICH CAN BE FOUND ON THE AGENCY'S WEBSITE:

   WWW.OUTSIDE.VERMONT.GOV/AGENCY/VTRANS/EXTERNAL/DOCS/CONSTRUCTION/03GEOTECHENG/ENGINEERING/MAST%20ARM%20AND%20OVERHEAD%20SIGN%20SUPPORT%20FOUNDATIONS%20MRE1%2010-01%20ENGINEERING.PDF

   THE CONTRACTOR SHALL BE RESPONSIBLE FOR FOUNDATION DESIGN. IN ADDITION TO FABRICATION DRAWINGS, DESIGN CRITERIA, AND DESIGN CALCULATIONS SHALL BE SUBMITTED AS WORKING DRAWINGS IN ACCORDANCE WITH SUBSECTION 105.03. BORING LOGS ARE PROVIDED IN THE PLANS FOR THE CONTRACTORS USE IN DESIGNING THE FOUNDATION. FOUNDATIONS WILL BE CONSIDERED INCIDENTAL TO ITEM 678.15 TRAFFIC SIGNAL.

G. GENERAL

1. A UNIFORMED TRAFFIC OFFICER WITH A BLUE LIGHT SHALL BE PRESENT DURING ALL LANE CLOSURES.
2. THE CONTRACTOR SHALL ACQUIRE ALL THE NECESSARY PERMITS AND MAKE ALL NECESSARY ARRANGEMENTS WITH THE UTILITY COMPANY TO PROVIDE A PERMANENT POWER SUPPLY TO THE TRAFFIC SIGNAL EQUIPMENT, IF APPLICABLE. THE ROUTING OF POWER TO THE INTERSECTION SHALL BE SUCH THAT THE STATE HAS FULL RESPONSIBILITY FROM THE TRANSFORMER THROUGH THE SIGNAL SYSTEM. NO INTERVENING OWNERSHIP/RESPONSIBILITY SHALL BE ALLOWED.
3. ALL ELECTRICAL WIRING SHALL BE DONE BY A LICENSED ELECTRICIAN AND OVERSEEN BY A MASTER ELECTRICIAN.

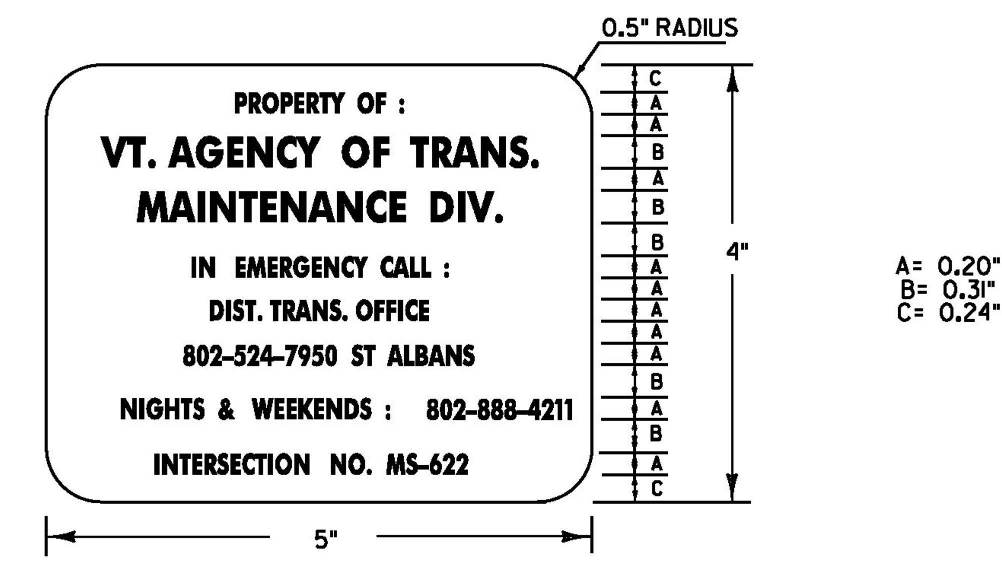
STREET LIGHTING GENERAL NOTES

1. BRACKET ARMS SHALL BE SINGLE MEMBER TYPE AND SHALL BE DESIGNED IN ACCORDANCE WITH THE 2013 AASHTO STANDARD SPECIFICATION FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES, AND TRAFFIC SIGNALS AND ITS LATEST REVISIONS.
2. STREET LIGHT ASSEMBLIES SHALL BE PAINTED FLAT BLACK AND HAVE FLAT BLACK HOUSINGS. FINISHES SHALL BE PER SECTION 679 OF THE LATEST SPECIFICATIONS FOR CONSTRUCTION.
3. LUMINAIRES SHALL BE ONE OF THE FOLLOWING OR APPROVED EQUAL:
   A. BETA LEDWAY IP-SERIES
   B. HOLOPHANE LEDEGENDS SERIES
   C. LRL LED SAT-96M SERIES.

   ALL LUMINAIRES SUPPLIED SHALL BE OF THE SAME TYPE AND FROM THE SAME MANUFACTURER.

   ALL LUMINAIRES SHALL BE EQUIPPED WITH BIRD SPIKES.
4. LIGHTING LEVELS MEASURED AT THE ROADWAY SURFACE SHALL HAVE AN AVERAGE MAINTAINED ILLUMINANCE OF 1.3 FOOT-CANDLES.
5. WIRING AND GROUNDING
   A. CIRCUIT CONDUCTORS SHALL BE CLEARLY IDENTIFIED BY CORROSION RESISTANCE TAGS INDICATING THE CIRCUIT NUMBER AND PANEL SOURCE AT EVERY LIGHT POLE AND HANDHOLE.
   B. ALL CONDUIT MUST INCLUDE A GROUNDING CONDUCTOR. RIGID STEEL CONDUIT SHALL BE PROPERLY CONNECTED AT ALL JOINTS SO AS TO BE WATERTIGHT AND MAINTAIN ELECTRICAL CONTINUITY AND HAVE GROUNDING BUSHINGS SO AS TO ACT AS A GROUNDING CONDUCTOR.
   C. THE GROUNDING CONDUCTORS SHALL BE CONTINUOUS.
   D. ALUMINUM WIRE SHALL NOT BE USED FOR GROUND WIRE.
6. ALL STREET LIGHTING WORK SHALL CONFORM TO STANDARD T-134

CONTROLLER IDENTIFICATION PLAQUE



LEGEND: - BLACK (NON-REFL.) - STAMPED PRIOR TO PAINTING
BACKGROUND: NATURAL ALUMINUM OR BRASS SURFACE

NOTES:

1. THE PLAQUE SHALL BE MOUNTED ON ALL TRAFFIC SIGNAL CONTROLLER CABINETS. IT SHALL BE FASTENED TO THE CONTROLLER CABINET IN SUCH A MANNER AS TO BE NOT EASILY REMOVED, SUCH AS WELDED, RIVETED OR BOLTED WITH VANDAL PROOF BOLTS.
2. THE LETTERS SHALL BE PUNCHED OR STAMPED, SUCH STAMPING SHALL PENETRATE AT LEAST THE BASE MATERIAL THICKNESS.
3. THE BASE MATERIAL FOR THE PLAQUE SHALL BE BRASS OR ALUMINUM WITH A MINIMUM THICKNESS OF 0.1 INCH

TRAFFIC SIGNAL GENERAL NOTES

1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE STATE OF VERMONT AGENCY OF TRANSPORTATION'S (VTrans) "STANDARD SPECIFICATIONS FOR CONSTRUCTION", DATED 2011, WITH LATEST REVISIONS.

2. OVERHEAD SIGN/SIGNAL SUPPORTS SHALL CONFORM TO AASHTO'S "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS", DATED 2013 AND IT'S LATEST REVISIONS.

3. THE DESIGN CALCULATIONS SHALL TAKE INTO ACCOUNT THE FOLLOWING CRITERIA:

   STRUCTURAL CRITERIA
   - DESIGN LIFE: 50 YEARS
   - WIND LOAD: 90 M.P.H., UNLESS SPECIAL SITE CONDITIONS DICTATE ICE LOAD PER AASHTO'S PUBLICATION ENTITLED "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS" DATED 2013 AND IT'S LATEST REVISIONS.

   FATIGUE CRITERIA
   - FATIGUE CATEGORY: I FOR MAST ARM SIGN STRUCTURES, 2 FOR SIGNAL MAST ARMS
   - VORTEX SHEDDING: INCLUDE
   - NATURAL WIND GUSTS: INCLUDE
   - TRUCK INDUCED WIND GUSTS: INCLUDE FOR ROADWAYS WHERE SPEED LIMIT IS 40 M.P.H. OR GREATER
   - GALLOPING: DO NOT INCLUDE IN DESIGN CALCULATIONS

   FOUNDATION CRITERIA
   - CONCRETE: CONCRETE, CLASS B, VTrans' "STANDARD SPECIFICATIONS FOR CONSTRUCTION", DATED 2011, SECTION 541.
   - REINFORCING STEEL: VTrans' "STANDARD SPECIFICATIONS FOR CONSTRUCTION", DATED 2011, SUBSECTION 713.01.
     ALLOWABLE BEARING CAPACITY: SEE GEOTECH REPORT IN CONTRACT DOCUMENTS
   - INTERNAL SOIL FRICTION ANGLE: SEE GEOTECH REPORT IN CONTRACT DOCUMENTS

4. ANCHOR BOLTS

   A) FOUR GALVANIZED ANCHOR BOLTS WITH TWO HEXAGON NUTS, ONE WASHER AND ONE LOCK WASHER PER BOLT SHALL BE FURNISHED WITH EACH POLE. ANCHOR BOLT PLATES, WHEN USED, SHALL ALSO BE GALVANIZED. SEE SUBSECTION 714.09. AFTER INSTALLATION, A MINIMUM OF TWO THREADS ON THE BOLT SHOULD BE EXPOSED ABOVE THE NUT.

   B) ALL BOLTS SHALL BE CHECKED ON THE NUT SIDE AFTER INSTALLATION FOR CONSISTENCY OF PATTERN. ANY STICKOUTS GREATER THAN THE OTHER BOLTS SHALL BE DISCARDED AND REINSTALLED PROPERLY. THE END OF THE PROPERLY INSTALLED BOLT SHALL BE AT LEAST FLUSH WITH THE NUT OR STICK OUT NOT MORE THAN THREE THREADS.

5. FLANGE BOLTS

   ALL FLANGE BOLTS AND HEX NUTS SHALL BE HIGH STRENGTH STEEL AND SHALL CONFORM TO ASTM A325. THE FLANGE BOLTS SHALL BE CAPABLE OF RESISTING 133% OF THE FULL DESIGN STRESS OF THE TUBE AT ITS YIELD STRENGTH STRESS.

6. HORIZONTAL AND VERTICAL MEMBERS

   STEEL TUBES SHALL BE FORMED AND WELDED WITH ONE CONTINUOUS LONGITUDINAL WELD ONLY. AFTER FORMING AND WELDING THEY SHALL BE COLD ROLLED TO ENSURE UNIFORMITY OF SIZE AND SMOOTHNESS OF WELD. THEY SHALL HAVE A MINIMUM YIELD STRENGTH OF 55 KSI. THERE SHALL BE NO TRANSVERSE WELDING EXCEPT AT THE FLANGE CONNECTIONS AND POLE BASE PLATES, WHERE THE TUBES SHALL TELESCOPE THE FLANGES AND PLATES AND BE CONTINUOUSLY WELDED BOTH SIDES INSIDE AND OUT TO WITHSTAND THE FULL TRANSFER OF THE BENDING STRENGTH TO THE BOLTS. OPTIONALLY, THE MEMBERS MAY BE A SERIES OF TWO OR THREE DIFFERENT DIAMETER PIPES WELDED TOGETHER. STEEL TUBES SHALL BE CONSTRUCTED FROM MATERIALS CONFORMING TO SUBSECTION 752.02.

7. GALVANIZING

   ALL STEEL COMPONENTS, EXCEPT CONCRETE REINFORCING, ARE TO BE HOT DIPPED GALVANIZED AFTER FABRICATION. THE ASSEMBLIES SHALL BE DESIGNED AND FABRICATED TO PERMIT GALVANIZING ON ALL INTERIOR AND EXTERIOR SURFACES AND SHALL BE FREE OF POCKETS AND OTHER STRUCTURAL OBSTRUCTIONS THAT WILL NOT PERMIT PROPER DEPOSITION OF ZINC COATING. GALVANIZING SHALL BE IN ACCORDANCE WITH SUBSECTION 752.02.

8. WELDING

   A) ALL WELDING SHALL BE PERFORMED PER SUBSECTION 506.10.

   B) ALL WELDS SHALL BE AT LEAST AS STRONG AS THE MATERIAL(S) BEING WELDED.

9. FOUNDATIONS

   A) FOUNDATIONS SHALL BE DESIGNED IN ACCORDANCE WITH WITH VTrans' MATERIALS & RESEARCH ENGINEERING INSTRUCTIONS GEOTECHNICAL DESIGN PROCEDURES FOR MAST ARM AND OVERHEAD SIGN SUPPORT FOUNDATIONS (MREI10-01), DATED MARCH 9, 2010, A COPY OF WHICH CAN BE FOUND ON THE AGENCY'S WEBSITE:

   WWW.OUTSIDE.VERMONT.GOV/AGENCY/VTRANS/EXTERNAL/DOCS/CONSTRUCTION/03GEOTECHENG/ENGINEERING/MAST%20ARM%20AND%20OVERHEAD%20SIGN%20SUPPORT%20FOUNDATIONS%20MREI%2010-01%20ENGINEERING.PDF

   THE CONTRACTOR SHALL BE RESPONSIBLE FOR FOUNDATION DESIGN. IN ADDITION TO FABRICATION DRAWINGS, DESIGN CRITERIA, AND DESIGN CALCULATIONS SHALL BE SUBMITTED AS WORKING DRAWINGS IN ACCORDANCE WITH SUBSECTION 105.03. BORING LOGS ARE PROVIDED IN THE PLANS FOR THE CONTRACTORS USE IN DESIGNING THE FOUNDATION. FOUNDATIONS WILL BE CONSIDERED INCIDENTAL TO ITEM 678.15 TRAFFIC SIGNAL.

   B) FOUNDATIONS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE FOLLOWING NOTES:

   1. MINIMUM EMBEDMENT DEPTH OF FIVE FEET SHALL BE USED FOR ALL SPREAD FOOTING FOUNDATIONS; MEASURED FROM THE GROUND SURFACE ELEVATION TO THE BOTTOM OF THE FOOTING ELEVATION.

   2. EXCEPT FOR THE UPPERMOST TWO FEET OF SOIL, DRILLED SHAFT FOUNDATIONS SHALL BE POURED AGAINST UNDISTURBED MATERIAL; THE TOP TWO FEET OF SOIL SHALL BE NEGLECTED FOR DESIGN PURPOSES. A DISPOSABLE CIRCULAR CONCRETE FORM, IF USED, SHALL NOT BE PLACED DEEPER THAN TWO FEET, IN ORDER NOT TO REDUCE THE FRICTION BETWEEN THE SOIL AND THE CONCRETE.

   3. AS AN ALTERNATIVE TO THE DRILLED HOLES, FOOTINGS MAY BE POURED IN EXCAVATED HOLES USING THE PROPER FORMS, WHICH MUST BE REMOVED. THE EXCAVATED HOLES SHALL BE AT LEAST TWO FEET CLEAR OF THE FOUNDATION SIDES AND ONE FOOT DEEPER THAN THE FOUNDATION. CARE SHALL BE TAKEN TO AVOID EXCAVATING AROUND THE TOP OF THE FOUNDATION. THE BACKFILL MATERIAL SHALL BE COMPACTED AS DESCRIBED IN SUBSECTION 204.08. DESIGN LIMITS AS FOR AUGURED FOOTINGS APPLIES.

   4. ANY BACKFILL PLACED ADJACENT TO THE FOOTING SHALL BE GRANULAR MATERIAL MEETING THE REQUIREMENTS FOR GRANULAR BACKFILL FOR STRUCTURES, SUBSECTION 704.08. IT SHALL BE COMPACTED AS DESCRIBED IN SUBSECTION 204.08.

   5. CONCRETE FOR THE FOUNDATION SHALL CONFORM TO THE REQUIREMENTS OF CONCRETE, SECTION 541 STRUCTURAL CONCRETE. IF DRILLED SHAFT FOUNDATIONS ARE REQUIRED, THE CONCRETE SPECIFICATIONS MAY NEED TO BE ADJUSTED FOR CONSTRUCTABILITY ISSUES. HOWEVER, IF REQUIRED, THE CONTRACTOR SHALL SUBMIT ANY CHANGES TO THE CONCRETE SPECIFICATION FOR REVIEW BY THE VTrans PROJECT MANAGER.

   6. STEEL PILES SHALL MEET THE REQUIREMENTS OF SECTION 505.

   7. WHEN THE DESIGN DEPTH OF A FOUNDATION CANNOT BE OBTAINED DUE TO UNFORESEEN FIELD CONDITIONS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER FOR THE MANUFACTURER TO OBTAIN A REVISED FOUNDATION DESIGN. SUCH A REVISION SHALL BE SUBMITTED TO VTrans PROJECT MANAGEMENT AND MAY REQUIRE UP TO A FOUR WEEK REVIEW PERIOD BY VTrans.

   C) SIGNALS/SIGNS SHALL BE INSTALLED AND LEVELED AND POLES SHALL BE PLUMB PRIOR TO PLACING GROUT UNDER POLE BASE. GROUT MATERIAL SHALL BE NON-SHRINKING MORTAR CONFORMING TO SUBSECTION 707.03, MORTAR TYPE IV.

10. EACH OVERHEAD TRAFFIC SIGNAL/SIGN SUPPORT SHALL BE GROUNDED. THE GROUND SHALL CONSIST OF THE FOLLOWING:

   A) AN INTERNAL GROUND LUG OPPOSITE THE HAND HOLE

   B) A #6 (MIN.) SOFT DRAWN COPPER GROUNDING ELECTRODE CONDUCTOR

   C) A 5/8" X 8' (MIN.) COPPER CLAD GROUNDING ELECTRODE THE RESISTANCE TO GROUND SHALL BE 25 OHMS OR LESS. ADDITIONAL GROUNDING ELECTRODES MAY BE REQUIRED (MINIMUM SPACING SHALL BE 6'). WHEN A POWER SERVICE, METER AND DISCONNECT ARE ATTACHED TO A POLE, THERE SHALL BE A CONTINUOUS GROUND WIRE FROM THE METER AND DISCONNECT WITH ANY RUN INTERNAL TO THE UPRIGHT, THROUGH THE 1/2" FLEXIBLE TUBING IN THE CONCRETE BASE TO THE REQUIRED GROUNDING ELECTRODE(S). THE GROUND WIRE FROM THE POLE GROUNDING LUG, CONTROLLER CABINET AND/OR LUMINAIRE MAY ATTACH TO THIS CONTINUOUS GROUNDING ELECTRODE CONDUCTOR FROM THE SERVICE METER AND DISCONNECT. THE CONTRACTOR SHALL PERFORM A RESISTANCE TO GROUND TEST ON THE CONTINUOUS GROUNDING ELECTRODE CONDUCTOR FROM THE SERVICE METER AND DISCONNECT AND PROVIDE A WRITTEN STATEMENT TO THE AREA ELECTRICAL INSPECTOR THAT THE GROUNDING ELECTRODE CONDUCTOR IS CONTINUOUS FROM THE SERVICE METER AND DISCONNECT AND THE RESISTANCE TO GROUND IS 25 OHMS OR LESS.

11. HORIZONTAL MEMBERS SHALL BE CAMBERED AND THE VERTICAL POLES BACK RAKED, WHERE APPLICABLE, TO THE ANTICIPATED DEAD LOAD DEFLECTION PLUS THE CAMBER, IF ANY, SPECIFIED ON THE PLANS.

12. AN EQUIVALENT ALTERNATE DESIGN MAY BE SUBSTITUED FOR THE DETAILS AND MATERIALS SHOWN.

13. THE DETAILS OF DESIGN FOR THE STRUCTURE AND FOUNDATION ARE TO BE SUPPLIED BY THE CONTRACTOR AND/OR BY THE MANUFACTURER. THE STRUCTURE SHALL BE DESIGNED TO RESIST THE MAXIMUM LOADING AS OUTLINED IN THE AASHTO STANDARD SPECIFICATIONS, SEE NOTE 2. ALL DESIGN CALCULATIONS FOR THE STRUCTURE AND THE FOUNDATION SHALL BE CHECKED AND STAMPED BY A LICENSED PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF VERMONT PRIOR TO SUBMITTAL OF THE FABRICATION DRAWINGS TO VTrans.

14. THE CONTRACTOR SHALL SUBMIT ONE DIGITAL VERSION OF THE DESIGN CALCULATIONS TO VTrans PROJECT MANAGER SHOWING THE FOLLOWING INFORMATION FOR EACH OF THE VERTICAL AND HORIZONTAL COMPONENTS OF THE STRUCTURE AND FOUNDATION:

   A) THE DESIGN AXIAL AND SHEAR FORCES AND BENDING AND TORSIONAL MOMENTS ACTING AT THE TOP OF THE FOUNDATION.

   B) THE DESIGN AXIAL, BENDING AND SHEAR STRESSES AND THE COMBINED STRESS RATIO.

   C) VIBRATION AND FATIGUE CALCULATIONS AS SET FORTH IN SECTION 11 OF THE AASHTO PUBLICATION REFERENCED IN NOTE 2.

   D) THE ALLOWABLE AXIAL, BENDING, AND SHEAR STRESSES.

   E) ITEMS A, B, AND D SHALL BE SHOWN FOR EACH OF THE GROUP LOADINGS (I, II, III) AND FOR THE BASIC WIND LOAD APPLIED TO THE TWO CASES OUTLINED IN THE AASHTO STANDARD SPECIFICATIONS (SEE NOTE 2), SECTION 1.2.5(D)(4).

   F) FAILURE TO SUPPLY THE PROPER DESIGN INFORMATION SHALL BE CAUSE FOR REJECTION OF THE STRUCTURE.

   G) A MINIMUM OF FOUR WEEKS SHALL BE REQUIRED FOR REVIEW BY VTrans.

   H) EVERY MEMBER AND CONNECTION IN AN OVERHEAD TRAFFIC SIGNAL SUPPORT SHALL BE DESIGNED TO PROVIDE ADDITIONAL RESIDUAL CAPACITY FOR FUTURE MODIFICATION EQUIVALENT TO A 5-SECTION TRAFFIC SIGNAL HEAD WITH A 5-INCH LOUVERED BACKPLATE LOCATED ON THE OUTERMOST EXTENT OF THE MAST ARM.

15. FABRICATION DRAWINGS IN A DIGITAL FORMAT SHALL BE SUBMITTED TO VTrans PROJECT MANAGER FOR APPROVAL PRIOR TO FABRICATION. THE FABRICATION DRAWINGS SHALL INCLUDE THE FOLLOWING INFORMATION:

   A) DETAILED DRAWING OF EACH COMPONENT OF THE STRUCTURE.

   B) MATERIAL SPECIFICATION FOR EACH COMPONENT OF THE STRUCTURE, EITHER BY COMPLETE SPECIFICATION OR REFERENCE TO APPLICABLE ASTM STANDARDS.

   C) NOTATION OF PROJECT NAME, PROJECT NUMBER, ROUTE NUMBER, AND STRUCTURE STATIONING TO BE INCLUDED ON EACH SHEET.

   D) DETAILS FOR LOCATION OF SIGNS/SIGNALS AND ATTACHMENT HARDWARE FOR THE SUPPORT STRUCTURE.

   E) ALL ELEVATIONS AND DIMENSIONS NECESSARY TO PROVIDE A COMPLETE SET OF RECORD PLANS.

   F) DEAD LOAD DEFLECTION AND CAMBER INFORMATION.

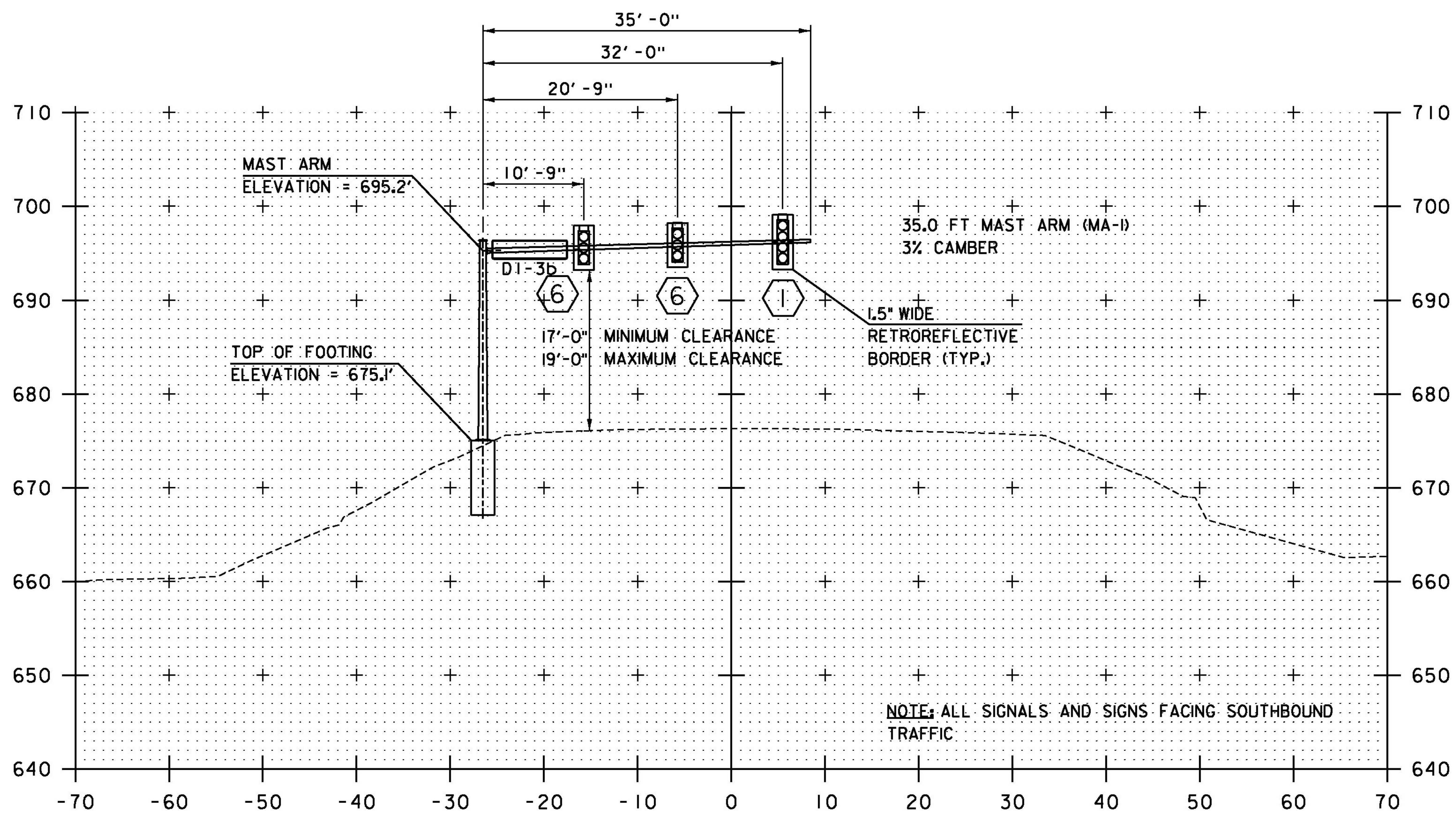
   G) WELDING DETAILS AND PROCEDURES ARE REQUIRED FOR ALL WELDS. PROCEDURES SHALL BE SUBMITTED FOR APPROVAL WITH REFERENCE TO EACH WELD IDENTIFIED ON THE FABRICATION DRAWINGS. SEE SUBSECTION 506.10.

16. THE TRAFFIC SIGNALS SHALL BE MOUNTED TO THE ARM OR POLE USING A FIXED MOUNT SYSTEM, UNLESS OTHERWISE NOTED ON THE CROSS SECTION SHEET. FOR SIGNALS MOUNTED ON A MAST ARM, THE MAST ARM AND MOUNTING POINT SHALL BE IN THE MIDDLE OF THE SIGNAL HEAD.

17. BASE PLATES SHALL BE STAMPED WITH THE VERTICAL POLE DIAMETER, HEIGHT, YIELD STRENGTH, GAUGE AND THE HORIZONTAL MEMBER DIAMETER, LENGTH, YIELD STRENGTH, GAUGE. ALTERNATELY, THE INFORMATION MAY BE STAMPED ON A METAL TAG RIVETED TO THE POLE NEAR THE HAND HOLE.

18. SEE STANDARD E-171A FOR ADDITIONAL NOTES.

19. CONTRACTOR TO SCHEDULE FINAL INSPECTION AND OBTAIN WRITTEN APPROVAL OF WORK FROM VTRANS TRAFFIC SIGNAL TECHNICIAN.



17+84.4

NOTES:

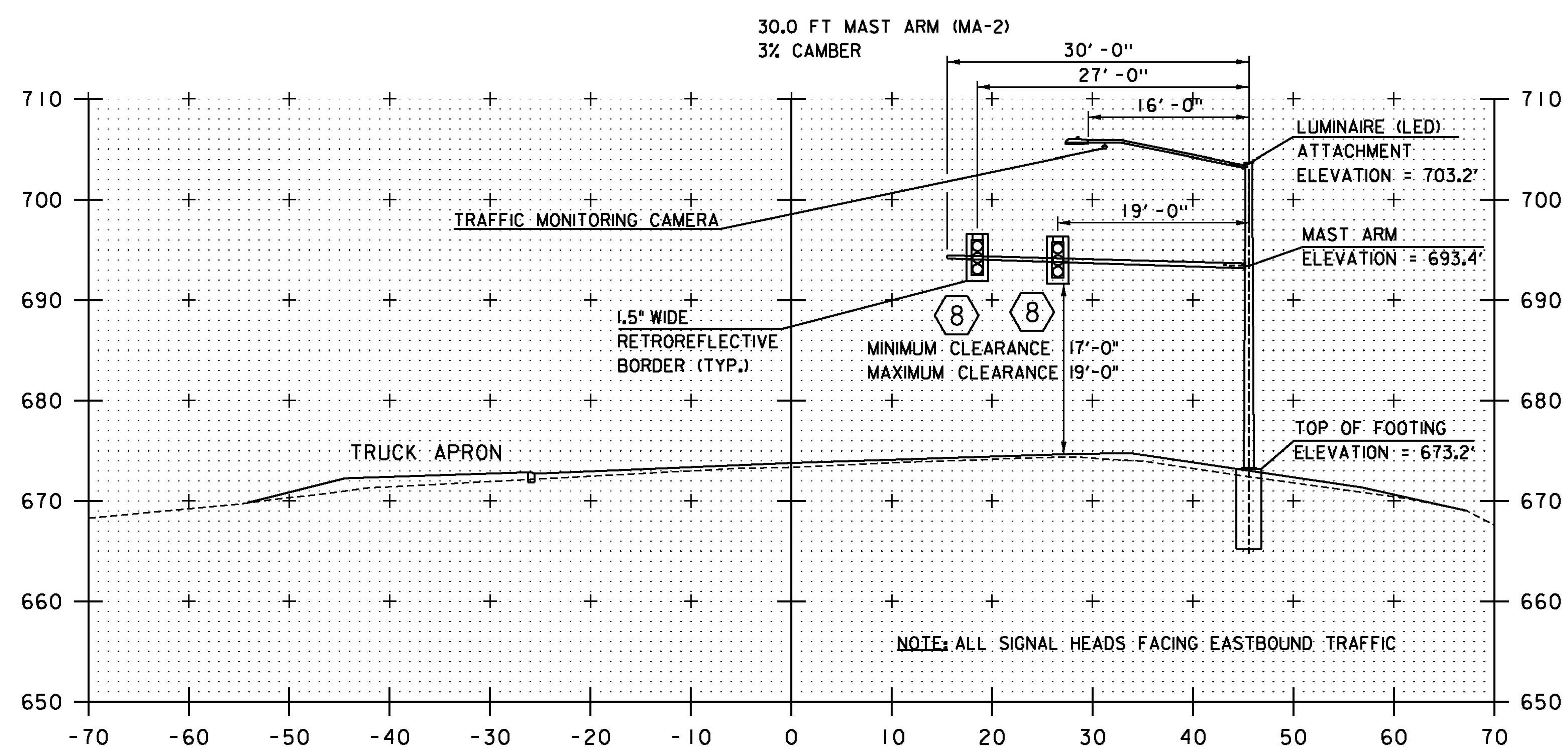
1.) SEE THE TRAFFIC SIGN SUMMARY SHEET AND SIGN DETAIL SHEET FOR INFORMATION ON D1-3b SIGN.

2.) VEHICLE STOP BAR DETECTION SYSTEM AND ADVANCED VEHICLE DETECTION SYSTEM SHALL BE INSTALLED ON MAST ARM PER MANUFACTURER'S RECOMMENDATIONS AND FIELD VERIFIED BY ENGINEER.

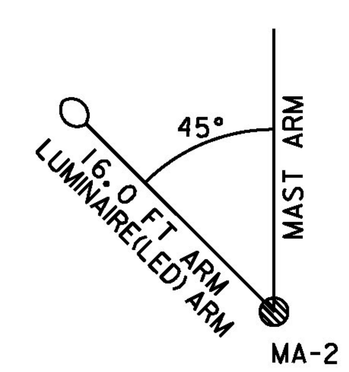
SCALE IN FEET

McFarland Johnson

PROJECT NAME: MORRISTOWN	
PROJECT NUMBER: STPG SGNL(47)	
FILE NAME: z15t047100alt.dgn	PLOT DATE: 5/13/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: R. LUCHINI
DESIGNED BY: R. LUCHINI	CHECKED BY: B. COLBURN
MAST ARM CROSS SECTION 1	SHEET 47 OF 58



1+52.4 SKEWED



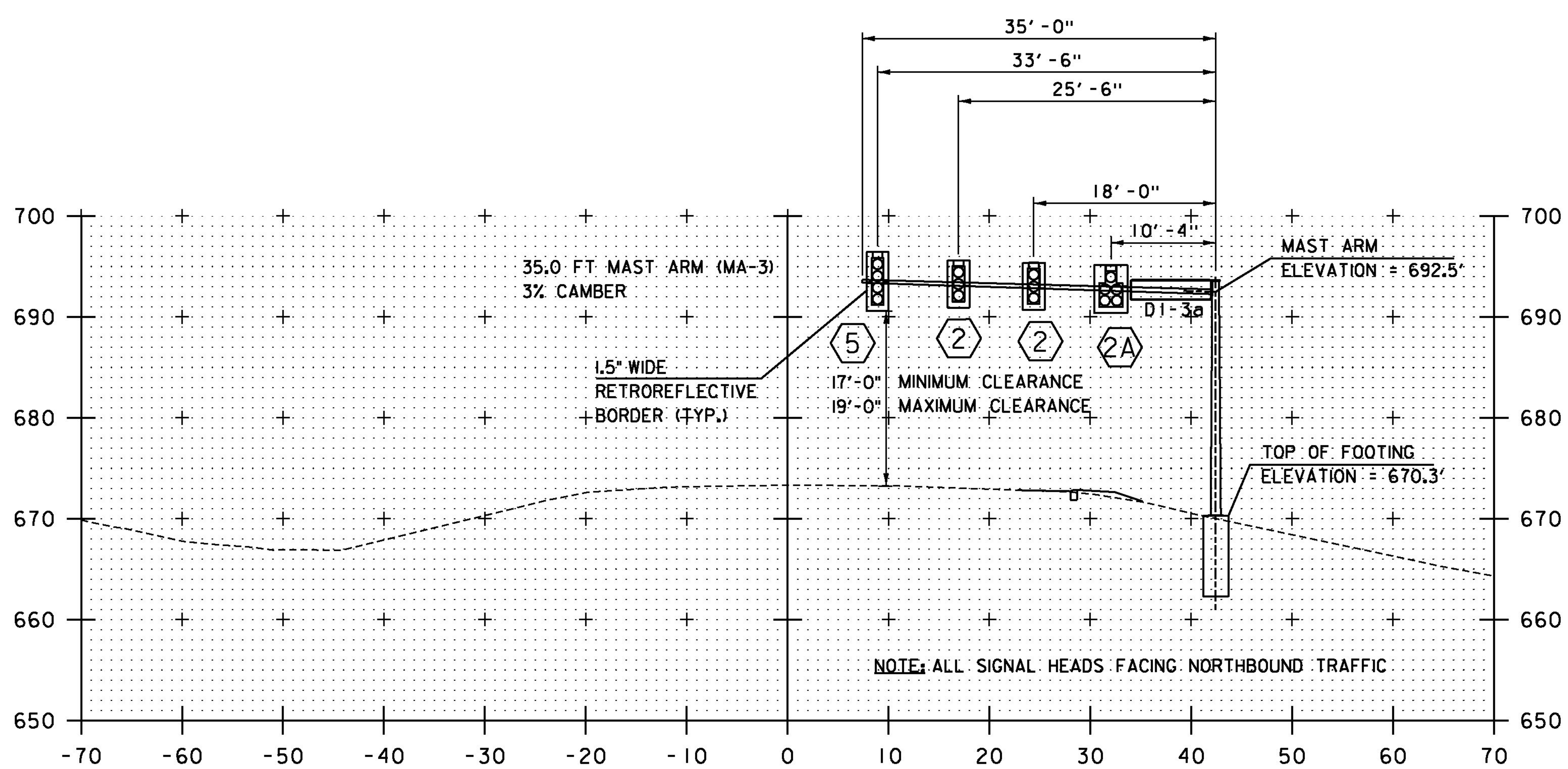
NOTES:

1.) VEHICLE STOP BAR DETECTION SYSTEM SHALL BE INSTALLED ON MAST ARM PER MANUFACTURER'S RECOMMENDATIONS AND FIELD VERIFIED BY ENGINEER.

SCALE IN FEET

McFarland Johnson

PROJECT NAME: MORRISTOWN	
PROJECT NUMBER: STPG SGNL(47)	
FILE NAME: z15+047100alt.dgn	PLOT DATE: 5/13/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: R. LUCHINI
DESIGNED BY: R. LUCHINI	CHECKED BY: B. COLBURN
MAST ARM CROSS SECTION 2	SHEET 48 OF 58



19+30

NOTES:

1.) SEE THE TRAFFIC SIGN SUMMARY SHEET AND SIGN DETAIL SHEET FOR INFORMATION ON D1-3a SIGN.

2.) VEHICLE STOP BAR DETECTION SYSTEM AND ADVANCED VEHICLE DETECTION SHALL BE INSTALLED ON MAST ARM PER MANUFACTURER'S RECOMMENDATIONS AND FIELD VERIFIED BY ENGINEER.

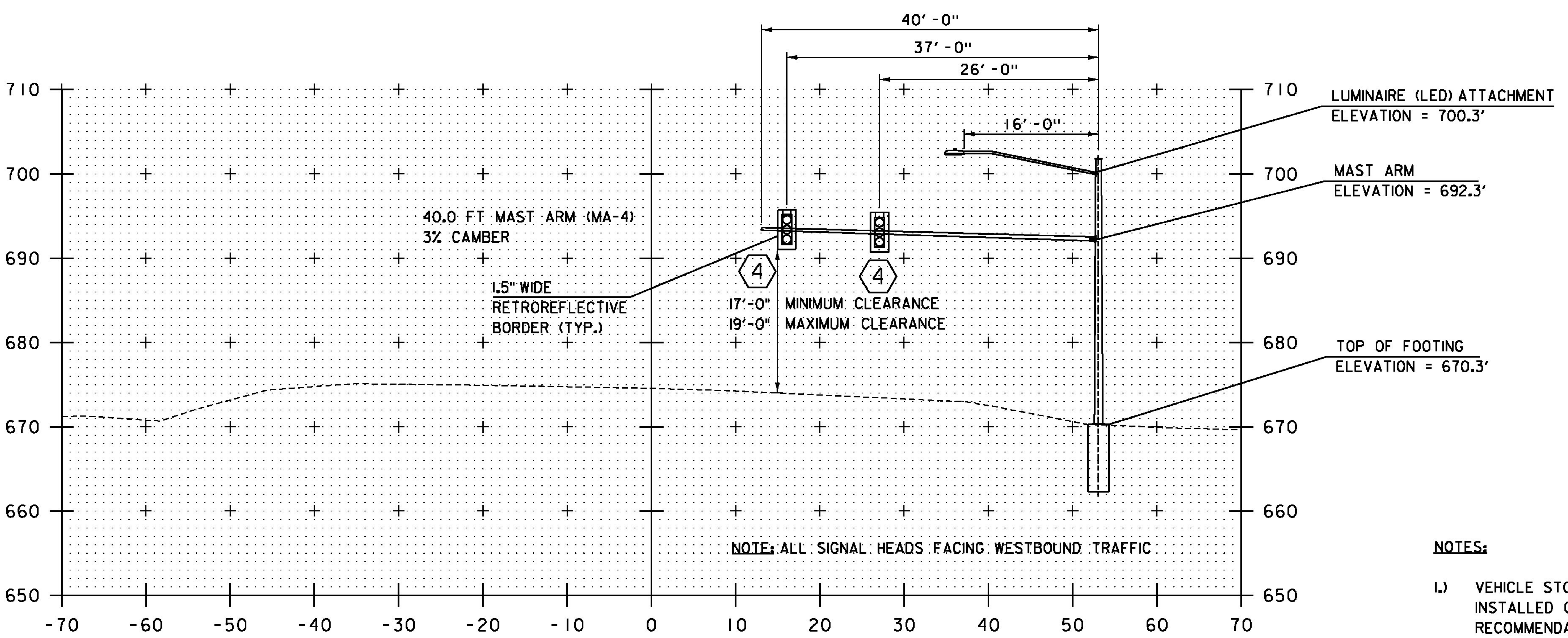
SCALE IN FEET

McFarland Johnson

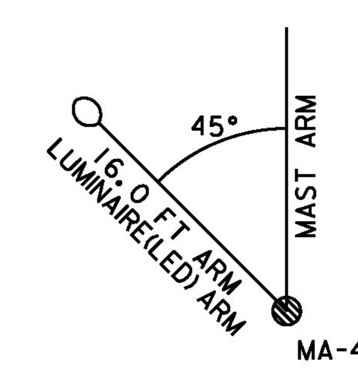
PROJECT NAME: MORRISTOWN
PROJECT NUMBER: STPG SGNL(47)

FILE NAME: z15+047xs_100alt.dgn
PROJECT LEADER: J. SANTACRUCE
DESIGNED BY: R. LUCHINI
MAST ARM CROSS SECTION 3

PLOT DATE: 5/13/2016
DRAWN BY: R. LUCHINI
CHECKED BY: B. COLBURN
SHEET 49 OF 58



100+33.9 SKEWED
PARALLEL TO MAST ARM
AT STA 101+71.3 RT 49.9



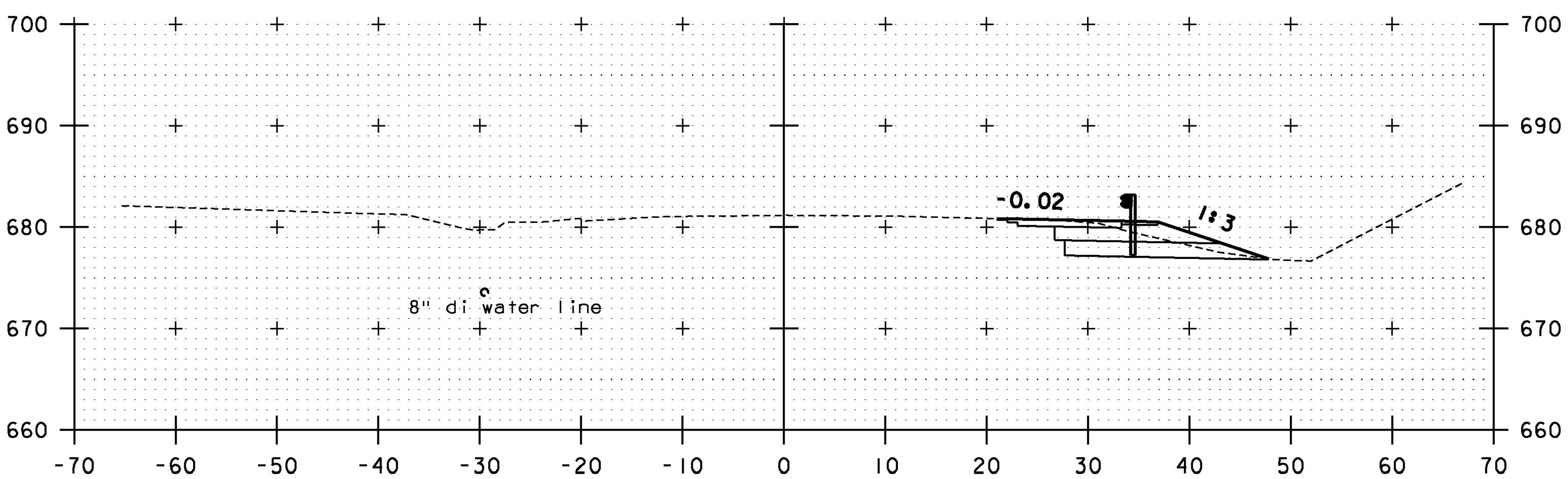
NOTES:

1.) VEHICLE STOP BAR DETECTION SYSTEM SHALL BE INSTALLED ON MAST ARM PER MANUFACTURER'S RECOMMENDATIONS AND FIELD VERIFIED BY ENGINEER.

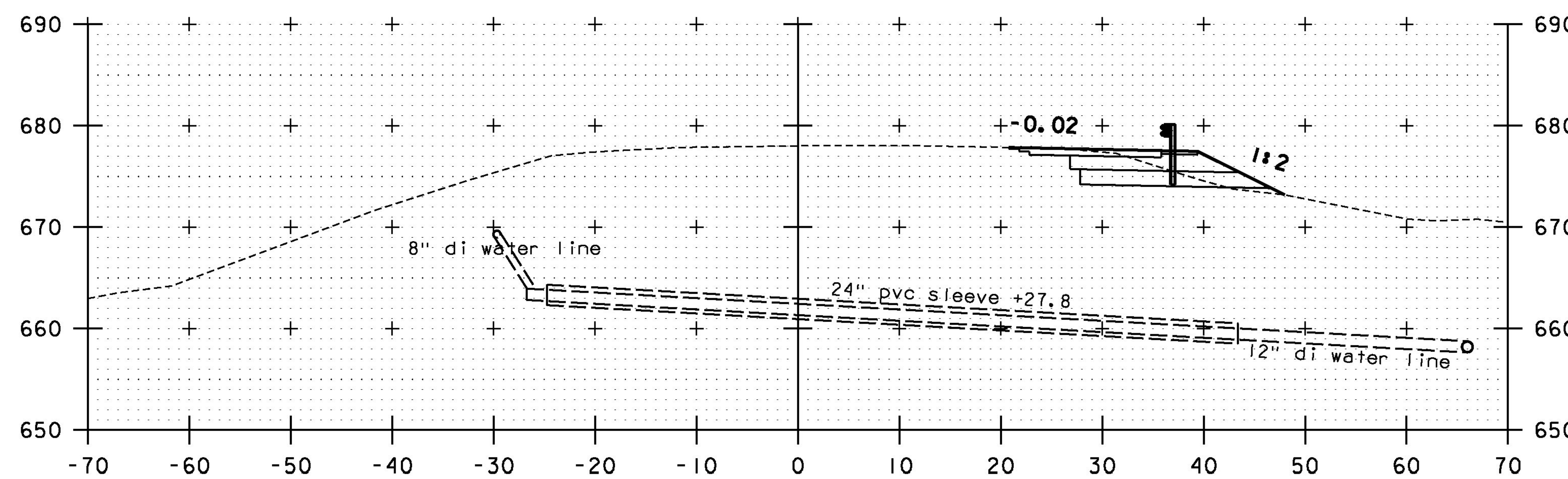
SCALE IN FEET

McFarland Johnson

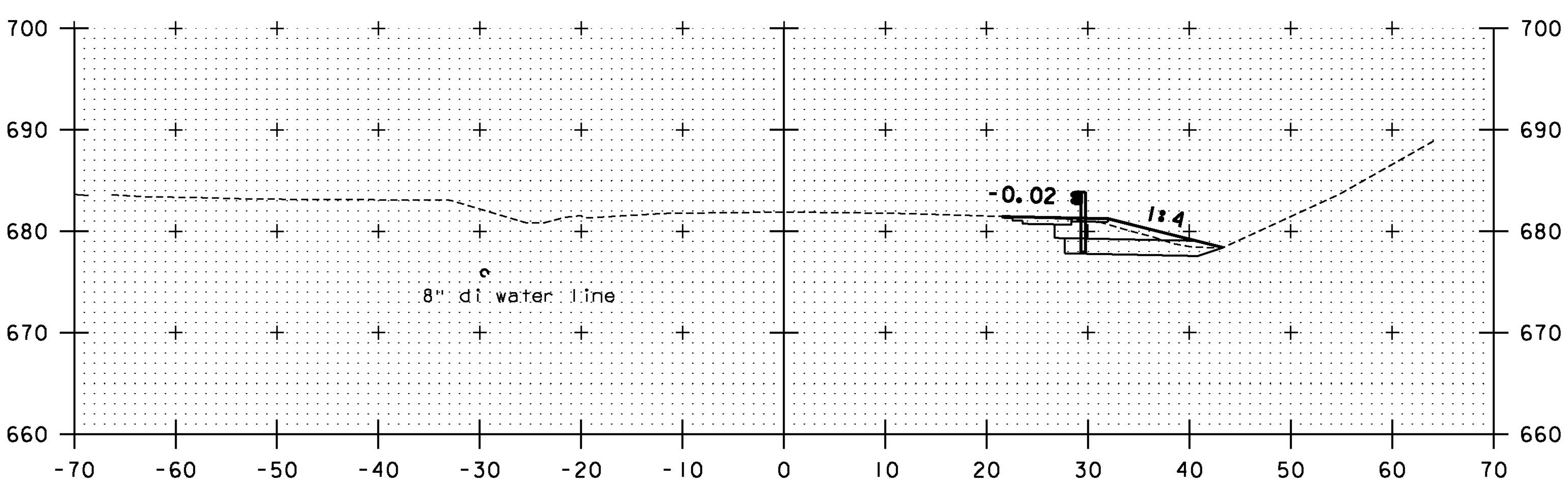
PROJECT NAME: MORRISTOWN	
PROJECT NUMBER: STPG SGNL(47)	
FILE NAME: z15t047100alt.dgn	PLOT DATE: 5/13/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: R. LUCHINI
DESIGNED BY: R. LUCHINI	CHECKED BY: B. COLBURN
MAST ARM CROSS SECTION 4	SHEET 50 OF 58



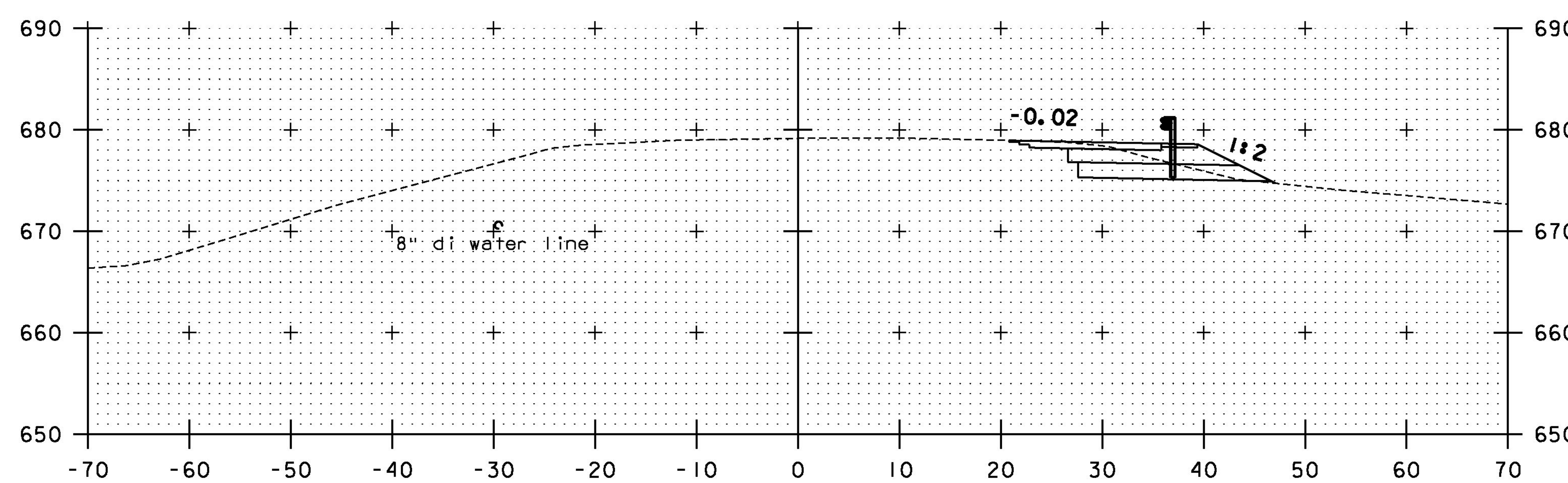
15+50



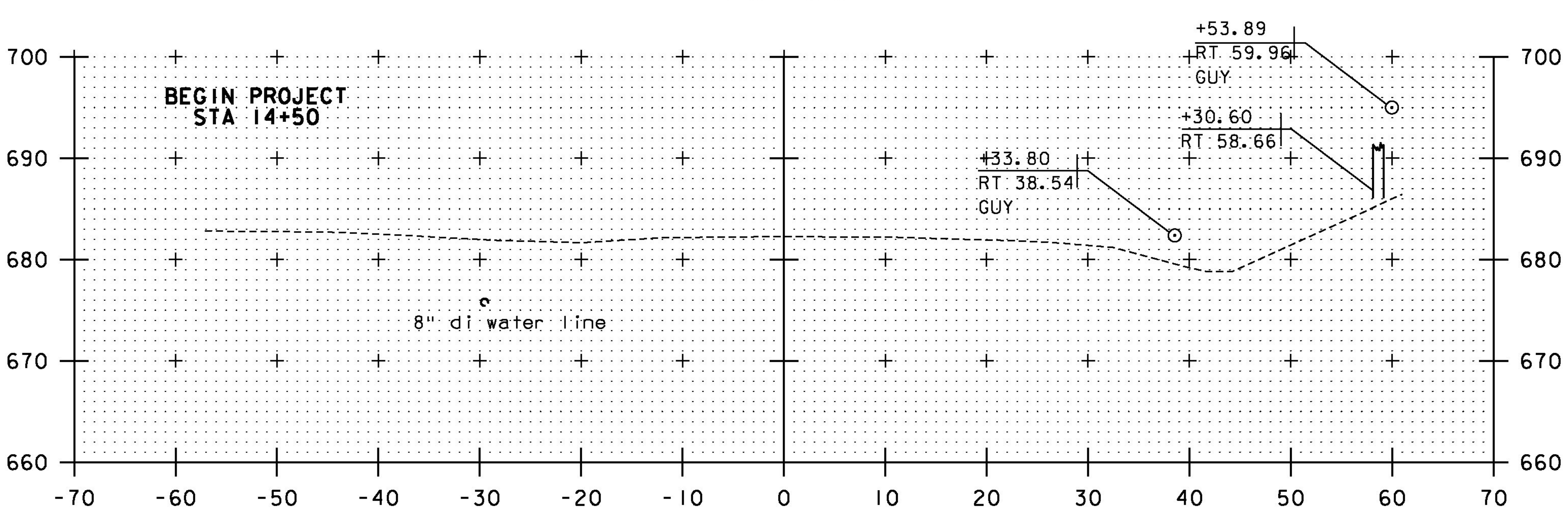
17+00



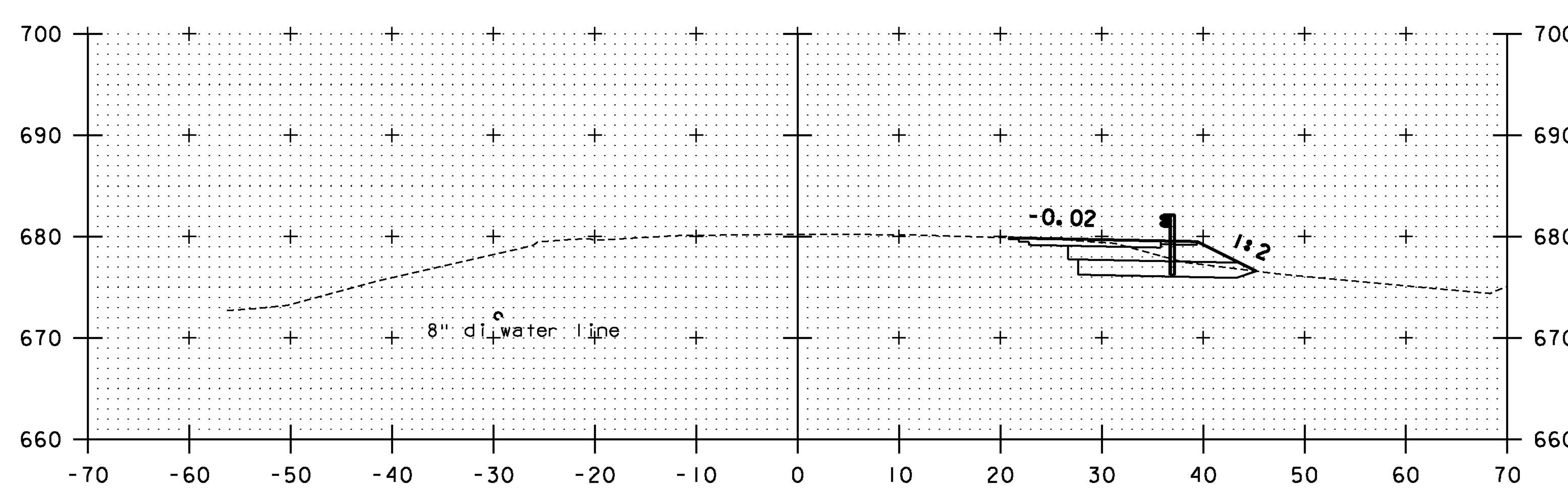
15+00



16+50



14+50

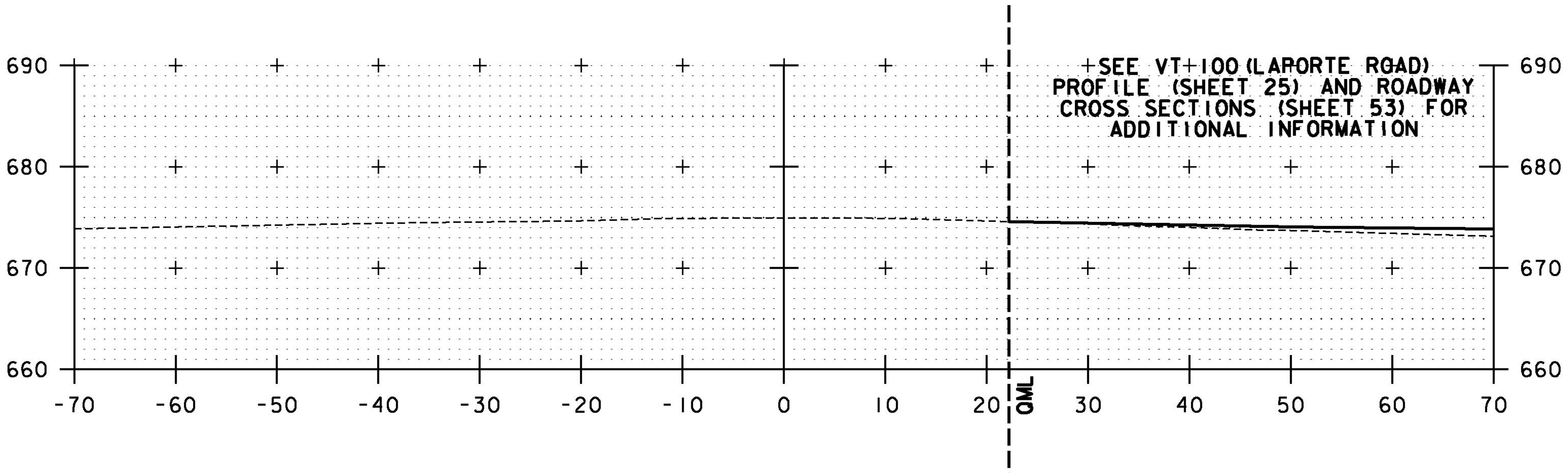


16+00

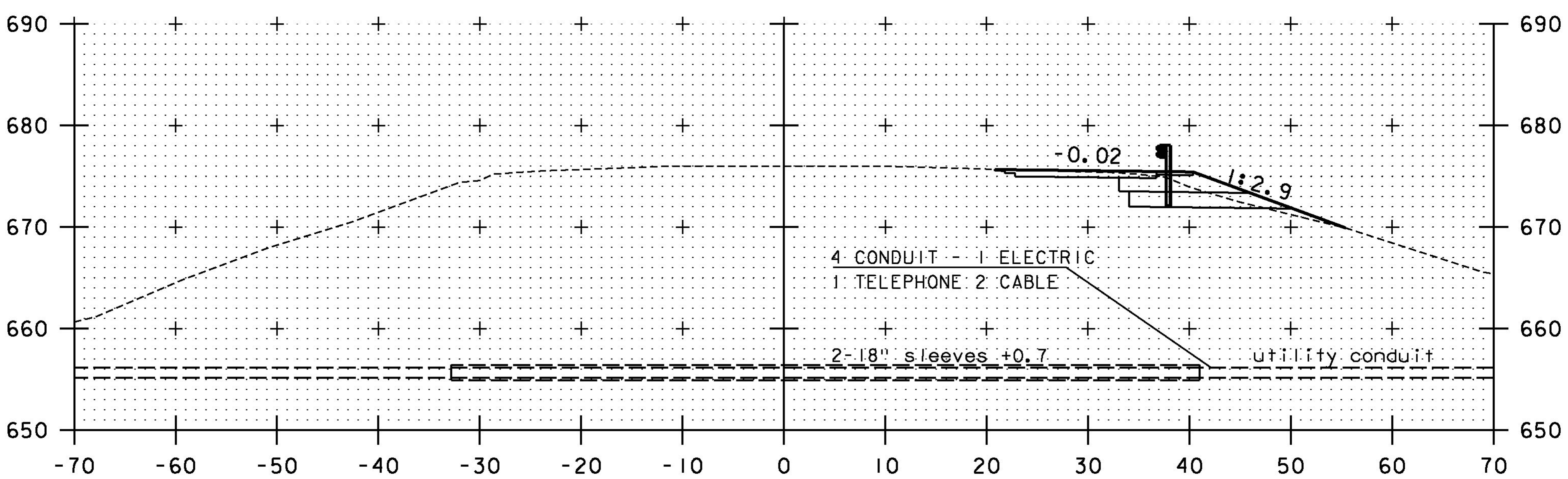
SCALE IN FEET

McFarland Johnson

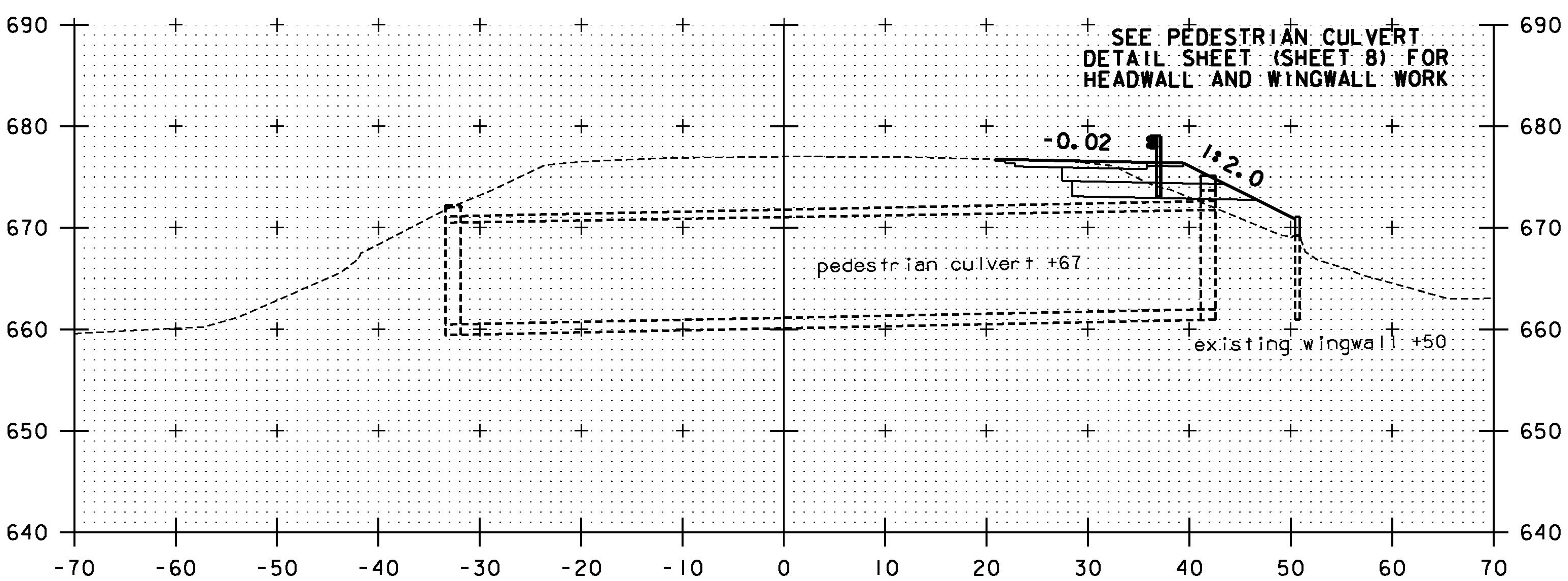
PROJECT NAME: MORRISTOWN	
PROJECT NUMBER: STPG SGNL(47)	
FILE NAME: z15+047xs_100alt.dgn	PLOT DATE: 5/13/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: R. LUCHINI
DESIGNED BY: R. LUCHINI	CHECKED BY: B. COLBURN
CROSS SECTION - VT 100	SHEET 51 OF 58



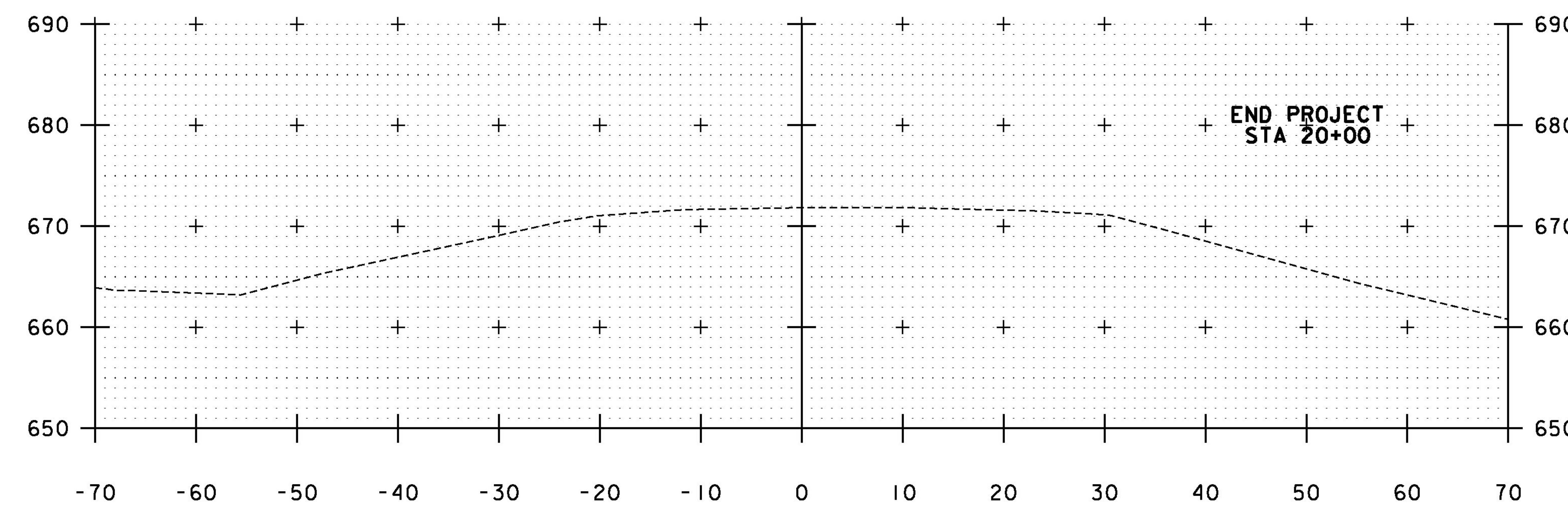
18+50



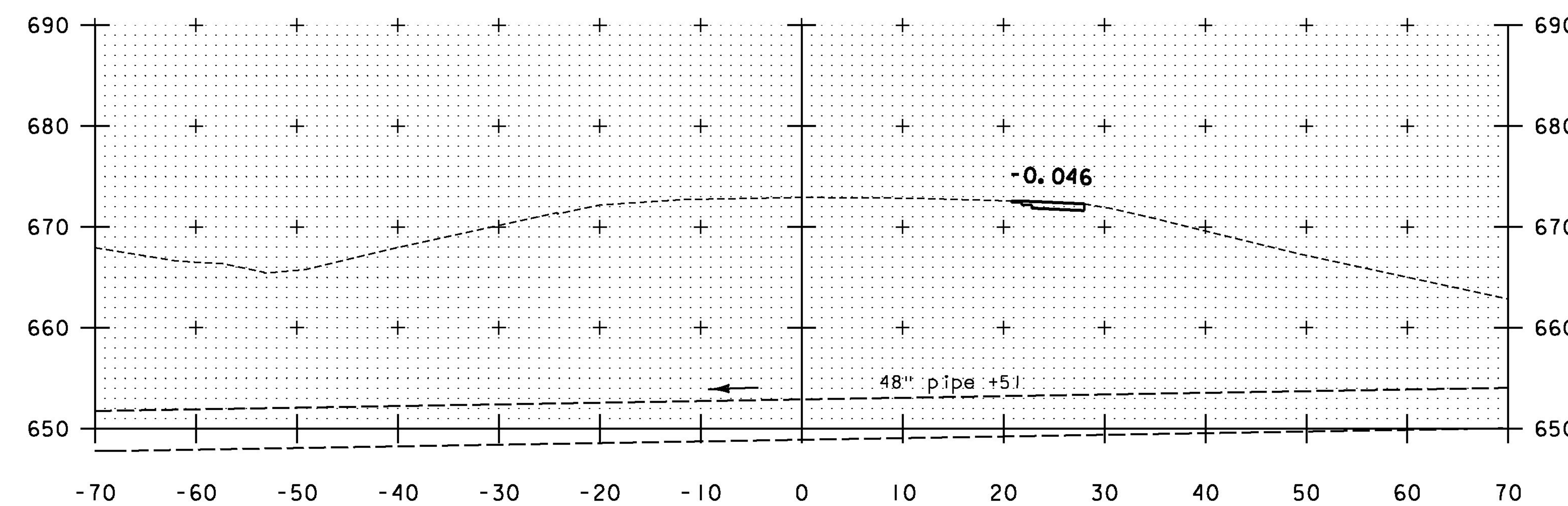
18+00



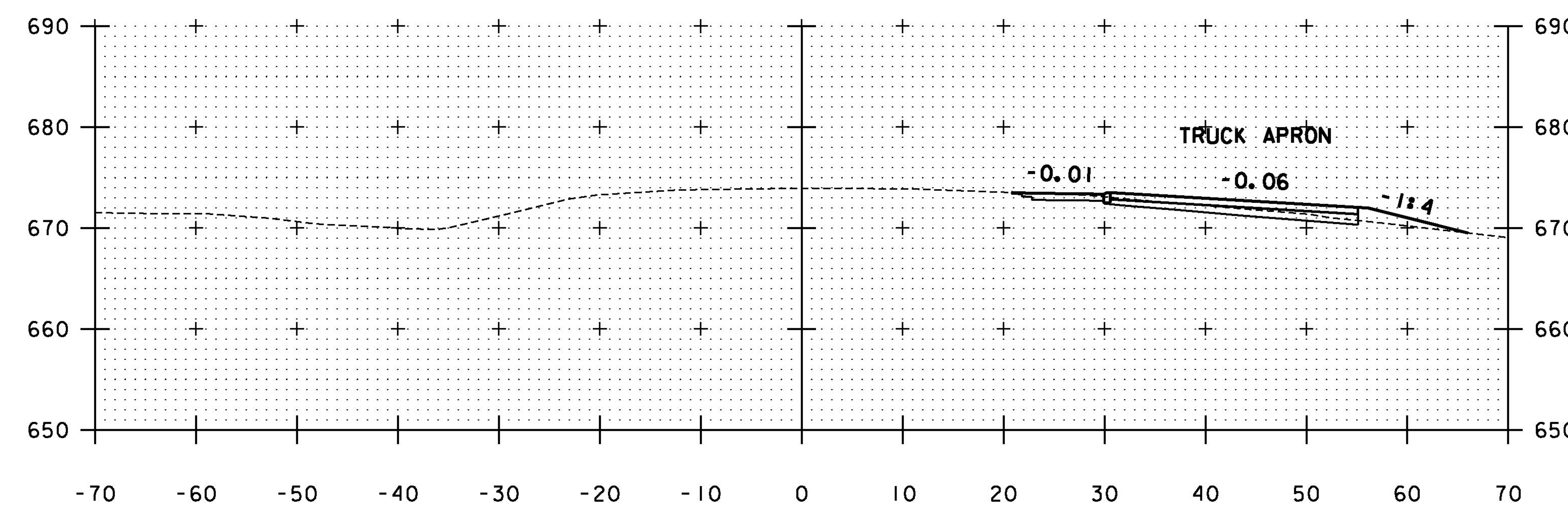
17+50



20+00



19+50

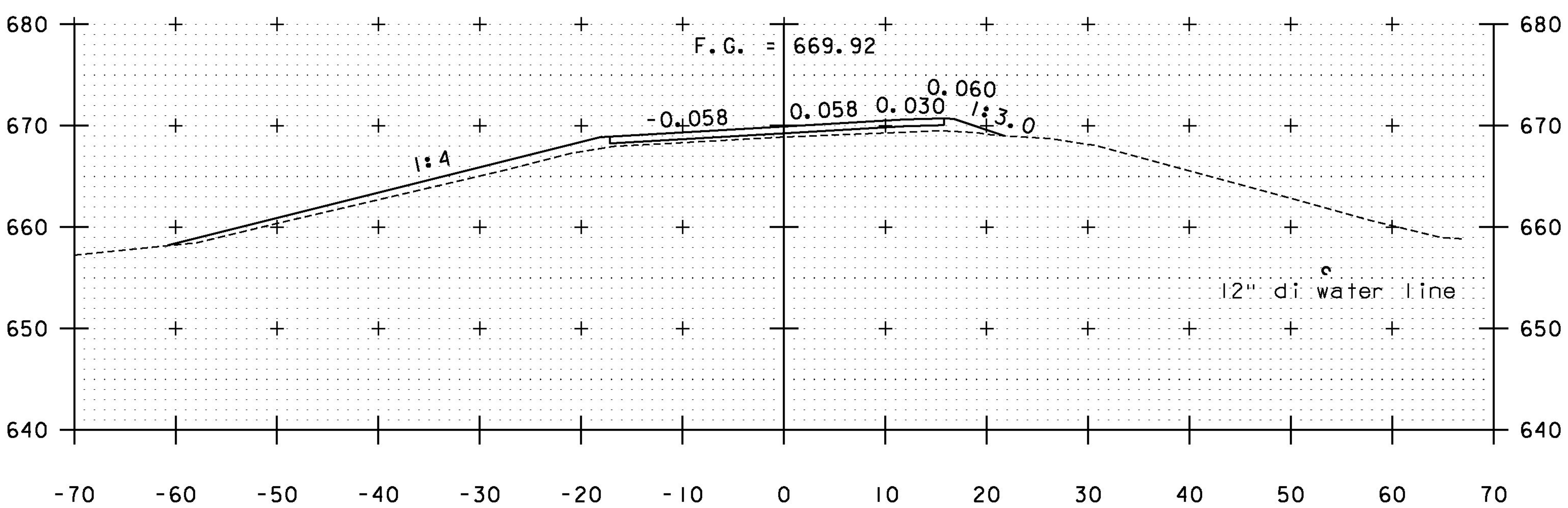


19+00

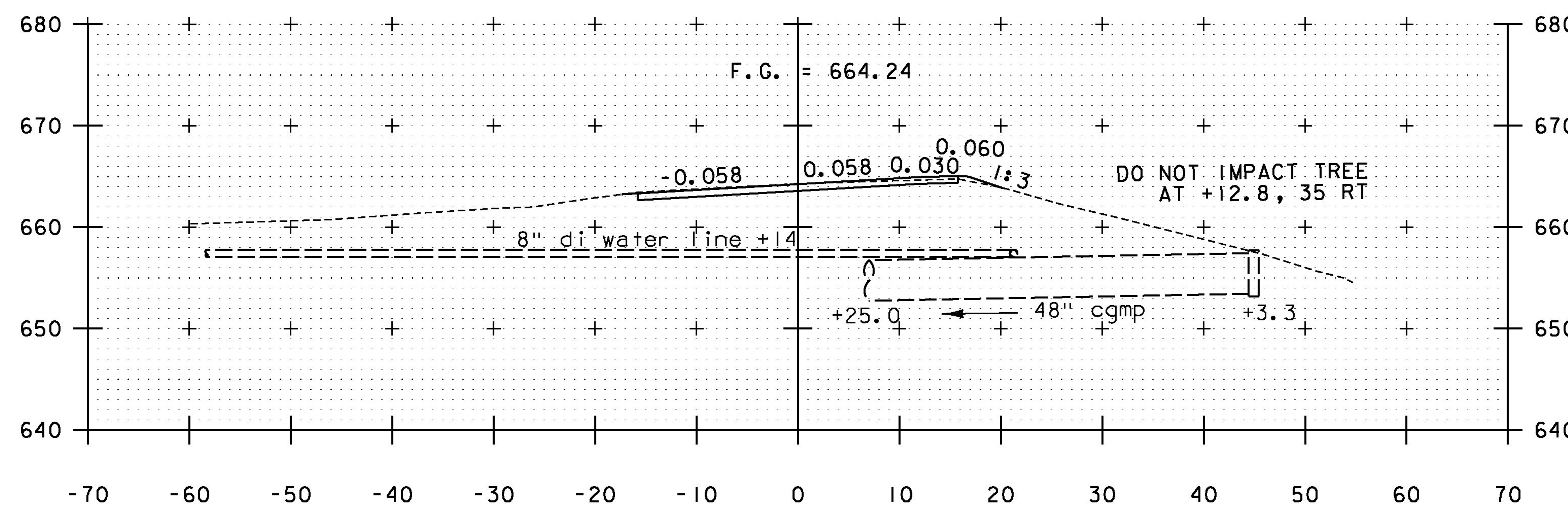
SCALE IN FEET

McFarland Johnson

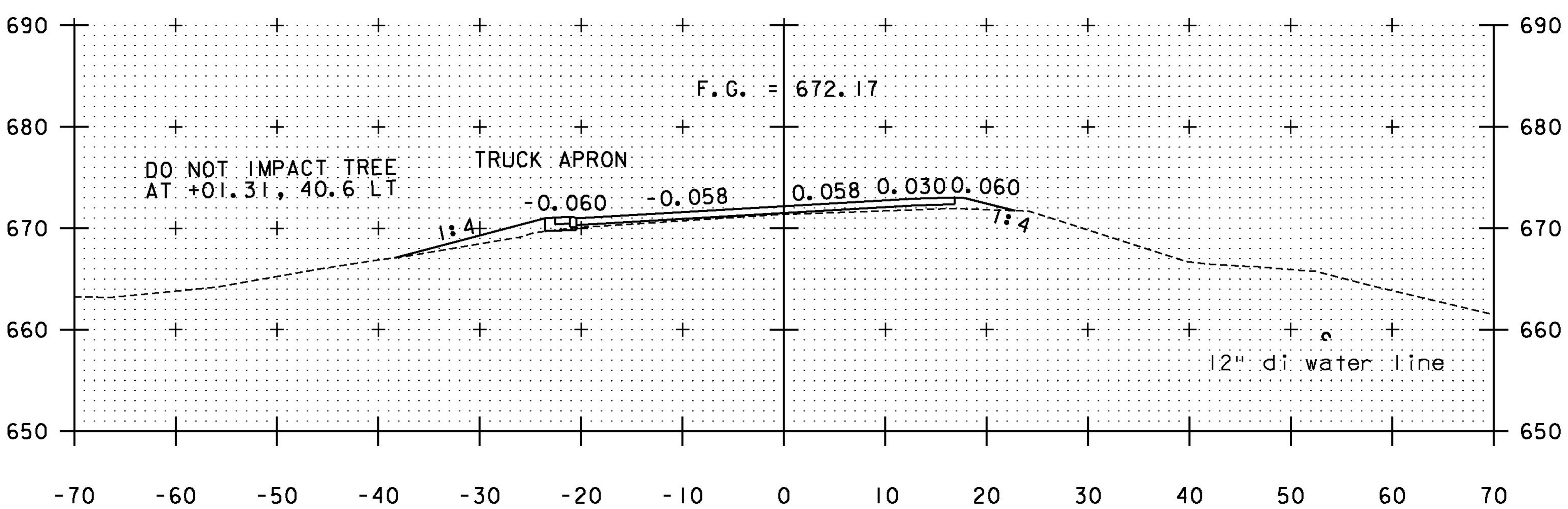
PROJECT NAME: MORRISTOWN	
PROJECT NUMBER: STPG SGNL(47)	
FILE NAME: z15t047xs_100alt.dgn	PLOT DATE: 5/13/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: R. LUCHINI
DESIGNED BY: R. LUCHININ	CHECKED BY: B. COLBURN
CROSS SECTION - VT 100	SHEET 52 OF 58



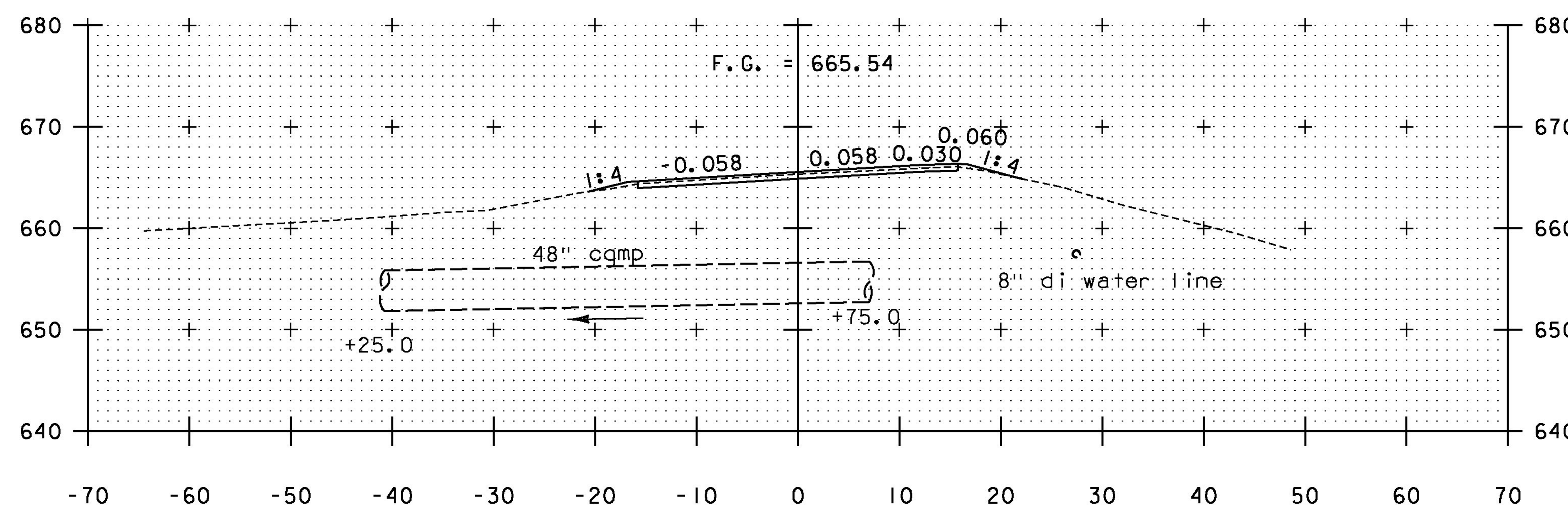
2+50



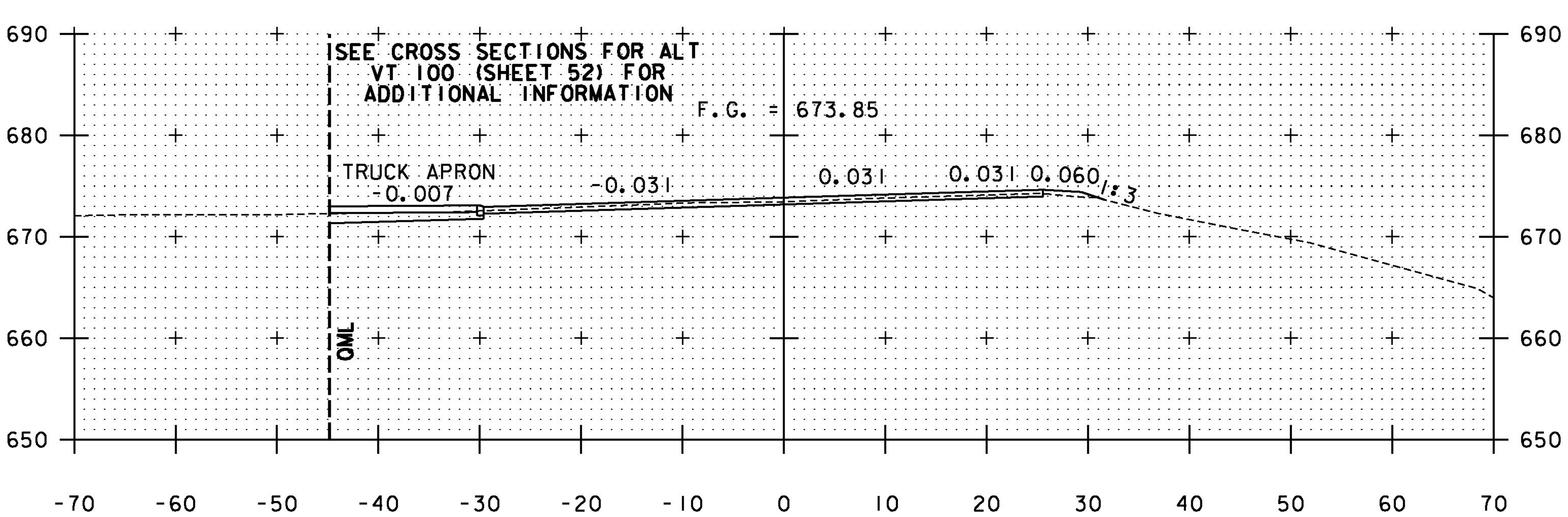
4+00



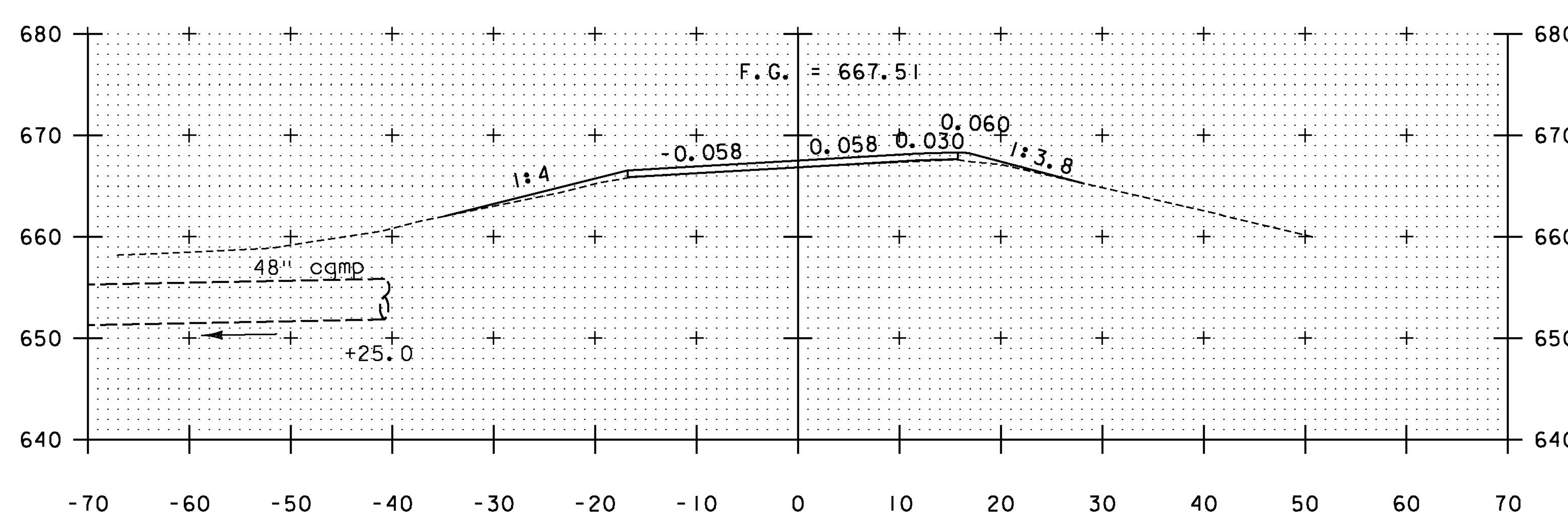
2+00



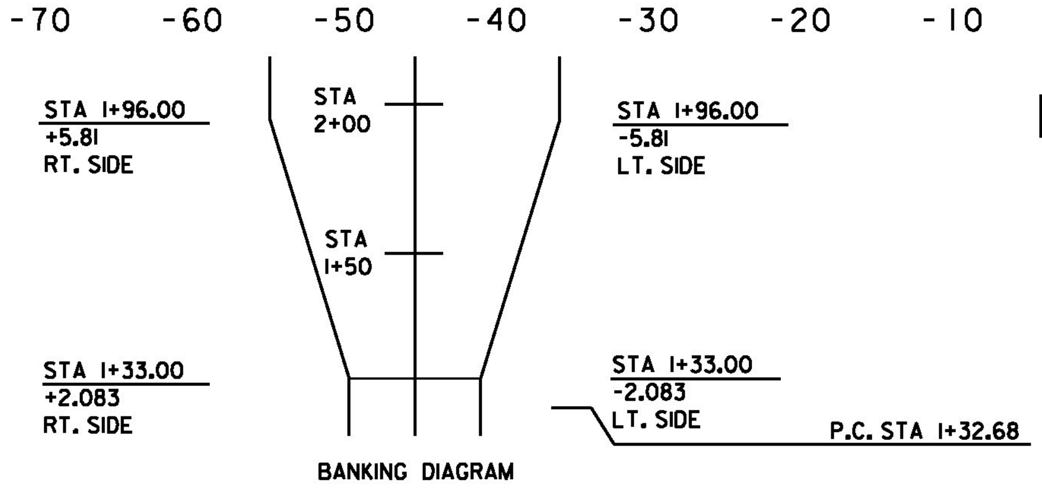
3+50



1+50



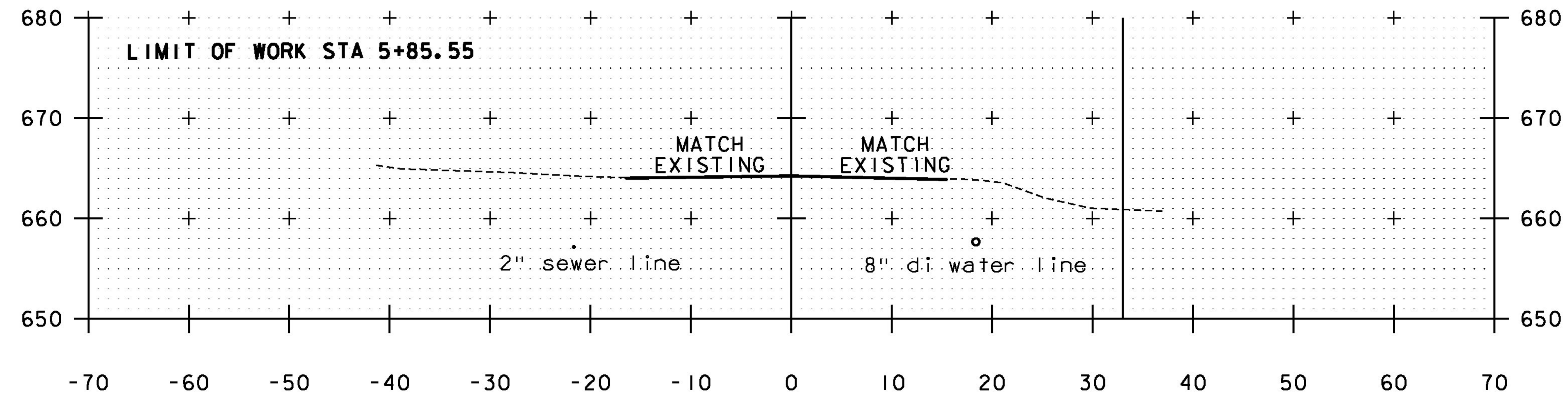
3+00



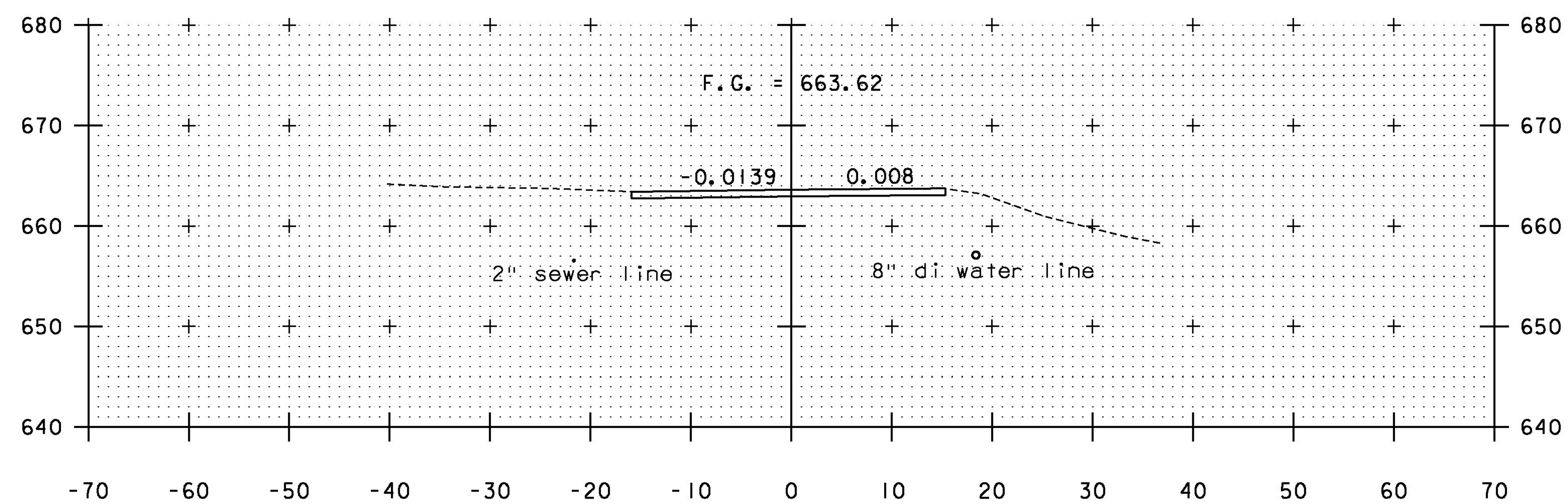
SCALE IN FEET

McFarland Johnson

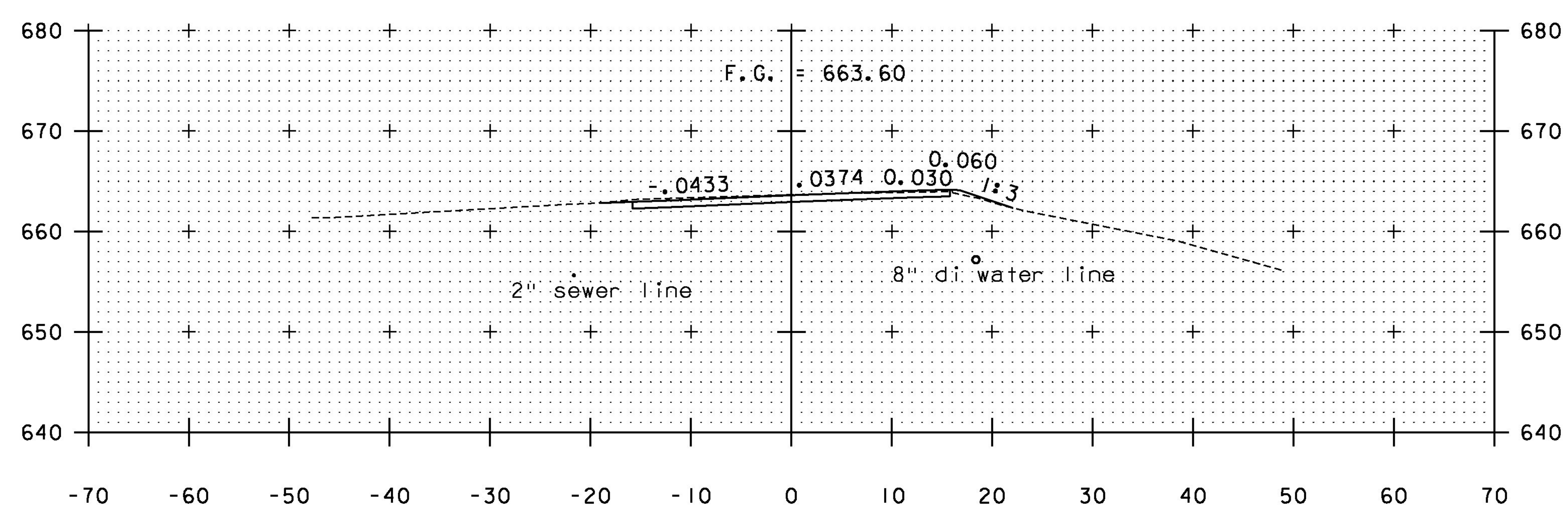
PROJECT NAME: MORRISTOWN	
PROJECT NUMBER: STPG SGNL(47)	
FILE NAME: z15t047xs_hst100.dgn	**PLOT DATE:** 5/13/2016
PROJECT LEADER: J. SANTACRUCE	**DRAWN BY:** R. LUCHINI
DESIGNED BY: R. LUCHINI	**CHECKED BY:** B. COLBURN
CROSS SECTION - VT 100 (LAPORTE ROAD)	**SHEET** 53 **OF** 58



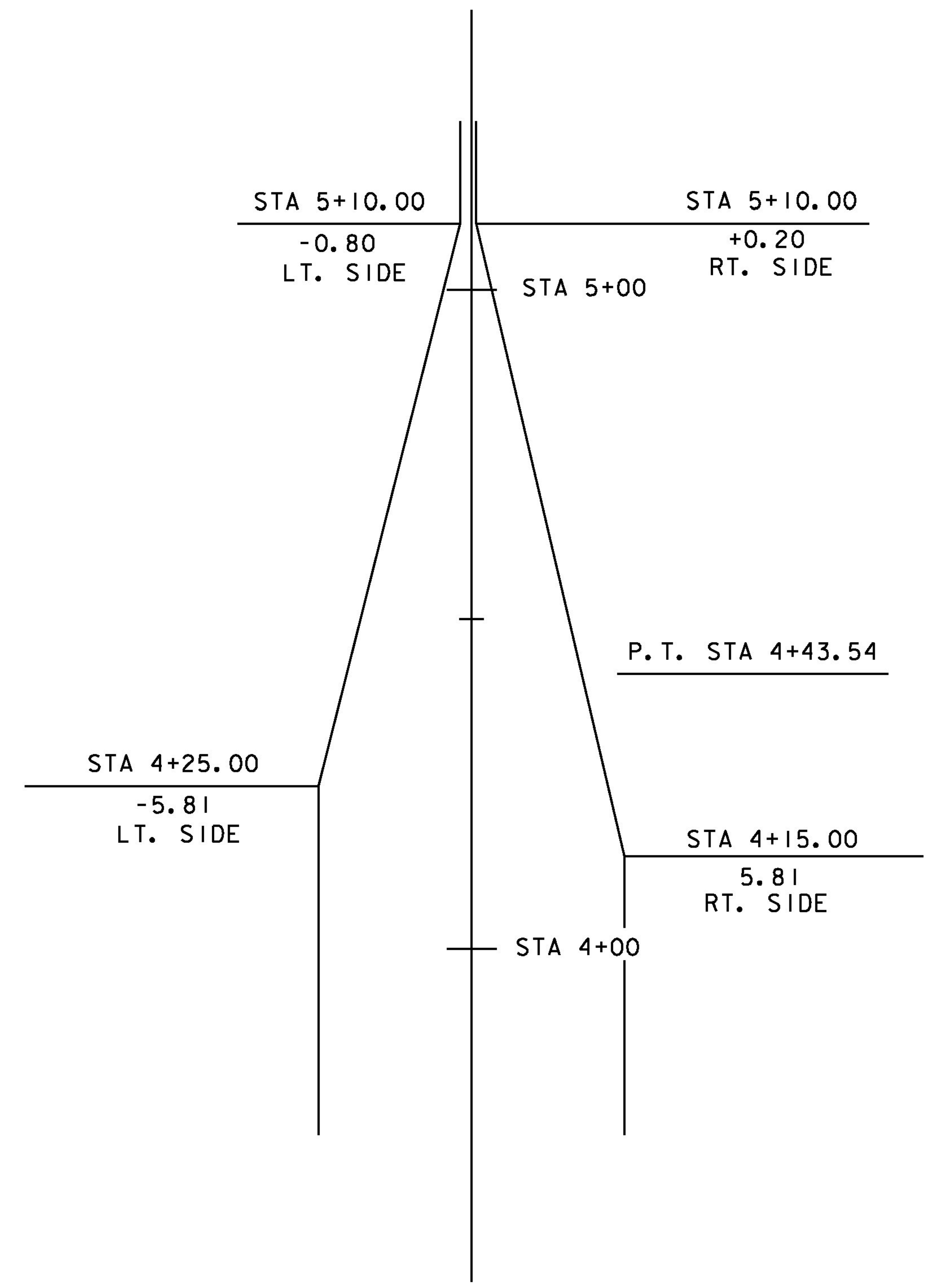
5+50



5+00



4+50



BANKING DIAGRAM

SCALE IN FEET

McFarland Johnson

PROJECT NAME: MORRISTOWN	
PROJECT NUMBER: STPG SGNL(47)	
FILE NAME: z15t047xs_100alt.dgn	**PLOT DATE:** 5/13/2016
PROJECT LEADER: J. SANTACRUCE	**DRAWN BY:** R. LUCHINI
DESIGNED BY: R. LUCHINI	**CHECKED BY:** B. COLBURN
CROSS SECTION - VT 100 (LAPORTE ROAD)	**SHEET** 54 **OF** 58

CONSTRUCTION PHASING NOTES

(INTERSECTION OF VT ROUTE 100, ALT VT ROUTE 100, BISHOP MARSHALL DRIVE AND VT ROUTE 100 (LAPORTE ROAD))

PHASE I

1. SET UP ADVANCED WARNING SIGN PACKAGE.

2. SET UP TEMPORARY TRAFFIC BARRIER, ENERGY ABSORPTION BARRIER TEST LEVEL 3(TL-3) AND TEMPORARY PORTABLE LIGHTING UNITS. ONE TEMPORARY PORTABLE LIGHTING UNIT WILL REMAIN OPERATIONAL UNTIL THE PERMANENT INTERSECTION LIGHTING IS FUNCTIONAL.

3. CONSTRUCT ROADWAY WIDENING, RELOCATION OF GUARDRAIL APPROXIMATELY STA 14+81 RT TO STA 17+75 RT, AND SLOPE WORK ON VT ROUTE 100. REMOVE PAVEMENT ON VT ROUTE 100 AND REGRADE GRAVEL SURFACE TO MATCH PROPOSED PROFILE AND SECTIONS.

4. REMOVE TEMPORARY TRAFFIC BARRIER AND CONSTRUCT SAFE LONGITUDINAL DROP-OFF PER VTRANS STANDARD PLANS T-35 AND T-36 AND HSD 400.01 DETAIL ALONG THE VT ROUTE 100 NORTHBOUND TRAVEL LANE. PLACE TRAFFIC SAFETY BARRELS ALONG EDGE OF DROP OFF.

5. ADJUST TRAFFIC SAFETY BARRELS ALONG THE NORTHBOUND VT ROUTE 100 THROUGH LANE TO PROVIDE A MINIMUM 10'0" WIDE TRAVEL LANE ADJACENT TO WORK ZONE BEFORE BEGINNING PAVING OPERATIONS ALONG VT ROUTE 100. INSTALL SUPERPAVE BITUMINOUS CONCRETE PAVEMENT TYPE I-S AND TYPE II-S ON VT 100.

PHASE II

1. USE TRAFFIC SAFETY BARRELS TO CLOSE OFF THE EXISTING SOUTHBOUND ALT VT ROUTE 100 LEFT-TURN LANE ALONG IT'S ENTIRE LENGTH TO FACILITATE TRUCK TURNING MOVEMENTS EXITING VT ROUTE 100 (LAPORTE ROAD) DURING CONSTRUCTION OF THE TRUCK APRON. THE CONTRACTOR MUST MAINTAIN TWO WAY TRAFFIC PATTERN AT ALL TIMES UNLESS OTHERWISE NOTED. THE CONTRACTOR MAY UTILIZE ONE LANE ALTERNATING TRAFFIC (OLAT) TO MAINTAIN TRAFFIC ON VT ROUTE 100 (LAPORTE ROAD) BETWEEN THE HOURS OF 9:00 AM AND 3:30 PM MONDAY THROUGH FRIDAY.

2. CONSTRUCT ROADWAY, RELOCATION OF GUARDRAIL APPROXIMATELY STA 17+75 RT TO STA 18+40 RT, AND SLOPE WORK ON VT ROUTE 100 (LAPORTE ROAD). TEMPORARY TRAFFIC BARRIER MAY NEED TO BE RELOCATED AND RESET DURING GRADING OPERATIONS ON VT ROUTE 100 (LAPORTE ROAD). ALL ADDITIONAL RELOCATIONS AND RESETTING OF THE TEMPORARY TRAFFIC BARRIER WILL BE CONSIDERED INCIDENTAL TO ITEM 641.10 AND NOT CONSIDERED FOR PAYMENT UNDER OTHER ITEMS. REMOVE PAVEMENT ON VT ROUTE 100 (LAPORTE ROAD) AND REGRADE GRAVEL SURFACE TO MATCH PROPOSED PROFILE AND SECTIONS. TRAFFIC WILL BE MAINTAINED ON VT ROUTE 100 (LAPORTE ROAD) SO AS NOT TO CREATE A VEHICULAR HAZARD BY EXCEEDING THE MAXIMUM ALLOWABLE GRADE DIFFERENCE PER THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) LATEST EDITION.

3. USE TRAFFIC SAFETY BARRELS TO CLOSE OFF THE TRUCK APRON AREA, CONSTRUCTION TRUCK APRON, AND PAVE VT ROUTE 100 (LAPORTE ROAD) TO THE BOTTOM OF THE WEARING COURSE LEVEL.

4. REMOVE AY REMAINING TEMPORARY TRAFFIC BARRIER.

PHASE III

1. USE TRAFFIC SAFETY BARRELS TO SEPARATE THE WORK ZONE FROM THE SOUTHBOUND VT ROUTE 100 TRAVEL LANE AND THE BISHOP MARSHALL DRIVE TRAVEL IN ORDER TO SAWCUT AND REMOVE THE EXISTING PAVEMENT AND RELOCATE THE EXISTING GUARDRAIL AS SHOWN ON THE PLANS.

2. THE STOP SIGNS ON VT ROUTE 100 (LAPORTE ROAD) AND BISHOP MARSHALL DRIVE ARE TO BE MAINTAINED UNTIL THE SIGNAL IS OPERATIONAL.

3. INSTALL SIGNAL EQUIPMENT AND COMPLETE LANDSCAPE RELOCATIONS BY THE PROJECT END DATE SHOWN IN THE SPECIAL PROVISIONS.

4. AT THIS STAGE, THE CONTRACTOR MAY COLD PLANE AND PAVE VT 100 AND VT ROUTE 100 (LAPORTE ROAD) AS SHOWN ON THE PLANS AND CONSTRUCT ALL NEW STRIPING.

CONSTRUCTION NOTES

(INTERSECTION OF ALT VT ROUTE 100 AND BRIDGE STREET)

1. SET UP ADVANCED WARNING SIGN PACKAGE AS SHOWN ON DETAIL TA-23 "LEFT-HAND LANE CLOSURE ON THE FAR SIDE OF AN INTERSECTION" FROM THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) LATEST EDITION.

2. USE TRAFFIC SAFETY BARRELS OR CONES TO CLOSE OFF THE EXISTING ALT VT ROUTE 100 LEFT-TURN LANE AT THE INTERSECTION AS SHOWN ON TA-23.

3. THE SIGNAL SHALL BE SET ON FLASH AND A UNIFORMED OFFICER SHALL BE PRESENT TO DIRECT TRAFFIC WHILE THE CONTRACTOR IS WORKING ON THE SIGNAL IN THE INTERSECTION.

4. INSTALL SIGNAL EQUIPMENT AND MAKE CHANGES TO THE EXISTING TRAFFIC CONTROLLER BY THE PROJECT END DATE SHOWN IN THE SPECIAL PROVISIONS.

TRAFFIC CONTROL NOTES

1. THE CONTRACTOR MAY REQUEST TO CLOSE VT ROUTE 100 (LAPORTE ROAD) FOR SHORT DURATIONS OR NIGHT OPERATIONS. SHORT DURATION CLOSURES WILL BE LIMITED TO NOT MORE THAN 48 CONSECUTIVE HOURS. A CLOSURE OF VT ROUTE 100 (LAPORTE ROAD) WILL REQUIRE APPROVAL OF THE RESIDENT ENGINEER AND THE TOWN OF MORRISTOWN VT. A DETOUR PLAN HAS BEEN INCLUDED IN THE PROJECT PLANS IN THE EVENT A SHORT DURATION CLOSURE OR NIGHT OPERATIONS ARE APPROVED BY THE RESIDENT ENGINEER AND THE TOWN OF MORRISTOWN VT. NO LONG TERM CLOSURES, THOSE LASTING MORE THAN 48 HOURS, WILL BE ALLOWED AND THE INCLUSION OF THE DETOUR PLAN DOES NOT INDICATE THE POTENTIAL APPROVAL OF A CLOSURE OF VT ROUTE 100 (LAPORTE ROAD) FOR ANY DURATION OF TIME. THE DETOUR PLAN HAS BEEN INCLUDED AS REFERENCE ONLY AS VT ROUTE 100 (LAPORTE ROAD) IS EXPECTED TO REMAIN OPEN TO TRAFFIC DURING CONSTRUCTION. IF A CLOSURE IS APPROVED, ALL WORK ASSOCIATED WITH THE DETOUR PLAN WILL BE CONSIDERED INCIDENTAL TO ITEM 641.10 AND WILL NOT BE CONSIDERED FOR PAYMENT UNDER OTHER ITEMS. THE STATE DETOUR (IF NEEDED) IS SHOWN FOR THE ROAD CLOSURE PORTION OF THIS PROJECT ON SHEET 58.

2. INSTALLATION OF DETOUR AND ON-SITE SIGNS SHALL NOT BLOCK ANY EXISTING TRAFFIC CONTROL SIGN ASSEMBLIES. DETOUR SIGNS SHALL MODIFY OR BE PLACED ADJACENT TO EXISTING ROUTE MARKER SIGN ASSEMBLIES WHEN POSSIBLE. THE CONTRACTOR SHALL MAINTAIN AT LEAST 200 FEET BETWEEN SIGN ASSEMBLIES WHENEVER POSSIBLE.

3. EXISTING SIGNS THAT ARE IN CONFLICT WITH THE TRAFFIC FLOW OF THE DETOUR SHALL BE REMOVED OR COVERED BY THE CONTRACTOR. ALL SIGNS REMOVED OR COVERED SHALL BE REPLACED OR UNCOVERED WHEN THE TRAFFIC CONTROL PACKAGE IS DISASSEMBLED. PAYMENT FOR THIS WORK WILL BE CONSIDERED INCIDENTAL TO ITEM 641.10 "TRAFFIC CONTROL".

4. THE CONTRACTOR SHALL SUBMIT A SITE-SPECIFIC TRAFFIC CONTROL PLAN INCLUDING THE WORK AT THE INTERSECTION OF VT ROUTE 100, ALT VT ROUTE 100, BISHOP MARSHALL DRIVE AND VT ROUTE 100 (LAPORTE ROAD) AND FOR THE WORK AT THE INTERSECTION OF ALT VT ROUTE 100 AND BRIDGE STREET IN ACCORDANCE WITH THE REQUIREMENTS OF SUB SECTION 105.03 AND THE VTRAN'S "STANDARDS SPECIFICATION FOR CONSTRUCTION" DATED 2011. THIS PLAN SHALL BE SUBMITTED AT LEAST TWO WEEKS IN ADVANCE OF THE START OF CONSTRUCTION AND THE WORK SHALL NOT COMMENCE UNTIL THE TRAFFIC CONTROL PLAN HAS BEEN ACCEPTED.

5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGNING, ERECTING, AND MAINTAINING (AS WELL AS REMOVING AND RESETTING) ALL DETOUR AND ON-PROJECT TEMPORARY TRAFFIC CONTROL ZONE DEVICES, INCLUDING (BUT NOT LIMITED TO) CONSTRUCTION SIGNS, BARRICADES, TEMPORARY TRAFFIC BARRIERS, PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS) AND OTHER REQUIRED DEVICES (AS PER APPROVED TEMPORARY TRAFFIC CONTROL PLAN) USED TO REGULATE, WARN AND GUIDE TRAFFIC DURING CONSTRUCTION. TRAFFIC CONTROL DEVICES SHALL MEET THE REQUIREMENTS OF LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AND PERTINENT E-SERIES AND T-SERIES STANDARDS. WHERE CONFLICTS EXIST, THE MUTCD SHALL GOVERN. EXACT LOCATIONS OF DEVICES SHALL BE COORDINATED WITH THE ENGINEER. THE COST OF ALL DETOUR AND ON-PROJECT TEMPORARY TRAFFIC CONTROL ZONE DEVICES (WITH THE EXCEPTION OF TEMPORARY TRAFFIC BARRIERS, ENERGY ABSORPTION ATTENTUATORS, AND PCMS) WILL BE PAID FOR UNDER ITEM 641.10, TRAFFIC CONTROL.

   THE CONTRACTOR SHALL COORDINATE PUBLISHING AND DISSEMINATING OF DETOUR INFORMATION TO THE PUBLIC AT LEAST TWO WEEKS IN ADVANCE OF THE START OF CONSTRUCTION AND THE CLOSING OF VT ROUTE 100 (LAPORTE ROAD), INCLUDING, BUT NOT LIMITED TO: TRAFFIC DELAYS FOR THE PUBLIC WITH THE ENGINEER. COORDINATION OF INFORMATION WITH THE RESIDENT ENGINEER WILL BE CONSIDERED INCIDENTAL TO ITEM 641.10 TRAFFIC CONTROL.

6. PORTABLE CHANGEABLE MESSAGE SIGNS "PCMS" SHALL BE PLACED AT THE APPROXIMATE LOCATIONS SHOWN ON THE PLANS (SHEET 58) OR WHERE DESIGNATED BY THE ENGINEER. THREE SIGNS SHALL BE PLACED AT THE LOCATIONS SHOWN ON THE PLANS 14 DAYS PRIOR TO THE START OF CONSTRUCTION TO WARN OF THE IMPENDING DETOURS. SIGN MESSAGE SHALL BE DETERMINED BY THE ENGINEER. PAYMENT FOR THESE SIGNS WILL BE MADE UNDER ITEM 641.15 "PORTABLE CHANGEABLE MESSAGE SIGN".

7. THE STATE ROUTE MARKERS USED FOR THE DETOUR AS SHOWN ON THE PLANS SHALL FOLLOW STANDARDS E-127 AND E-136B. THESE SIGNS SHALL BE REMOVED AT THE END OF THE ROAD CLOSURE. THESE SIGNS AND THEIR REMOVAL SHALL BE PAID FOR UNDER ITEM 641.10 "TRAFFIC CONTROL".

8. ALL TRAFFIC CONTROL DEVICES SHALL BE KEPT IN THEIR PROPER POSITION AT ALL TIMES AND SHALL BE REPAIRED, REPLACED, OR CLEANED AS NECESSARY TO PRESERVE THEIR APPEARANCE AND CONTINUITY.

9. ALL SIGNS SHALL BE PLACED WITHIN EXISTING STATE OR TOWN RIGHTS-OF-WAY.

10. NO CONSTRUCTION SIGNS SHALL BE INSTALLED AS TO INTERFERE WITH STOPPING SIGHT DISTANCE AND CORNER SIGHT DISTANCE FROM DRIVES AND TOWN HIGHWAYS.

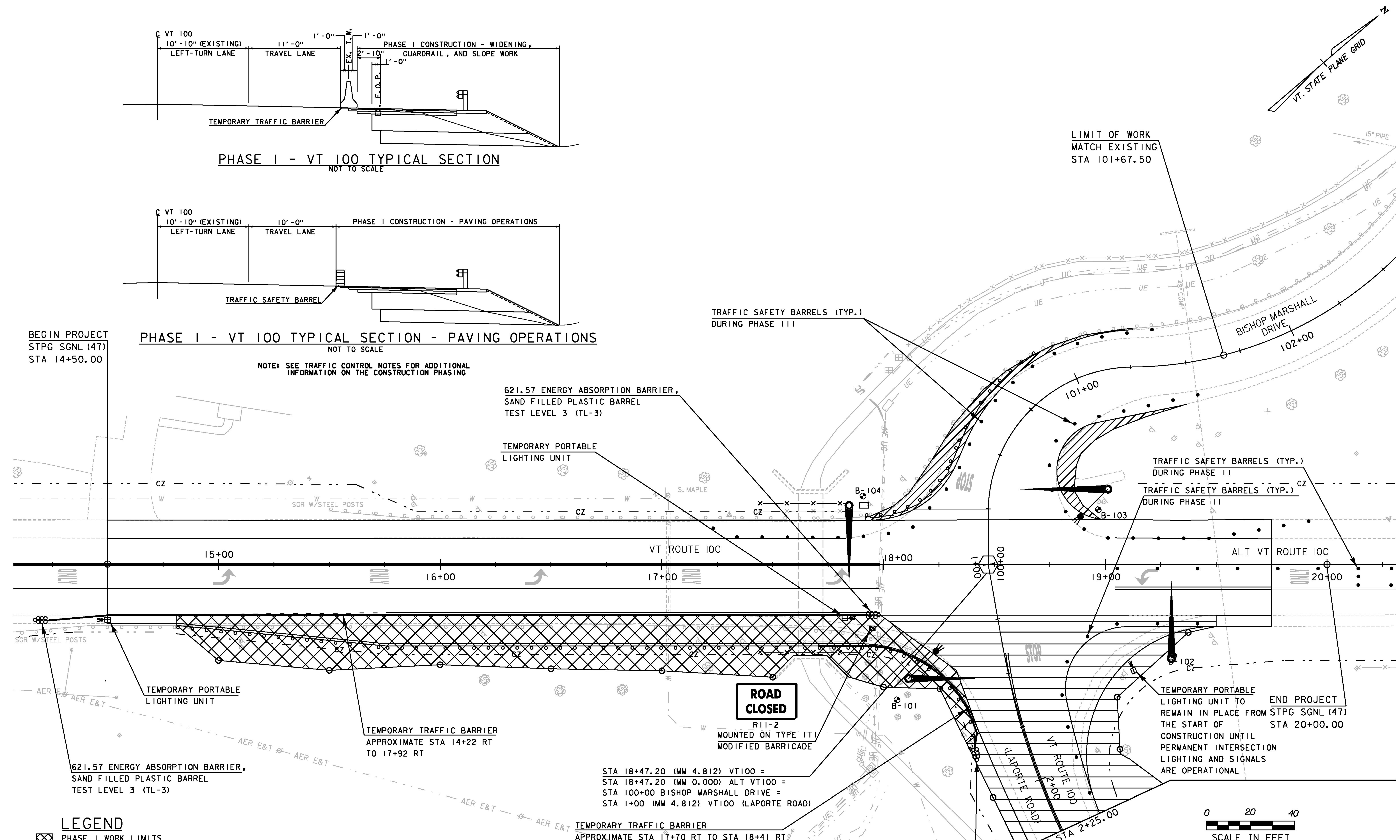
11. IF THE BINDER PAVEMENT COURSE OF ANY ROADWAY WILL BE OPEN TO TRAFFIC FOR MORE THAN 3 DAYS THEN THE CONTRACTOR SHALL APPLY TEMPORARY PAVEMENT MARKINGS INCLUDING WHITE EDGE AND LANE LINES, YELLOW CENTERLINE, AND STOP BAR IN CONFORMANCE WITH THE SPECIFICATIONS AND PAID FOR UNDER THE APPROPRIATE ITEMS NOTED ON THE QUANTITY SHEETS.

12. CONTACT DIG-SAFE AT 1-888-344-7233 (DIG-SAFE) OR 811 PRIOR TO BREAKING GROUND TO INSTALL ANY SIGN POSTS.

McFarland Johnson

PROJECT NAME: MORRISTOWN
PROJECT NUMBER: STPG SGNL(47)

FILE NAME: z15t047tcpnotes.dgn	PLOT DATE: 5/17/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: J. SANTACRUCE
DESIGNED BY: J. SANTACRUCE	CHECKED BY: B. COLBURN
TRAFFIC CONTROL PLAN NOTES	

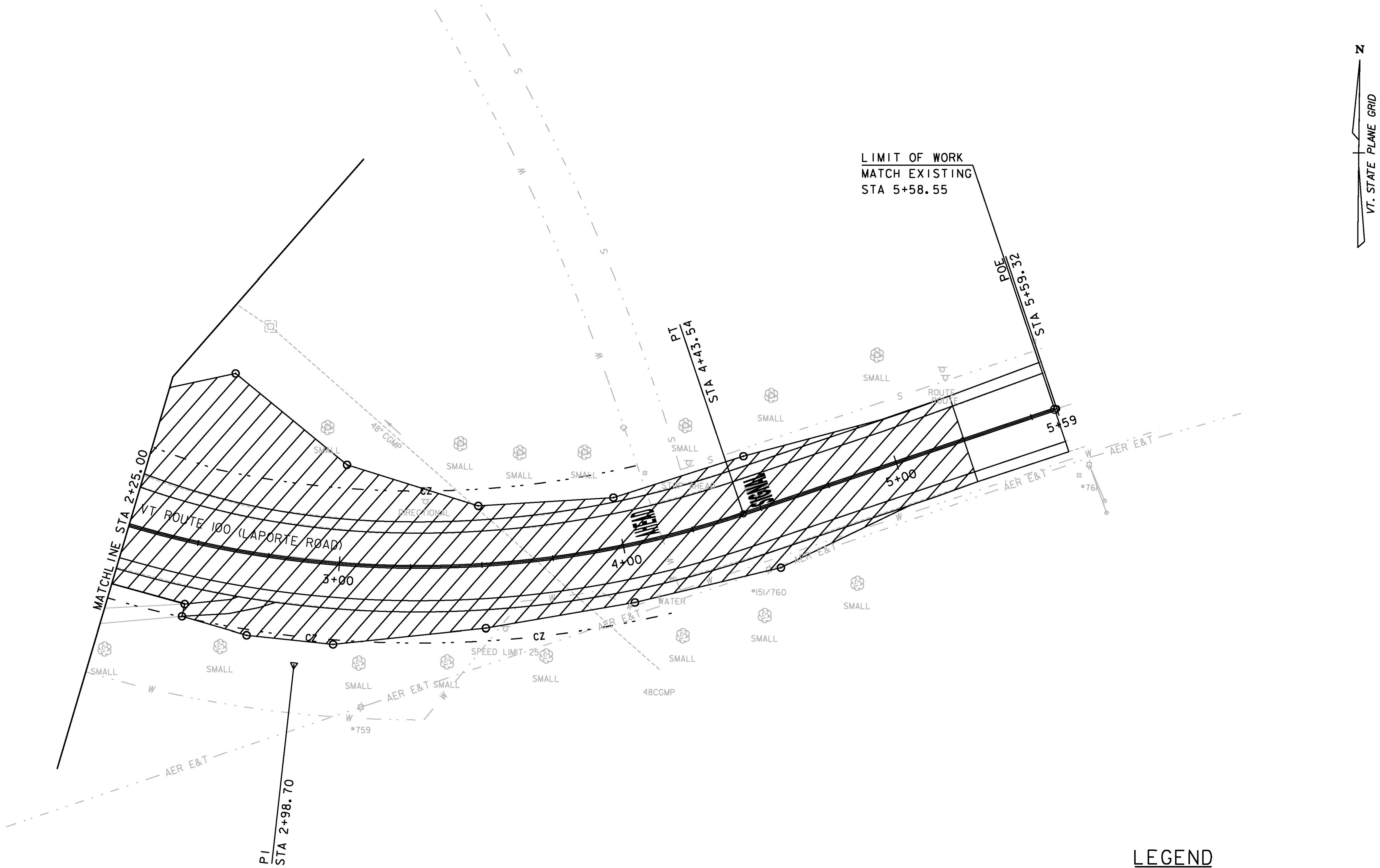


PROJECT NAME: MORRISTOWN
PROJECT NUMBER: STPG SGNL(47)

McFarland Johnson

FILE NAME: z15t047bdr_dtr.dgn
PROJECT LEADER: J. SANTACRUCE
DESIGNED BY: R. LUCHINI
TRAFFIC CONTROL LAYOUT SHEET 1

PLOT DATE: 5/13/2016
DRAWN BY: R. LUCHINI
CHECKED BY: B. COLBURN
SHEET 56 OF 58



LEGEND

PHASE II WORK LIMITS

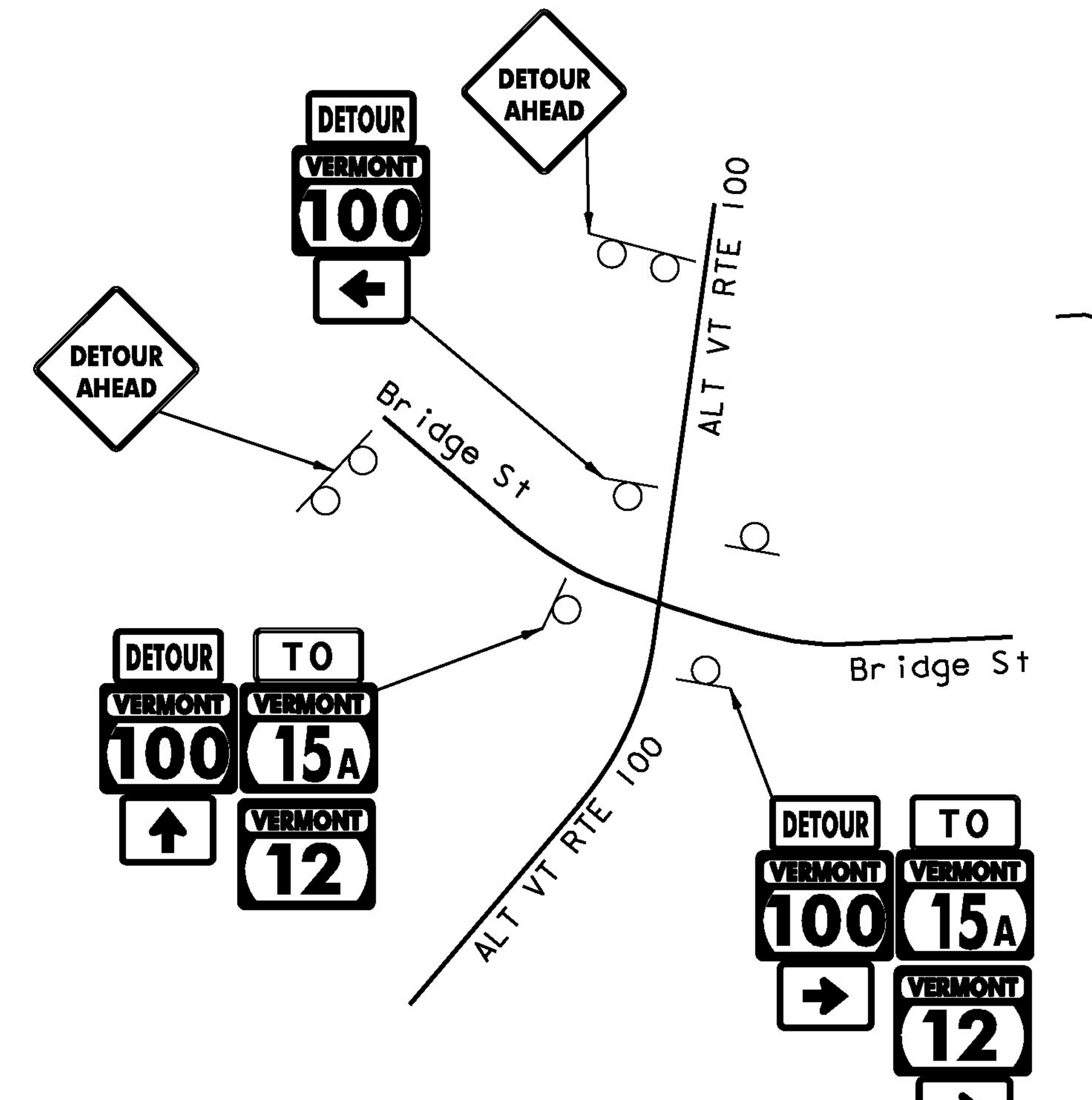
0 20 40
SCALE IN FEET

PROJECT NAME: MORRISTOWN
PROJECT NUMBER: STPG SGNL(47)

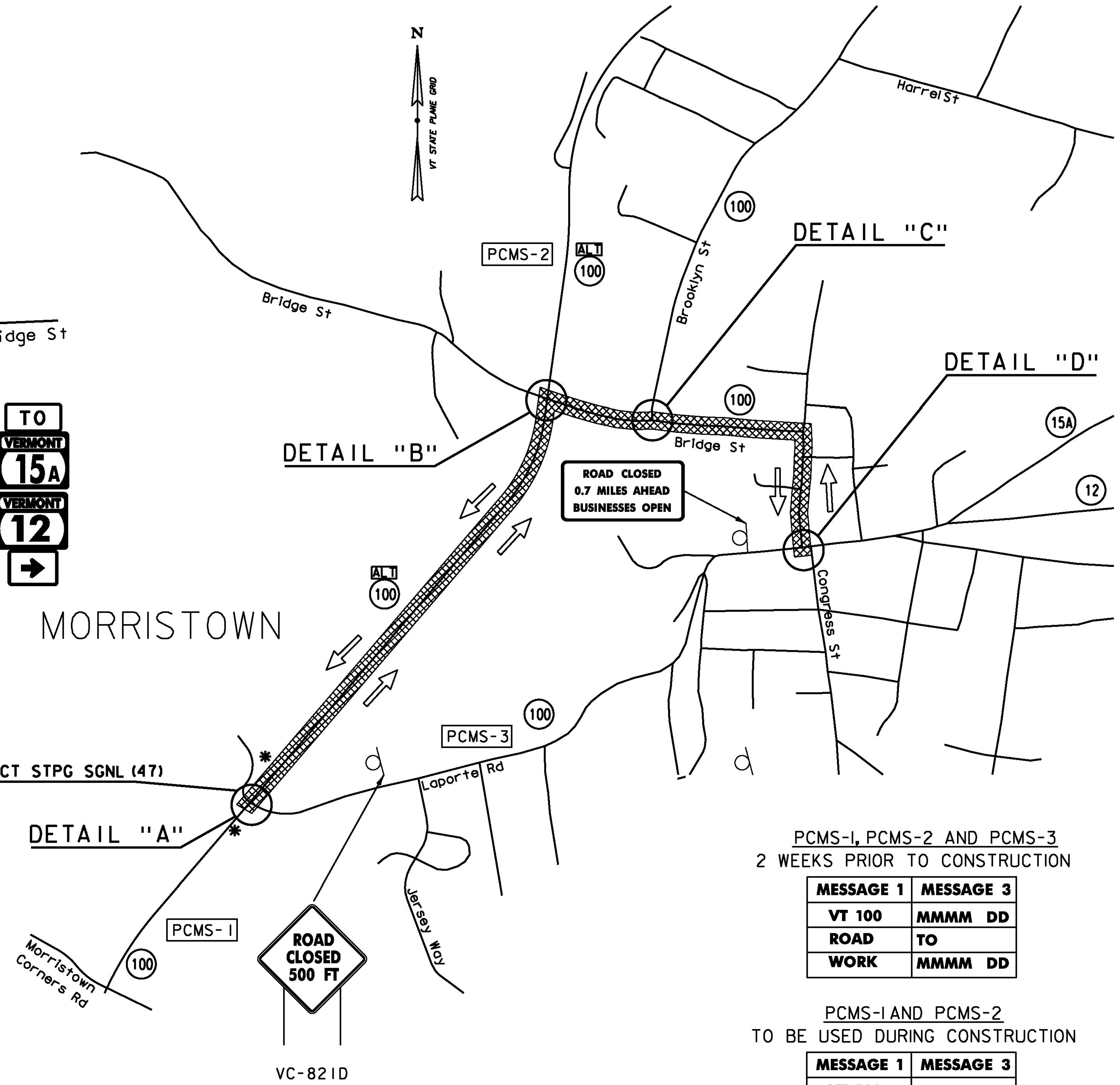
McFarland Johnson

FILE NAME: z15t047bdr_dtr.dgn
PROJECT LEADER: J. SANTACRUCE
DESIGNED BY: R. LUCHINI
TRAFFIC CONTROL LAYOUT SHEET 2

PLOT DATE: 5/13/2016
DRAWN BY: R. LUCHINI
CHECKED BY: B. COLBURN
SHEET 57 OF 58



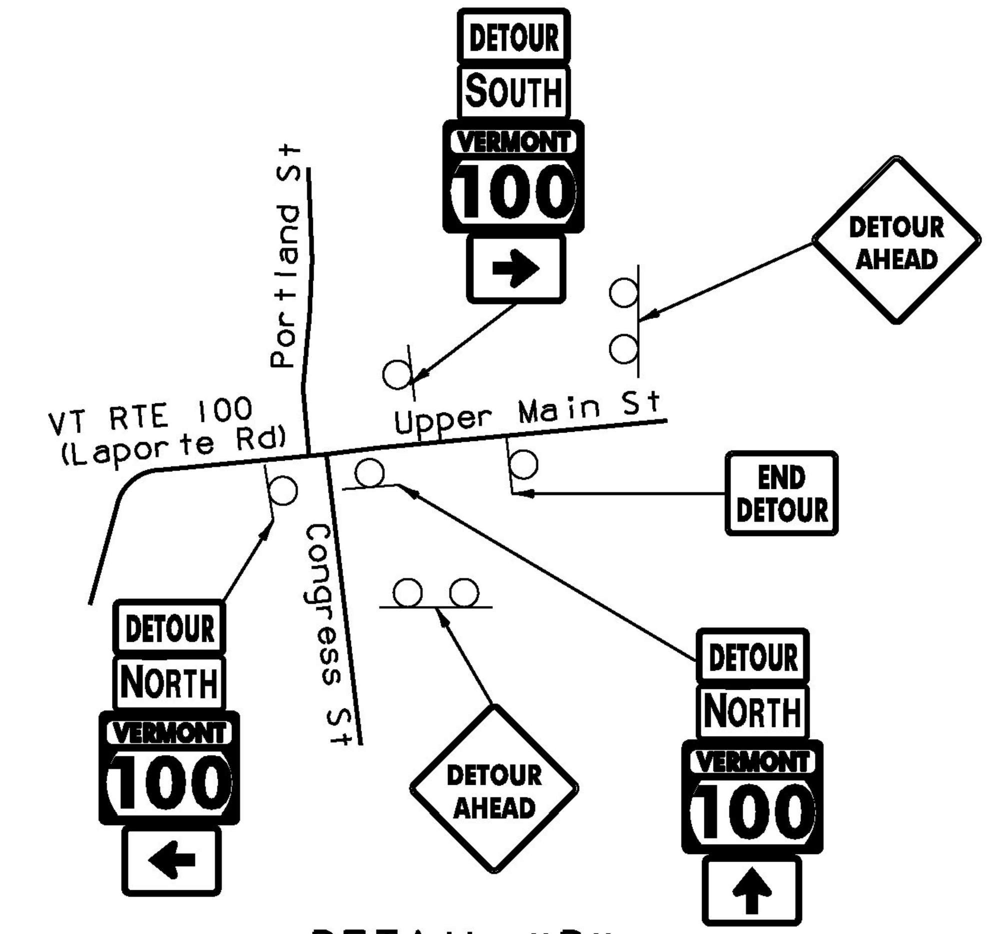
DETAIL "B"



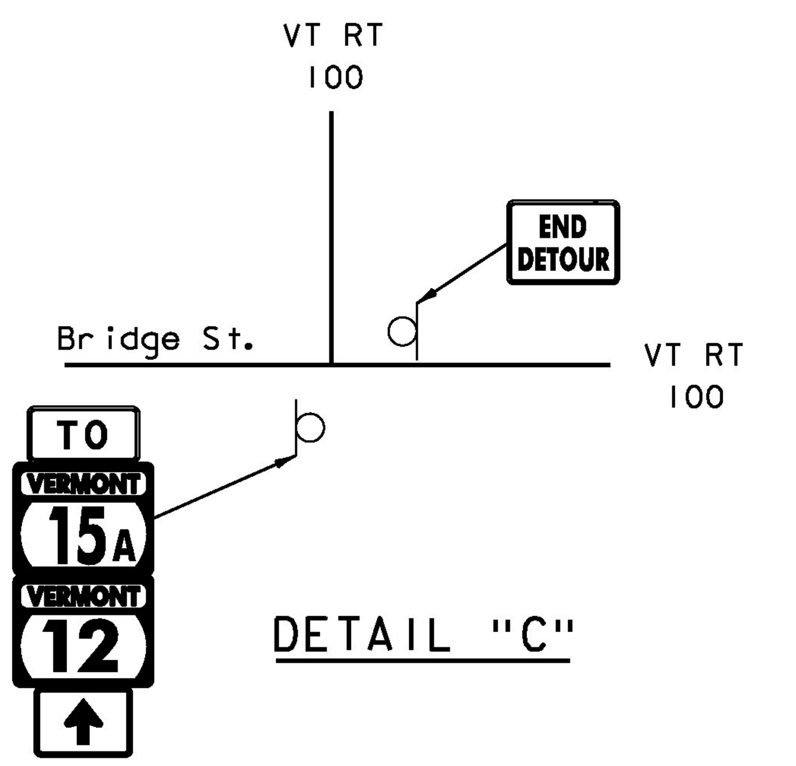
DETOUR SIGNING PLAN

NOT TO SCALE

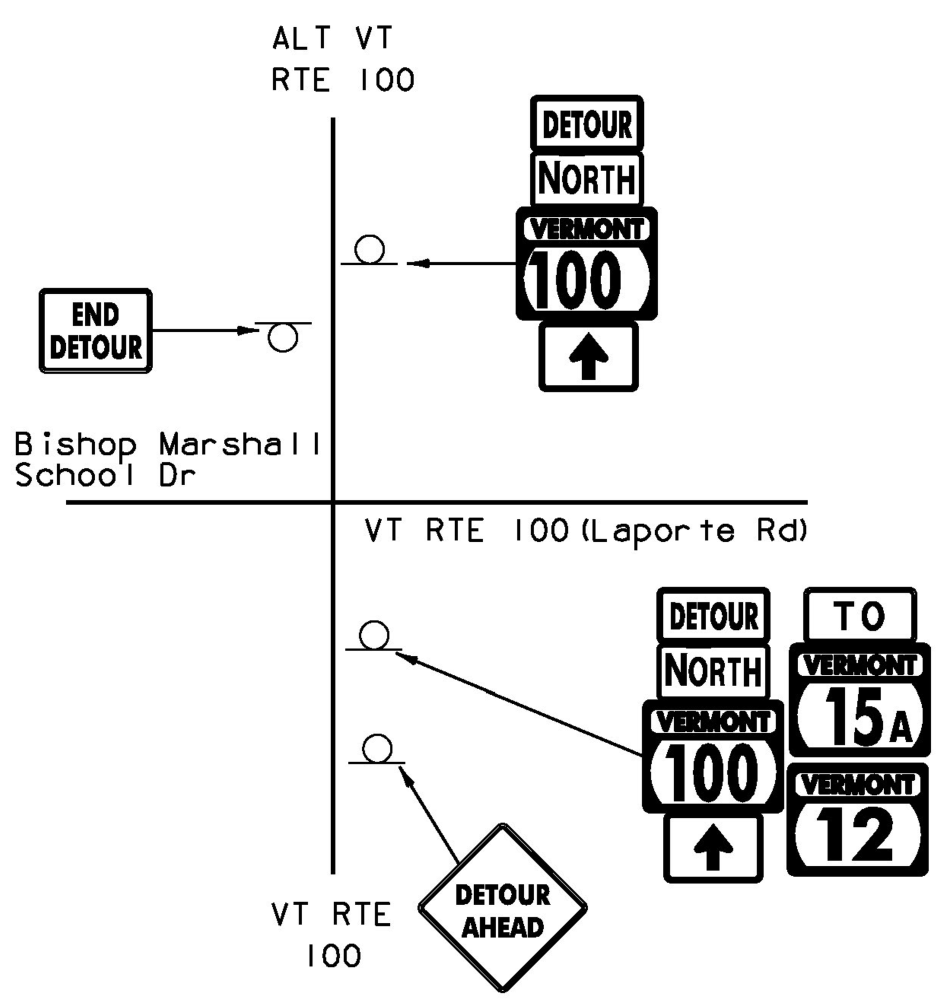
(DETOUR SIGNING PLAN IF REQUIRED FOR TEMPORARY CLOSURE OF VT ROUTE 100 (LAPORTE ROAD) AS DIRECTED BY THE ENGINEER)



DETAIL "D"



DETAIL "C"



DETAIL "A"

PCMS-1, PCMS-2 AND PCMS-3
2 WEEKS PRIOR TO CONSTRUCTION

MESSAGE 1	MESSAGE 3
VT 100	MMMM DD
ROAD	TO
WORK	MMMM DD

PCMS-1 AND PCMS-2
TO BE USED DURING CONSTRUCTION

MESSAGE 1	MESSAGE 3
VT 100	USE
ROAD	BRIDGE
CLOSED	STREET

SEE TRAFFIC CONTROL NOTES FOR ADDITIONAL INFORMATION ON THE PLACEMENT OF PCMS

THRU LENGTH	: 0.73 MILES
DETOUR LENGTH	: 0.96 MILES
3 WEEK PROPOSED CLOSURE	
ADDITIONAL LENGTH	: 0.23 MILES
END TO END LENGTH	: 1.69 MILES

ID NUMBER	SIGN TEXT	SIZE OF SIGN WIDTH (IN)	HEIGHT (IN)	NUMBER OF SIGNS REQ'D	AREA OF EACH SIGN (SF)	COLOR	REMARKS
W20-2	DETOUR AHEAD	48	48	5	16.0	BLACK AND FLOURESCENT ORANGE	INSTALL ON 2 POSTS
W20-3	ROAD CLOSED 500 FT	48	48	1	16.0	BLACK AND FLOURESCENT ORANGE	INSTALL ON 2 POSTS
M1-5	VERMONT 100	30	24	8	5.0	GREEN AND WHITE	
M1-5	VERMONT 15A	30	24	4	5.0	GREEN AND WHITE	
M1-5	VERMONT 12	30	24	4	5.0	GREEN AND WHITE	
M3-1	NORTH	24	12	4	2.0	GREEN AND WHITE	MOUNT BELOW M4-8
M3-3	SOUTH	24	12	1	2.0	GREEN AND WHITE	MOUNT BELOW M4-8
M4-8	DETOUR	24	12	8	2.0	BLACK AND FLOURESCENT ORANGE	MOUNT ABOVE M1-5
M4-8a	END DETOUR	24	18	3	3.0	BLACK AND FLOURESCENT ORANGE	
M4-5	TO	24	12	4	2.0	GREEN AND WHITE	MOUNT ABOVE M1-5
M6-3	↑	21	15	5	2.19	BLACK AND FLOURESCENT ORANGE	MOUNT BELOW M1-5
M6-1L	←	21	15	2	2.19	BLACK AND FLOURESCENT ORANGE	MOUNT BELOW M1-5
M6-1R	→	21	15	3	2.19	BLACK AND FLOURESCENT ORANGE	MOUNT BELOW M1-5
R11-3B	ROAD CLOSED 0.7 MILES AHEAD BUSINESSES OPEN	30	60	1	12.5	BLACK AND FLOURESCENT ORANGE	INSTALL ON 2 POSTS

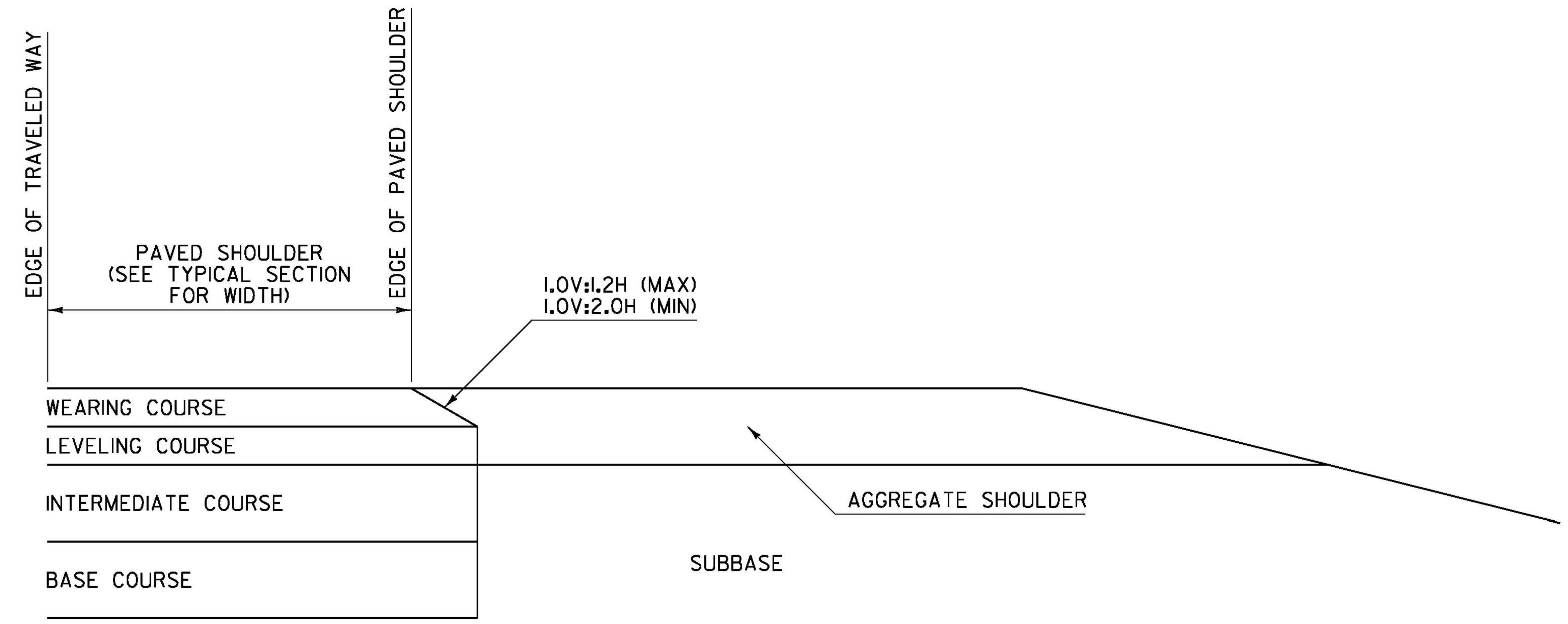
THE ESTIMATED QUANTITIES OF "PERMANENT CONTROLS" ARE HEREBY LISTED. ADDITIONAL SIGNS REQUIRED FOR THE CONSTRUCTION APPROACHES ARE SHOWN ON STANDARD DETAIL T-10. THE CONTRACTOR IS RESPONSIBLE FOR ALL "OPERATIONAL CONTROLS" REQUIRED UNDER SECTION 641 OF THE 2011 VTRANS SPECIFICATIONS AND THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), PART VI LATEST EDITION.

* SEE STANDARD T-10 FOR CONSTRUCTION APPROACH SIGNING AND TRAFFIC CONTROL PLANS FOR DETAILS OF CLOSURE.

NOTE: CONTRACTOR SHALL UTILIZE EXISTING ROUTE MARKER SHIELDS WHERE POSSIBLE BY ADDING THE NECESSARY DETOUR SIGNS TO REDUCE THE POSSIBLITY OF REDUNDANT SIGNS.

McFarland Johnson

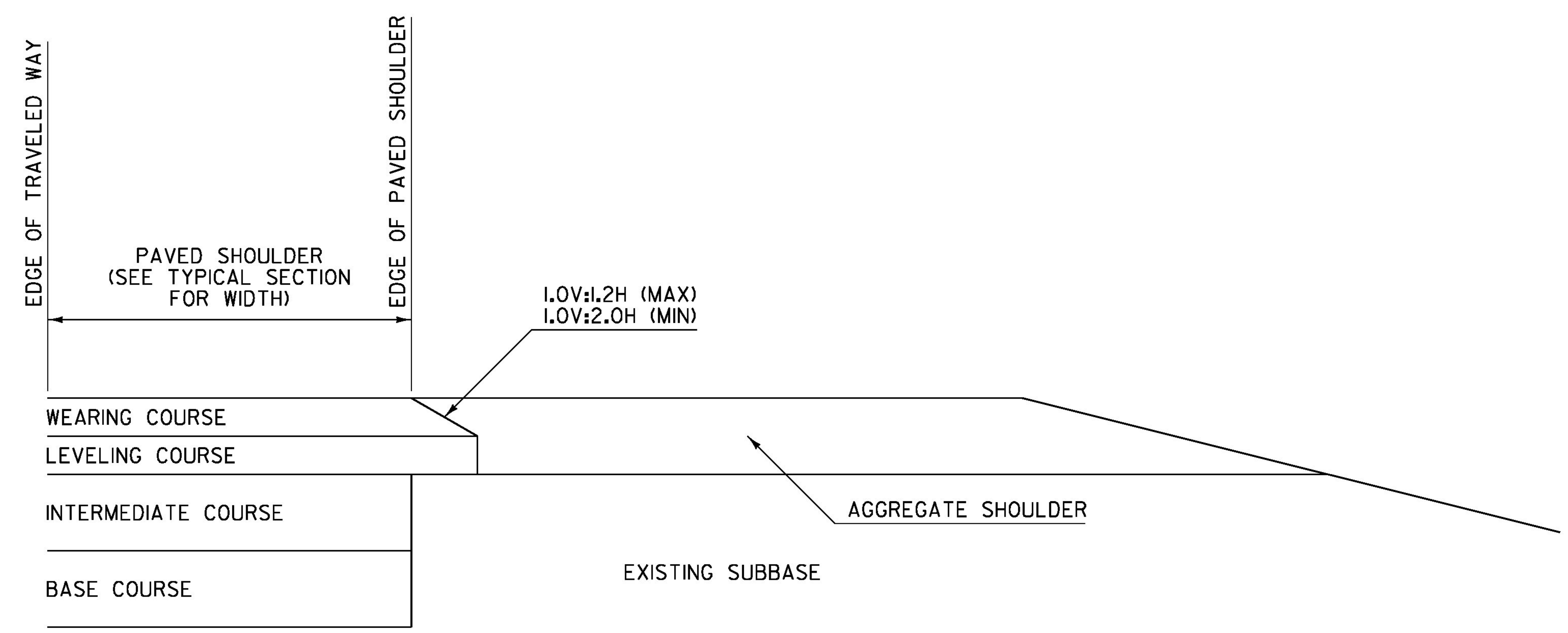
PROJECT NAME: MORRISTOWN	
PROJECT NUMBER: STPG SGNL(47)	
FILE NAME: z15t047detour.dgn	PLOT DATE: 5/13/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: J. SANTACRUCE
DESIGNED BY: J. SANTACRUCE	CHECKED BY: B. COLBURN
DETOUR PLAN	SHEET 58 OF 58



SAFETY EDGE DETAIL
FOR PAVING BELOW WEARING COURSE

NOTES:

1. THIS DETAIL IS INTENDED FOR WHEN PAVING EXTENDS BELOW THE WEARING COURSE.
2. PRIOR TO PLACEMENT OF THE LEVELING AND/OR WEARING COURSE, THE SUBBASE LOCATED BENEATH THE AGGREGATE SHOULDER SHALL BE PREPARED FLUSH WITH THE BOTTOM OF THE LEVELING COURSE.
3. BASE COURSE LIMITS MAY VARY, SEE TYPICAL SECTIONS FOR WIDTH.



SAFETY EDGE DETAIL
FOR PAVING WEARING COURSE ONLY

NOTES:

1. THIS DETAIL IS INTENDED FOR WHEN ONLY THE LEVELING AND/OR WEARING COURSE IS TO BE PLACED.
2. PAVEMENT COURSES MAY VARY, SEE TYPICAL SECTIONS FOR ACTUAL PAVEMENT COURSES REQUIRED.

SAFETY EDGE WIDTH BASED ON WEARING COURSE THICKNESS AND A 1V:1.6H SLOPE

WEARING COURSE THICKNESS (INCHES)	NOMINAL SAFETY EDGE WIDTH (INCHES)
1.25	2.000
1.50	2.375
1.75	2.750
2.00	3.125
2.25	3.500
2.50	4.000

GENERAL NOTES:

1. PLACEMENT OF THE WEARING COURSE SHALL INCLUDE THE SAFETY EDGE, UNLESS THE FOLLOWING APPLIES:
   - A. THE ADJACENT SLOPE IS STEEPER THAN THE SAFETY EDGE.
   - B. THE EDGE OF PAVEMENT BEING PLACED ABUTS BOUND MATERIAL.
   - C. VEHICLES ARE RESTRICTED FROM LEAVING THE PAVED SURFACE (EXAMPLE: GUARDRAIL).
2. THE SAFETY EDGE SHALL BE FORMED IN SUCH A WAY THAT THE BITUMINOUS CONCRETE PAVEMENT IS EXTRUDED OR COMPRESSED TO FORM THE SLOPE. DEVICES THAT SIMPLY STRIKE-OFF THE MIX WITHOUT PROVIDING ANY COMPACTIVE EFFORT WILL NOT BE ALLOWED.
3. THE SAFETY EDGE SHALL NOT BE CONSIDERED PART OF THE PAVED SHOULDER.
4. THIS WORK SHALL BE INCIDENTAL TO THE RESPECTIVE BITUMINOUS CONCRETE PAVEMENT ITEM.

REV.	DATE	DESCRIPTION
0	MAR. 29, 2016	ORIGINAL APPROVAL

OTHER DETAILS REQUIRED: NONE

DETAILS APPROVED FOR USE BY HIGHWAY SAFETY & DESIGN

SAFETY EDGE DETAILS

VTrans Working to Get You There VERMONT AGENCY OF TRANSPORTATION

HIGHWAY SAFETY & DESIGN DETAIL

HSD-400.01

EAST COAST SIGNALS APPROVED FOR SUBMITTAL 7-18-16 MSF

APPROVED
By Erin Lewis at 4:52 pm, Jul 28, 2016

DATASHEET

CABINETS & SIGNALS

NEMA Cabinet Comparison

One of the most extensive lines of weatherproof NEMA traffic cabinets designed for ultimateease in configuration and installation.

About NEMA Cabinets

Often the first interactions that motorists, pedestrians, and bicyclists have with ITS take place at signalized intersections – where the signals and cabinets represent the front lines of signalized roadways. Econolite offers an extensive, high quality line of NEMA TS1 and TS2 cabinets, built specifically for traffic applications.

Econolite's line of traffic control cabinets are designed and manufactured for rigid pole base or pedestal mounting - zero flex and completely weather proof. Econolite cabinets are manufactured from high-quality, 5052-H32 aluminum.

The design incorporates a door opening that is 80 percent of the front surface for easy access to the traffic controllers and racks. Econolite also accommodates a specified painted finish with a minimum 2 mm thickness powder coating process for extreme durability.

At A Glance

- Plug-N-Go "Power Bus" assembly centralizes power terminations with plug-in connectors simplifying installation and providing flexibility for future expansion with virtually no rewiring
- Modular design and components for ease of maintenance and field upgrades
- Door openings are 80 percent of front surface for greater access to equipment, reducing maintenance time and simplifying diagnostics

ECONOLITE®

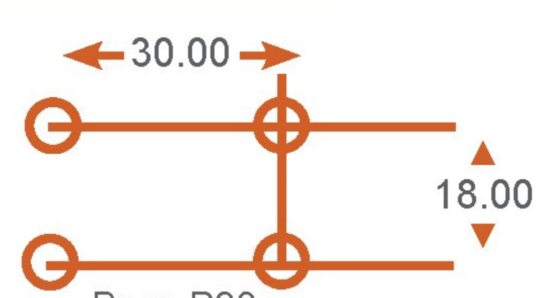
15-inch base extension required

EAST COAST SIGNALS APPROVED FOR SUBMITTAL 7-18-16 MSF

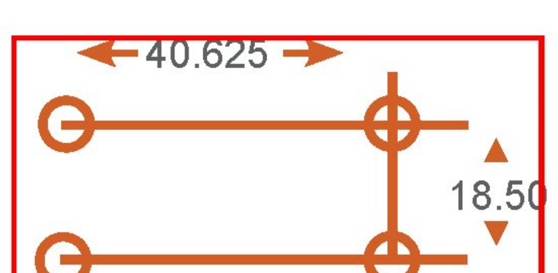
DATASHEET

CABINETS & SIGNALS

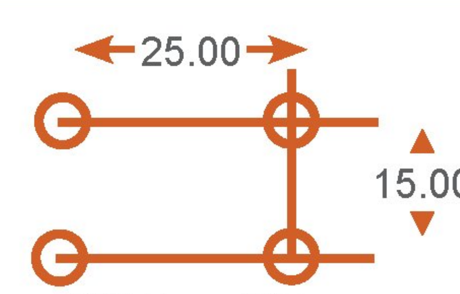
								
Cabinet	**Super P44**	**36 in. G**	**49 in. M**	**60 in. M**	**55 in. P44**	**55 in. P38**	**77 in. R**	**67 in. O**
Dimensions	57.25 in. H x 61 in. W x 28.65 in. D	40 in. H x 24.50 in. W x 17.25 in. D (OD)	49.00 in. H x 30.25 in. W x 16.88 in. D (OD)	60.00 in. H x 30.25 in. W x 16.88 in. D (OD)	55.00 in. H x 44.25 in. W x 26.00 in. D (OD)	55.00 in. H x 38.25 in. W x 26.00 in. D (OD)	76.75 in. H x 44.25 in. W x 26.00 in. D (OD)	67.00 in. H x 30.25 in. W x 24.75 in. D (OD)
Material	Aluminum 0.125 in.							
Finish	Black Natural, Powder Coat Paint, West Spray Paint							
Access	1-full size door or 2-full size doors (front and back of cabinet)							
Ventilation	Pleated media fiber filter in door 100 Cubic Feet per Minute (CFM) with thermostatic control							
Locking System	Three-point locking system with choice of locks							
Handles	Stainless steel with padlock feature							
Door Stops	Three-position locking stops on bottom of each door							
Detector Rack Assembly	Shelf-mount detector rack assembly							
Configuration	Eight vehicle phases, four pedestrian phases, and four overlaps (optional)							
Police Door	Signal on/off and flash/auto switches and auto/manuals with with police cord (optional)							
Lighting	Incandescent, Fluorescent or LED							
Shelf Drawer	Slide-out shelf/drawer storage unit (optional)							
Flasher	One slot for two-circuit flasher (optional second slot and flasher)							
Flash Transfer Relay	Receptacles for up to 6 flash transfer relatys (optional 8 FTR's)							



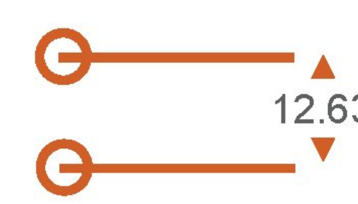
Base P38



Base 55 P44/R77



332 Base 067



Standard Base M

ECONOLITE

3360 E La Palma Avenue, Anaheim, CA 92806 · 714-630-3700 · sales@econolite.com · www.econolite.com

222240214-3

EAST COAST SIGNALS APPROVED FOR SUBMITTAL 7-18-16 MSF

CONTROLLERS DATASHEET

ASC/3 Series NEMA TS2/Actuated Controllers

APPROVED
By Erin Lewis at 5:07 pm, Jul 28, 2016

The ASC/3 was designed using the latest electronics technology, which offers the user a controller that is more reliable, easier to maintain, and interchangeable.

About ASC/3

The traffic signal controller is one of the most important components of a transportation system. Playing a crucial role in the safety and management of traffic, its importance is undeniable. The controller is also at the heart of any intelligent transportation system (ITS), enhancing transportation efficiency and safety.

The ASC/3 builds upon the proven software, design flexibility, and unique feature set of Econolite's popular ASC/2 family of controllers. All firmware in the ASC/3 is stored in flash memory. This allows for quick and easy intersection programming and software updates in the field without changing hardware or extensive training. The ASC/3 firmware is easily updated in the background while the intersection remains in operation. Once updated, the controller only needs to be power cycled to allow the new firmware to take control. The majority of the electronic components of the ASC/3 are contained in one easy-to-replace module.

At A Glance

- Windows-based remote user interface (optional)
- Advanced controller, coordinator, and preemptor features
- Enhanced transient and environmental protection
- Protocol support for ECPIP, NTCIP, and AB3418
- Software support for **Centracs**® and **Aries**®, and any compliant pre-qualified applications
- 16 x 40 LCD display with adjustable contrast

ECONOLITE

Controller Models

The ASC/3 is available in two models. Both share a common enclosure, power supply, processor, keyboard, display and optional data key telemetry and Ethernet modules.

- ASC/3-1000: Dedicated to the TS2 Type-1 environment
- ASC/3-2100: Can operate in any TS1/TS2 Type-1 and TS2 Type-2 environment

ASC/3-1000: NEMA TS2 / Type-1

The ASC/3-1000 meets and exceeds all requirements of the NEMA TS2 Type-1 Standard. Its interface controls all inputs and outputs over a high-speed RS-485 serial bus (Port 1) with digital addressing that simplifies cabinet wiring. This bus also interfaces directly to a TS2 Malfunction Management Unit (MMU) for enhanced intersection monitoring.

ASC/3-2100: NEMA TS2 Type-2 / TS1

The ASC/3-2100 meets and exceeds all the requirements of the NEMA TS2 Type-2 Standard. It also provides downward compatibility to the Econolite KMC-8000, ASC-8000, ASC/2-2100 and ASC/2S-2100 controllers as well as other NEMA TS1 controllers.

An optional 25-pin telemetry connector matches the KMC-8000 and ASC-8000. This allows the ASC/3-2100 to be used as a direct replacement for older controllers.

Control Features

- 16 phases, 8 configurable concurrent groups in 4 timing rings
- All standard NEMA TS1, TS2 and NTCIP functions
- 16 timed vehicle overlaps
- Transit Signal Priority
- 16 pedestrian phases that can be configured as pedestrian overlaps
- Exclusive pedestrian operation
- Soft vehicle recall
- Conditional service
- Dynamic max operation
- Bike minimum green, second walk and pedestrian clear times, plus a walk and pedestrian clearance maximum
- Advanced walk
- Pedestrian clear protect
- Red maximum
- Vehicle extension 2
- Guaranteed minimum green, walk, ped clear, yellow, red, red revert and overlap green
- Redundant monitoring of the MMU status to enhance intersection monitoring
- 4 timing plans selectable on TOD or coordination plan basis or for one cycle following preemption
- Powerful logic processor

Basic Specifications

- Temperature
  - -34C (-30F) to +74C (+165F)
- Power
  - A built-in, high-efficiency switching power supply generates all required internal voltages as well as 24 VDC for external use.
  - Fuses are mounted on the front of the controller for 120 VAC input and 24 VDC output.
- Dimensions
  - 10 1/2" x 15 1/4" x 9" (H x W x D)

ECONOLITE

3360 E La Palma Avenue, Anaheim, CA 92806 · 714-630-3700 · sales@econolite.com · www.econolite.com

382030114-3

MMU2-16LE SmartMonitor™
MMU2-16LEip SmartMonitor™

APPROVED
By Erin Lewis at 5:07 pm, Jul 28, 2016

The MMU2-16LE SmartMonitor® series Malfunction Management Unit (MMU) exceeds all the requirements set forth in the NEMA Standard TS2-2003 (R2008)

About the MMU2-16LEip-RM

The MMU2-16LE series includes two large area Liquid Crystal Displays (LCD) for a continuous Full Intersection display. A separate graphical LCD provides a menu driven interface to status, signal voltages, configuration, event logs, and the integrated context sensitive Help System.

The built-in Setup Wizard ensures that the enhanced monitor programming is done quickly and accurately, even by a novice. The industry first patented Diagnostic Wizard automatically pinpoints malfunctioning signals and offers trouble shooting advice.

An Ethernet or EIA-232 port is used to communicate with a Personal Computer or Traffic Management Center using field proven EDI ECcom software.

At A Glance

- A key component for safer traffic control
- The MMU-16LEip model replaces the standard EIA-232 port with a 10/100 Mbps Ethernet port for remote communications with a Traffic Management Center
- Meets the new MMU2 Standard and MUTCD Requirements
- Full intersection LCD back-lighted signal display
- Built-in Set up Wizard automatically configures enhanced parameters

NEMA TS2-2003 (R2008) Standard Including Amendment #4

The MMU2-16LE SmartMonitor meets all specifications of the NEMA Standard TS2-2003 (R2008) for the MMU2 configuration while maintaining compatibility with NEMA TS1-1989 Assemblies.

NEMA Standard Flashing Yellow Arrow PPLT

Standard MMU2 requirements of TS-2 Amendment #4-2012, providing modes for both TS-2 or TS-1 cabinet configurations.

ECcom PC Software

Access to the MMU2-16LE data is provided by the industry standard ECcom Windows based software for status, event, log retrieval, configuration, and data archival, event logs, and the Help system.

RMS Engine

A DSP coprocessor converts AC input measurements to True RMS voltages, virtually false sentencing due to changes in frequency, phase, or sine wave distortion.

LEDguard®

This innovative signal threshold technique can be used to increase the level of monitoring protection when using LED based signal heads.

Standardized Communications

Real-time SDLC communications with the Controller Unit exchanges field input status, Controller Unit output status, fault status, MMU programming, and time and date.

Event Logging

A time-stamped nonvolatile event log records the complete intersection status as well as AC line events, configuration changes, monitor resets, temperature, and true RMS voltages.

Setup Wizard

Use the built-in setup wizard to configure the NEMA enhanced settings of the SmartMonitor by answering a short series of questions regarding intersection design and operation.

Diagnostic Wizard & Help System

The diagnostic wizard automatically pinpoints faulty signals and offers trouble-shooting guidance. The integrated help system provides context sensitive operational assistance.

Full Intersection & Status Display

Two high contrast, large area LCD continuously show full RYG(W) intersection status. A separate graphic LCD provides a menu driven user interface to status, signal voltages, configuration, event logs, and the Help system.

Program Card Memory

Enhanced settings of the MMU2-16LE SmartMonitor are stored in nonvolatile memory on the program card. Moving the program card to another MMU2-16LE automatically transfers all settings.

Module Choices

- MMU2-16LEip SmartMonitor 12/16 channel LCD Series with Ethernet Port
- MMU2-16LE SmartMonitor 12/16 channel LCD Series with EIA-232 Port

ECONOLITE®
3360 E La Palma Avenue, Anaheim, CA 92806 · 714-630-3700 · sales@econolite.com · www.econolite.com

EAST COAST SIGNALS APPROVED FOR SUBMITTAL 7-18-16 MSF

DATASHEET

PS-200 TS2
Cabinet Power Supply

APPROVED
By Erin Lewis at 5:07 pm, Jul 28, 2016

The PS-200 unit, which supplies regulated DC power, unregulated AC power, and a line frequency reference for the Detector Rack, BIUs, load switches, and other auxiliary equipment.

About the PS-200

The PS-200 cabinet power supply is a shelfmounted unit, which supplies regulated DC power, unregulated AC power, and a line frequency reference for the detector rack, BIUs, load switches, and other auxiliary equipment. The PS-200 meets all requirements of the NEMA TS2-2003 standard.

All TS-2 Type 1 cabinet assemblies require the use of this unit, as well as any TS-2 Type 2 cabinet assemblies that utilize Bus Interface Units (BIU).

Each PS-200 cabinet power supply is put through a rigorous quality program and tested under the extreme environmental conditions experienced on the street.

At A Glance

- The PS-200 provides four outputs rated over the full -30°F to 165°F (-34°C to +74°C) NEMA operating temperature range:
  - +12 VDC rated at 2 Amps
  - +24 VDC rated at 2 Amps
  - 12 VAC rated at 0.25 Amps
  - 60 Hz Line Frequency Reference rated at 50 mAmps
  - Input Voltage Operating Range is 89 VAC to 135 VAC at 60 Hz

ECONOLITE

Display Indicators

A separate LED indicator is provided to display output status and fuse integrity for the three supply outputs. The Line Frequency Reference LED indicator pulses to show 60 Hz activity.

Input / Output Pins

A	AC Neutral
B	Line Frequency Reference Output
C	AC Line Input
D	+12 VDC Output
E	+24 VDC Output
F	Reserved
G	Logic Ground
H	Earth Ground
I	12 VAC Output
J	Reserved

Output Protection

The +12 VDC, +24VDC, and 12 VAC outputs are fused for over-current protection. Each output is protected against voltage transients by a 1500 Watt suppressor.

Test Points

Individual test jacks are provided for the +12 VDC output, +24 VDC output, and Logic Ground reference.

Basic Specifications

- Dimensions
  - 6" H x 5.8" W x 8.3" D

ECONOLITE
3360 E La Palma Avenue, Anaheim, CA 92806 · 714-630-3700 · sales@econolite.com · www.econolite.com

Bus Interface Unit (BIU)

APPROVED
By Erin Lewis at 5:07 pm, Jul 28, 2016

The BIU-64 is a rack module which interfaces 24V logic I/O signals to the Synchronous Data Link Control (SDLC) serial bus of TS2 Type-1 cabinets.

About the BIU

It is required in all TS2 Type-1 cabinets and in TS2 Type-2 cabinets when controller I/O interface is through the SDLC bus, not via TS1 MS-A, B, and C connectors.

Physically, the *BIU-64* consists of a circuit board and a front panel. A male 64-pin DIN 41612 type-B series connector provides the connection to the backplane of the rack. A female 15-pin metal shell D subminiature connector with latching blocks provides the connection to the SDLC cable. The front panel provides separate indicator lights for Power, Transmit, and Valid Data. It also provides a handle for easy removal of the unit from the rack. A separate TS2 cabinet power supply provides the required 24 VDC power plus a 60 Hz line-timing reference.

At A Glance

- Exceeds BIU requirements of NEMA TS2-2002
- Interfaces detectors, load switches, and 24V signals to TS2 Port-1 SDLC bus
- Used in all TS2 Type-1 cabinets for Terminal and Facilities plus Detector Racks
- Used in TS2 Type-2 for Detector Racks
- Fully hot-swappable
- Separate Power, Transmit, and Valid Data LED indicators display DC power and port status

Hardware

The BIU measures 2.34 in. W x 4.50 in. H x 6.60 in. D. Low-profile components are used in order to facilitate an optional half-width front plate unit which measures 1.17 in. x 4.5 in. x 6.60 in. The BIU will slide freely into two rack card-guides having a nominal slot width of 0.075 in. and a maximum slot width of 0.125 in.

An aluminum handle is provided on the front panel to allow easy removal of the BIU from the rack. Nominal outer dimensions of the handle shall be 1 in. x 2½ in.

The card rack connector on back of the BIU is a male 64-pin DIN 41612 type-B series. The connector is centered at the edge of the circuit board and oriented with Pin 1 located on top. The circuit board edges align with the connector per DIN 41612.

The Port-1 SDLC bus connector on the front panel of the BIU is a 15-pin metal shell subminiature type with female gold plated contacts. The connector is equipped with latching blocks and mates with a male 15-pin D-type cable connector that is equipped with spring latches (Amp part number 745012-1 or equivalent).

The front panel made of 0.090 in. sheet aluminum and is finished with a durable protective coating. Two indicator lamps are provided on the front panel, as specified by the TS2 Standard, for Power and Transmit. In addition, the front panel provides a Valid Data indicator, which lights whenever a Valid Data frame is received. The Power light flashes during absence of Line Frequency Reference (LFR) from the cabinet power supply. The BIU operates with internally generated 60 Hz reference in the absence of the LFR signal.

Pin Assignments

- Port-1 (SDLC bus) pin assignments shall be as specified in Section 8.6.2.1 of the TS2 Standard:
  - 1 - Rx Data
  - 2 - Logic Ground
  - 3 - Rx Clock +
  - 4 - Logic Ground
  - 5 - Tx Data
  - 6 - Logic Ground
  - 7 - Tx Clock +
  - 8 - Logic Ground
  - 9 - Rx Data -
  - 10 - Not Used
  - 11 - Rx Clock -
  - 12 - Earth Ground
  - 13 - Tx Data -
  - 14 - Reserved
  - 15 - Tx Clock -

ECONOLITE
3360 E La Palma Avenue, Anaheim, CA 92806 · 714-630-3700 · sales@econolite.com · www.econolite.com

EAST COAST SIGNALS APPROVED FOR SUBMITTAL 7-28-16 MSF

DATASHEET

Serial GPS for Cobalt, ASC/3 Controller or ASC/2M Master

About GPS

We provide two different assemblies for serial connection of GPS to ASC/3, CobaltTM controllers and ASC/2M masters. Both include a fused connection to the cabinet 24VDC, a cable to connect to the Garmin antenna, a mounting plate and gaskets for the antenna and a cable to connect to either a 9 pin or 25 pin serial connector.

For clarification, our direct serial interface provides the physical cable connection between the GPS antenna and controller as well as a fused 2-wire lead to power the GPS antenna from the controller cabinet. The serial cable can be provided with a DB9 or DB25 connector and pinned as required for compatibility with the controller. The data communicated through the serial interface to the controller is purely a function of the GPS antenna (Garmin• -34.6°F to +165°F (-37°C to +74°C) a default baud rate of 4800 (adjustable if necessary), 8 data bits, and no parity. The data interface protocol is based on the National Marine Electronics Associations (NMEA) 0183 ASCII interface specification. The standard is fully defined in NMEA 0183, Version 3.0 and may be obtained at www.nmea.org/ Details for the Garmin GPS antenna are available at http://static.garmincdn.com/pumac/GPS16HVS_TechnicalSpecifications.pdf.

Part Number and Description

- 171-1369-501 - GPS 16X with DB9 Cable Assembly
- 171-1369-502 - GPS 16X with DB25 Cable Assembly

APPROVED
By Erin Lewis at 5:08 pm, Jul 28, 2016

Basic Specifications

- Temperature
  - -34.6°F to +165°F (-37°C to +74°C)

ECONOLITE

3360 E La Palma Avenue, Anaheim, CA 92806 · 714-630-3700 · sales@econolite.com · www.econolite.com

TMIB Cabinet Interface

APPROVED
By Erin Lewis at 5:08 pm, Jul 28, 2016

Econolite's TMIB cabinet interface is a TEES/TS2 detector card for a standard detector card rack or shelf-mount enclosure.

About the TMIB

The TMIB connects up to four AccuScan forward-fire radar units to a traffic controller in the cabinet. The TMIB also facilitates Ethernet-based setup and monitoring communications from a PC to the radar units. Easy to install and set-up, the TMIB manages outputs from radar units around the intersection. Non-volatile memory retains the detector configuration, which can also be saved to a computer or restored from a saved file.

For the traffic controller, valid detection and output of up to 64 objects can facilitates optimal signal timing. Up to 16 wired open-collector outputs or up to 64 SDLC-protocol based outputs provide all the demand information that a modern traffic controller needs in an ITS solution. The TMIB interfaces detector outputs directly to NEMA TS1/TS2, TEES Type 170/179, or 2070 ATC traffic controllers, including SDLC when the controller software supports it in all cabinet types.

At A Glance

- Stop Line, Dilemma Zone, or Advanced vehicle detection
- Cost Effective & Superior Value
- Loop replacement (non-intrusive detection)
- Presence or Pulse Outputs
- Custom trigger conditions
- Easy to install and configure
- Reliable Performance
- Minimal Maintenance
- Low Power Consumption
- 100Base-TX Ethernet to network
- 170/2070, TS1 & TS2 Controller Support

Installation Options:

- Detector Rack installation
  - 4 rear-edge outputs or up to 16 rear-edge outputs with expansion modules
  - 4 rear-edge status outputs for use with BIU
  - 12 outputs on front panel for wired I/O or to expansion modules
  - SDLC protocol emulates up to 4 BIU functions for up to 64 outputs
- Shelf-Mount Enclosure installation
  - 12 wired open-collector outputs on front panel
  - SDLC protocol emulates up to 4 BIU functions for up to 64 outputs

General Data

- Electrical
  - 10 to 30 VDC, 2.5W, power on read-edge connector
  - Consumption, current <100 mA @ 24 VDC
  - Reset Switch
- Interfaces
  - 44-terminal double row Cinch Jones card edge connector
  - DB-15 NEMA TS2 / TEES SDLC protocol
  - HD-15 for 12 open-collector outputs, 12 or 24 VDC, Ground True
  - RJ45 100Base-Tx Ethernet for PC Data Communication Protocol
  - 4x UMRR sensor interface
  - Optional external power supply
  - Debug and USB connectors (reserved)
- Supported Traffic Sensors:
  - Up to 4 AccuScan models with RS-485 output
- Detector Outputs
  - Up to 16 wired open-collector outputs with expansion module
    (4 detector outputs on rear-edge connector with status angle)
  - Port 1 SDLC protocol response offers up to 64 outputs
- Indicators
  - 24 status LEDs (4 x 6 grind) for diagnostics and 16 outputs (2 power, 2 heartbeat, 2 error, and 2 SDLC rack)
- Regulatory
  - NEMA TS2-2003 compliant
  - TEES
  - FCC Part 15, Class A
- Product support and training available

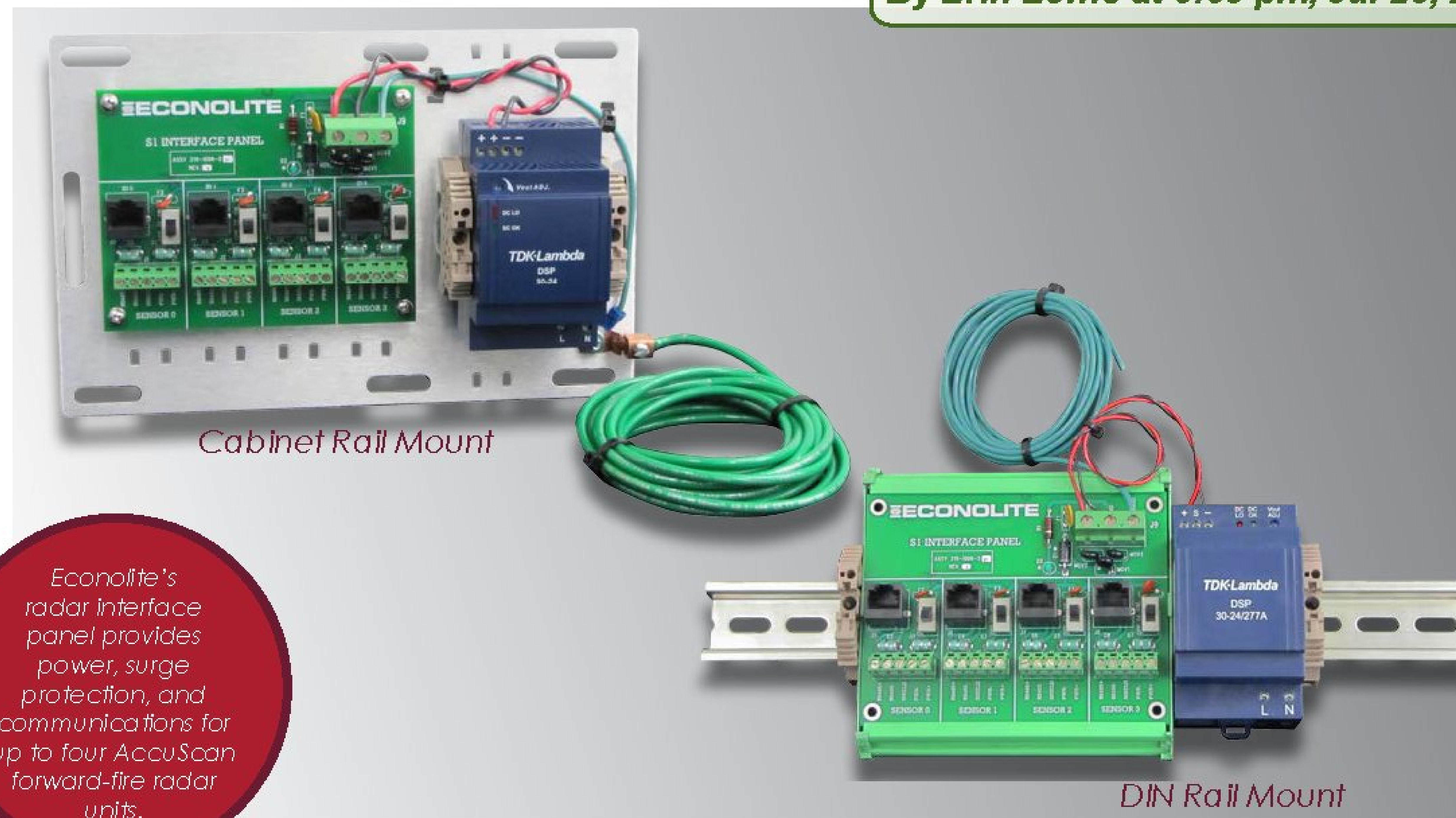
Basic Specifications

- Dimensions & Weight:
  - H x W x L: 114mm x 57mm??? x 178mm (4.5in x 2.2in x 7in)
  - Weight 0.4 kg (0.8 lb.)
- Environmental:
  - -34ºC to +74ºC (-29ºF to +165ºF)
  - 0 to 95% relative humidity, non-condensing
- Warranty – 2 years

ECONOLITE
3360 E La Palma Avenue, Anaheim, CA 92806 · 714-630-3700 · sales@econolite.com · www.econolite.com

Radar Interface Panels

APPROVED
By Erin Lewis at 5:08 pm, Jul 28, 2016



Cabinet Rail Mount

DIN Rail Mount

Econolite's radar interface panel provides power, surge protection, and communications for up to four AccuScan forward-fire radar units.

About the Interface Panels

Econolite's radar interface panels provide power, surge protection, and communications for up to four AccuScan forward-fire radar units. Typical installation includes a TMIB cabinet interface that provides Ethernet connectivity to the radar units. Direct RS-485 serial communications from the panel to the radar units is also possible. On the interface panel, each radar unit has its own power switch.

Easy to install and set-up, the radar interface panel provides a mechanical place to land cables coming from outside the cabinet and multiple layers of electrical surge suppression to help protect other cabinet equipment from outside surges and noise. Protection includes transformer isolation, MOV, gas discharge tubes, diode isolation, and resettable fuses. Power is 110 or 220 VAC to the replaceable power supply on the interface panel, typically wired from the protected side of the cabinet power distribution. No supplemental surge suppression will be required.

This small-footprint interface panel is available for cabinet rail or DIN rail mounting. A power LED indicates when the interface panel is active.

At A Glance

- Supports 1 to 4 AccuScan sensors
- Surge suppression and communications distribution
- Isolates TMIB from outside cabling
- Easy to install and wire
- DIN rail or cabinet rail mount
- Reliable Performance
- Minimal Maintenance
- LED power indicator
- Low Power Consumption
- TEES and NEMA compliant

Installation Options

- Cabinet Rail Mount
  - Slots support most cabinet rail spacing's
  - Rail lugs available separately
- DIN Rail Mount
  - DIN rail available separately

General Data

- Electrical
  - 110 or 220 VAC, 50 or 60 Hz, 30W
  - Ground wire to cabinet ground
- Interfaces
  - 4x 5-pin Phoenix connectors to radar units
  - 4x RJ12 connectors to TMIB cabinet interface (order appropriate number cables with panel)
- Indicators
  - Power Status LEDs on panel and power supply
- Environmental
  - -34°C to +74°C (-29°F to +165°F)
  - 0 to 95% relative humidity, non-condensing

  Regulatory:
  - NEMA TS 2-2003 compliant
  - TEES
  - FCC Part 15, Class A
- Product support and training available through the EGI Learning Center

Basic Specifications

- Dimensions & Weight (Cabinet Rail Mount):
  - W x L x H: 241mm x 160mm x 71mm (9.5in x 6.3in x 2.8in)
  - Weight 0.8 kg (1.8 lb.)
- Dimensions & Weight (DIN Rail Mount):
  - W x L x H: 185mm x 127mm x 67mm (7.3in x 5in x 2.6in)
  - Weight 0.7 kg (1.5 lb.)
- Warranty
  - 2 years

ECONOLITE
3360 E La Palma Avenue, Anaheim, CA 92806 · 714-630-3700 · sales@econolite.com · www.econolite.com

EAST COAST SIGNALS APPROVED FOR SUBMITTAL 7-18-16 MSF

DETECTION DATASHEET

AccuScan 300

APPROVED
By Erin Lewis at 5:08 pm, Jul 28, 2016

The advanced capabilities of radar-based detection far outweigh the simplicity of inductive loops.

About AccuScan 300

The cornerstone of any ITS program is vehicle detection at a signalized intersection. The key is for accurate, reliable and maintenance free vehicle presence detection at the stop bar. The Econolite AccuScan 300 radar-based detection solution is specifically designed to provide accurate stop bar detection for signalized intersection control. It provides up to six lanes of vehicle detection at up to 344 feet – enabling vehicle queue detection. AccuScan 300 is a forward-fire radar sensor delivering precise sampling measurements on an individual lane bases, ideal for single and multi-phase intersections. AccuScan 300 is an Intelligent Transportation System (ITS) solution with central management software that is convenient for fast integration to existing network infrastructure.

AccuScan 300 works with Econolite's radar sensor configuration and management software (TMConfigurator), which allows for easy sensor setup and programming of detection zones. AccuScan 300 is fully compatible with 170/2070 and NEMA controllers and multiple sensors and can be easily integrated into NEMA or 33X series cabinets using one full-width detector rack-compatible interface module (TMIB).

At A Glance

- Stop Bar vehicle and bike detection
- By lane detection accuracy
- Loop replacement (non-intrusive detection)
- Flexible installation
- On-board Attitude Sensor simplifies sensor aiming
- Custom trigger conditions
- ETA, Dilemma Zone, Queue Length, and Speed measurement
- Convenient installation wizard
- Geographical Awareness
- RS-485 and 100Base-TX Ethernet interface option
- 170/2070, TS1 & TS2 Interface available

ECONOLITE®

Intersection features and functions:

- Stop Bar Vehicle Detection for up to 6 lanes
- Counting and Classification
- Wrong Way Detection (vehicle moving opposite to the defined direction of traffic)
- Speed measurement

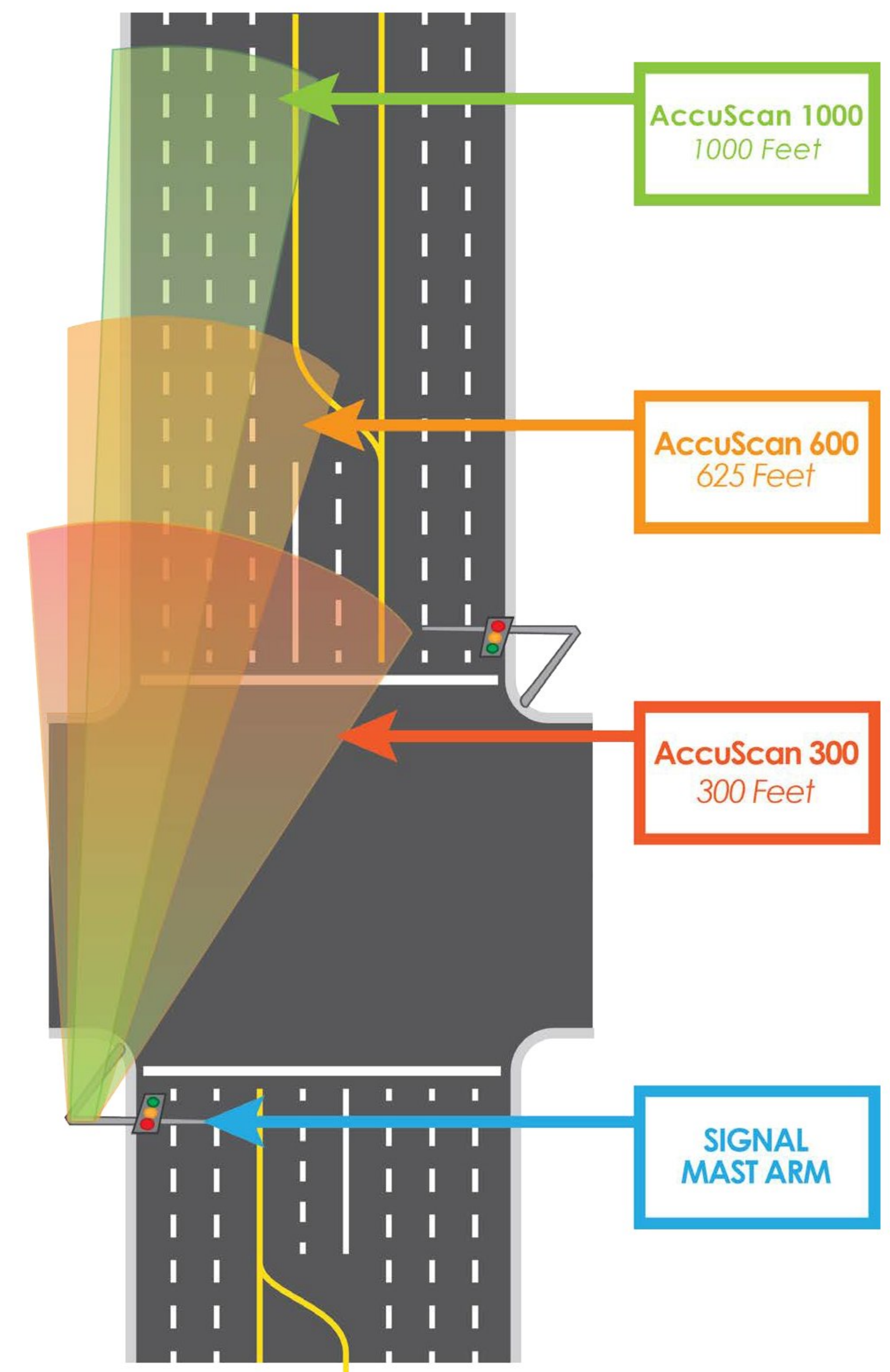
Installation Parameters:

- Traffic Direction: Approaching & Receding
- Typical Mounting Height: 18-24ft (6-8m)
- Typical Sensor Azimuth Angle: -12º
- Typical Sensor Elevation Angle: -6º
- Typical Stop Bar Detection Distance: 60-150ft (20-50m)

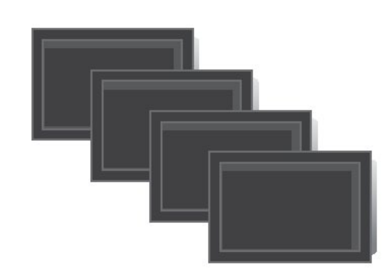
(Parameters may vary based on site geometry and detection objectives)

General Data:

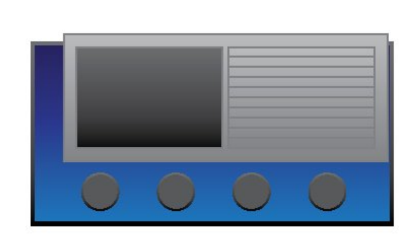
- Sensor Performance
  - Maximum Range Typ. 344 ft (105m)
  - Range Accuracy: Typ. < ±2.5% or < ±0.25m (bigger of)
  - Speed Accuracy: Typ. < ±0.28m/s or ±1% (bigger of)
  - Update Time: ≤ 50ms
  - Track Initialization Time: 6-10 cycles
  - Simultaneously Tracked Objects: up to 64
- Interface
  - RS485 half/full duplex
  - 100BaseT Ethernet
- Environmental
  - Ambient Temperature: -40ºF to +185ºF (-40ºC to +85ºC)
  - IP 67 (with connector mated)
- Mechanical
  - Weight (Approximate): 10.22oz (290g)
  - Dimensions (LxDxH)…3.7in x 1.5in x 3.3in (95mm, 38.1mm, 85mm)
  - Connector: Hirose LF10 series circular type
  - Power Supply: 24VDC, 3.7W
  - Frequency Band: 24GHz
- Compliance
  - ETSI EN 300-440, FCC part 15, RSS-310, RSS-210, SRRC, KCC, NCC
- Warranty
  - 2 Years
- Product support and training available through the EGI Learning Cente



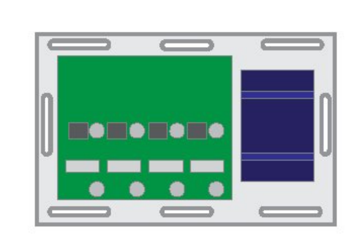
RADAR (x4)



CONTROLLER (x1)



INTERFACE PANEL (x1)



CABINET INTERFACE

ECONOLITE
3360 E La Palma Avenue, Anaheim, CA 92806 · 714-630-3700 · sales@econolite.com · www.econolite.com

EAST COAST SIGNALS APPROVED FOR SUBMITTAL 7-18-16 MSF

DETECTION DATASHEET

AccuScan 600

APPROVED
By Erin Lewis at 5:08 pm, Jul 28, 2016

The advanced capabilities of radar-based detection far outweigh the simplicty of inductive loops.

About AccuScan 600

Actively managing and controlling traffic at intersections and dilemma zones requires accurate extended vehicle detection from the stop bar to 500 feet before the stop bar. With Econolite's AccuScan 600 radar detection solution, agencies and MPOs can actively manage dilemma zones and intersections based on traffic demand to enhance safety and efficiency even on curved approaches. A single Econolite AccuScan 600 sensor enables up to six lanes of vehicle detection at various distances up to 625 feet from the mounting location of the sensor. By providing vehicle detection out to 625 feet, Econolite AccuScan 600 enables dilemma zone protection, green light extension, ETA, queue, and bicycle detection strategies. AccuScan 600 is an Intelligent Transportation System (ITS) solution with central management software that is convenient for fast integration to existing network infrastructure.

At A Glance

- Stop Bar and Advance vehicle detection – in one sensor
- Loop replacement (non-intrusive detection)
- Depth by-lane detection accuracy
- On-board Attitude Sensor simplifies sensor aiming
- Flexible installation
- Custom trigger conditions
- ETA, Dilemma Zone, Queue Length and Speed measurement
- Convenient installation wizard
- Geographical Awareness
- 100Base-TX Ethernet interface option
- 170/2070, TS1 & TS2 Interface

ECONOLITE®

Enhancing Safety

A research study by the Texas Department of Transportation (TxDOT) demonstrated that advance detection significantly reduced collision occurrence at intersections. The study on advance detection found:

- 58% reduction in red light violations
- 39% reduction in severe crash frequency
- 80% reduction in heavy-vehicle red light violations

Intersection Features & Options

- Stop bar and advance detection for up to 4 lanes
- Counting and classification
- Wrong way detection
- Speed measurement

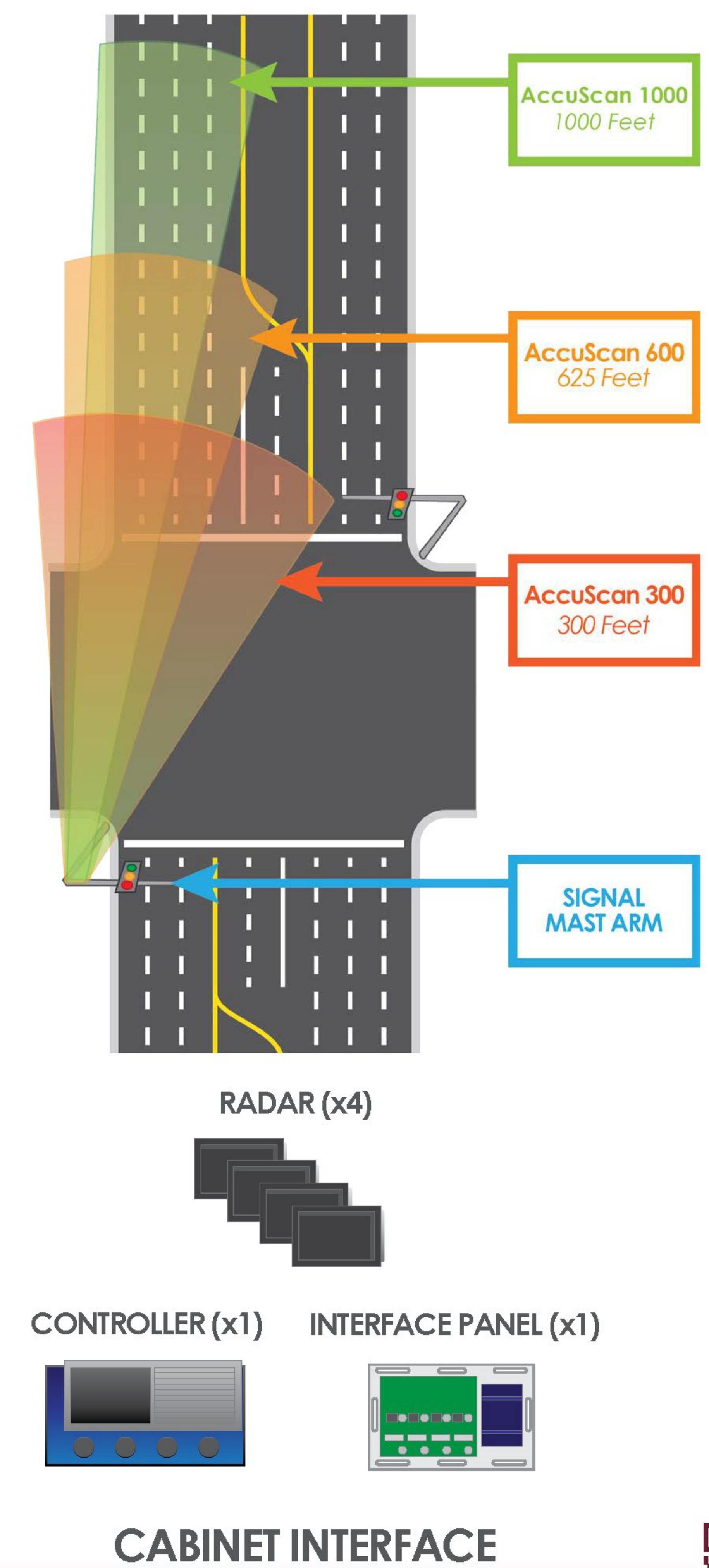
Installation Parameters

- Traffic Direction: Approaching & Receding
- Typical Mounting Height: 18-24ft (6-8m)
- Typical Sensor Azimuth Angle: -8º
- Typical Sensor Elevation Angle: -6º
- Typical Stop Bar Detection Distance: 60-150ft (20-50m)
- Typical Advance Detection Distance: 150ft-480ft (50-160m)

(Parameters may vary based on site geometry and detection objectives)

General Data

- Sensor Performance
  - Maximum Range Typ: 625 ft (190m)
  - Range Accuracy: Typ. < ±2.5% or < ±0.25m (bigger of)
  - Speed Accuracy: Typ. < ±0.28m/s or ±1% (bigger of)
  - Update Time: ≤ 50ms
  - Track Initialization Time: 6-10 cycles
  - Simultaneously Tracked Objects: up to 64
- Interface
  - RS485 half/full duplex
  - 100BaseT Ethernet
- Environmental
  - Ambient Temperature: -40ºF to +185ºF (-40ºC to +85ºC)
  - IP 67 (with connector mated)
- Mechanical
  - Weight (Approximate): 11.64oz (330g)
  - Dimensions (LxWxH): 4.3in x 1.5in x 3.8in(110mm, 38.1mm, 99mm)
  - Connector: Sensor LF10 series circular type
  - Power Supply: 24VDC, 3.7W
  - Frequency Band: 24GHz
- Compliance
  - ETSI EN 300-440, FCC part 15, RSS-310, RSS-210, SRRC, KCC, NCC
- Warranty
  - 2 Years
- Product support and training available through the EGI Learning Center



ECONOLITE
3360 E La Palma Avenue, Anaheim, CA 92806 · 714-630-3700 · sales@econolite.com · www.econolite.com

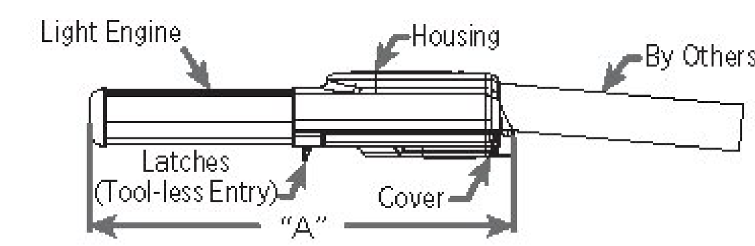
EAST COAST SIGNALS APPROVED FPR SUBMITTAL 7-18-16 MSF

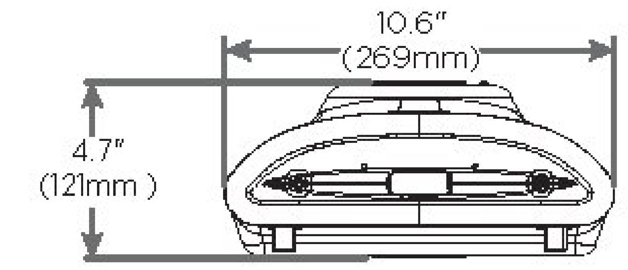
STR-LWY-4M-HT-IP-02-06

LEDway® IP66 Street Light – Type IV Medium – Horizontal Tenon Mount – 20–60 LEDs

Product Description

Luminaire housing is all aluminum construction. Standard luminaire utilizes terminal block for power input suitable for #2-#14 AWG wire. Luminaire is designed to mount on a 2" (51mm) IP, 2.375" (60mm) O.D. horizontal tenon or 1.25" (32mm) IP, 1.66" (42mm) O.D. horizontal tenon when ordered with XA-XIL125IP accessory kit and is adjustable +/-5° to allow for luminaire leveling (two axis T-level included). Horizontal tenon must be minimum 8" (203mm) long.





LED Count (x10)	Dimension	Measurements
02	"A"	17.5" (443mm)
03	"A"	17.5" (443mm)
04	"A"	22.0" (559mm)
05	"A"	22.0" (559mm)
06	"A"	22.0" (559mm)

Performance Summary

- Utilizes BetaLED® Technology
- Patented NanoOptic® Product Technology
- Made in the U.S.A. of U.S. and imported parts
- **CRI:** Minimum 70 CRI
- **CCT:** 5700K (+/- 500K) Standard, 4000K (+/- 300K)
- **Limited Warranty†:** 10 years on luminaire/10 years on Colorfast DeltaGuard® finish
- **EPA and Weight:** Reference EPA and Weight spec sheet

Accessories

Field Installed Accessories	
XA-BRDSPK30 (20-30 LEDs)	**XA-XSLBLS30 (20-30 LEDs)**
XA-BRDSPK60 (40-60 LEDs) Bird Spikes for Light Engine	**XA-XSLBLS60 (40-60 LEDs)** External Backlight Shield
XA-BRDSPKHSG Bird Spikes for Housing	**XA-XIL125IP** 1.25" (32mm) IP Pipe Sealing Kit

Ordering Information

Example: STR-LWY-4M-HT-02-E-UL-SV-525-IP-OPTIONS

STR-LWY	4M	HT		E				IP -
Product	**Optic**	**Mounting**	**LED Count (x10)**	**Version**	**Voltage**	**Color Options***	**Drive Current**	**Options**
STR-LWY	**4M** Type IV Medium	**HT** Horizontal Tenon	**02** **03** **04** **05** **06**	**E**	**UL** Universal 120-277V **UH** Universal 347-480V	**SV** Silver (Standard) **BK** Black **BZ** Bronze **PB** Platinum Bronze **WH** White	**525**** 525mA **700** 700mA	**IP IP66 Classification** **40K 4000K Color Temperature** - Color temperature per luminaire **DIM 0-10V Dimming** - Control by others - Refer to dimming spec sheet for details - Can't exceed specified drive current **F Fuse** - Not available with all ML options. Refer to ML spec sheet for availability with ML options - When code dictates fusing, use time delay fuse **HL Hi/Low (175/350/525 Dual Circuit Input)** - Refer to ML spec sheet for details - Sensor not included **ML Multi-Level** - Refer to ML spec sheet for details **N No Quick Disconnect Harness or Leveling Bubble** - Standard product features unless N option is specified **PD Power Door** - All connections between door and luminaire are shipped unconnected from the factory; door release spring included to open door automatically when the latches are released **R NEMA Photocell Receptacle** - Not available with all ML options. Refer to ML spec sheet for availability with ML options - Photocell by others - Intended for downlight applications at 0° tilt **SC Door Safety Tether** - Stainless steel aircraft cable **UTL Utility** - Includes exterior wattage label that reflects watts for the drive current selected. The ability to exceed selected drive current will be disabled

APPROVED
By Erin Lewis at 4:50 pm, Jul 28, 2016

† See www.cree.com/lighting/products/warranty for warranty terms.
* Light engine portion of extrusion is not painted and will remain natural aluminum regardless of color selection. ** Available on luminaires with 30-60 LEDs.

EAST COAST SIGNALS APPROVED FPR SUBMITTAL 7-18-16 MSF

Product Specifications

CONSTRUCTION & MATERIALS

- Housing is all aluminum construction
- Terminal block for power input suitable for #2-#14 AWG wire
- Luminaire is designed to mount on a 2" (51mm) IP, 2.375" (60mm) O.D. horizontal tenon or 1.25" (32mm) IP, 1.66" (42mm) O.D. horizontal tenon when ordered with XA-XIL125IP accessory kit and is adjustable +/-5° to allow for luminaire leveling (two axis T-level included). Horizontal tenon must be minimum 8" (203mmm) long
- Exclusive Colorfast DeltaGuard® finish features an E-Coat epoxy primer with an ultra-durable powder topcoat, providing excellent resistance to corrosion, ultraviolet degradation and abrasion. Standard is silver. Bronze, black, white, and platinum bronze are also available

ELECTRICAL SYSTEM

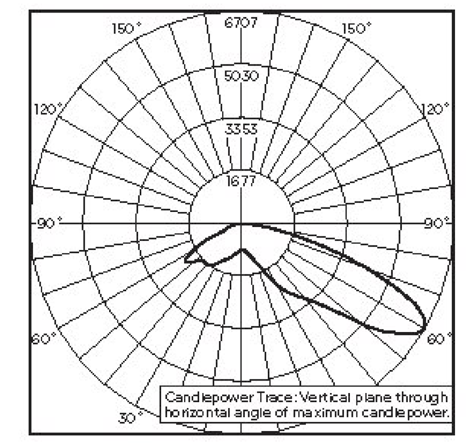
- **Input Voltage:** 120-277V or 347-480V, 50/60Hz, Class 1 drivers
- **Power Factor:** > 0.9 at full load
- **Total Harmonic Distortion:** < 20% at full load
- Quick disconnect harness suitable for mate and break under load provided on power feed to driver for ease of maintenance
- Integral 10kV surge suppression protection standard
- To address inrush current, slow blow fuse or type C/D breaker should be used

REGULATORY & VOLUNTARY QUALIFICATIONS

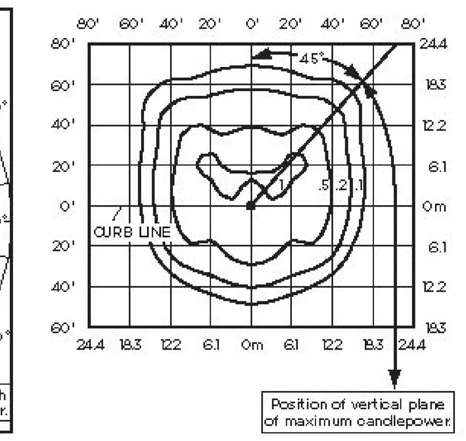
- cULus Listed
- Suitable for wet locations
- Enclosure rated IP66 per IEC 60529 when ordered without R or ML options
- Consult factory for CE Certified products
- Meets CALTrans 611 Vibration testing and GR-63-CORE Section 4.4.1/5.4.2 Earthquake Zone 4
- Certified to ANSI C136.31-2001, 3G bridge and overpass vibration standards
- 10kV surge suppression protection tested in accordance with IEEE/ANSI C62.41.2
- Luminaire and finish are endurance tested to withstand 5,000 hours of elevated ambient salt fog as defined in ASTM Standard B 117
- Product qualified on the DesignLights Consortium ("DLC") Qualified Products List ("QPL") when ordered without full backlight control shield
- RoHS Compliant
- Meets Buy American requirements within ARRA

Photometry

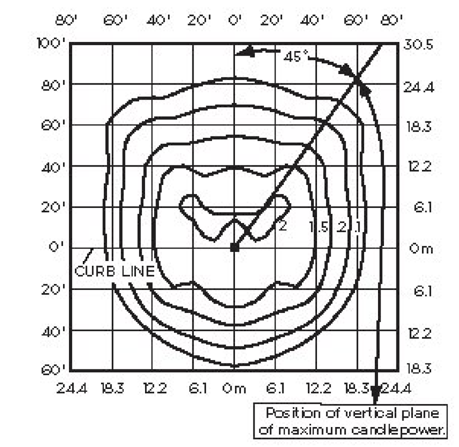
All published luminaire photometric testing performed to IESNA LM-79-08 standards by a NVLAP certified laboratory.



CESTL Test Report #: 2013-0028
STR-LWY-4M-**-06-E-UL-700-40K
Initial Delivered Lumens: 11,036



STR-LWY-4M-**-03-E-UL-700
Mounting Height: 25' (7.6m) A.F.G.
Initial Delivered Lumens: 5,907
Initial FC at grade



STR-LWY-4M-**-06-E-UL-700
Mounting Height: 25' (7.6m) A.F.G.
Initial Delivered Lumens: 11,683
Initial FC at grade

IES Files
To obtain an IES file specific to your project consult:
http://www.cree.com/lighting/tools-and-support/exterior-ies-configuration-tool

Lumen Output, Electrical, and Lumen Maintenance Data

Type IV Medium Distribution													
LED Count (x10)	5700K		4000K		System Watts 120-277V	System Watts 347-480V	TOTAL CURRENT						50K Hours Projected Lumen Maintenance Factor @ 15°C (59°F)**
	Initial Delivered Lumens	BUG Ratings* Per TM-15-11	Initial Delivered Lumens	BUG Ratings* Per TM-15-11			120V	208V	240V	277V	347V	480V	
525mA @ 25°C (77°F)													
03	4,725	B2 U0 G1	4,550	B2 U0 G1	53	55	0.45	0.26	0.23	0.21	0.16	0.13	93%
04	6,313	B2 U0 G1	6,079	B2 U0 G1	66	71	0.56	0.33	0.29	0.26	0.21	0.16	
05	7,839	B2 U0 G2	7,549	B2 U0 G2	86	87	0.72	0.42	0.37	0.33	0.25	0.19	
06	9,346	B2 U0 G2	9,000	B2 U0 G2	100	103	0.84	0.49	0.43	0.38	0.30	0.22	
700mA @ 25°C (77°F)													
02	3,977	B1 U0 G1	3,830	B1 U0 G1	47	51	0.39	0.23	0.21	0.19	0.15	0.12	91%
03	5,907	B2 U0 G1	5,688	B2 U0 G1	70	73	0.59	0.34	0.30	0.27	0.21	0.16	
04	7,891	B2 U0 G2	7,598	B2 U0 G2	91	93	0.77	0.45	0.39	0.35	0.27	0.20	
05	9,799	B2 U0 G2	9,436	B2 U0 G2	113	115	0.96	0.55	0.48	0.43	0.33	0.25	
06	11,683	B3 U0 G2	11,250	B2 U0 G2	134	135	1.13	0.65	0.57	0.50	0.39	0.29	

* For more information on the IES BUG (Backlight-Uplight-Glare) Rating visit www.iesna.org/PDF/Erratas/TM-15-11BugRatingsAddendum.pdf.
** For recommended lumen maintenance factor data see TD-13. Calculated L_{70} based on 10,000 hours LM-80-08 testing: > 150,000 hours in accordance with guidelines describing "successors to previously tested subcomponents" (Section 5) per Sep 9, 2011 ENERGY STAR guidelines.
See http://www.energystar.gov/ia/partners/prod_development/new_specs/downloads/luminaires/ENERGY_STAR_Final_Lumen_Maintenance_Guidance.pdf.

State of Vermont
Highway Safety & Design Section

Agency of Transportation
Project Delivery Bureau

TO: BOB SUCKERT, P.E., RESIDENT ENGINEER

FROM: ERIN LEWIS, P.E., PROJECT MANAGER

DATE: OCTOBER 11, 2016

SUBJECT: MORRISTOWN STPG SGNL(47) – CULVERT AND TRAFFIC CAMERAS REVIEW

We have completed our review of the Pedestrian Culvert Camera System and Traffic Signal Monitoring Camera dated **9/19/16** for the subject project. Based on our review, the equipment is **approved** per the attachment.

Please let me know if you have any questions.

EPL:epl

Attachments: Approved Submittal

cc: Project File
Chris Williams, Regional Construction Engineer
Glenn Lavoie, Winterset Inc.
Mike Clark, Winterset Inc.
Matt Fisher, East Coast Signals

Large Single Door

Highway Tech Signal Equipment Sales, Inc.
6 Gardiner Road / P.O. Box 3180
Sabattus, ME 04280
Tel. (207) 375-8248
Fax (207) 375-8279

APPLICATION - NEMA 3R

APX Enclosures, Inc. 3R large single door enclosures are designed to house electronic controls, terminals, and instruments, and to **provide protection from rain, sleet, snow, dripping water and corrosion, while providing ventilation.**

APPLICATION - NEMA 4X

APX Enclosures, Inc. 4X large single door enclosures are designed to house electronic controls, terminals, and instruments, and to **provide protection from rain, sleet, snow, dripping water and corrosion, as well as hosedown, splashing water, oil or coolant seepage.**

INDUSTRY STANDARD:

U.L. Type 3R, 4X

NEMA 3R SHOWN

STANDARD CONSTRUCTION:

(For details see specification sheets.)

A. ENCLOSURE:

1. The complete enclosure is made from .125" thick aluminum alloy type 5052-H32 to provide a strong and rigid construction. Alternative material is 14 gauge type 304 stainless steel. (Specifier must choose the material to be used.)
2. Each enclosure is equipped with two adjustable "C" mounting channels on both side walls, and back wall, providing versatile positioning of shelves, or optional panels or rack mounting angles.
3. The door frame opening is double flanged on all four sides. These flanges increase the strength of door opening and help prevent dust and liquids from dropping into the enclosure when the door is opened.
4. All exterior seams are ground smooth or sealed weathertight with silicone sealant.
5. Pole or wall mounted enclosures have welded stiffener plates to reinforce the top and bottom of rear wall. Welded bottom plates are standard on pole mounted enclosures. A removable bolt-on bottom plate is available as an option.
6. (3R only) Enclosures have provisions for mounting a forced-air fan system that can be thermostatically controlled, and air is exhausted through a slotted vent system in the roof overhang.

B. DOOR:

1. All doors are equipped with a three-point latching mechanism with nylon rollers at the top and bottom.
2. Each door handle is .75" stainless steel round bar and has provisions for a padlock.
3. (3R only) The standard main door lock is Corbin #1548-1 or equal.
4. (3R only) A louvered air vent with filter-retaining brackets and a disposable paper filter element is provided.
5. The main door is sealed with closed-cell neoprene gasket.
6. The continuous door hinge is .075" thick stainless steel with a .25" stainless steel hinge pin.
7. The switch compartment with removable back panel is standard and also made from .125" thick aluminum alloy type 5052-H32. This back can optionally be replaced with a clear lexan window to provide for limited access inspection of operating components or instrumentation.
8. The switch compartment door hinge is 14 gauge stainless steel with a .120 stainless steel hinge pin.

C. FINISH:

1. Natural aluminum enclosures are mill finish per federal specification QQA-250/8.
2. Painted enclosures are treated with an iron phosphate coating and dried by radiant heat.

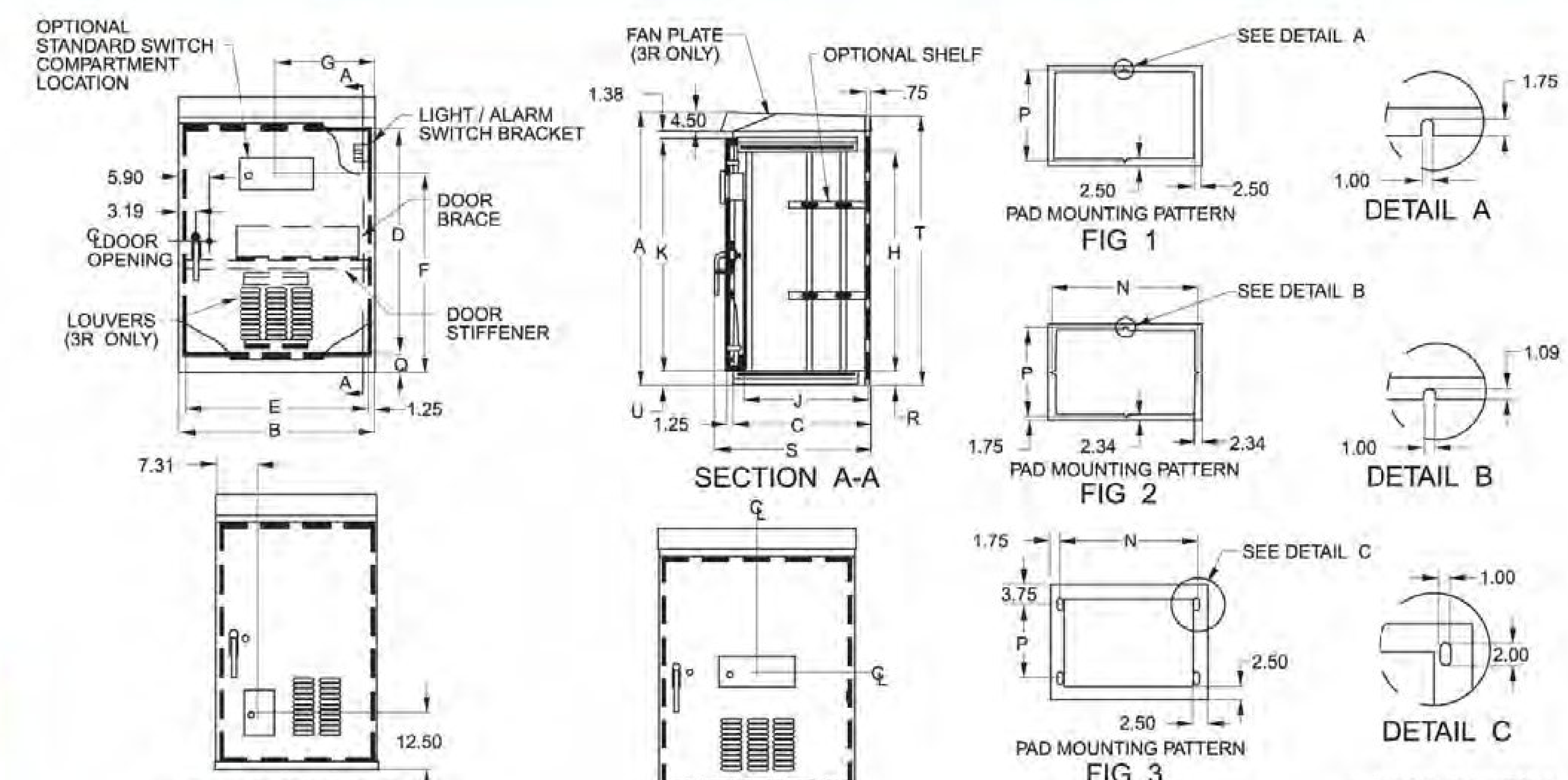
FOR NEMA TYPE 4X RATING:
***DELETE** all vents and main door lock (Corbin #1548-1), and Corbin R357SGS switch compartment lock.*
***ADD** Chicago #1703-100-G switch compartment lock.*
All through holes are sealed.

G-Cabinet will be supplied with 1 Shelf and aluminum backpanel. Cabinet shall be painted Black

LARGE SINGLE DOOR

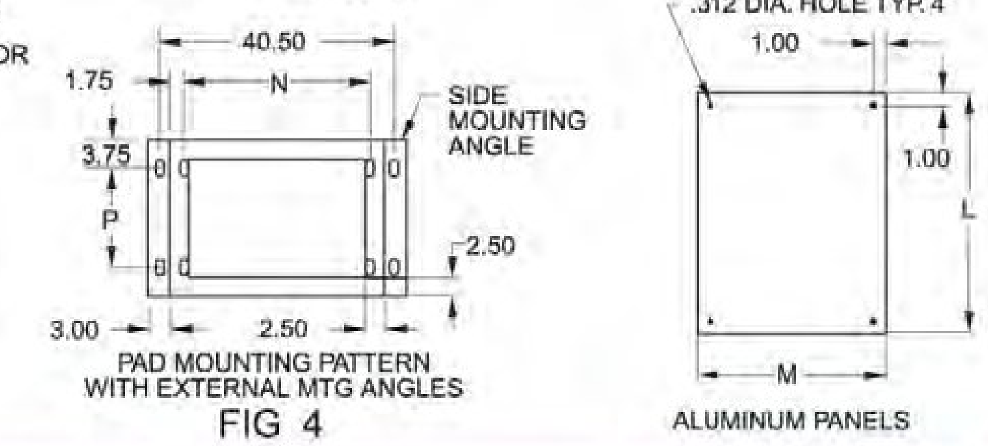
Large Single Door

LARGE SINGLE DOOR



OPTIONAL LOCATION FOR 'B' SWITCH COMPARTMENT

OPTIONAL LOCATION FOR 'D' OR 'C' SWITCH COMPARTMENTS



OPTIONS:

- Panels
- Locks: Special Keying
- Windows
- Painted Finishes
- Filters
- Rack Rails
- Shelves
- Custom Equipment Mounting
- Pedestal Adapter (reinforced bottom)
- Swing Rack
- Climate Control
- Air conditioner
- Sunshields
- Insulation *
- Heater
- Forced Air Ventilation-Fan (3R only)

DIMENSIONS (inches)

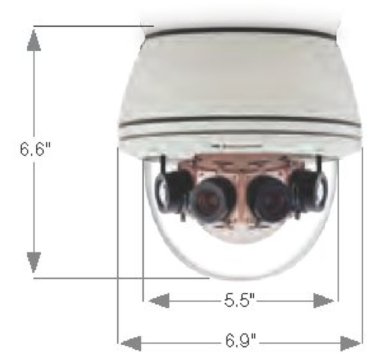
CATALOG NUMBER	MOUNTING OPTIONS			OVERALL ENCLOSURE			DOOR OPENING		SWITCH COMPARTMENT LOCATION		AVAILABLE EQUIPMENT SPACE		DOOR HEIGHT	PANEL SIZE		PAD MTG. PATTERN		MISCELLANEOUS DIMENSIONS				
	PED	POLE	PAD	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U
FIG.1																						
TC301815	YES	YES	YES	30.00	18.00	15.00	21.00	15.50	16.81	8.00	19.00	11.31	23.25	22.63	15.00	N/A	12.50	2.00	3.00	18.62	28.50	.88
TC362015	YES	YES	YES	36.00	20.00	15.00	27.00	17.50	23.25	10.00	25.00	11.31	29.25	28.63	17.00	N/A	12.50	2.00	3.00	18.62	34.50	.88
TC412516	YES	YES	YES	41.00	25.00	16.00	32.00	22.50	28.25	12.50	30.00	12.31	34.25	33.63	22.00	N/A	13.50	2.00	3.00	19.62	39.50	.88
TC512516	YES	YES	YES	51.00	25.00	16.00	42.00	22.50	34.25	12.50	40.00	12.31	44.25	43.63	22.00	N/A	13.50	2.00	3.00	19.62	49.50	.88
FIG.2																						
TC503017	NO	YES	YES	50.00	30.00	17.00	39.00	27.50	37.25	15.00	39.00	13.31	41.25	42.63	27.00	26.50	13.50	4.00	3.00	20.62	48.50	2.88
TC503617	NO	NO	YES	50.00	36.00	17.00	39.00	33.50	37.25	18.00	39.00	13.31	41.25	42.63	33.00	32.50	13.50	4.00	3.00	20.62	48.50	2.88
TC583017	NO	NO	YES	58.00	30.00	17.00	47.00	27.50	45.25	15.00	47.00	13.31	49.25	50.63	27.00	26.50	13.50	4.00	3.00	20.62	56.50	2.88
TC763017	NO	NO	YES	76.00	30.00	17.00	65.00	27.50	63.25	15.00	65.00	13.31	67.25	68.63	27.00	26.50	13.50	4.00	3.00	20.62	74.50	2.88
FIG.3																						
TC363624	NO	NO	YES	36.00	36.00	24.00	25.00	33.50	23.25	18.00	25.00	20.31	27.25	28.63	33.00	32.50	18.50	4.00	3.00	27.62	34.50	2.88
TC443624	NO	NO	YES	44.00	36.00	24.00	33.00	33.50	31.25	18.00	33.00	20.31	35.25	36.63	33.00	32.50	18.50	4.00	3.00	27.62	42.50	2.88
TC553826	NO	NO	YES	55.00	38.00	26.00	44.00	35.50	39.37	19.00	44.00	22.31	46.25	48.25	35.00	34.50	18.50	4.00	3.00	29.62	53.50	2.88
TC554426	NO	NO	YES	55.00	44.00	26.00	44.00	41.50	39.37	22.00	44.00	22.31	46.25	48.25	41.00	40.50	18.50	4.00	3.00	29.62	53.50	2.88
TC723618	NO	NO	YES	72.00	36.00	18.00	61.00	33.50	45.00	18.00	61.00	14.31	63.25	65.25	45.00	32.50	13.50	4.00	3.00	21.62	70.50	2.88
TC773826	NO	NO	YES	77.00	38.00	26.00	66.00	35.50	50.00	19.00	66.00	22.31	68.25	70.25	35.00	34.50	18.50	4.00	3.00	29.62	75.50	2.88
TC774426	NO	NO	YES	77.00	44.00	26.00	66.00	41.50	50.00	22.00	66.00	22.31	68.25	70.25	41.00	40.50	18.50	4.00	3.00	29.62	75.50	2.88

APPROVED
By Erin Lewis at 8:06 am, Oct 11, 2016

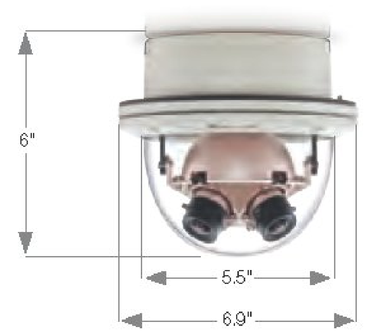
Arecont Vision®
Leading the Way in Megapixel Video™

Configuration

SurroundVideo (8MP, 20MP and 40MP Models)



Surface Mount



In-Ceiling Mount

SurroundVideo WDR (12MP Models)

Surface Mount

Accessories (Sold Separately)

AV-CRMA
Corner Mount Adapter

AV-EBA
Electrical Box Adapter Plate for SV-WMT, MD-WMT2, HSG2-WMT, MicroDome® and MegaView®

AV-JBA
Junction Box Adapter for HSG2-WMT, D4S-WMT. Replacement Part for: MegaView® 2, AV-PMJB, AV-WMJB

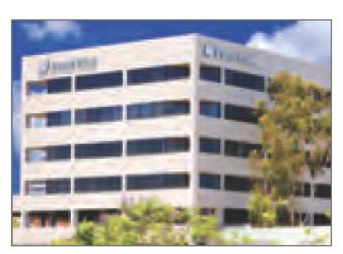
AV-PMA
Pole Mount Adapter

AV-PMJB
Pendant Mount Bracket with Junction Box (Mount Cap not included) for SurroundVideo Omni Series – 1.5" NPT Female

AV-WMJB
Wall Mount Bracket with Junction Box (Mount Cap not included) for SurroundVideo Omni Series – 1.5" NPT Female

SV-CAP
Cap only for 8MP, 20MP and 40MP Panoramic SurroundVideo Models – 1.5" NPT Male

SV-FMA
False Ceiling Flush Mount Adapter for Day/Night Panoramic Series



Global Sales and Support

Arecont Vision is the leading manufacturer of high-performance megapixel IP cameras and associated software.

Americas

Los Angeles, CA, USA
Arecont Vision, LLC. Headquarters
425 E. Colorado St., 7th Floor
Glendale, CA 91205, USA

Phone: +1.818.937.0700
Toll Free: 877.CAMERA.8
Fax: +1.818.937.0464

Sales
Phone: +1.818.937.0700 x 3
Email: avsales@arecontvision.com

Support
Phone: +1.818.937.0700 x 1
Email: support@arecontvision.com

Latin America
Email: latam.sales@arecontvision.com

EMEA

Düsseldorf, Germany
Phone: +49.69.6953.4600
Email: europe.sales@arecontvision.com

Moscow, Russia
CJSC Arecont Vision
Phone: +7.495.649.0577
Fax: +7.495.221.5227
Email: info@arecontvision.ru

Middle East
Email: mena.sales@arecontvision.com

Africa
Email: africa.sales@arecontvision.com

APAC

China
Phone: +86.180.0179.1799
Alt. Phone: +1.818.937.0700 x 3
Fax: +1.818.649.3404
Email: apac.sales@arecontvision.com

Rev 003.002

Arecont Vision®

SurroundVideo® IP Megapixel Dome Cameras

8–40MP H.264 All-in-One 180° and 360° Panoramic True Day/Night Indoor/Outdoor Dome IP Cameras with WDR (Wide Dynamic Range) Models

WDR 180° Panoramic

WDR 360° Panoramic

180° Panoramic

360° Panoramic

ONVIF | S

180° and 360° Panoramic Coverage with Exceptional Resolution – **Surround**Video

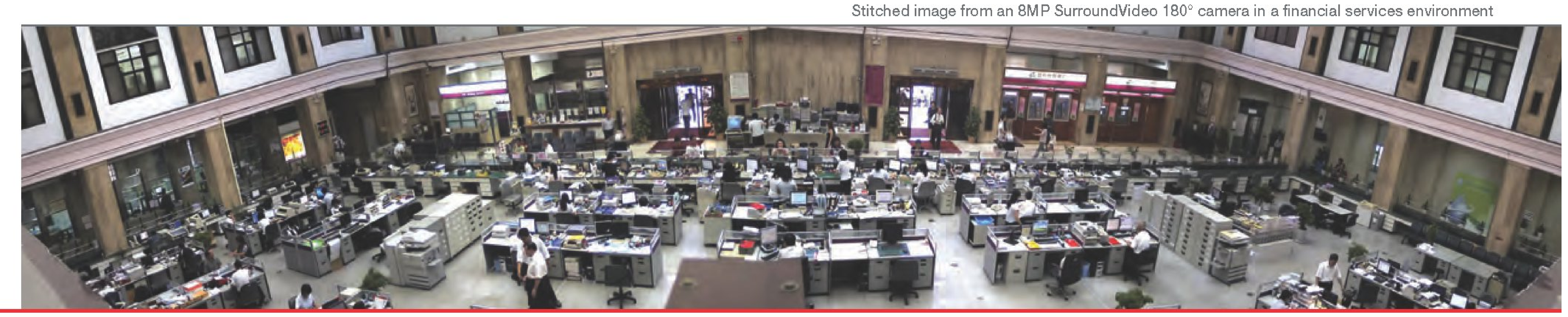
SurroundVideo panoramic view IP megapixel cameras provide all-in-one solutions for wide area video surveillance. Four sensors and lenses are housed in a impact-resistant IP66 dome enclosure. The cameras are available in 180° and 360° configurations and resolutions of 8-, 12-WDR, 20- and 40- megapixels (MP). A single SurroundVideo panoramic camera can replace multiple conventional cameras with the ability to zoom into multiple regions of interest.

Highlighted Features:

- Industry's First 8MP, 12MP, 20MP and 40MP Panoramic Megapixel Cameras
- Optional True WDR up to 100dB at Full Resolution Available on 12MP Models: See Clearly in Shaded and Bright Light Conditions Simultaneously
- Forensic Zooming – Zoom Live or After the Event While Recording Full Field of View in HD – Replace PTZ Devices
- Binning Mode for Strong Low Light Performance in 12MP, 20MP and 40MP Models
- Bit Rate Control and Multi-Streaming
- True Day/Night Functionality with Mechanical IR Cut Filter
- Outdoor Rated IP66 and IK-10 Impact-Resistant Housing
- Total PoE Solution (WDR Models)
- PoE and Auxiliary Power: 12–48V DC/24V AC
- Easily Adjustable 2-Axis Camera Gimbal with 360° Pan and 90° Tilt
- +/- 5° Electrical Vertical Alignment to Locate Each Sensor Position (180° Series)
- +/- 10° (+/- 7° WDR) Mechanical Tilt Adjustment to Locate Each Sensor Angle (360° Series)
- Complete Mounting Options
- Dual Encoder H.264/MJPEG
- Privacy Mask, Motion Detection and Flexible Cropping
- Fast Frame Rates
- ONVIF Profile S Conformant

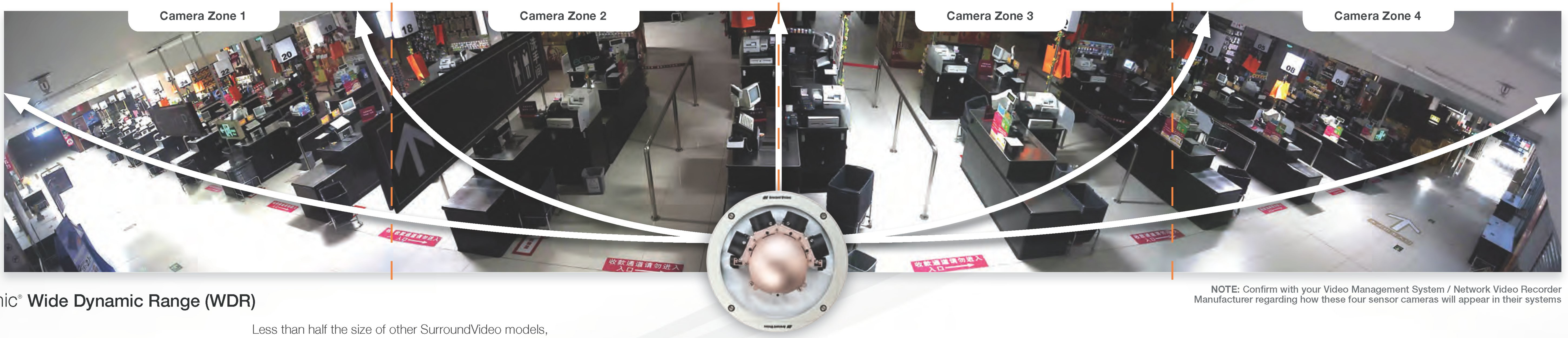
180° Panoramic | 360° Panoramic (8–20MP Models) | True Day/Night with IR Cut Filter | All-in-One Dome Solution with Integrated Lenses | Impact / Weather Resistant IK-10 and IP66 Rated | Pixel Binning Mode (12–40MP Models) | Wide Dynamic Range (12MP Models) | Heater/Blower (8, 20, and 40MP Models) | Dual Encoder H.264/MJPEG

Stitched image from an 8MP SurroundVideo 180° camera in a financial services environment



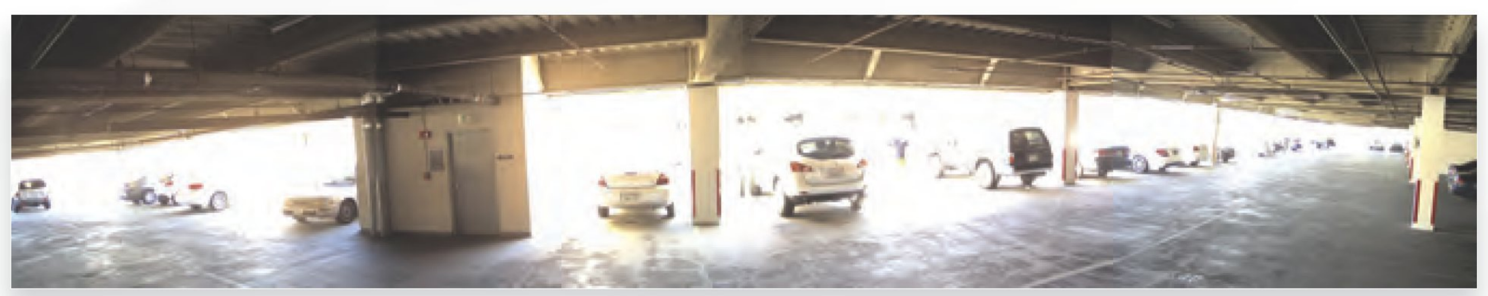
Higher Resolution up to 40 Megapixels + Panoramic Field of View = Greater ROI

Arecont Vision megapixel technology delivers superior image quality and reduces overall system costs by covering larger areas with fewer cameras. An area typically requiring multiple pan-tilt-zoom (PTZ) cameras or multiple fixed cameras can be covered with a single SurroundVideo® panoramic camera. The cameras deliver comprehensive coverage and forensic detail, all without the need for an operator to direct them or the propensity to be facing the wrong way when an incident occurs. Highly cost-efficient solutions, SurroundVideo panoramic cameras virtually obsolete the need for and related expense of PTZ cameras.

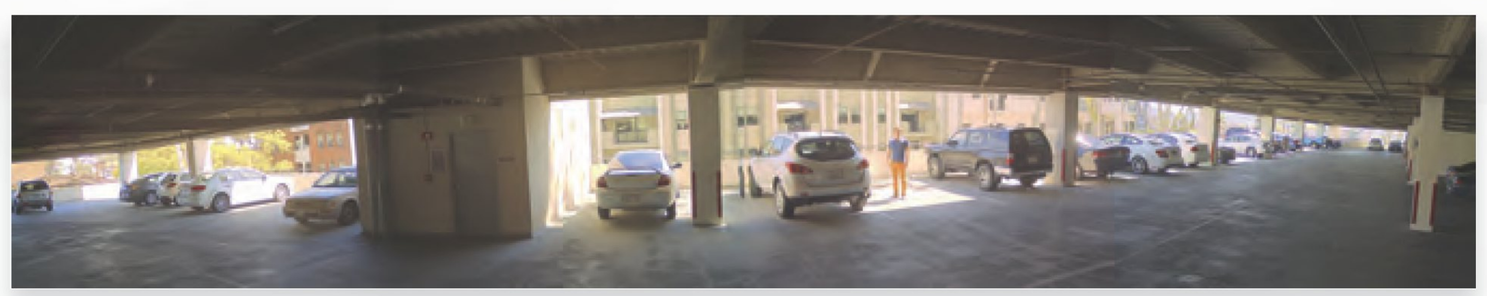


NOTE: Confirm with your Video Management System / Network Video Recorder Manufacturer regarding how these four sensor cameras will appear in their systems

Compact 180° and 360° MegaDynamic® Wide Dynamic Range (WDR)

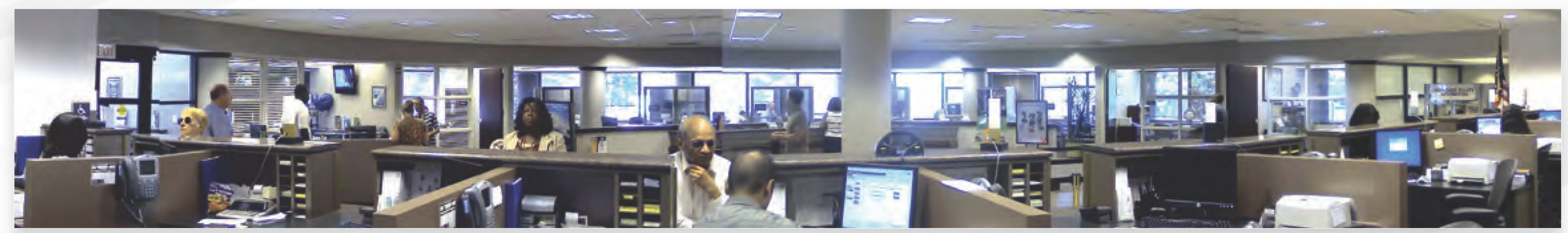


Megapixel image without WDR

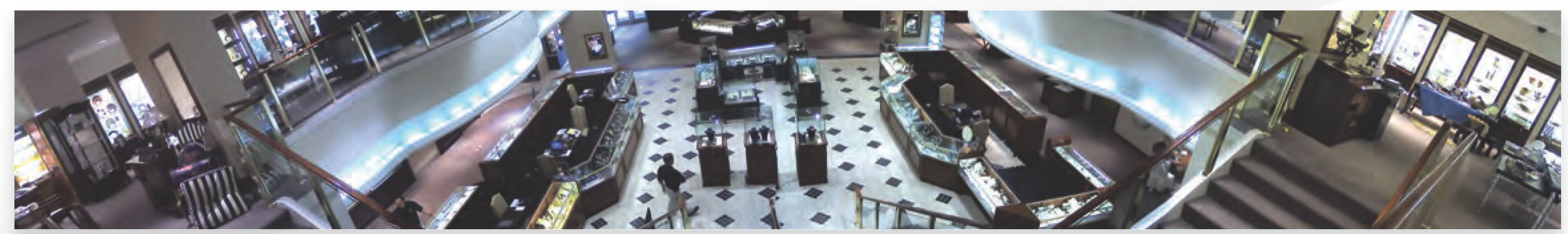


Megapixel image with WDR

Less than half the size of other SurroundVideo models, the 12MP SurroundVideo WDR cameras (AV12186DN and AV12366DN) produces clear images in extreme lighting conditions. Our WDR technology delivers a dynamic range of up to 100dB at full resolution and without lowering frame rates, maximizing the amount of detail in both bright and dark areas of a scene. The WDR performance of Arecont Vision cameras represents an up to 50dB improvement (300x) in dynamic range compared to non-WDR cameras.



Stitched image from a SurroundVideo 180° camera in a banking environment



Stitched image from a SurroundVideo 180° camera in a retail environment

Extended Motion Detection*

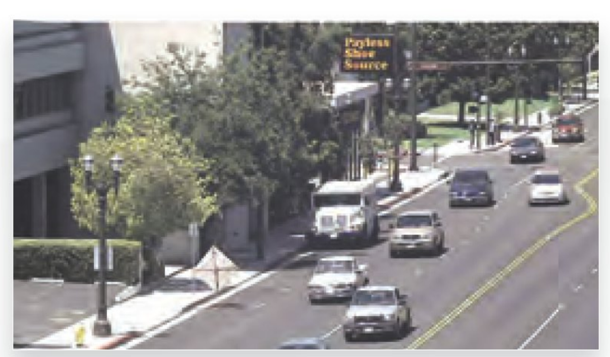
64 Zones

1,024 Zones

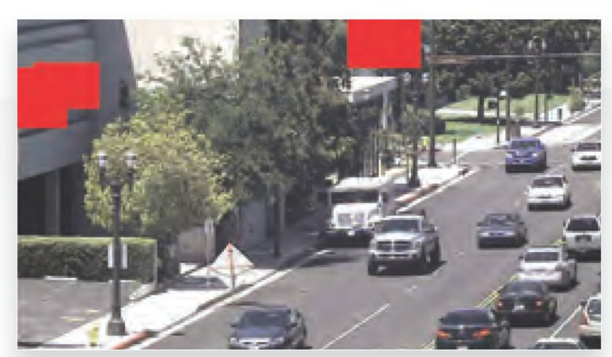
Extended motion detection offers a high granularity grid of 1,024 distinct motion detection zones.

*Examples shown with one of four sensors

Privacy Mask*



Normal



Masked

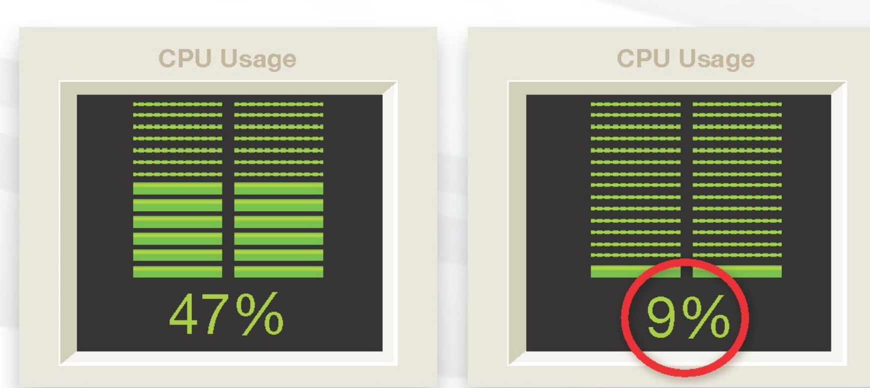
Privacy mask is the ability to select multiple regions of an arbitrary shape and block the video. It is supported by both HTTP and TFTP protocols, and features an on-board web interface.

*Examples shown with one of four sensors

Compliant H.264 Compression

SurroundVideo's compliant implementation of H.264 allows full frame rates and full resolution without sacrificing image quality. With bit rate control, the CPU load is decreased at both the client (decompression) side and the server/storage side, allowing lower bandwidth and storage relative to MJPEG. Real Time Streaming Protocol (RTSP) allows for compatibility with media players such as Apple QuickTime®, VLC and others.

H.264 Decompression (example)



2MP with live video in MJPEG

2MP with live video in H.264

Product Comparison

2X

Model	Panoramic Configuration	Sensor	Resolution	Max Frame Rate @ Full Resolution	Minimum Illumination	Lens	WDR	H.264 MJPEG	True Day/Night	Binning Mode	Heater/Blower Option
AV8185DN	180°	8MP (2MP x 4)	6400 x 1200	6fps	Color: 0.2 Lux B/W: 0 Lux, IR Sensitive	CS, 7.8mm, 1/2", F1.8, IR, H-FOV = 47°		•	•		•
AV8365DN	360°	8MP (2MP x 4)	6400 x 1200	6fps	Color: 0.2 Lux B/W: 0 Lux, IR Sensitive	CS, 3.5mm, 1/2", F1.8, IR, H-FOV = 96°		•	•		•
AV8185CO	180°	8MP (2MP x 4)	6400 x 1200	6fps	Color: 0.2 Lux	CS, 7.8mm, 1/2", F1.8, IR, H-FOV = 47°		•			•
AV8365CO	360°	8MP (2MP x 4)	6400 x 1200	6fps	Color: 0.2 Lux	CS, 3.5mm, 1/2", F1.8, IR, H-FOV = 96°		•			•
AV12186DN	180°	12MP (3MP x 4)	8192 x 1536	5.2fps	Color (Non-Binning): 0.5 Lux Color (Binning): 0.25 Lux B/W: 0 Lux, IR Sensitive	M12, 5.4mm, 1/3.2", F2.0, IR, H-FOV = 47°	•	•	•	•	Comes with Blower
AV12366DN	360°	12MP (3MP x 4)	8192 x 1536	5.2fps	Color (Non-Binning): 0.5 Lux Color (Binning): 0.25 Lux B/W: 0 Lux, IR Sensitive	M12, 2.6mm, 1/2.5", F2.0, IR, H-FOV = 96°	•	•	•	•	Comes with Blower
AV20185DN	180°	20MP (5MP x 4)	10240 x 1920	3.5fps	Color (Non-Binning): 0.3 Lux Color (Binning): 0.15 Lux B/W: 0 Lux, IR Sensitive	CS, 6.2mm, 1/2.5", F1.8, IR, H-FOV = 47°		•	•	•	•
AV20365DN	360°	20MP (5MP x 4)	10240 x 1920	3.5fps	Color (Non-Binning): 0.3 Lux Color (Binning): 0.15 Lux B/W: 0 Lux, IR Sensitive	CS, 3.5mm, 1/2.5", F1.8, IR, H-FOV = 96°		•	•	•	•
AV20185CO	180°	20MP (5MP x 4)	10240 x 1920	3.5fps	Color (Non-Binning): 0.3 Lux Color (Binning): 0.15 Lux	CS, 6.2mm, 1/2.5", F1.8, IR, H-FOV = 47°		•		•	•
AV20365CO	360°	20MP (5MP x 4)	10240 x 1920	3.5fps	Color (Non-Binning): 0.3 Lux Color (Binning): 0.15 Lux	CS, 3.5mm, 1/2.5", F1.8, IR, H-FOV = 96°		•		•	•
AV40185DN	180°	40MP (10MP x 4)	14592 x 2752	1.5fps	Color (Non-Binning): 0.3 Lux Color (Binning): 0.15 Lux B/W: 0 Lux, IR Sensitive	CS, 7.2mm, 1/2.3", F2.4, IR, H-FOV = 47°		•	•	•	•

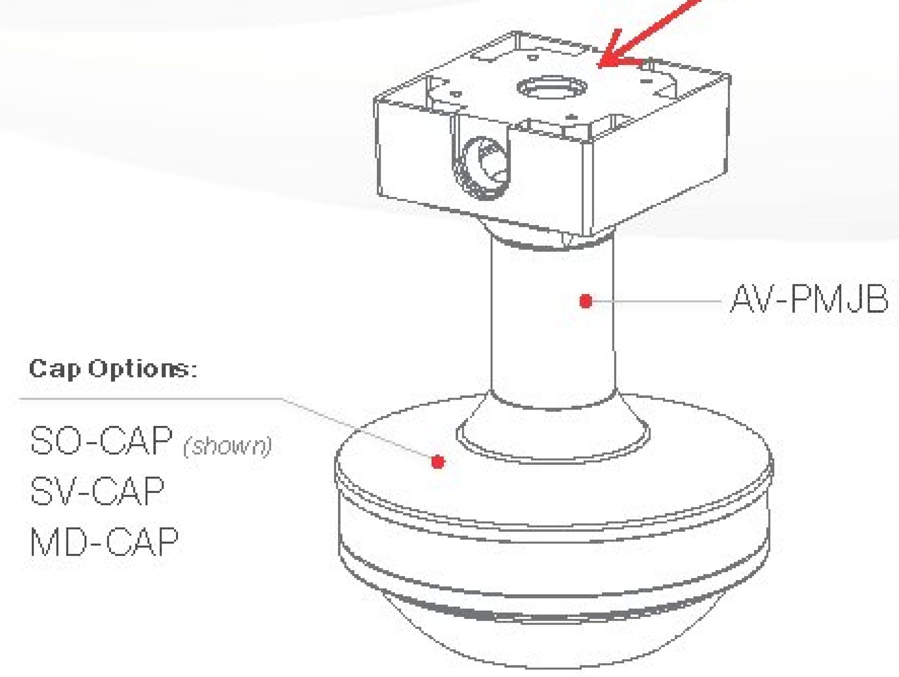
APPROVED
By Erin Lewis at 8:06 am, Oct 11, 2016

Arecont Vision®
Leading the Way in Megapixel Video™

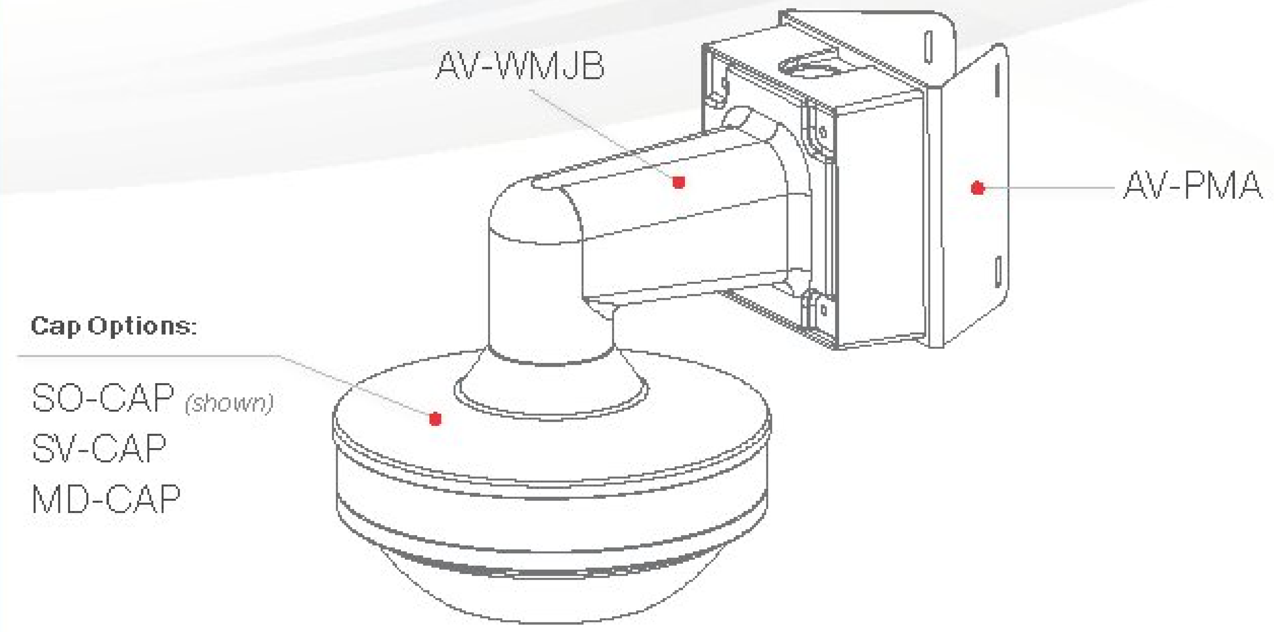
Standard Dome Accessories

Accessories for Indoor/Outdoor Ceiling, Wall, Pole and Corner Mounting Solutions

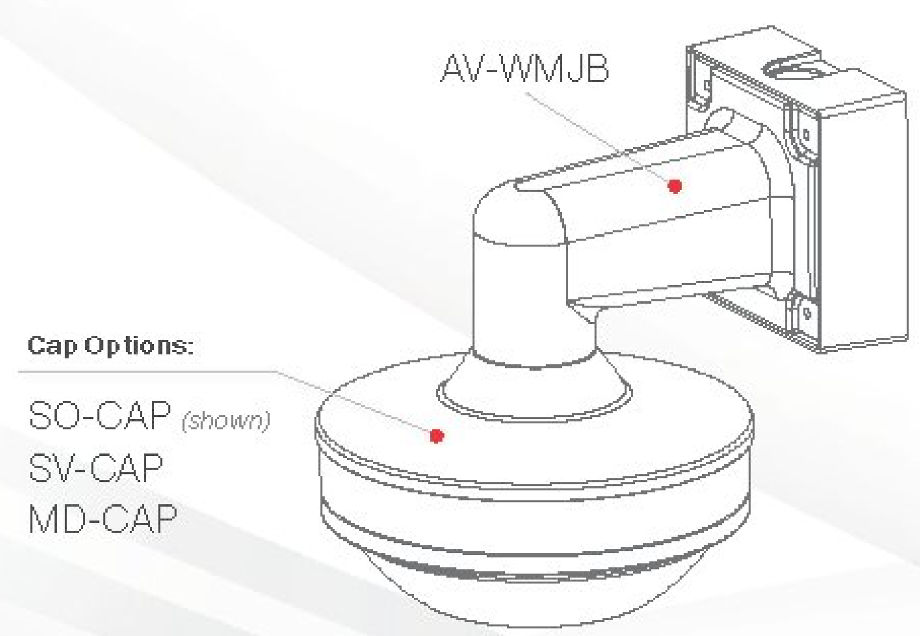
Ceiling Mount Configuration



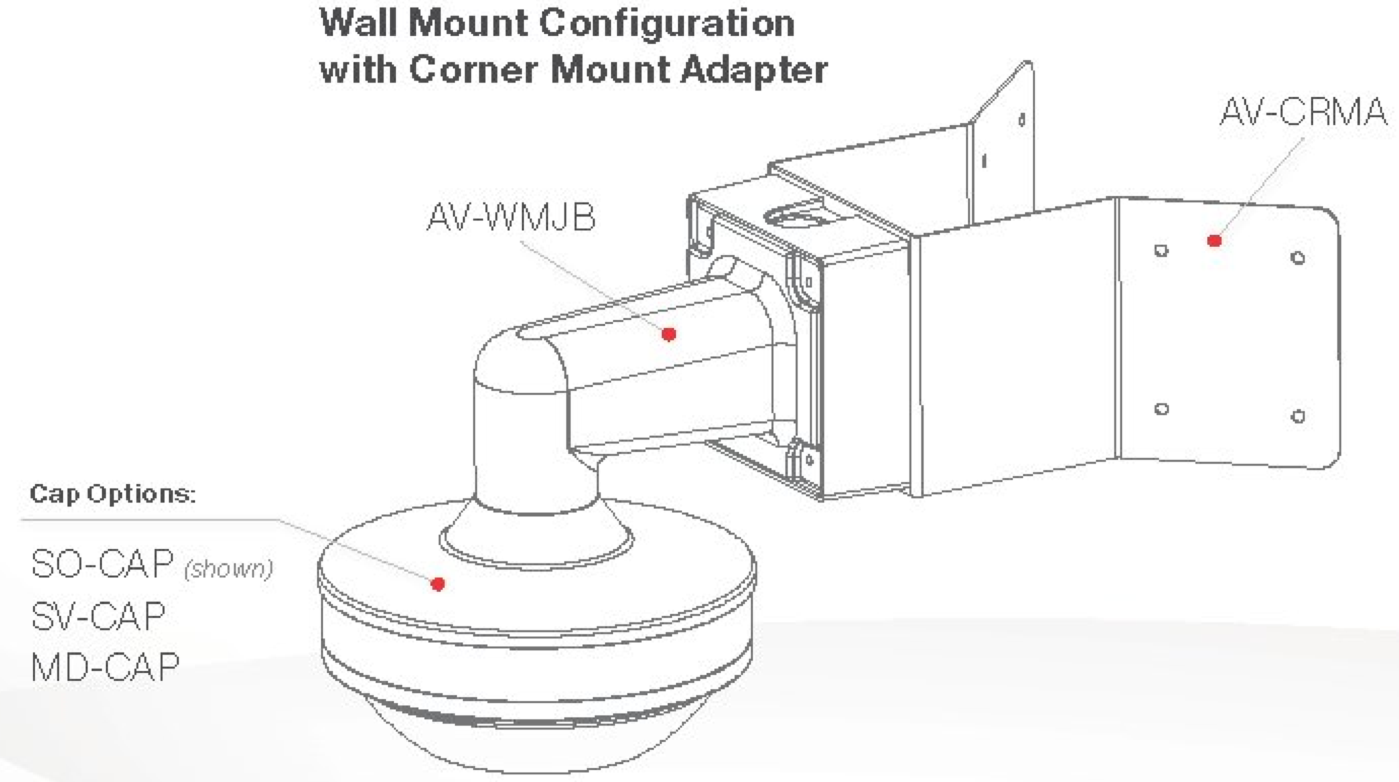
Wall Mount Configuration with Pole Mount Adapter



Wall Mount Configuration

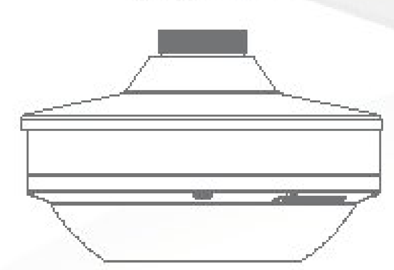


Wall Mount Configuration with Corner Mount Adapter



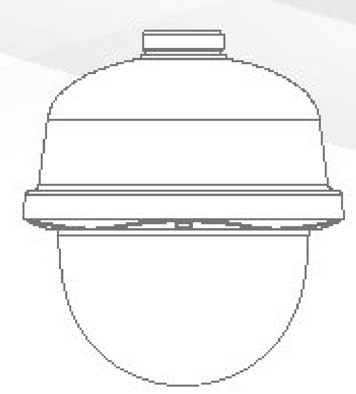
Cap Options:

SO-CAP



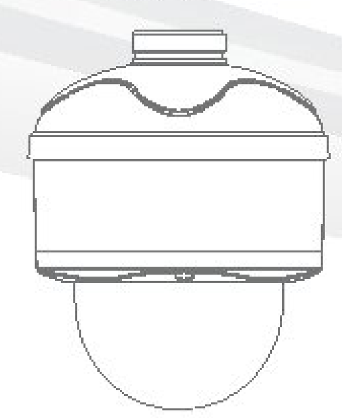
Works with SurroundVideo® Omni and SurroundVideo® Omni G2

SV-CAP



Works with SurroundVideo® and SurroundVideo® G5

MD-CAP



Works with MegaDome® Series, SurroundVideo® G5 Mini and MegaVideo® Compact D4SO

Compatible Cameras:

TZ Series

Unified Threat Management firewall

The Dell™ SonicWALL™ TZ Series is the most secure Unified Threat Management (UTM) firewall for small businesses, retail deployments, remote sites, branch offices and distributed enterprises. Unlike consumer-grade products, the TZ Series delivers the most effective anti-malware, intrusion prevention, content/URL filtering and application control capabilities along with the broadest most secure mobile platform support for laptops, smartphones and tablets. It provides full deep packet inspection (DPI) at very high performance levels, eliminating the network bottleneck that other products introduce, and enabling organizations to realize increased productivity gains. The TZ Series is the most secure, sophisticated and widely-deployed security platform on the market today.

Additionally, the Dell SonicWALL Application Intelligence and Control capabilities in the TZ 215 ensures that bandwidth is available for business-critical applications while throttling or blocking unproductive applications. The TZ 215 also offers advanced application traffic analytics and reporting for deep insight into bandwidth utilization and security threats.

The TZ Series includes additional advanced networking features such as IPSec and SSL VPN, multiple ISP failover, load balancing, optional integrated 802.11n wireless and network segmentation, and also enables PCI compliance. The TZ Series is the only available UTM firewall that provides a native VPN remote access client for Apple® iOS, Google® Android™, Windows, Mac OS and Linux. This unique client also supports Clean VPN™, which decontaminates threats from VPN traffic. Providing the most secure support for mobile platforms, only Dell SonicWALL delivers full malware scanning of SSL encrypted traffic and application control for iOS and Android devices.

The new TZ Series is an elegant integration of multiple point products, combined into a single solution providing value while reducing complexity.

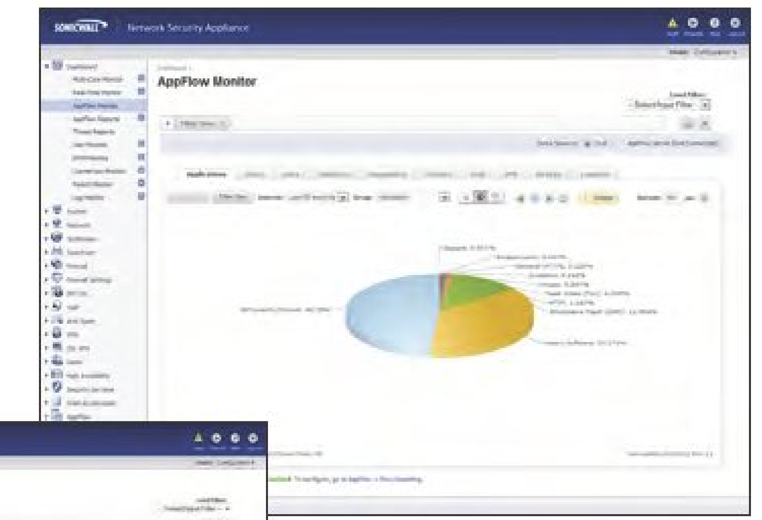
About Dell SonicWALL

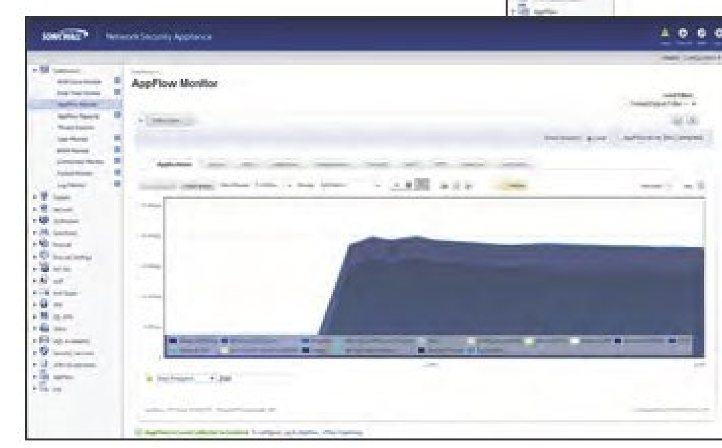
Dell SonicWALL develops advanced intelligent network security and data protection solutions that adapt as organizations and threats evolve. Dell SonicWALL designs award-winning hardware, software and virtual-appliance solutions to detect and control applications and protect networks from intrusions and malware attacks. Dell SonicWALL is trusted by small businesses and large enterprises worldwide. Since 1991, it has shipped over two million appliances through its global network of channel partners to keep tens of millions of business computer users safe and in control of their data.

- Built on the proven security architecture of SonicOS, the TZ Series provides highly effective anti-malware and intrusion prevention to keep networks safe from sophisticated modern threats.
- Highly secure SSL VPN remote access is available natively for Apple iOS, Google Android, Windows, Mac OS and Linux based devices to unleash the potential of a mobile workforce.
- Dell SonicWALL content and URL filtering blocks multiple categories of objectionable web content to enable high workplace productivity and reduce legal liability.
- Easy to comprehend and quick to deploy, the graphical user interface in the TZ Series eliminates the choice between ease-of-use and power, driving down total cost of ownership.

Dell SonicWALL architecture

The Dell SonicWALL TZ 205 and TZ 215 feature dual-core Cavium CPUs, which process parallel data streams simultaneously, increasing overall protection and performance. Dual-core technology offers superior performance, scalability, and energy efficiency when compared with network security platforms based on general-purpose processors with separate security co-processors, or Application-Specific Integrated Circuits (ASIC), which can't keep up with evolving complex attacks in real time from both inside and outside the network perimeter. The advanced high performance dual-core architecture makes the TZ Series the fastest solution in its class, with performance levels of up to 500 Mbps of stateful throughput, 110 Mbps deep packet inspection throughput and 130 Mbps 3DES or AES VPN throughput.





SonicOS software

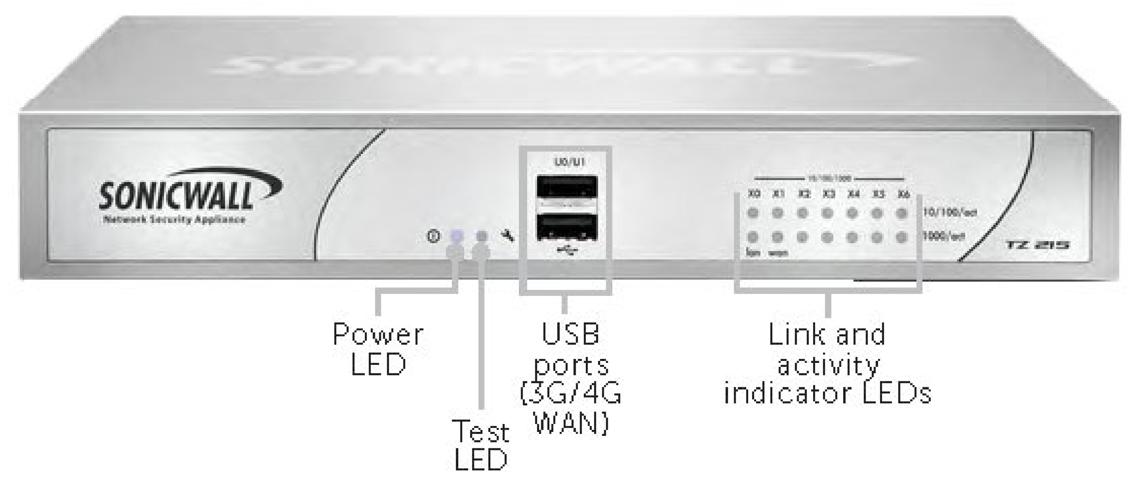
Dell SonicWALL's patented* Reassembly-Free Deep Packet Inspection® (RFDPI) technology enables simultaneous, multi-threat and application scanning and analysis of unlimited files sizes and connections at extremely high speeds. This single code base is at the core of every Dell SonicWALL firewall, from the TZ 105 to the Dell SonicWALL SuperMassive E10800. SuperMassive E10800 with SonicOS is the highest overall protection Next-Generation Firewall to earn the NSS Labs Recommend rating. RFDPI is tightly integrated into the firewall platform, streamlining management of granular firewall policies, directly via the firewall interface or via the Dell SonicWALL Global Management System. Organizations can choose from an entire line of proven Dell SonicWALL firewalls with SonicOS, which massively scale to meet the needs of the highest performance networks.

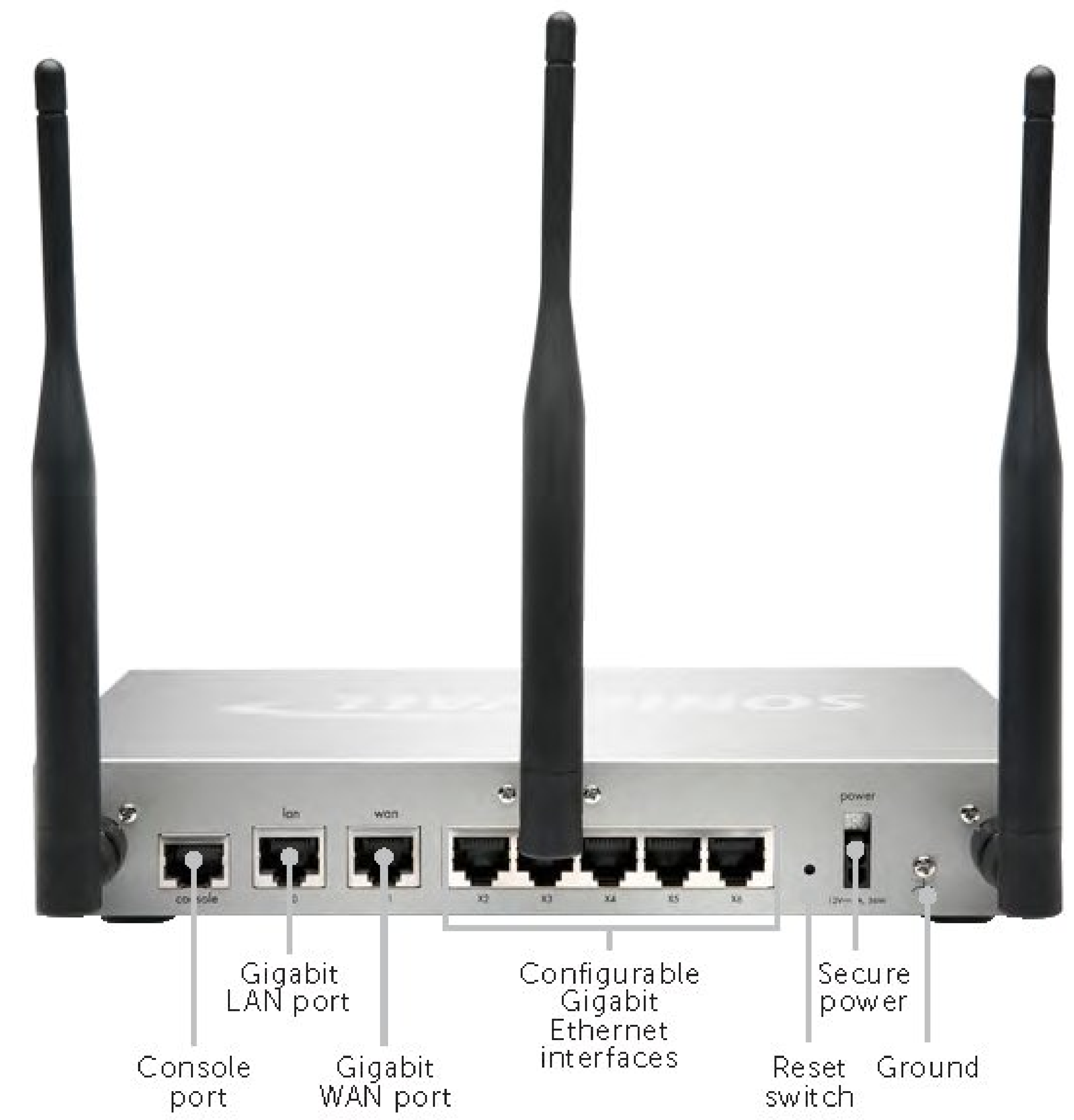
*U.S. Patents 7,310,815; 7,600,257; 7,738,380; 7,835,361; 7,991,723

	TZ 105	TZ 205	TZ 215
Firewall overview			
Stateful Packet Inspection Firewall throughput	200 Mbps	500 Mbps	500 Mbps
IPS throughput	60 Mbps	80 Mbps	110 Mbps
GAV throughput	40 Mbps	60 Mbps	70 Mbps
VPN throughput	75 Mbps	100 Mbps	110 Mbps
Full DPI (UTM)	25 Mbps	40 Mbps	60 Mbps
Maximum UTM/DPI connections	8,000	12,000	32,000
Unlimited file size protection	●	●	●
Hardware			
Dual core processor		●	●
Gigabit ethernet		●	●
802.11n support	●	●	●
Dual band 802.11 a/b/g/n support		●	●
Security services			
Intrusion protection*	●	●	●
Gateway Anti-Virus, Anti-Spyware and Cloud AV*	●	●	●
Content and URL Filtering (CFS)*	●	●	●
Enforced Client Anti-Virus and Anti-Spyware*	●	●	●
Application Intelligence and Control*			●

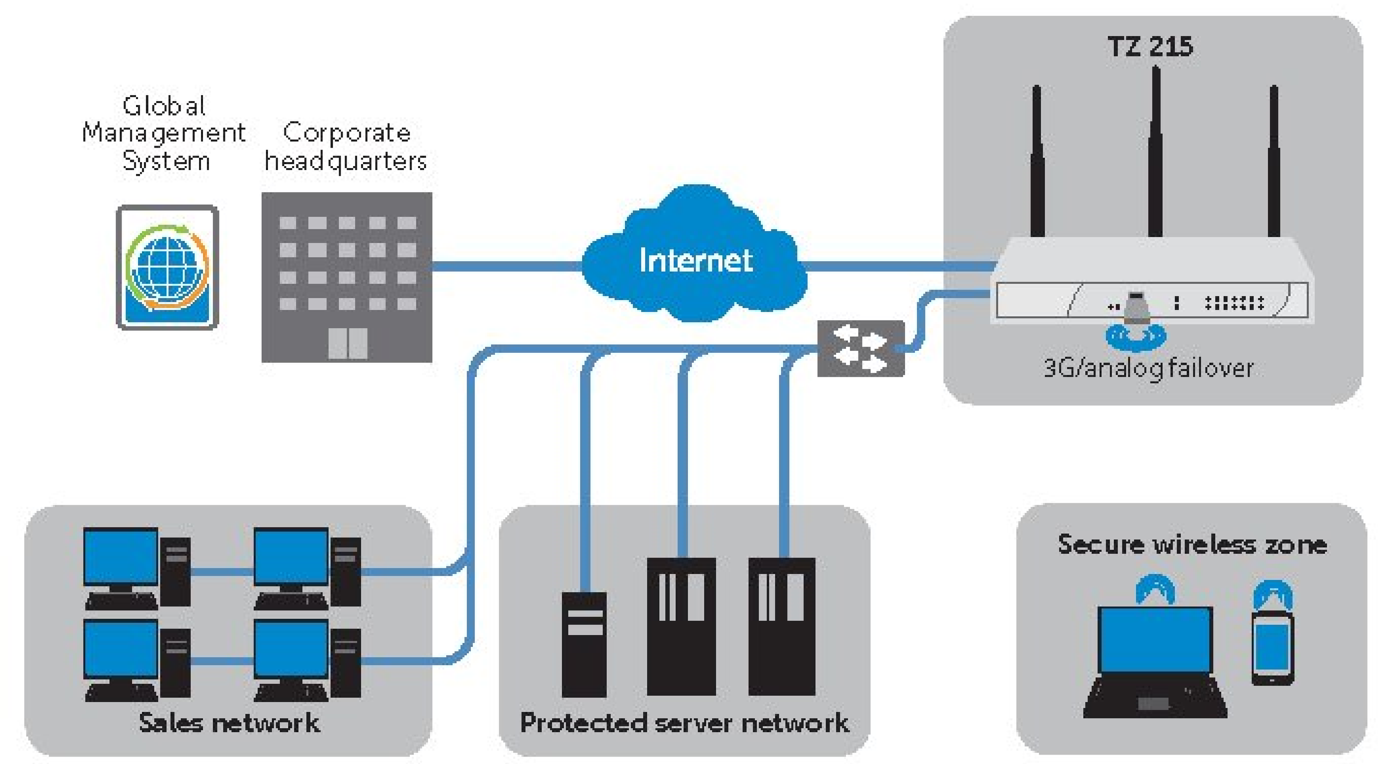
*Available with subscription service

Dell SonicWALL TZ 215 retail/branch office





The new Dell SonicWALL TZ 215 is the most secure, highest performance Unified Threat Management (UTM) firewall available for small businesses and branch offices. Designed for small businesses, distributed enterprises, branch offices and retail deployments, the TZ 215 integrates anti-malware, intrusion prevention, application control and URL filtering, driving down cost and complexity. It provides a dual-core architecture delivering full deep packet inspection (DPI) without diminishing network performance, thus eliminating bottlenecks that other products introduce, enabling businesses to realize increased productivity gains. The TZ 215 also provides application control to ensure bandwidth for critical applications, while throttling non-productive ones. Advanced networking features include multiple ISP failover and load balancing, optional dual-band secure wireless, IPSec VPN support, network segmentation and PCI compliance capabilities.



Hardware description	SKU
TZ 215	01-SSC-4976
TZ 215 Wireless-N	01-SSC-4977
TZ 215 TotalSecure 1-year	01-SSC-4982
TZ 215 Wireless-N TotalSecure 1-year	01-SSC-4984

Service description	SKU
Comprehensive Gateway Security Suite 1-year	01-SSC-4793
Gateway Anti-Virus, Intrusion Prevention, and Application Intelligence, Control and Visualization 1-year	01-SSC-4757
Content/URL Filtering 1-year	01-SSC-4763
Comprehensive Anti-Spam Service 1-year	01-SSC-4787
8x5 support 1-year	01-SSC-4769
24x7 support 1-year	01-SSC-4775

SonicWALL

Features

Intrusion prevention	
Feature	Description
Signature-based scanning	Tightly integrated, signature-based intrusion prevention scans packet payloads for vulnerabilities and exploits that target critical internal systems.
Automatic signature updates	Dell SonicWALL's Research Team continuously updates and deploys an extensive list of over 5,400 IPS signatures covering 52 attack categories. These signatures take immediate effect and do not require reboots or any other interruption in service.
Outbound threat prevention	The ability to inspect both inbound and outbound traffic ensures that the network will not unwittingly be used in Distributed Denial of Service attacks and will prevent any Command and Control Botnet communication.
Intra-zone IPS protection	Intrusion prevention can be deployed between internal security zones to protect sensitive servers and to prevent internal attacks.
VPN	
IPSec VPN for site-to-site connectivity	High-performance IPSec VPN allows the firewall to connect remote branch offices to a central location.
SSL VPN or IPSec client remote access	Utilize clientless SSL VPN technology or an easy-to-manage IPSec client for easy access to email, files, computers, intranet sites and applications from a variety of platforms.
Redundant VPN gateway	When using multiple WANs, a primary and secondary VPN can be configured to allow seamless automatic failover and failback of all VPN sessions.
Route-based VPN	The ability to perform dynamic routing over VPN links ensures continuous uptime in the event of a temporary VPN tunnel failure by seamlessly re-routing traffic between endpoints through alternate routes.
Clean VPN	Dell SonicWALL Clean VPN™ both secures the integrity of VPN access and decontaminates malicious threats before they can enter the corporate network.
Gateway threat prevention	
Gateway anti-malware	Dell SonicWALL's patented RFDPI engine scans all ports and protocols for viruses without file size or stream length limitation. SonicLabs Researchers constantly provide updated threat protection, providing faster response times and threat prevention.
Reassembly-Free Deep Packet (RFDPI)	Reassembly-Free Deep Packet Inspection keeps track of malware regardless of the order or inspection timingwith which the packets arrive. This allows for extremely low latency while eliminating file and stream size limitations. This provides greater performance and security than outdated proxy designs which reassemble contents using sockets bolted to traditional anti-virus programs and are plagued with inefficiencies and the overhead of memory thrashing leading to high latency, low performance and size limitations.
Cloud anti-virus	Using the built-in RFDI engine, Dell SonicWALL can leverage the power of the cloud to provide the most comprehensive set of anti-malware signatures available, while minimizing latency or delay. The Dell SonicWALL Cloud Anti-Virus Service provides millions of additional malware signatures for inspection of executable files using the most up-to-date information available.
Bi-directional Inspection	RFDPI can be performed on both inbound and outbound connections to provide protection in all networktraffic directions.
24x7 signature updates	SonicLabs Research Team team creates and updates signature databases that are propagated automatically to the firewalls in the field, with those signatures taking immediate effect without any reboot or service interruption required.
Firewall and networking	
Stateful packet inspection	All network traffic is inspected, analyzed and brought into compliance with firewall access policies.
DOS attack protection	SYN Flood protection provides defense against DOS attacks using both layer 3 SYN proxy and layer 2 SYN blacklisting technologies.
Flexible deployment	Can be deployed in traditional NAT and Layer 2 Bridge modes.
Policy-based routing	Create routes based on protocol to direct traffic to a preferred WAN connection with the ability to fail backto a secondary WAN in the event of an outage.
High availability	Supports Active/Passive failover to ensure increased reliability by protecting against hardware or software faults.
WAN load balancing	Load balance up to four WAN interfaces using Round Robin, Spillover or Percentage based methods.
WAN acceleration	WAN Acceleration decreases latency and increases transfer speeds between remote sites for even higher network efficiency gains.

Features

VoIP	
Feature	Description
Advanced QoS	Guarantee critical communications with 802.1p and DSCP tagging and remapping of VoIP traffic on the network.
DPI of VoIP traffic	Predefined signatures detect and block VoIP specific threats.
H.323 gatekeeper and SIP proxy support	Block spam calls by requiring that all incoming calls are authorized and authenticated by H.323 gatekeeper or SIP proxy.
Management and monitoring	
Web GUI	An intuitive web-based interface allows quick and convenient configuration in addition to management through Dell SonicWALL Global Management System (GMS®), or the CLI.
SNMP	SNMP provides the ability to protectively monitor and respond to threats and alerts.
Netflow/IPFIX	Export an extended set of data through IPFIX or NetFlow protocols for granular insight into application traffic, bandwidth utilization and security threats in addition to powerful troubleshooting and forensics capabilities. Compatible with Dell SonicWALL Scrutinizer and third-party monitoring and reporting applications. (TZ 215 only)
Centralized policy management	With Dell SonicWALL GMS, monitor, configure and report on multiple Dell SonicWALL appliances from a single intuitive interface and customize your security environment to suit your individual policies.
Application intelligence and control	
Application control	Identify and control applications or individual components of an application based on RFDPI technology instead of relying on well-known ports and protocols.
Application bandwidth management	Allocate bandwidth to critical applications while throttling unproductive application traffic for an efficient and productive network.
Custom application identification	Create and configure custom application identification based on traffic parameters or on patterns unique to an application in its network communications.
Application traffic analytics	Provides organizations with granular insight into application traffic, bandwidth utilization and security in addition to powerful troubleshooting and forensics capabilities. (TZ 215 only)
Application signature database	A continuously expanding database of over 3,500 application signatures ensures that administrators are able to control the usage of all the latest applications on their network at a category or individual level.
User activity tracking	User identification is seamlessly integrated with Microsoft® Active Directory and other authentication systems enabling tracking and reporting of individual user identification.
GeoIP country traffic identification	Identify and control network traffic going to or coming from specific countries. (TZ 215 only)

Firewall and networking

Firewall
- Reassembly-Free Deep Packet Inspection
- Stateful packet inspection
- DOS attack protection
- TCP reassembly
- Stealth mode

Application control
- Application control
- Application component blocking
- Application bandwidth management
- Custom application signature creation
- AppFlow visualization
- Data leakage prevention
- IPFIX with extensions reporting
- User activity tracking
- GeoIP country traffic identification
- Comprehensive application signature database

Intrusion prevention
- Signature-based scanning
- Automatic signature updates
- Outbound threat prevention
- IPS exclusion list
- Hyperlinked log messages
- Unified CFS and app control with bandwidth throttling

Anti-malware
- Stream-based malware scanning
- Gateway anti-virus
- Gateway anti-spyware
- Cloud Anti-Virus Service

VoIP
- Advanced QoS
- Bandwidth management
- DPI of VoIP traffic
- Full Interoperability
- H.323 gatekeeper and SIP proxy support

Networking
- Dynamic routing
- Policy-based routing
- Advanced NAT
- DHCP server
- Bandwidth management
- Link aggregation
- Port redundancy
- High availability
- IPv6 ready
- Load balancing

Management and monitoring
- Web GUI
- Command line interface
- SNMP
- Analyzer reporting
- Scrutinizer reporting
- GMS policy management and reporting
- Logging
- Netflow/IPFix
- App visualization
- Centralized policy management
- Single sign-on
- Terminal service/Citrix support

Security services
- Intrusion Prevention Service
- Gateway Anti-Malware Service
- Content Filtering Service
- Enforced Client Anti-Virus and Anti-Spyware Service – McAfee®
- Application Intelligence, Control and Visualization Service

Specifications

Firewall	TZ 105 Series	TZ 205 Series	TZ 215 Series
SonicOS version		SonicOS 5.8.1 and later	
Stateful throughput[1]	200 Mbps	500 Mbps	500 Mbps
IPS throughput[2]	60 Mbps	80 Mbps	110 Mbps
GAV throughput[2]	40 Mbps	60 Mbps	70 Mbps
UTM throughput[2]	25 Mbps	40 Mbps	60 Mbps
Maximum connections[3]	8,000	12,000	48,000
Maximum UTM/DPI connections	8,000	12,000	32,000
New connections/sec	1,000	1,500	1,800
Nodes supported		Unrestricted	
Denial of service attack protection		22 classes of DoS, DDoS and scanning attacks	
SonicPoints supported	1	2	16
VPN			
3DES/AES throughput[4]	75 Mbps	100 Mbps	130 Mbps
Site-to-site VPN tunnels	5	10	20
Bundled GVC licenses (maximum)	0 (5)	2 (10)	2 (25)
Bundled SSL VPN licenses (maximum)	1 (5)	1 (10)	2 (10)
Encryption/Authentication/DH Group		DES, 3DES, AES (128, 142, 256-bit), MD5, SHA-1/DH Group 1, 2, 5, 14	
Virtual assist bundled (maximum)	—	1 (30-day trial)	2 (30-day trial)
Key exchange		IKE, Manual Key, Certificates (X.509), L2TP over IPSec	
Certificate support		Verisign, Thawte, Cybertrust, RSA Keon, Entrust and Microsoft CA for Dell SonicWALL-to-Dell SonicWALL VPN, SCEP	
VPN features		Dead Peer Detection, DHCP Over VPN, IPSec NAT Traversal, Redundant VPN Gateway, Route-based VPN	
Global VPN client platforms supported		Microsoft® Windows XP, Vista 32/64-bit, Windows 7 32/64-bit	
SSL VPN platforms		Microsoft Windows XP/Vista 32/64-bit/Windows 7, Mac OSX 10.4+, Linux FC3+/Ubuntu 7+/OpenSUSE	
Mobile Connect platform supported		Apple® iOS 4.2 or higher, Google® Android™ 4.0 or higher	
Security services			
Deep Packet Inspection services		Gateway Anti-Virus, Anti-Spyware, Intrusion Prevention, Application Intelligence and Control (TZ 215 only)	
Content Filtering Service (CFS)		HTTP URL, HTTPS IP, keyword and content scanning, ActiveX, Java Applet, and cookie blocking bandwidth management on filtering categories, allow/forbid lists	
Enforced Client Anti-Virus and Anti-Spyware		McAfee®	
Comprehensive Anti-Spam Service[6]		Supported	
Application Intelligence and Control	Application control		Application Traffic Visualization and Advanced Application Control
Networking			
IP address assignment		Static, (DHCP, PPPoE, L2TP and PPTP client), Internal DHCP server, DHCP relay	
NAT modes		1:1, 1:many, many:1, many:many, flexible NAT (overlapping IPs), PAT, transparent mode	
VLANS	5, PortShield	10, PortShield	20, PortShield
DHCP		Internal server, relay	
Routing		OSPF, RIP v1/v2, static routes, policy-based routing, multicast	
Authentication		XAUTH/RADIUS, Active Directory, SSO, LDAP, Novell, internal user database, Terminal Services, Citrix	
Local user database		150 users	
VoIP		Full H.323v1-5, SIP, gatekeeper support, outbound bandwidth management, VoIP over WLAN, deep inspection security, full interoperability with most VoIP gateway and communications devices	
System			
Zone security		Yes	
Schedules		Yes	
Object-based/group-based management		Yes	
DDNS		Dynamic DNS providers include: dyndns.org, yi.org, no-ip.com and changeip.com	
Management and monitoring		Local CLI, Web GUI (HTTP, HTTPS), SNMP v2; Global management with Dell SonicWALL GMS	
Logging and reporting		Analyzer, Scrutinizer, GMS, Local Log, Syslog, Solera Networks, NetFlow v5/v9 (TZ 215), IPFIX with Extensions (TZ 215), Real-time Visualization (TZ 215 only)	
Hardware failover	—	Active/Passive	Active/Passive
Anti-spam		RBL support, Allowed/Blocked Lists, Optional Dell SonicWALL Comprehensive Anti-Spam Service[6]	
Load balancing		Yes, Outgoing and Incoming	
Standards		TCP/IP, UDP, ICMP, HTTP, HTTPS, IPSec, ISAKMP/IKE, SNMP, DHCP, PPPoE, L2TP, PPTP, RADIUS, IEEE 802.3	
WAN acceleration support[7]		Yes, with Dell SonicWALL WXA appliances	
Built-in wireless LAN			
Standards	802.11b/g/n	802.11a/b/g/n (3x3)	802.11a/b/g/n (3x3)
Wireless security standards		(WEP, WPA, WPA2, 802.11i, TKIP, PSK,02.1x, EAP-PEAP, EAP-TTLS)	
Virtual Access Points (VAPs)		Up to 8	
Antennas	Double: detachable, external	Triple: 2 external detachable, 1 internal	Triple: detachable, external
Radio power–802.11b/802.11g/802.11n	18 dBm max/18 dBm @ 6Mbps, 15 dBm @ 54Mbps	15.5 dBm max/18 dBm max/17 dBM @ 6 Mbps, 13 dBM @ 54 Mbps	
Radio power–802.11a/802.11b/802.11g/802.11n	—	15.5 dBm max/18 dBm max/17 dBM @ 6 Mbps, 13 dBM @ 54 Mbps	
Radio power–802.11n (2.4GHz)/802.11n (5.0GHz)	19 dBm MCS 0, 12 dBm MCS 15	19 dBm MCS 0, 11 dBm MCS 15/17 dBm MCS 0, 12 dBm MCS 15	
Radio receive sensitivity–802.11a/802.11b/802.11g	-90 dBm @ 11Mbps/-91 dBm @ 6 Mbps , -74 dBm @54 Mbps	-95 dBm MCS 0, -81 dBm MCS 15/-90 dBm @ 11Mbps/ -91 dBm @ 6Mbps, -74 dBm @ 54 Mbps	
Radio receive sensitivity–802.11n (2.4GHz)/802.11n (5.0GHz)	-89 dBm MCS 0, -70 dBm MCS 15	-89 dBm MCS 0, -70 dBm MCS 15/ -95 dBm MCS 0, -76 dBm MCS 15	
Hardware built-in wireless LAN			
Interfaces	(5) 10/100 fast ethernet, 1 USB, 1 console	(5) 10/100/1000 copper gigabit, 1 USB, 1 console	(7) 10/100/1000 copper gigabit, 2 USB, 1 console
Processor	Single-core	Dual-core	Dual-core
Flash memory/RAM	32 MB/256 MB	32 MB/256 MB	32 MB/512 MB
3G wireless/modem[5]		Supported with approved adapters[5]	
USB ports	1	1	2
Power input		100 to 240 VAC, 50-60 Hz, 1 A	
Max power consumption	5.2W/7.0W	6.4W/10.5W	9.0W/12.0W
Total heat dissipation	17.8 BTU/23.7 BTU	21.9 BTU/35.8 BTU	30.6 BTU/41.4 BTU
Certifications		VPNC, ICSA Firewall 4.1	
Certifications pending		EAL4+, FIPS 140-2 Level 2, IPv6 Phase 1, IPv6 Phase 2	
Form factor and dimensions	5.555 x 1.42 x 7.48 in (14.1 x 3.6 x 19 cm)	5.555 x 1.42 x 7.48 in (14.1 x 3.6 x 19 cm)	7.125 x 1.5 x 10.5 in (18.1 x 3.81 x 26.67 cm)
Weight	0.75 lbs/0.34 kg 0.84 lbs/0.38 kg	0.75 lbs/0.34 kg 0.84 lbs/0.38 kg	1.95 lbs/0.97 kg 2.15 lbs/0.97 kg
Major regulatory compliance		FCC Class A, CES Class A, CE, C-Tick, VCCI, Compliance MIC, NOM, UL, cUL, TUV/GS, CB, NOM, WEEE, RoHS	
Environment/humidity		40-105° F, 0-40° C/ 5-95% non-condensing	
MTBF		28 years/15 years	

[1] Testing Methodologies: Maximum performance based on RFC 2544 (for firewall). Actual performance may vary depending on network conditions and activated services. [2] UTM/Gateway AV/Anti-Spyware/ IPS throughput measured using industry standard Spirent WebAvalanche HTTP performance test and Ixia test tools. Testing done with multiple flows through multiple port pairs. [3] Actual maximum connection counts are lower when DPI services are enabled. [4] VPN throughput measured using UDP traffic at 1280 byte packet size adhering to RFC 2544. [5] 3G card and modem are not included. See http://www.sonicwall.com/us/products/cardsupport.html for supported USB devices. [6] The Comprehensive Anti-Spam Service supports an unrestricted number of users but is recommended for 250 users or less. [7] With Dell SonicWALL WXA Series Appliances.

Mobile Connect

Available on the App Store

ANDROID APP ON Google play

Security Monitoring Services from Dell SecureWorks are available for this appliance Series. For more information, visit **www.dell.com/secureworks**

Dell SonicWALL

EW Outdoor Motion Sensor

PROJECT
LOCATION/TYPE

Product Overview

Description

WattStopper's EW outdoor motion sensors provide occupancy based control of outdoor lighting. Raintight and rated for -40°F to 130°F, EW sensors perform reliably in all weather conditions.

Operation

EW sensors operate at line voltage and can be mounted onto a standard, outdoor junction box. Utilizing advanced PIR technology, the sensors detect the difference between infrared energy in motion and the background space to turn lighting on when a person or vehicle enters the coverage area. After the area is vacated and the time delay elapses, lighting automatically turns off. The EW's dual PIR detectors and three level lens increase the detection density as well as the accuracy of motion detection.

Lampholders

For situations when a complete outdoor sensor package is desired, the EWF models include durable, polycarbonate lamp holders that accept PAR 20 or 38 lamps. They are UV and impact resistant and are impervious to weathering. The EWF features a unique dual-adjustment aiming system that allows the lamps to be angled and locked into position without the use of tools. The lamp holders' unique silicon seals allow them to be aimed above horizontal in damp or wet areas.

Applications

Applications for commercial settings include walkways, parking lots, dock lighting and warehouses. Typical uses outside a home include garages, backyards, entrance ways and porches.

Features

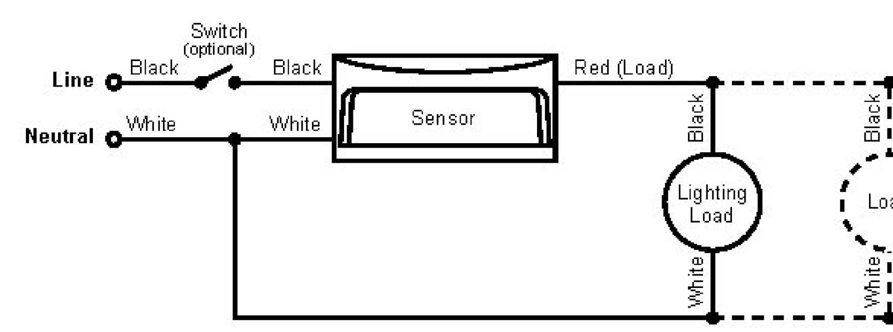
- Sensors can be mounted on walls, eaves, or ceilings for installation convenience
- 270° coverage
- Front rotates for easy coverage adjustment
- Precision, double-shot tooling with internal silicon gaskets prevents water and dust contamination
- No tools needed to aim or adjust lamp holders for speedier installation
- Optional override-ON to turn lights on remotely for the length of the time delay
- ON/OFF control based on daylight levels via adjustable light level setting
- Zero crossing circuitry reduces stress on the relay and results in increased sensor life
- ASIC enhances reliability and helps to eliminate false triggers
- Pulse Count Processing eliminates false triggers and provide RFI and EMI immunity
- Patented Voltage Drop Protection
- Solid state digital microprocessor offers increased reliability
- User-adjustable time delay from 12 seconds to 16 minutes

Specifications

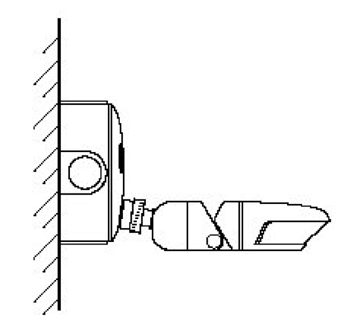
- 120 VAC or 277 VAC operation
- UL 773A rated raintight; UL 1571 rated for wet locations
- Operating temperature: -40° to 130°F (-40 to 54°C)
- Adjustable light level of 0.5 to 200 footcandles (5.4 - 2,152.8 lux)
- Isolated relay with N/O and N/C outputs; rated for 1 Amp @ 30 VDC/VAC (EW-200)
- 1/2" threaded nipple fits standard NEMA weatherproof fixture fitting
- Lamp holders use PAR 20 or 38 lamps, up to 150W each lamp*
- Compatible with all electronic ballasts and PL lamp ballast systems
- Sensor dimensions: 6.7" x 3.2" x 2.2" (170mm x 80mm x 55mm)
- UL and cUL listed
- Five year warranty

Wiring, Mounting & Installation

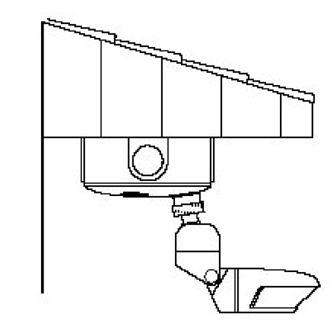
Wiring Diagram



Mounting Diagrams

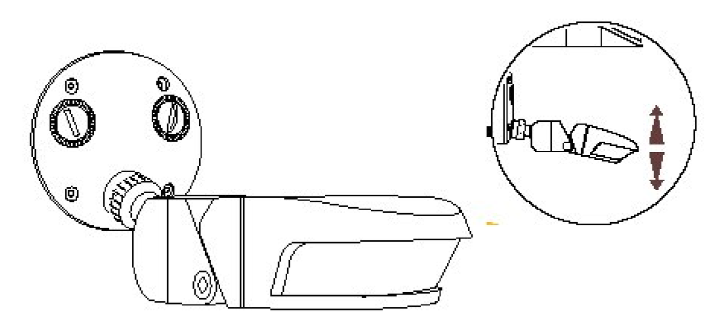


Wall or pole mounting

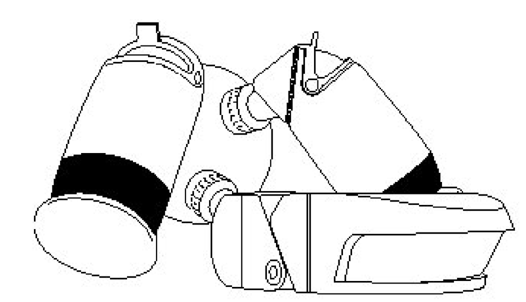


Ceiling/eave mounting

Installation & Positioning

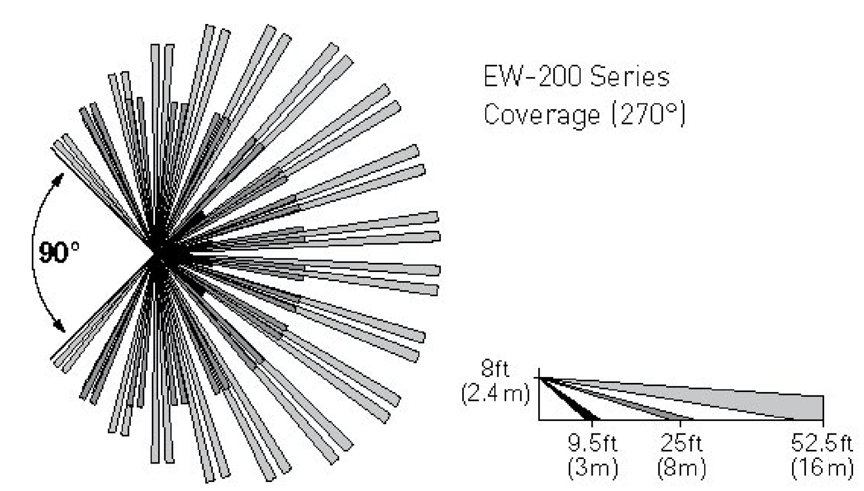


Sensor with Lampholders



Coverage

Coverage Pattern



Ordering Information

Catalog No.	Color	Voltage	Load Rating	Coverage	Features
☑ EW-200-120-W	Arctic white	120 VAC; 60 Hz	0-1000 watt ballast,	270°	Isolated relay
☐ EW-200-120-G	Arch. grey		tungsten		
☐ EW-200-277-W	Arctic white	277 VAC; 60 Hz	0-1000 watt ballast	270°	Isolated relay
☐ EWF-205-120-W	Arctic white	120 VAC; 60 Hz	0-1000* watt ballast, tungsten	270°	Lamp holders

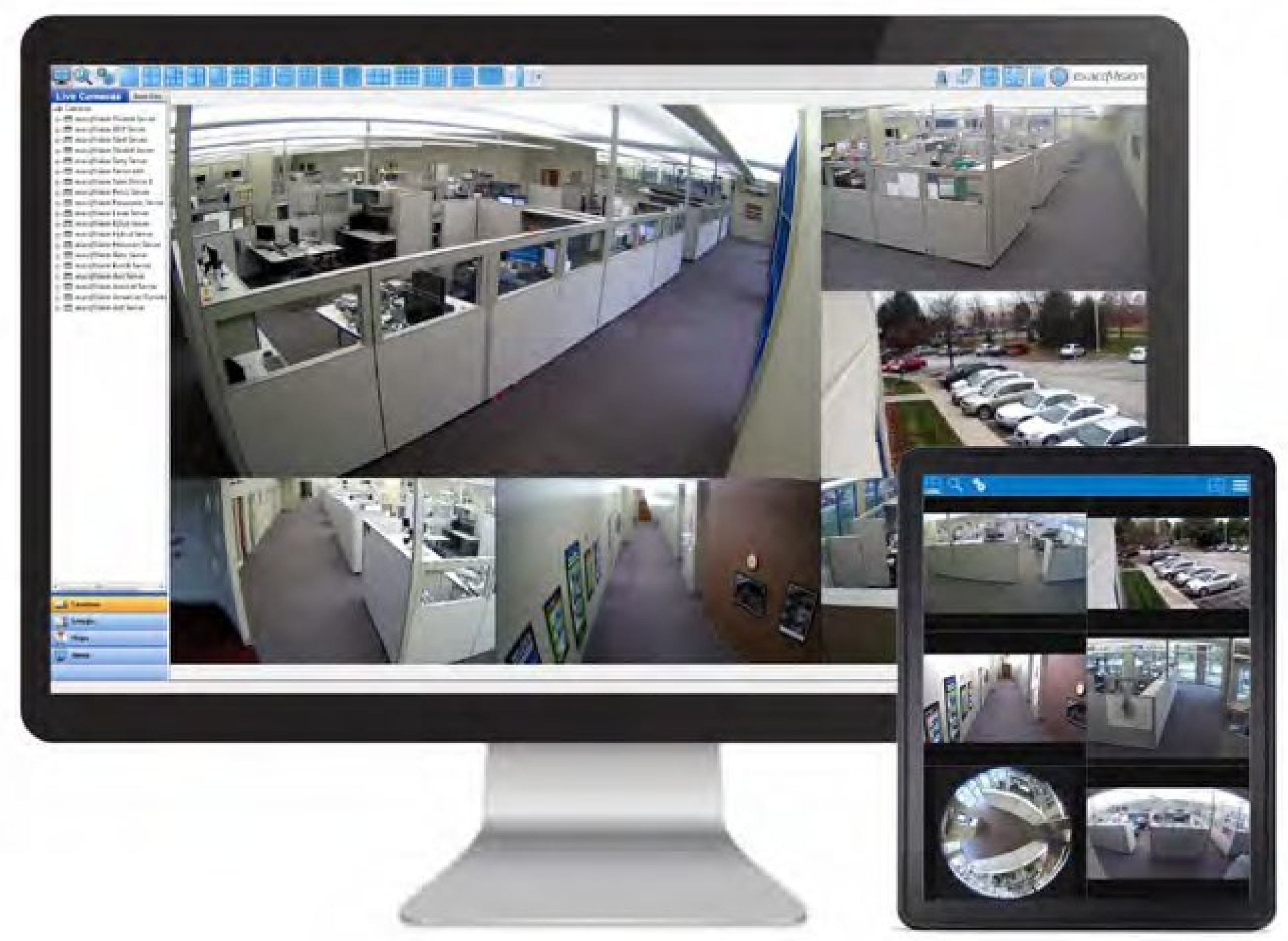
*The sensors with lamp holders may use up to 300 watts for lamps even though they have a 0-1000 watt load rating

APPROVED
By Erin Lewis at 8:07 am, Oct 11, 2016

Supplying EXACQ model 1608-48-2000-R2 Hybrid NVR with 16 Analog & 8 IP Channel Inputs, 480 IPS, 16 Analog, 2000 GB

exacqVision

Product Brochure



IP Camera & Hybrid
Network Video Recorders

VMS Software

Single Camera to
Enterprise Solutions

www.exacq.com

Operating System

Browser

Mobile

+1.317.845.5710 USA (Corporate Headquarters)
+44.2087.505660 United Kingdom/Europe
+852.8120.9275 Hong Kong
+65.6319.9826 Asia / Pacific

exacq
From Tyco Security Products

exacqVision Server & Hardware Cheatsheet
(effective June 2016)

	Hardware configurations are subject to change without notice.	LC-Series			ELP-Series				A-Series						Z-Series			
		IPS	Hybrid	Una	IPS		Hybrid		IPS			Hybrid			IPS		Hybrid	
ANALOG	Form Factor	LC-IPS	LC-Hybrid	LC-Una	ELP	ELPR	ELP	ELPR	Desktop	2U	4U	Desktop	2U	4U	2U	4U	2U	4U
	Analog Inputs		8/16				8/16	8/16				8/16/32	16 /32	16/32/48/64			16 looping/32	16 looping/32 looping/48/64
	Frame Rate	25/30 FPS per input					25/30 FPS per input					25/30 FPS per input					25/30 FPS per input	
	Alarm Inputs	Up to 48 (optional USB I/O)					4 TTL	4 TTL				8 TTL	16 TTL	16 TTL			16 TTL	16 TTL
	Alarm Outputs	Up to 20 24TTL, 6 Relay (optional USB I/O)					2 TTL, 1 Relay	2 TTL, 1 Relay				3 TTL & 1 Relay	15 TTL & 1 Relay	15 TTL & 1 Relay			15 TTL & 1 Relay	15 TTL & 1 Relay
	Analog Outputs		1				1	1				1/2/2	2/2	2/2/4/4			2	2/2/4/4
	Audio Inputs		8/16				4	4				16	16	8/16/32			16	16
IP	Max IP Cameras	16		8 or 16 PoE+	24				64						128			
	Included IP Camera Licenses	4 (Start)		8 or 16	4				4			4 or 8	8	8	8			
	Alarm Inputs / Outputs														Inputs: 4 / Outputs: 1 TTL & 1 Relay	Inputs: 8 / Outputs: 3 TTL & 1 Relay	Inputs: 16 TTL Outputs: 15 TTL & 1 relay	
SERVER & GENERAL	Pre-Loaded VMS Software	Start / Professional, Enterprise (Optional)			Professional / Enterprise (Optional)				Professional / Enterprise (Optional)						Professional / Enterprise (Optional)			
	Typical Video Storage Rate (Mbps)	100	100	150	200	200	200	200	250 (Windows) 300 (Linux)	300 (Windows) 450 (Linux)	350 (Windows) 550 (Linux)	250 (Windows) 300 (Linux)	300 (Windows) 450 (Linux)	350 (Windows) 550 (Linux)	400 (Windows) 800 (Linux)	800 (Windows) 1200 (Linux)	400 (Windows) 800 (Linux)	800 (Windows) 1200 (Linux)
	Local Client Display Rate (FPS)	270	270	270	270	270	270	270	Windows: 480 (Standard CPU) /1100 (i5)/1800 (i7) - Linux: 600 (Standard CPU)/1000 (i5)/1200 (i7)						Windows: 1800 - Linux: 1200			
	Max Storage	6 TB	6 TB	12TB	6 TB	12 TB	6 TB	12 TB	12 TB	18 TB	48 TB	8 TB	12 TB	32 TB	48 TB	120 TB	48 TB	120 TB
	Removable HD					Yes		Yes							Yes	Yes	Yes	Yes
	RAID Configuration										5 (Optional)			5 (Optional)	5	6	5	6
	Operating System	Ubuntu Linux 14.04			Ubuntu Linux 14.04				Windows 7 64-bit (Standard) / Windows 2012 R2 or Ubuntu Linux 14.04 (Optional)									
	Operating System Location	HD	HD	HD	120 GB SSD				120 GB SSD Linux or Windows (Standard)						120 GB SSD			
	Monitor Output	HDMI, VGA		HDMI, VGA	1 DVI-I + 1 HDMI + 1 Display Port (max 2 simultaneous monitors)				1 DVI-I + 1 HDMI + 1 Display Port (max 2 simultaneous monitors)						1 DVI-I + 1 HDMI +1 DisplayPort (max 2 simultaneous monitors)			
	NIC	2x1 Gbps	1x1 Gbps	1x1 Gbps	2x1 Gbps				2x1 Gbps (Standard) / 4x1 Gbps (Optional)			2x1 Gbps	2x1 Gbps	2x1 Gbps	2x1 Gbps (Standard) / 2x10 Gbps SPF+ (Optional)			
	Redundant Power Supply										(Optional)			(Optional)	Dual Hot-Swap			
	Serial														1 RS 485	1 RS485	1 RS485	1 RS485
	Audio Outputs (Server)				1	1	1	1	1	1	1	1	1		1	1	1	1

	S-Series - Networked Video Storage for exacqVision Recorders	
Form Factor	Enterprise 2U	Enterprise 4U
Archiving - Max Video Recorders	32	64
Archiving - Max Data Rate (Mbps)	1500 (single NIC) / 2000 (dual NIC bonding)	
Archiving - Designed for ESM	☑	☑
Ext. Storage - Max Video Recorders	32	64
Ext. Storage - Max Data Rate (Mbps)	350	500
Ext. Storage - Designed for ESM	☑	☑
Ext. Storage - Minimum Video Recorder OS	Microsoft Server 2008, Windows 7, Linux Ubuntu 10.04	
Pre-loaded VMS Software	exacqVision Storage Enterprise	
ESM Monitoring Compatible	☑	☑
Storage Maximum (Internal)	32 TB RAID 5	80 TB RAID 6
NIC	3x1 Gbps (2 for storage, 1 for management) or 4x1 Gbps (optional)	
Operating System	Microsoft Server 2008, Windows 7, Linux Ubuntu 10.04	
Redundant Power Supply	Dual Hot Swap	

exacqVision LC-Series

exacqVision ELP-Series

exacqVision A-Series

exacqVision Z-Series

exacqVision S-Series

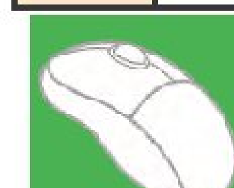
What you get with an exacqVision purpose-built server:
- 3-year Warranty
- 3 years Software Updates
- Factory installed VMS

exacqVision

VMS Software Solutions Overview

(effective June 2016)

Software specifications are subject to change without notice.		Start	Professional	Enterprise
System	Max Cameras Per Server	16 Analog / 16 IP	64 Analog / 128 IP	64 Analog / 128 IP
	Max Server Connections Per Client	1	512 (client) / 16 (web browser client)	512 (client) / 16 (web browser client)
	Windows & Linux Server Compatibility	☑	☑	☑
	Free Windows, Linux & Mac Clients	☑	☑	☑
	Browser-Based Viewing of Live/Stored Events	☑	☑	☑
	Compatible with Free Exacq Mobile App	☑	☑	☑
	EasyConnect Auto-Detect/Connect to Compatible IP Cameras	☑	☑	☑
	Fisheye/Panoramic Lens Support (Live & Recorded)	☑	☑	☑
	Client Bandwidth Throttling	☑	☑	☑
	Pre-Post Alarm Recording	☑	☑	☑
	Soft Triggers	☑	☑	☑
	Time-Lapse Recording		☑	☑
	Extended Storage		☑	☑
	Archiving		☑	☑
	Per-Camera Min/Max Retention		☑	☑
	Audit Trail		☑	☑
	Custom User Groups		☑	☑
	Third-Party Integrations		☑	☑
	Smart Search		☑	☑
	Email Notification for System Health Events		☑	☑
	exacqVision Surveillance Keyboard Support		☑	☑
	ESM Failover			☑
	Enterprise Camera Management			☑
	Enterprise Server Monitoring			☑
	Enterprise User Management			☑
	LDAP/Active Directory			☑
	Compatible with exacqVision Virtual Appliance			☑
	Software Updates Included (exacqVision Servers)	3 years	3 years	3 years
	Software Updates Included (3rd Party Servers)	90 days	1 year	1 year
Live View	View Cameras on Multiple Monitors	☑	☑	☑
	PTZ Control & Presets	☑	☑	☑
	Digital PTZ Control & Presets	☑	☑	☑
	Motion & Alarm Indication	☑	☑	☑
	Event Linking on Discreet Inputs	☑	☑	☑
	Event Linking on Video, Serial & Health Events		☑	☑
	Event-Driven & Time-Lapse Video Switching		☑	☑
	Camera Groups		☑	☑
	Multi-Streaming		☑	☑
	Event Notifications		☑	☑
	Two-Way Audio		☑	☑
	Maps		☑	☑
	VideoPush Video Wall			☑
	Hierarchical Maps for Fast Camera Navigation			☑
Search, Export & Archive	exacqReplay Instant Replay	☑	☑	☑
	Thumbnail & Timeline Event Search	☑	☑	☑
	POS & ATM Serial Text Search	☑	☑	☑
	Multi-Camera Playback	☑	☑	☑
	Export to DVD	☑	☑	☑
	Export to .AVI, .MOV, .MP4 or .EXE File	☑	☑	☑
	Bookmarking		☑	☑
	Multiple Camera Export		☑	☑
	Case Management			☑



Try exacqVision Now!

Connect to our demo servers or install the server software to your own computer and IP cameras with a full-featured free trial license. Try the exacqVision web browser client or the free Exacq Mobile app.

www.exacq.com/tryexacqvision

Accessories

Enterprise System Manager (ESM)

Maximize the uptime of your exacqVision Enterprise recorders with ESM. Access via browser on PC or mobile device

USB I/O Module

Add configurable trigger inputs, outputs and serial connections to expand your surveillance system.

Surveillance Keyboard

Pre-configured for quick, easy installation and advanced control of live and recorded video from the exacqVision client.

Exacq Mobile

Free app provides live & recorded video from multiple systems simultaneously (iOS/Android/Windows Phone 8)

exacqVision edge

exacqVision Edge

Install exacqVision Edge directly onto compatible IP cameras for a complete, full-featured VMS without a server.

exacqVision virtual

exacqVision Virtual

Pre-configured VMware Ready virtual appliance supported on systems with exacqVision Enterprise licenses.

exacqVision E-Series

E-Series Encoders

Single and 4-channel cost-effective encoders to convert analog cameras to IP to utilize exacqVision IP camera servers.

exacqVision

Cross Platform IP Video Surveillance Software and Systems

Hybrid NVR Servers - 2U Rackmount

IP and Analog Cameras

16 or 32 Analog Inputs + 8 IP Inputs (expandable to 64)
Up to 6TB Storage per server

The exacqVision® Hybrid NVR (Network Video Recorder) Server provides seamless integration and recording of both analog and IP video surveillance cameras. The exacqVision VMS (Video Management System) server software (Standard or Enterprise) is pre-installed on either a Windows or Linux operating system. The powerful, yet easy to operate client user interface installs on any standard computer running Windows, Linux or Mac OS X and can connect to an unlimited number of exacqVision Hybrid and IP camera servers creating a virtually unlimited amount of cameras and protection.

Features

exacqVision 2U Rackmount Hybrid NVR Servers & VMS Software

Flexible Scalability

- Up to 96 cameras (32 analog + 64 network) per server. Included 8 IP licenses.
- Simple and cost-effective to add additional IP camera licenses.
- Common client simultaneously connects to unlimited exacqVision servers to create scalable network.
- Standard and Enterprise VMS server software.

Powerful Integration

- Supports latest IP camera technology including multi-megapixel cameras, H.264, analytics.
- Integration with access control systems, iSCSI storage and loss prevention systems.

True Hybrid

- Seamless integration of analog and IP cameras on a single server
- Supports analog and IP PTZ cameras.
- Digital PTZ functionality on all cameras (analog and IP) in live and recorded mode.

Intuitive exacqVision Software

- Requires little to no training
- Multi-monitor client display. Drag and drop cameras between monitors.
- Graphical search display for all cameras and recorded audio.
- Multi-camera playback and export
- Powerful video and audio export features.

Mobile Access

- Access video with web browsers and mobile devices with internet access.

Cross Platform

- Server software runs on Windows or Linux
- Client software freely available for Windows, Linux and Macintosh

Mac

IP Camera Integration

Access Control Integration

The latest Network Camera Integration Partner list with model numbers is available at www.exacq.com/ipcameras.html

01-2010

Technical Specifications

exacqVision Hybrid NVR Servers - 2U Rackmount

Hybrid NVR - 16 Analog Inputs / Up to 64 IP Inputs

Model #	Analog Inputs	IPS	Looping Outputs	Analog Outputs	IP Licenses	HD Capacity
1608-12-0320-R2	16	120	16	1 mux / 1 spot	8 (Up to 64)	320 GB
1608-12-0500-R2	16	120	16	1 mux / 1 spot	8 (Up to 64)	500 GB
1608-12-1000-R2	16	120	16	1 mux / 1 spot	8 (Up to 64)	1000 GB
1608-12-2000-R2	16	120	16	1 mux / 1 spot	8 (Up to 64)	2000 GB
1608-12-3000-R2	16	120	16	1 mux / 1 spot	8 (Up to 64)	3000 GB
1608-12-4000-R2	16	120	16	1 mux / 1 spot	8 (Up to 64)	4000 GB
1608-12-6000-R2	16	120	16	1 mux / 1 spot	8 (Up to 64)	6000 GB
1608-12-0320-R2	16	480	16	1 mux / 1 spot	8 (Up to 64	320 GB
1608-48-0500-R2	16	480	16	1 mux / 1 spot	8 (Up to 64)	500 GB
1608-48-1000-R2	16	480	16	1 mux / 1 spot	8 (Up to 64)	1000 GB
1608-48-2000-R2	16	480	16	1 mux / 1 spot	8 (Up to 64)	2000 GB
1608-48-3000-R2	16	480	16	1 mux / 1 spot	8 (Up to 64)	3000 GB
1608-48-4000-R2	16	480	16	1 mux / 1 spot	8 (Up to 64)	4000 GB
1608-48-6000-R2	16	480	16	1 mux / 1 spot	8 (Up to 64)	6000 GB

Hybrid NVR - 32 Analog Inputs / Up to 64 IP Inputs

Model #	Analog Inputs	IPS	Looping Outputs	Analog Outputs	IP Licenses	HD Capacity
3208-24-0320-R2	32	240	0	2 mux / 2 spot	8 (Up to 64)	320 GB
3208-24-0500-R2	32	240	0	2 mux / 2 spot	8 (Up to 64)	500 GB
3208-24-1000-R2	32	240	0	2 mux / 2 spot	8 (Up to 64)	1000 GB
3208-24-2000-R2	32	240	0	2 mux / 2 spot	8 (Up to 64)	2000 GB
3208-24-3000-R2	32	240	0	2 mux / 2 spot	8 (Up to 64)	3000 GB
3208-24-4000-R2	32	240	0	2 mux / 2 spot	8 (Up to 64)	4000 GB
3208-24-6000-R2	32	240	0	2 mux / 2 spot	8 (Up to 64)	6000 GB
3208-96-3200-R2	32	960	0	2 mux / 2 spot	8 (Up to 64)	320 GB
3208-96-0500-R2	32	960	0	2 mux / 2 spot	8 (Up to 64)	500 GB
3208-96-1000-R2	32	960	0	2 mux / 2 spot	8 (Up to 64)	1000 GB
3208-96-2000-R2	32	960	0	2 mux / 2 spot	8 (Up to 64)	2000 GB
3208-96-3000-R2	32	960	0	2 mux / 2 spot	8 (Up to 64)	3000 GB
3208-96-4000-R2	32	960	0	2 mux / 2 spot	8 (Up to 64)	4000 GB
3208-96-6000-R2	32	960	0	2 mux / 2 spot	8 (Up to 64)	6000 GB

SERVER SPECIFICATIONS

RECORDING RESOLUTION (ANALOG):	CIF: 352 x 240 NTSC / 352 x 288 PAL 2CIF: 720 x 240 NTSC / 720 x 288 PAL D1: 720 x 480 NTSC / 720 x 576 PAL
RECORDING RESOLUTION (IP):	Only limited to IP Camera Resolution
FRAME RATE IPS (ANALOG):	NTSC: 120 ,240,480,960 PAL: 100,200,400,800
COMPRESSION (ANALOG):	MPEG-4 ASP or MJPEG
COMPRESSION (IP):	H.264, MPEG-4, MJPEG
ALARM INPUTS:	16 TTL inputs - screw terminal
ALARM OUTPUTS:	15 TTL outputs and 1 relay output - screw terminal
VIDEO INPUTS (ANALOG):	16 or 32 BNC
ANALOG PTZ PROTOCOLS:	Pelco D/P, GE-Impac, GE-ASCII, Bosch, Panasonic
VIDEO INPUTS (IP):	Up to 64 per server
VIDEO OUTPUTS (ANALOG):	2 or 4 BNC
LOOPING OUTPUTS:	16 or 0 BNC
AUDIO INPUTS:	4 audio input - screw terminal + IP camera audio
SERIAL CONNECTIONS:	RS-485 PTZ port
NIC:	1Gbit 1000Base T RJ-45
USB2 PORTS:	8 (2 front, 6 rear)
HARD DRIVE STORAGE:	Enterprise Class (see exacqVision model numbers)
VGA OUTPUT:	1 VGA (DB15) or DVI-D
KEYBOARD & MOUSE:	Yes
DVD/CD RW:	Yes (front panel access)
WATCHDOG TIMER:	Yes
OPERATING SYSTEM:	Windows XP Pro, Windows Server 2003 or Linux
REGULATORY:	CE (Class A), FCC (Class A)
WARRANTY:	3 years, parts and labor
DIMENSIONS (LxWxH):	21.25 x 19.0 x 3.5 (2U) in. / 53.975 x 48.26 x 8.89 cm
WEIGHT:	28.7 - 32.1 lbs. / 13 - 14.6 kg
OPERATING TEMPERATURE:	40 - 90° F / 4.5 - 35° C
RELATIVE HUMIDITY:	5-95% RH (non-condensing)
INPUT VOLTAGE:	120 VAC
POWER CONSUMPTION:	< 250 watts (150 watts typical)

CLIENT WORKSTATION MINIMUM REQUIREMENTS

Full remote operation from most computers

OS:	Windows, Linux, Mac OS
PROCESSOR:	2 Ghz Celeron (min.)
MEMORY:	512 MB RAM
VGA:	Standard high performance

WEB BROWSER ACCESS

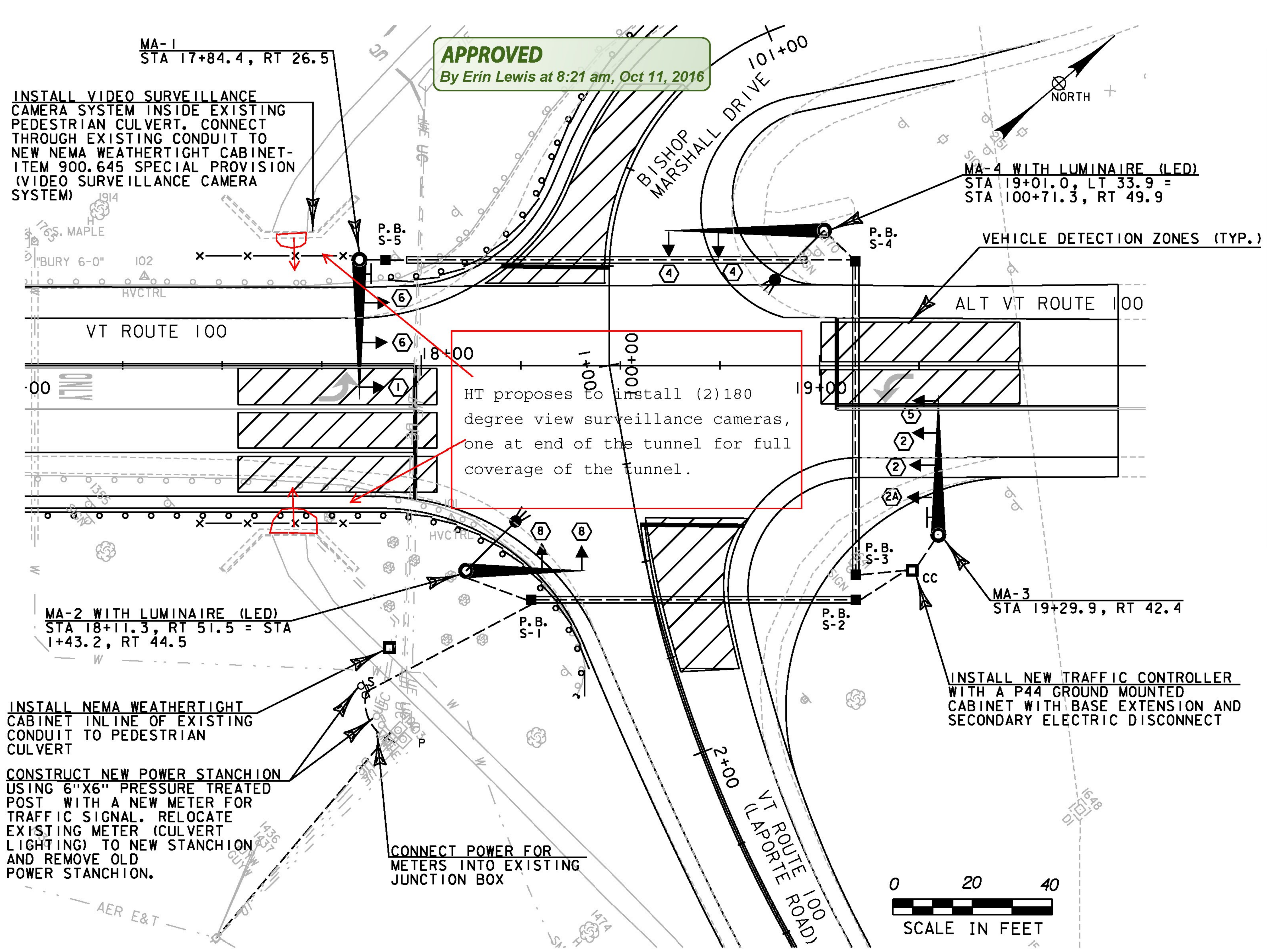
Access servers from online brower

COMPATIBILITY: Internet Explorer, Firefox, Apple Safari, Opera, Google Chrome

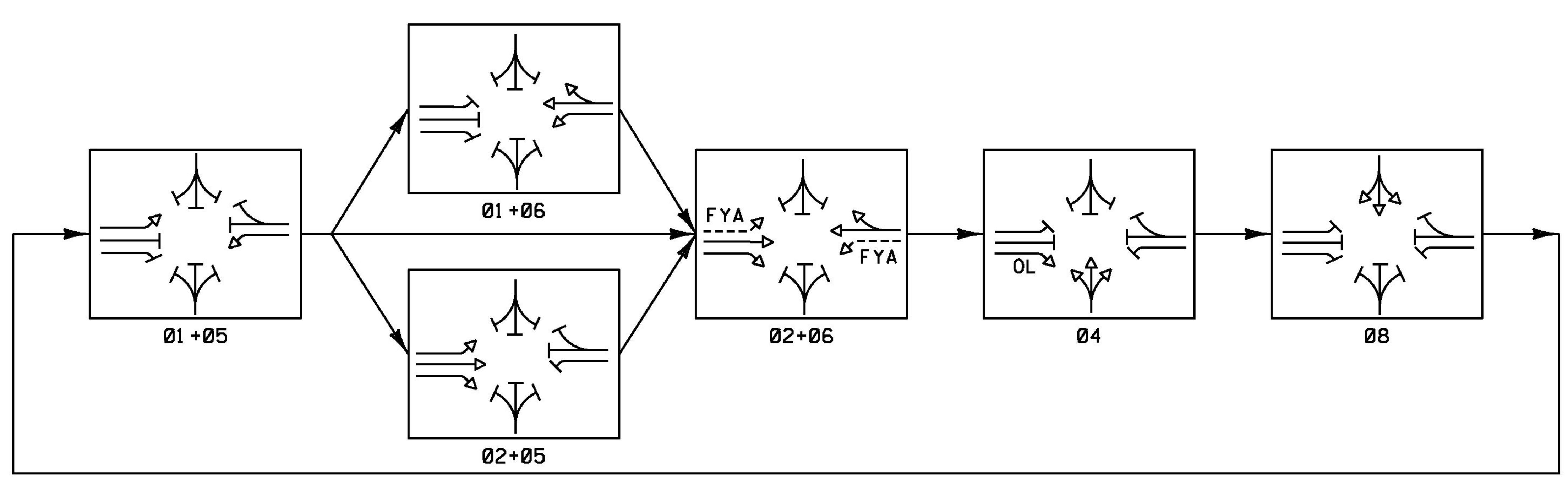
MOBILE DEVICE ACCESS

Access video with mobile devices via mobile web browser

e.g.
iPhone and iPod Touch
BlackBerry
Android



VT ROUTE 100, ALT VT ROUTE 100, AND BISHOP MARSHALL DRIVE



·---- = PERMISSIVE MOVEMENT   OL = OVERLAP   FYA = FLASHING YELLOW ARROW

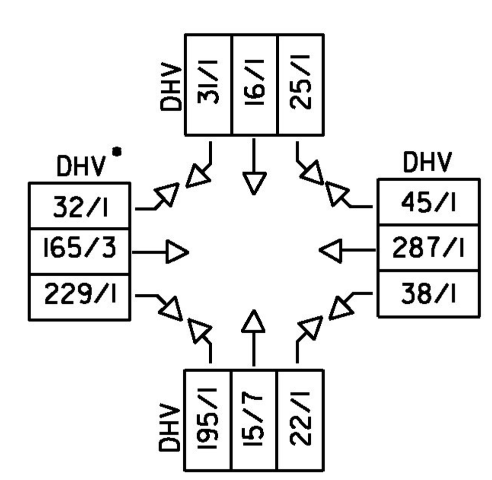
TABLE OF CHANGE SEQUENCE																			
FACE	Ø1 & Ø5			Ø1 & Ø6			Ø2 & Ø5			Ø2 & Ø6			Ø4			Ø8			FLASHING OPERATION
	CLEAR TO			CLEAR TO			CLEAR TO			CLEAR TO			CLEAR TO			CLEAR TO			
	R/W	ALL OTHERS		R/W	ALL OTHERS		R/W	ALL OTHERS		R/W	ALL OTHERS		R/W	ALL OTHERS		R/W	ALL OTHERS		
1	◁G	◁Y	◁R	◁G	◁Y	◁R	◁R	◁R	◁R	FYA	◁Y	◁R	◁R	◁R	◁R	◁R	◁R	◁R	FR
2	R	R	R	R	R	R	G	Y	R	G	Y	R	R	R	R	R	R	R	FY
2a	R	R	R	R	R	R	G/G▷	Y/Y▷	R	G/G▷	Y/Y▷	R	G/G▷	Y/Y▷	R	R	R	R	FY
4	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	FR
5	◁G	◁Y	◁R	◁R	◁R	◁R	◁G	◁Y	◁R	FYA	◁Y	◁R	◁R	◁R	◁R	◁R	◁R	◁R	FR
6	R	R	R	G	Y	R	R	R	R	G	Y	R	R	R	R	R	R	R	FY
8	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	FR

LIST OF MAJOR EQUIPMENT

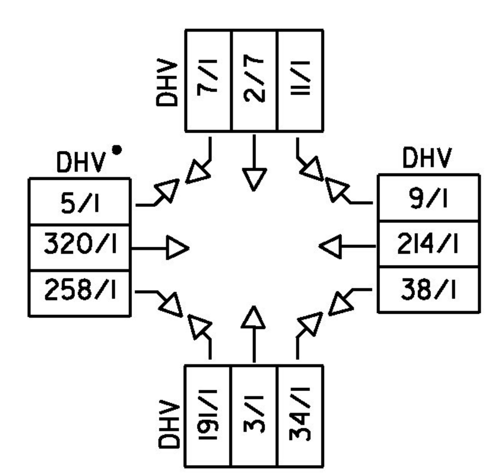
EQUIPMENT ITEM 678.15	QUANTITY
12-PHASE TS-2 TYPE 1 TRAFFIC SIGNAL CONTROLLER IN P44 CABINET WITH EXTENSION BASE/ FOUNDATION AND SECONDARY POWER DISCONNECT	1
SIGNAL POLE WITH 35' MAST ARM (MA-1)	1
SIGNAL POLE WITH 30' MAST ARM (MA-2)	1
SIGNAL POLE WITH 35' MAST ARM (MA-3)	1
SIGNAL POLE WITH 40' MAST ARM (MA-4)	1
NEW 12" POLYCARBONATE, 3-SECTION LED SIGNAL HEAD (ONE WAY) W/TUNNEL VISORS, LOUVERED BACKPLATES, AND MOUNTING HARDWARE	8
NEW 12" POLYCARBONATE, 4-SECTION LED SIGNAL HEAD (ONE WAY) W/TUNNEL VISORS, LOUVERED BACKPLATES, AND MOUNTING HARDWARE	2
NEW 12" POLYCARBONATE, 5-SECTION LED SIGNAL HEAD (ONE WAY) W/TUNNEL VISORS, LOUVERED BACKPLATES, AND MOUNTING HARDWARE	1
CAMERA ASSEMBLY (VIDEO MONITORING)	1
VIDEO CAMERA CARD AND RACK	1
ADVANCED VEHICLE DETECTION (EA)	2
VEHICLE STOP BAR DETECTION (EA)	4
POWER METER ON STANCHION	1

ALL OTHER WIRING AND INCIDENTALS REQUIRED TO PROVIDE A FULLY FUNCTIONAL TRAFFIC SIGNAL SYSTEM WILL BE CONSIDERED INCIDENTAL TO ITEM 678.15.

EXISTING	NEW	LEGEND
		UTILITY POLE
		LUMINAIRE
		LIGHT OR WOOD POLE
		STRAIN POLE
		CONTROLLER CABINET
		PULLBOX/JUNCTION BOX
		SIGNAL HEAD
		CONDUIT
		VEHICLE LOOPS
		PEDESTAL POST
		STANCHION
	-S	SWEEP
		STREET NAME SIGN
		VEHICLE DETECTION ZONE



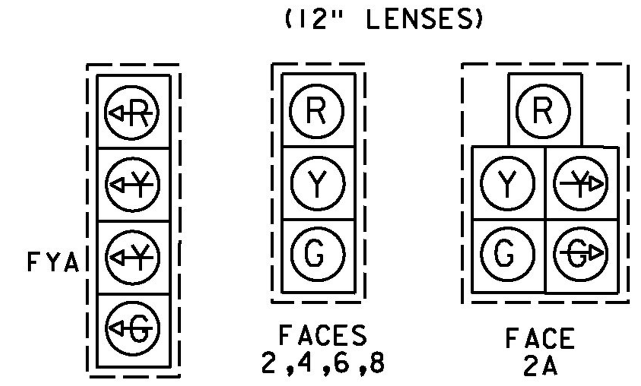
2015
A.M. DESIGN HOUR VOLUME
TRAFFIC



2015
P.M. DESIGN HOUR VOLUME
TRAFFIC

*DESIGN HOUR VOLUME / % TRUCK

SIGNAL FACE ARRANGEMENT
(12" LENSES)



FACES
1,5

FACES
2,4,6,8

FACE
2A

FYA = FLASHING YELLOW ARROW

CONTROLLER TIMING CHART									
LOCAL PROGRAMMING	PHASES								
	1	2	3	4	5	6	7	8	9
MINIMUM GREEN	5	8	--	5	5	8	--	5	--
EXTENSION	3	3	--	3	3	3	--	3	--
YELLOW CLEARANCE	4	4	--	4	4	4	--	4	--
ALL RED CLEARANCE	2	2	--	2	2	2	--	2	--
DHV	--	--	--	--	--	--	--	--	--
MAX GREEN I 6:00-9:00 AM	10	30	--	16	10	30	--	10	--
MAX GREEN II 3:00-6:00 PM	10	33	--	13	10	33	--	10	--
MAX GREEN 10:00AM-3:00PM	10	25	--	15	10	25	--	10	--
FLASH MODE 10:00PM-6:00AM	FR	FY	--	FR	FR	FY	--	FR	--
WALK	--	--	--	--	--	--	--	--	--
FLASHING DON'T WALK	--	--	--	--	--	--	--	--	--
RECALL	OFF	MIN	--	OFF	OFF	MIN	--	OFF	--

SIGNAL CONDUIT & SLEEVE LENGTHS					
FROM	TO	2" WIRED CONDUIT SIGNAL	2" CONDUIT SIGNAL (SPARE)	2" CONDUIT POWER	12" SLEEVE
EX. POLE	EX. JB		2 x 81 FT		
P	S		2 x 22 FT	2 x 22 FT	
S	PB S-1	1 x 54 FT	1 x 54 FT	1 x 54 FT	
PB S-1	MA-2	3 x 22 FT	1 x 22 FT		
PB S-1	PB S-2	4 x 87 FT	1 x 87 FT	1 x 87 FT	1 x 79 FT
PB S-2	CC	4 x 20 FT	1 x 20 FT	1 x 20 FT	
CC	MA-3	2 x 15 FT	1 x 15 FT		
CC	PB S-3	4 x 18 FT	1 x 18 FT		
PB S-3	PB S-4	4 x 84 FT	1 x 84 FT		1 x 76 FT
PB S-4	MA-4	2 x 16 FT	1 x 16 FT		
PB S-4	PB S-5	3 x 124 FT	1 x 124 FT		1 x 101 FT
PB S-5	MA-1	3 x 12 FT	1 x 12 FT		

NOTES:

1. ALL EQUIPMENT NECESSARY TO PROVIDE A FULLY FUNCTIONAL VEHICLE STOP BAR DETECTION SYSTEM AND ADVANCED VEHICLE DETECTION WILL BE PAID FOR UNDER ITEM 678.15 TRAFFIC CONTROL SIGNALS.
2. ALL PULLBOXES SHOWN ON THE PLANS SHALL BE ITEM 678.27 PULLBOX, DOUBLE.
3. ALL TRAFFIC SIGNAL CONDUIT PROPOSED IN THE ROADWAY WILL BE INSTALLED IN THE SAME SLEEVE AS THE LIGHTING CONDUIT.
4. PHASE 1 AND PHASE 5 WILL CONSIST OF A PROTECTED GREEN ARROW INDICATION, FLASHING YELLOW ARROW CONDITION SHALL OPERATE DURING PHASE 2 AND PHASE 6 AND SHALL TERMINATE CONCURRENT WITH PHASE 2 AND PHASE 6 OPERATION IN CONFORMANCE WITH THE CURRENT MUTCD MANUAL.
5. CONTRACTOR SHALL INSTALL ADVANCED VEHICLE DETECTION ON THE MAINLINE APPROACHES AS DIRECTED IN THE TRAFFIC SIGNAL SYSTEM NOTES.
6. THE CONTRACTOR SHALL USE CAUTION TO PROTECT ALL UNDERGROUND UTILITIES FROM DAMAGE DURING THE INSTALLATION OF ELECTRIC CONDUIT. ANY DAMAGE TO THE EXISTING UNDERGROUND UTILITIES WILL BE REPAIRED AT THE COST OF THE CONTRACTOR, AT NO COST TO THE STATE OR THE UTILITY OWNER. SEE UTILITY SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
7. THE CONTRACTOR SHALL MODIFY THE EXISTING PEDESTRIAN CULVERT LIGHTING SYSTEM TO INCLUDE MOTION SENSORS AT EACH END OF THE CULVERT UNDER ITEM 900.645 SPECIAL PROVISION (MODIFYING EXISTING PEDESTRIAN CULVERT LIGHTING).
8. SEE SHEET 45 AND 46 FOR ADDITIONAL SIGNAL NOTES.

McFarland Johnson

PROJECT NAME: MORRISTOWN
PROJECT NUMBER: STPG SGNL(47)

FILE NAME: z15t047sig01.dgn
PROJECT LEADER: J. SANTACRUCE
DESIGNED BY: R. LUCHINI
TRAFFIC SIGNAL LAYOUT SHEET 1

PLOT DATE: 5/17/2016
DRAWN BY: R. LUCHINI
CHECKED BY: B. COLBURN
SHEET 43 OF 58

Datasheet

APPROVED
By Erin Lewis at 8:08 am, Oct 11, 2016

AXIS Q6044-E PTZ Dome Network Camera

Outdoor, high-speed PTZ dome with HDTV 720p and 30x zoom

AXIS Q6044-E is a top-of-the-line PTZ dome, offering HDTV 720p resolution and fast and precise pan/tilt performance. With endless 360° pan and 30x optical zoom, it can monitor wide areas and provide detailed surveillance. It has day and night functionality, maintaining high image quality even in low-light conditions. Arctic Temperature Control ensures safe start-up in extreme cold, and electronic image stabilization gives more useful video in windy conditions. In fog, automatic defog provides clearer video. Active Gatekeeper automatically moves the camera to a preset position when motion is detected in a pre-defined area, tracking the detected object.

> HDTV 720p and 30x optical zoom

> Outdoor-ready and Arctic Temperature Control

> Vandal-resistant and shock detection

> Electronic image stabilization

> Automatic defog

1485643/EN/M3.2/022016

AXIS Q6044-E PTZ Dome Network Camera

Models	AXIS Q6044-E 60 Hz AXIS Q6044-E 50 Hz
Camera	
Image sensor	1/3" Progressive scan CCD
Lens	4.4-132 mm, F1.4-4.6 Horizontal angle of view 62.9°-2.2° Vertical angle of view 37°-1.2° Autofocus
Day and night	Automatically removable infrared-cut filter
Minimum illumination	Color: 0.2 lux at 30 IRE F1.4 B/W: 0.04 lux at 30 IRE F1.4 Color: 0.3 lux at 50 IRE F1.4 B/W: 0.05 lux at 50 IRE F1.4
Shutter time	1/10000 s to 1/4 s
Pan/Tilt/Zoom	Pan: 360° endless, 0.05° - 450°/s Tilt: 220°, 0.05°-450°/s 30x optical zoom and 12x digital zoom, total 360x zoom E-flip, 256 preset positions, Tour recording, Guard tour, Control queue, On-screen directional indicator, Set new pan 0°, Adjustable zoom speed
Video	
Video compression	H.264 (MPEG-4 Part 10/AVC) Baseline and Main Profiles Motion JPEG
Resolutions	HDTV 720p 1280x720 to 320x180
Frame rate	Up to 30/25 fps (60/50 Hz) in all resolutions
Video streaming	Multiple, individually configurable streams in H.264 and Motion JPEG Controllable frame rate and bandwidth VBR/MBR H.264
Image settings	Wide Dynamic Range (WDR), manual shutter time, compression, color, brightness, sharpness, white balance, exposure control, exposure zones, backlight compensation, fine tuning of behavior at low light, rotation: 0°, 180°, text and image overlay, 32 individual 3D privacy masks, image freeze on PTZ, electronic image stabilization, automatic defog
Network	
Security	Password protection, IP address filtering, HTTPS[a] encryption, IEEE 802.1X[a] network access control, Digest authentication, User access log, Centralized Certificate Management
Supported protocols	IPv4/v6, HTTP, HTTPS[a], SSL/TLS[a], QoS Layer 3 DiffServ, FTP, CIFS/SMB, SMTP, Bonjour, UPnP™, SNMP v1/v2c/v3 (MIB-II), DNS, DynDNS, NTP, RTSP, RTP, SFTP, TCP, UDP, IGMP, RTCP, ICMP, DHCP, ARP, SOCKS, SSH, NTCIP
System integration	
Application Programming Interface	Open API for software integration, including VAPIX® and AXIS Camera Application Platform; specifications at *www.axis.com* AXIS Video Hosting System (AVHS) with One-Click Connection ONVIF Profile S, specification at *www.onvif.org*
Analytics	Video motion detection, Autotracking, Active Gatekeeper Support for AXIS Camera Application Platform enabling installation of third-party applications, see *www.axis.com/acap*
Event triggers	Analytics, Shock detection, Fan, Temperature, Manual trigger, PTZ moving, PTZ preset, Edge storage events Heater Casing open
Event actions	File upload: FTP, SFTP, HTTP, HTTPS network share and email Notification: email, HTTP, HTTPS and TCP Day/night mode, Guard tour, Video recording to edge storage, Pre- and post-alarm video buffering, PTZ preset, Overlay text, Send SNMP trap
Data streaming	Event data
Built-in installation aids	Pixel counter
General	
Casing	IP66-, NEMA 4X- and IK10-rated metal casing (aluminum), polycarbonate (PC) clear dome, sunshield (PC/ASA) PVC free
Memory	512 MB RAM, 128 MB Flash Battery backed-up real-time clock
Power	Axis High PoE midspan 1-port: 100-240 V AC, max 74 W
Connectors	RJ45 10BASE-T/100BASE-TX PoE, RJ45 Push-pull Connector (IP66) included
Storage	Support for SD/SDHC/SDXC card Support for recording to dedicated network-attached storage (NAS) For SD card and NAS recommendations see *www.axis.com*
Operating conditions	With 30 W midspan: -20 °C to 50 °C (-4 °F to 122 °F) With 60 W midspan: -50 °C to 50 °C (-58 °F to 122 °F) Maximum temperature (intermittent): 60 °C (140 °F) Arctic Temperature Control: Start-up as low as -40 °C (-40 °F) Humidity 10-100% RH (condensing)
Storage conditions	-50 °C to 60 °C (-58 °F to 140 °F)
Approvals	EN 55022 Class A, EN 61000-3-2, EN 61000-3-3, EN 61000-6-1, EN 61000-6-2, EN 55024, FCC Part 15 Subpart B Class A, ICES-003 Class A, VCCI Class A, C-tick AS/NZS CISPR 22 Class A KCC KN22 Class A, KN24, IEC/EN/UL 60950-1 EN 50121-4, IEC 62236-4, IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-6, IEC 60068-2-14, IEC 60068-2-27, NEMA 250 Type 4X IEC/EN/UL 60950-22, IEC 60068-2-30, IEC 60068-2-60, IEC 60068-2-78 IEC/EN 60529 IP66, NEMA TS-2-2003 v02.06, Subsection 2.2.7, 2.2.8, 2.2.9; IEC 62262 IK10, ISO 4892-2 **Midspan:** EN 60950-1, GS, UL, cUL, CE, FCC, VCCI, CB, KCC, UL-AR
Weight	3.7 kg (8.2 lb)
Dimensions	Ø232 x 280 mm (Ø9.1 x 11.0 in)
Included accessories	Axis High PoE 60 W Midspan 1-port, RJ45 Push-pull Connector (IP66), Sunshield Installation Guide, Windows decoder 1-user license
Optional accessories	Smoked dome cover, AXIS T91A Mounting Accessories AXIS T90 Illuminators, AXIS T8310 Video Surveillance Control Board, Installation Display, Multi-user decoder license pack
Video management software	AXIS Camera Companion, AXIS Camera Station, Video management software from Axis' Application Development Partners available on *www.axis.com/techsup/software*
Languages	English, German, French, Spanish, Italian, Russian, Simplified Chinese, Japanese, Korean, Portuguese, Traditional Chinese
Warranty	Axis 3-year warranty and AXIS Extended Warranty option, see *www.axis.com/warranty*

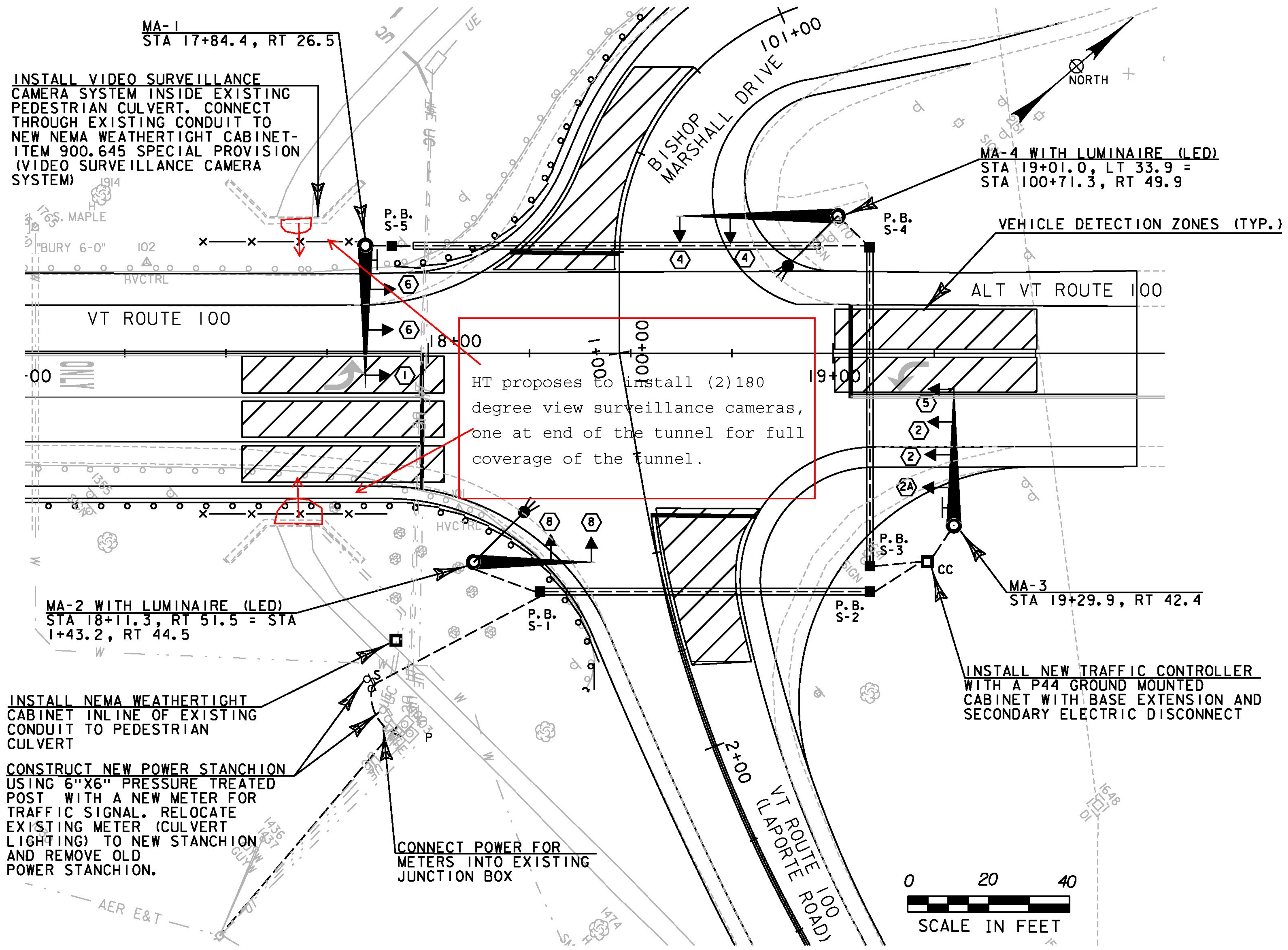
a. *This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit. (www.openssl.org), and cryptographic software written by Eric Young (eay@cryptsoft.com).*

Environmental responsibility:

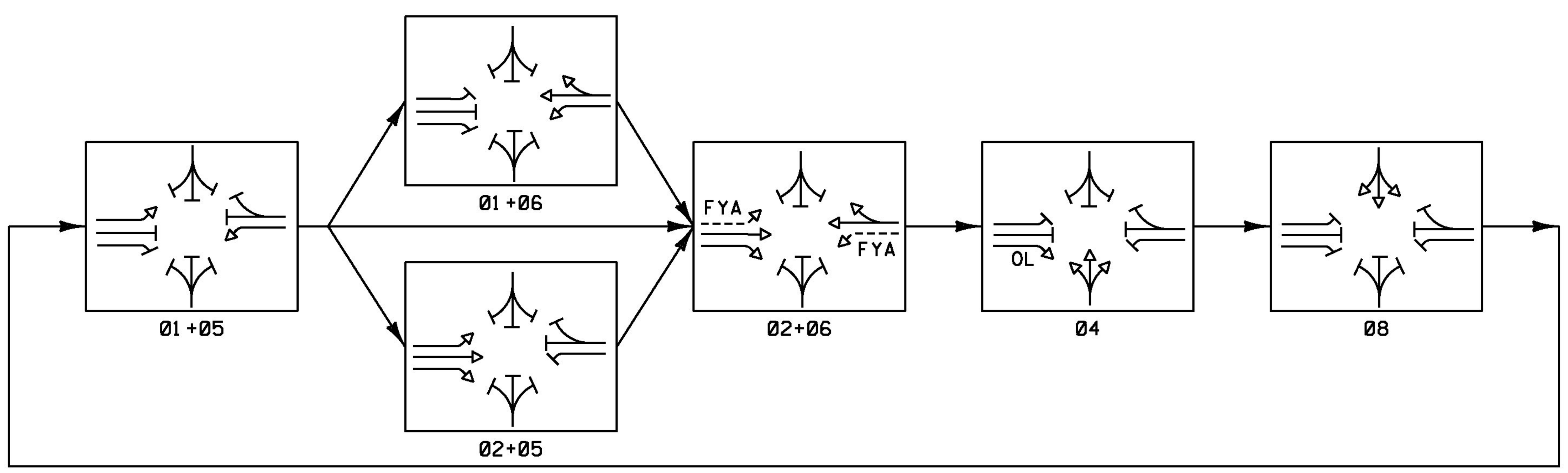
www.axis.com/environmental-responsibility

Highway Tech
6 Sabattus Road • P.O. Box 1209 • Sabattus, ME 04280
ME Office - Tel. (207) 375-8218 - Fax (866) 232-7011
NY Office - Tel. (607) 299-4601 - Fax (866) 350-3162

AXIS COMMUNICATIONS



VT ROUTE 100, ALT VT ROUTE 100, AND BISHOP MARSHALL DRIVE



----- = PERMISSIVE MOVEMENT OL = OVERLAP FYA = FLASHING YELLOW ARROW

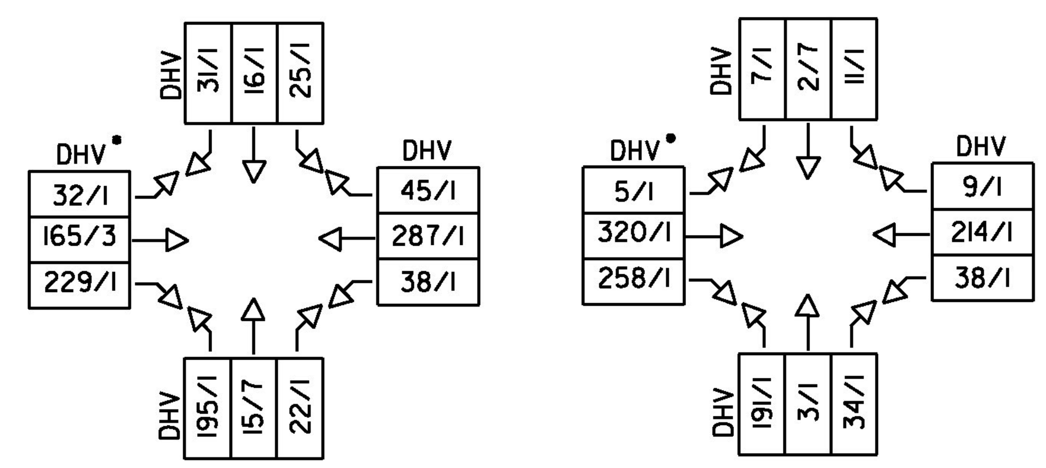
TABLE OF CHANGE SEQUENCE																			
FACE	Ø1 & Ø5			Ø1 & Ø6			Ø2 & Ø5			Ø2 & Ø6			Ø4			Ø8			FLASHING OPERATION
	CLEAR TO			CLEAR TO			CLEAR TO			CLEAR TO			CLEAR TO			CLEAR TO			
	R/W	ALL OTHERS		R/W	ALL OTHERS		R/W	ALL OTHERS		R/W	ALL OTHERS		R/W	ALL OTHERS		R/W	ALL OTHERS		
1	◂G	◂Y	◂R	◂G	◂Y	◂R	◂R	◂R	◂R	FYA	◂Y	◂R	◂R	◂R	◂R	◂R	◂R	◂R	FR
2	R	R	R	R	R	R	G	Y	R	G	Y	R	R	R	R	R	R	R	FY
2a	R	R	R	R	R	R	G/G▸	Y/Y▸	R	G/G▸	Y/Y▸	R	G/G▸	Y/Y▸	R	R	R	R	FY
4	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	FR
5	◂G	◂Y	◂R	◂R	◂R	◂R	◂G	◂Y	◂R	FYA	◂Y	◂R	◂R	◂R	◂R	◂R	◂R	◂R	FR
6	R	R	R	G	Y	R	R	R	R	G	Y	R	R	R	R	R	R	R	FY
8	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	FR

LIST OF MAJOR EQUIPMENT

EQUIPMENT ITEM 678.15	QUANTITY
12-PHASE TS-2 TYPE 1 TRAFFIC SIGNAL CONTROLLER IN P44 CABINET WITH EXTENSION BASE/ FOUNDATION AND SECONDARY POWER DISCONNECT	1
SIGNAL POLE WITH 35' MAST ARM (MA-1)	1
SIGNAL POLE WITH 30' MAST ARM (MA-2)	1
SIGNAL POLE WITH 35' MAST ARM (MA-3)	1
SIGNAL POLE WITH 40' MAST ARM (MA-4)	1
NEW 12" POLYCARBONATE, 3-SECTION LED SIGNAL HEAD (ONE WAY) W/TUNNEL VISORS, LOUVERED BACKPLATES, AND MOUNTING HARDWARE	8
NEW 12" POLYCARBONATE, 4-SECTION LED SIGNAL HEAD (ONE WAY) W/TUNNEL VISORS, LOUVERED BACKPLATES, AND MOUNTING HARDWARE	2
NEW 12" POLYCARBONATE, 5-SECTION LED SIGNAL HEAD (ONE WAY) W/TUNNEL VISORS, LOUVERED BACKPLATES, AND MOUNTING HARDWARE	1
CAMERA ASSEMBLY (VIDEO MONITORING)	1
VIDEO CAMERA CARD AND RACK	1
ADVANCED VEHICLE DETECTION (EA)	2
VEHICLE STOP BAR DETECTION (EA)	4
POWER METER ON STANCHION	1

ALL OTHER WIRING AND INCIDENTALS REQUIRED TO PROVIDE A FULLY FUNCTIONAL TRAFFIC SIGNAL SYSTEM WILL BE CONSIDERED INCIDENTAL TO ITEM 678.15.

EXISTING	NEW	LEGEND
		UTILITY POLE
		LUMINAIRE
		LIGHT OR WOOD POLE
		STRAIN POLE
		CONTROLLER CABINET
		PULLBOX/JUNCTION BOX
		SIGNAL HEAD
		CONDUIT
		VEHICLE LOOPS
		PEDESTAL POST
		STANCHION
	—S	SWEEP
		STREET NAME SIGN
		VEHICLE DETECTION ZONE

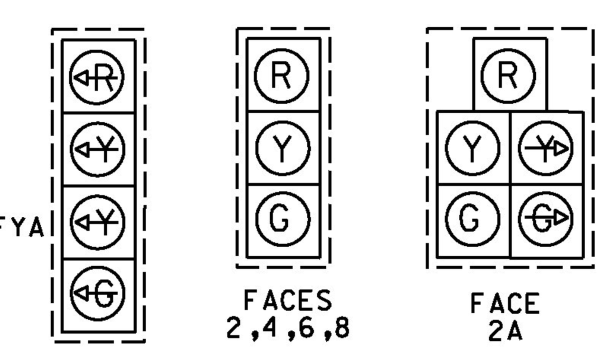


2015
A.M. DESIGN HOUR VOLUME
TRAFFIC

2015
P.M. DESIGN HOUR VOLUME
TRAFFIC

*DESIGN HOUR VOLUME / % TRUCK

SIGNAL FACE ARRANGEMENT
(12" LENSES)



FACES 1,5

FACES 2,4,6,8

FACE 2A

FYA = FLASHING YELLOW ARROW

CONTROLLER TIMING CHART									
LOCAL PROGRAMMING	PHASES								
	1	2	3	4	5	6	7	8	9
MINIMUM GREEN	5	8	--	5	5	8	--	5	--
EXTENSION	3	3	--	3	3	3	--	3	--
YELLOW CLEARANCE	4	4	--	4	4	4	--	4	--
ALL RED CLEARANCE	2	2	--	2	2	2	--	2	--
DHV	--	--	--	--	--	--	--	--	--
MAX GREEN I 6:00-9:00 AM	10	30	--	16	10	30	--	10	--
MAX GREEN II 3:00-6:00 PM	10	33	--	13	10	33	--	10	--
MAX GREEN 10:00AM-3:00PM	10	25	--	15	10	25	--	10	--
FLASH MODE 10:00PM-6:00AM	FR	FY	--	FR	FR	FY	--	FR	--
WALK	--	--	--	--	--	--	--	--	--
FLASHING DON'T WALK	--	--	--	--	--	--	--	--	--
RECALL	OFF	MIN	--	OFF	OFF	MIN	--	OFF	--

SIGNAL CONDUIT & SLEEVE LENGTHS					
FROM	TO	2" WIRED CONDUIT SIGNAL	2" CONDUIT SIGNAL (SPARE)	2" CONDUIT POWER	12" SLEEVE
EX. POLE	EX. JB		2 x 81 FT		
P	S		2 x 22 FT	2 x 22 FT	
S	PB S-1	1 x 54 FT	1 x 54 FT	1 x 54 FT	
PB S-1	MA-2	3 x 22 FT	1 x 22 FT		
PB S-1	PB S-2	4 x 87 FT	1 x 87 FT	1 x 87 FT	1 x 79 FT
PB S-2	CC	4 x 20 FT	1 x 20 FT	1 x 20 FT	
CC	MA-3	2 x 15 FT	1 x 15 FT		
CC	PB S-3	4 x 18 FT	1 x 18 FT		
PB S-3	PB S-4	4 x 84 FT	1 x 84 FT		1 x 76 FT
PB S-4	MA-4	2 x 16 FT	1 x 16 FT		
PB S-4	PB S-5	3 x 124 FT	1 x 124 FT		1 x 101 FT
PB S-5	MA-1	3 x 12 FT	1 x 12 FT		

NOTES:

1. ALL EQUIPMENT NECESSARY TO PROVIDE A FULLY FUNCTIONAL VEHICLE STOP BAR DETECTION SYSTEM AND ADVANCED VEHICLE DETECTION WILL BE PAID FOR UNDER ITEM 678.15 TRAFFIC CONTROL SIGNALS.
2. ALL PULLBOXES SHOWN ON THE PLANS SHALL BE ITEM 678.27 PULLBOX, DOUBLE.
3. ALL TRAFFIC SIGNAL CONDUIT PROPOSED IN THE ROADWAY WILL BE INSTALLED IN THE SAME SLEEVE AS THE LIGHTING CONDUIT.
4. PHASE 1 AND PHASE 5 WILL CONSIST OF A PROTECTED GREEN ARROW INDICATION, FLASHING YELLOW ARROW CONDITION SHALL OPERATE DURING PHASE 2 AND PHASE 6 AND SHALL TERMINATE CONCURRENT WITH PHASE 2 AND PHASE 6 OPERATION IN CONFORMANCE WITH THE CURRENT MUTCD MANUAL.
5. CONTRACTOR SHALL INSTALL ADVANCED VEHICLE DETECTION ON THE MAINLINE APPROACHES AS DIRECTED IN THE TRAFFIC SIGNAL SYSTEM NOTES.
6. THE CONTRACTOR SHALL USE CAUTION TO PROTECT ALL UNDERGROUND UTILITIES FROM DAMAGE DURING THE INSTALLATION OF ELECTRIC CONDUIT. ANY DAMAGE TO THE EXISTING UNDERGROUND UTILITIES WILL BE REPAIRED AT THE COST OF THE CONTRACTOR, AT NO COST TO THE STATE OR THE UTILITY OWNER. SEE UTILITY SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
7. THE CONTRACTOR SHALL MODIFY THE EXISTING PEDESTRIAN CULVERT LIGHTING SYSTEM TO INCLUDE MOTION SENSORS AT EACH END OF THE CULVERT UNDER ITEM 900.645 SPECIAL PROVISION (MODIFYING EXISTING PEDESTRIAN CULVERT LIGHTING).
8. SEE SHEET 45 AND 46 FOR ADDITIONAL SIGNAL NOTES.

McFarland Johnson

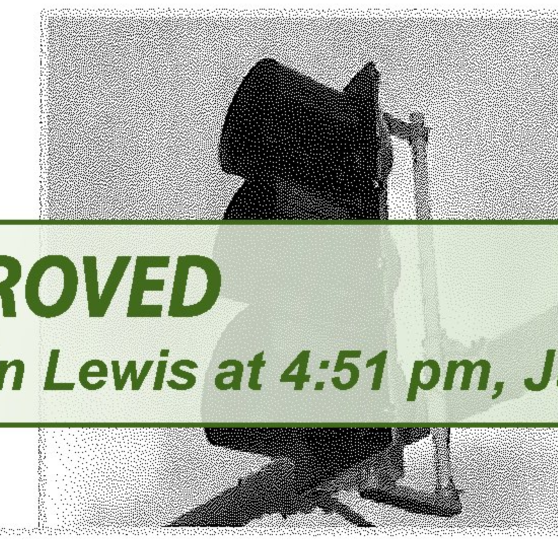
PROJECT NAME:	MORRISTOWN
PROJECT NUMBER:	STPG SGNL(47)

FILE NAME: z15t047s1g01.dgn	PLOT DATE: 5/17/2016
PROJECT LEADER: J. SANTACRUCE	DRAWN BY: R. LUCHINI
DESIGNED BY: R. LUCHINI	CHECKED BY: B. COLBURN
TRAFFIC SIGNAL LAYOUT SHEET 1	SHEET 43 OF 58

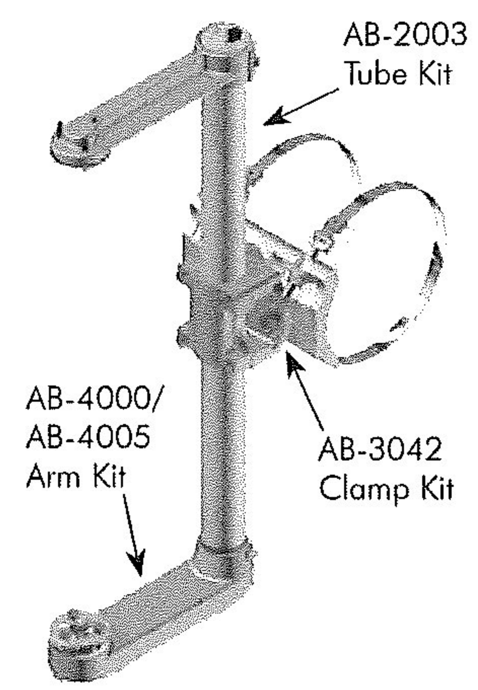
EAST COAST SIGNALS APPROVED FOR SUBMITTAL 7-18-16 MSF

1-Way Assemblies

Designed to accommodate all traffic signals, with the exception of optically programmed. The Tallon Series Astro-Brac is designed to be tough and durable. It features all-axis adjustability and is designed to facilitate the mounting of any size signal to any size mast arm or pole.



APPROVED
By Erin Lewis at 4:51 pm, Jul 28, 2016

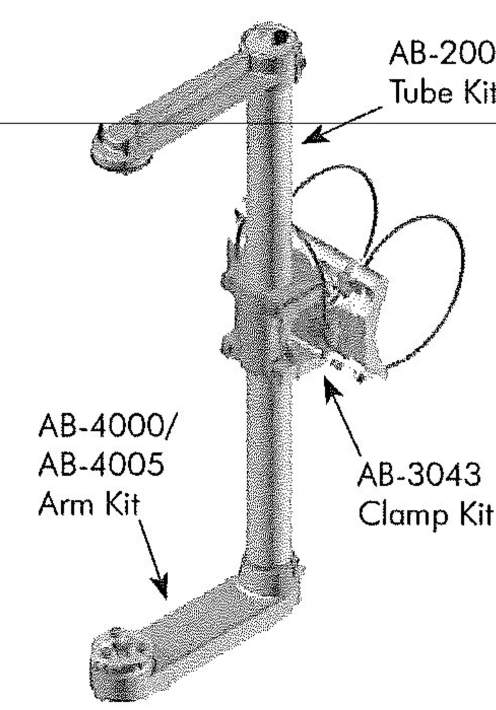


Astro-Brac Assy, Tallon Series, 1-Way Band Mount

AB-0618 - [Signal Section] - [Band Length] - [Coating]

Signal Section	Band Length	Coating
1=1 Sec	29=29" Band	PNC=Process No Color
2=2 Sec	36=36" Band	P_ _=Paint
3=3 Sec	42=42" Band	
4=4 Sec	48=48" Band	
5=5 Sec	56=56" Band	

Note:
Stainless steel upgrade available: includes stainless clamp screw and slotted washer.
Specify by including -SS in the part number, i.e., AB-0618-3-29-SS-PNC.

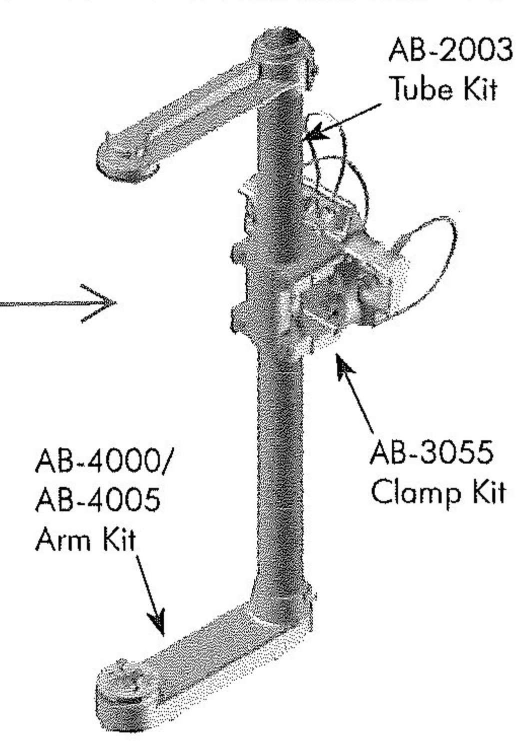


Astro-Brac Assy, Tallon Series, 1-Way Cable Mount

AB-0617 - [Signal Section] - [Cable Length] - [Coating]

Signal Section	Cable Length	Coating
1=1 Sec	62=62" Cable	PNC=Process No Color
2=2 Sec	84=84" Cable	P_ _=Paint
3=3 Sec	96=96" Cable	
4=4 Sec		
5=5 Sec		

Note:
Stainless steel upgrade available: includes stainless cable and slotted washer.
Specify by including -SS in the part number, i.e., AB-0617-3-62-SS-PNC.



Astro-Brac Assy, Galaxy Series, 1-Way Cable Mount

AG-0125 - 3&4 - 84 - P-34 Black

Signal Section	Cable Length	Coating
1=1 Sec	62=62" Cable	PNC=Process No Color
2=2 Sec	84=84" Cable	P_ _=Paint
3=3 Sec	96=96" Cable	
4=4 Sec		
5=5 Sec		

Note:
Stainless steel upgrade available: includes stainless cable and slotted washer.
Specify by including -SS in the part number, i.e., AG-0125-3-62-SS-PNC.

Note: 1. All assemblies are supplied standard with stainless steel fasteners.
2. See Reference Section for clamp kit pole diameters.
3. See Reference Section for available paint colors.

Highway Tech

Astro-Brac

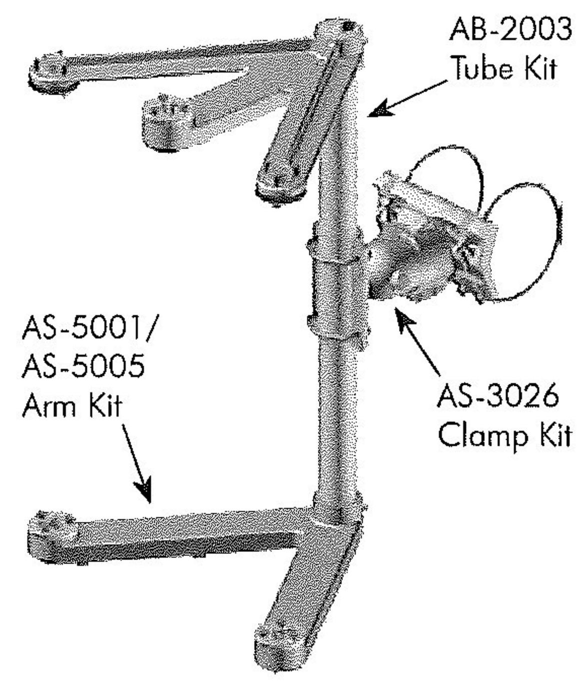
pelco PELCO PRODUCTS, INC.

EAST COAST SIGNALS APPROVED FOR SUBMITTAL 7-18-16 MSF

Cluster Assemblies

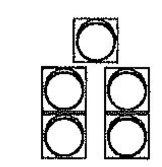
The Atlas Large Capacity series of Astro-Brac can conceal one 3/4" diameter or two 5/8" diameter conduits. The cluster assemblies are designed to mount five-section heads to any size or shape of mast arm or pole.

APPROVED
By Erin Lewis at 5:10 pm, Jul 28, 2016

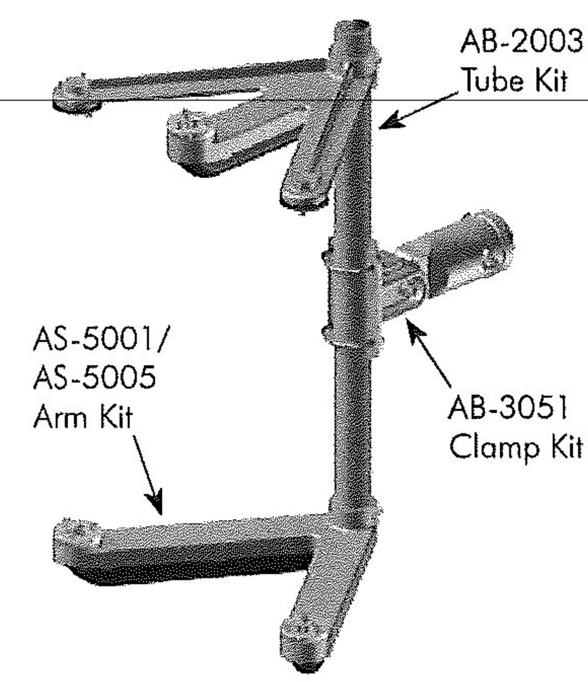


Astro-Brac Assy, Atlas Series, 5-Sec Cluster, Articulated Serrated Cable Mount

	Cable Length		Coating
AS-0162 -	☐	-	☐
	62=62" Cable 84=84" Cable 96=96" Cable		PNC=Process No Color P_ _=Paint

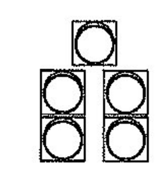


Note:
Stainless steel upgrade available: includes stainless cable and slotted washer.
Specify by including -SS in the part number, i.e., AS-0162-62-SS-PNC.

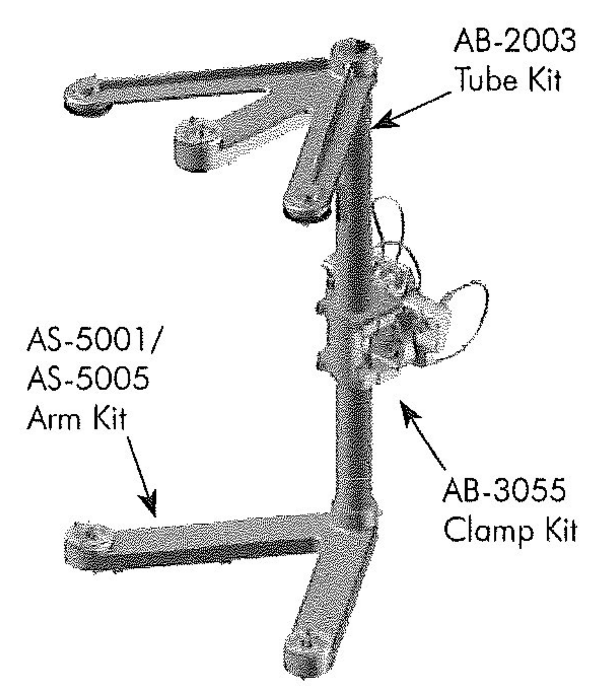


Astro-Brac Assy, Atlas Series, 5-Sec Cluster, Articulated Serrated Tenon Mount

	Cable Length		Coating
AS-0187 -	☐	-	☐
	62=62" Cable 84=84" Cable 96=96" Cable		PNC=Process No Color P_ _=Paint

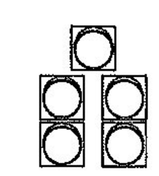


Note:
Stainless steel upgrade available: includes stainless cable and slotted washer.
Specify by including -SS in the part number, i.e., AS-0187-62-SS-PNC.



Astro-Brac Assy, Glaxy Series, 5-Sec Cluster, Cable Mount

	Cable Length		Coating	
AG-0138 -	84	-	P-34	Black Finish
	62=62" Cable 84=84" Cable 96=96" Cable		PNC=Process No Color P_ _=Paint	



Note:
Stainless steel upgrade available: includes stainless cable and slotted washer.
Specify by including -SS in the part number, i.e., AG-0138-62-SS-PNC.

Note: 1. All assemblies are supplied standard with stainless steel fasteners.
2. See Reference Section for clamp kit pole diameters.
3. See Reference Section for available paint colors.

Astro-Brac

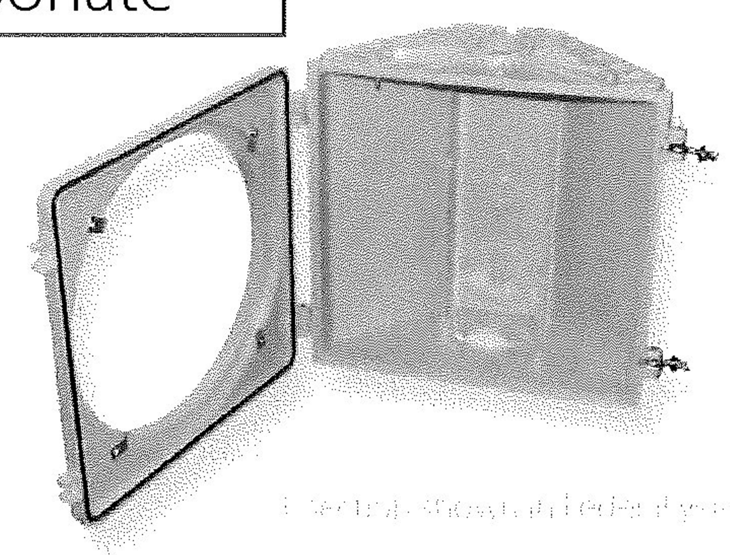
pelco PELCO PRODUCTS, INC.

EAST COAST SIGNALS APPROVED FOR SUBMITTAL 7-18-16 MSF

Traffic Signal Housing

Cabinets
Controllers
Signals
Signs
Software
Specialty

8″ Diameter
12″ Diameter
Aluminum
Polycarbonate



APPROVED
By Erin Lewis at 5:10 pm, Jul 28, 2016

Overview

McCain's Traffic Signal Housings, available in eight and twelve inch varieties, provide a durable and low-maintenance housing for standard LED modules as well as McCain incandescent optical assemblies. Manufactured from polycarbonate or aluminum, the housings are compliant with multiple agency standards including the Institute of Transportation Engineers (ITE), Caltrans, and most state Departments of Transportation (DOTs). An industry leader in signal manufacturing and supply, McCain offers an extensive range of materials, configurations, and accessories, including backplates, visors, and signal assemblies, to meet your traffic signal requirements.

Benefits

- Modular design promotes flexible configuration options: one to five sections, vertical, horizontal, and doghouse (5-section cluster)
- Fabricated from aluminum or polycarbonate with 10% fiberglass reinforcement (available without fiberglass reinforcement)
- 8″ or 12″ diameter
- Weathertight doors
- Custom hardware and terminal block location available

Product Description

The McCain Traffic Signal Housings are modular in design, allowing a multitude of signal housing configurations for standard LEDs as well as McCain incandescent optical assemblies.

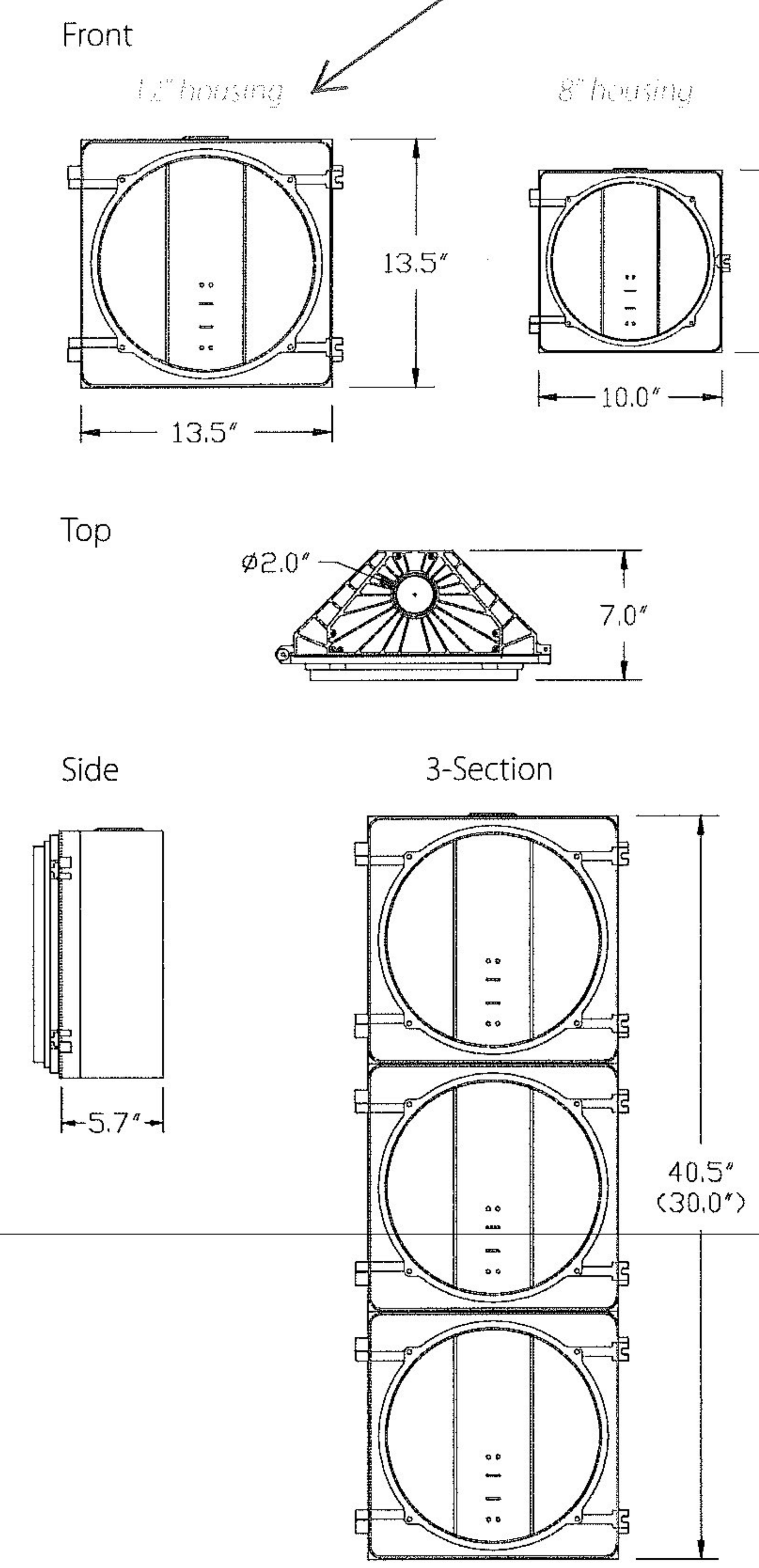
Available in polycarbonate and aluminum, each section is injection molded or cast in one piece. Reinforcement ribs and serrated ports, both top and bottom, provide strength and positive locking with other sections and mounting hardware. Positive latching of doors is achieved with stainless steel eyebolts and wing nut assemblies, and the doors feature four metal threaded inserts for visor attachment. A positive seal is assured with an E.P.D.M. rubber gasket creating a moisture-free and dust-tight atmosphere.

Traffic Signal Housings are compatible with McCain backplates and visors, available in both aluminum and ABS. The top and bottom ports allow installation into many framework mounting assemblies.

Signals supplied will be black, 3, 4 & 5-Section with Tunnel visors

EAST COAST SIGNALS APPROVED FOR SUBMITTAL 7-18-16 MSF

Traffic Signal Housing



Dimensions are approximate and may vary.

3-section 12" housing shown as an example configuration. 3-section 8" housing height dimensions is listed in parentheses.

Depth for the 8" and 12" housings are approximately the same.

Minor differences between the 8" and 12" may not be shown.

Standard Features

- Modular sections, one-piece, injection molded or cast
- 72-tooth serrated boss and reinforcing ribs, top and bottom
- Brass threaded inserts for visor attachment (4)
- Housings have a cast boss for mounting a 5 or 6-position terminal block; one side of terminal block with fast-on terminals, the other side with screw terminals
- The words red, amber, and green are cast next to each boss to identify light source lead wires
- 5 or 6-position terminal block installed in center section (1) (alternate mounting is available)
- Stainless steel door roll pins and eye bolt/wing nut assemblies
- Integral lugs on the housing and doors with stainless steel roll pins provide effective door hinges
- Weathertight E.P.D.M. rubber door gasket
- Aluminum and polycarbonate, and 8" and 12" housings can be mixed in one signal head

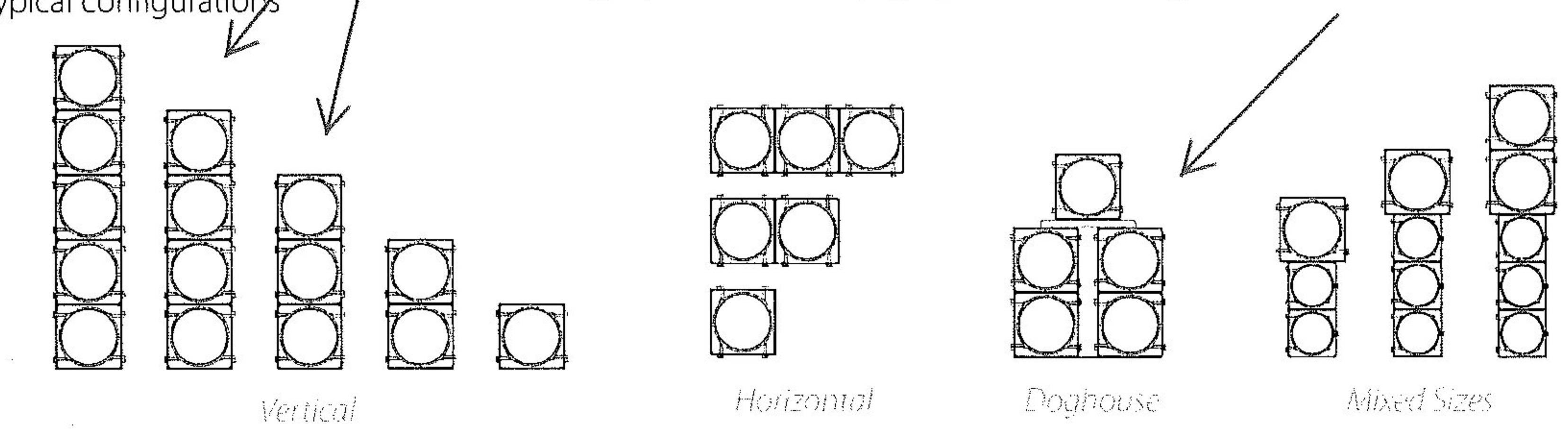
General Specifications

Dimensions: (1-section)	8": 10.0" H x 10.0" W x 7.0" D 12": 13.5" H x 13.5" W x 7.0" D		
Material:	Polycarbonate: Ultraviolet and heat stabilized, flame retardant, permanently colored, 10% fiber-glass reinforcement Aluminum: Type 360, reduced corrosion, increased powder coat adhesion		
Finish(es):	Polycarbonate: Colored resins integral to housing Aluminum: Powder coated		
Color(s):	Federal yellow, signal green, black, or custom colors		
Mounting:	2.0" hole top and bottom fits 1.5" NPT fittings		
Environmental:	Operating temperature: -37°C to +74°C Humidity: 0 to 95% (non-condensing)		
Shipping Weight: (empty, 1-section)	Polycarbonate: Aluminum:	8" - 2.1 lbs 8" - 4.0 lbs	12" - 4.2 lbs 12" - 7.8 lbs

Options

- Fiberglass-free polycarbonate
- Location, quantity, and type of terminal blocks
- Door mounting hardware: Push pin (removable) or roll pin (permanent)
- Visors
- Backplates
- Mounting: Various framework, orientation, and configurations
- Light Source: LED or incandescent
- High-performance (highly directional) signal version

Typical configurations



Highway Tech
Traffic Signal & ITS System Intergrators
(207) 375-8248

To learn more about McCain's Integrated Traffic Solutions, please contact info@mccain-inc.com or call (760) 727-8100

McCain®

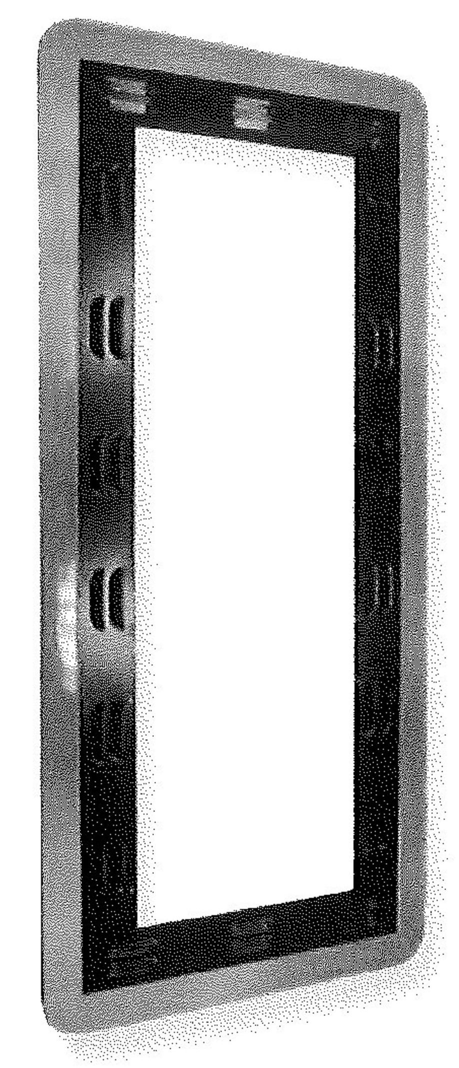
2365 OAK RIDGE WAY VISTA, CALIFORNIA 92081 USA WWW.MCCAIN-INC.COM

EAST COAST SIGNALS APPROVED FOR SUBMITTAL 7-18-16 MSF

Cabinets
Controllers
Signals
Signs
Software
Specialty

Backplates with Retroreflective Borders

APPROVED
By Erin Lewis at 5:11 pm, Jul 28, 2016



Shown is a 3-Section Louvered Version

Overview

McCain's Backplates for traffic signals provide a visual contrast between signal heads and the background enhancing signal visibility that is further improved with the use of retroreflective tape around the border of the backplate. The use of retroreflective tape has received approval from the Federal Highway Administration (FHWA), *MUTCD-Interim Approval for Use of Retroreflective Border on Signal Backplates*, February 6, 2004. A seven-year safety study showed that the use of retroreflective backplate borders reduced total crashes at intersections by 15% to 24%. Backplates with retroreflective borders provide an aesthetically pleasing and functional look in addition to increased traffic safety for your intersections.

Benefits and Features

- Enhanced signal visibility
- 1", 2", or 3" Retroreflective tape border
- Available in 1-section thru 5-section in-line, and 5-section cluster configurations
- Fits 8" and 12" signals
- 5" overall width
- Louvered and non-louvered
- Standard flat black powder coat face
- Compatible with most standard signal mountings

Product Description

McCain's Backplates with retroreflective borders for standard traffic signals fit both 8" and 12" signal heads, are fabricated from louvered aluminum, and have five-inch borders. They accommodate retroreflective tape widths of one inch, two inches, or three inches around the perimeter of the backplates.

The backplate aluminum is 0.050" thick and is powder coated flat black for increased visual contrast against the background.

McCain backplates are configured for one-section to five-section in-line or five-section cluster signals. All the in-line backplates are fabricated from one solid piece of aluminum. The five-section cluster backplate is a three-piece design.

The retroreflective tape is specially designed by 3M for vertical mounting and comes in two options:

3M 3930 Series High Intensity Prismatic Reflective Sheeting
3M 3990 Series Diamond Grade VIP Reflective Sheeting

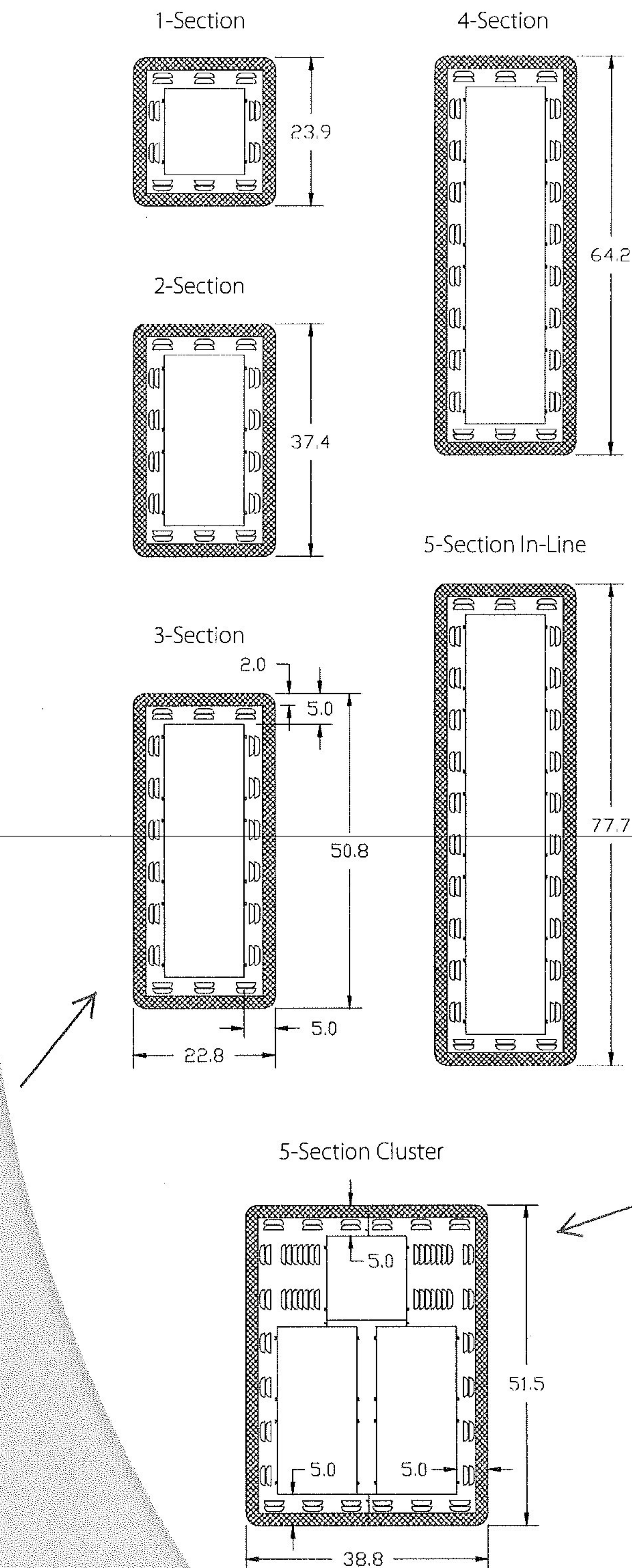
Backplates shall be 3, 4 & 5-Section Louvered Aluminum with 2" Reflective Tape, Fluorescent Yellow 3M # 4081

McCain®
www.mccain-inc.com

EAST COAST SIGNALS APPROVED FOR SUBMITTAL 7-18-16 MSF

Backplates with Retroreflective Borders

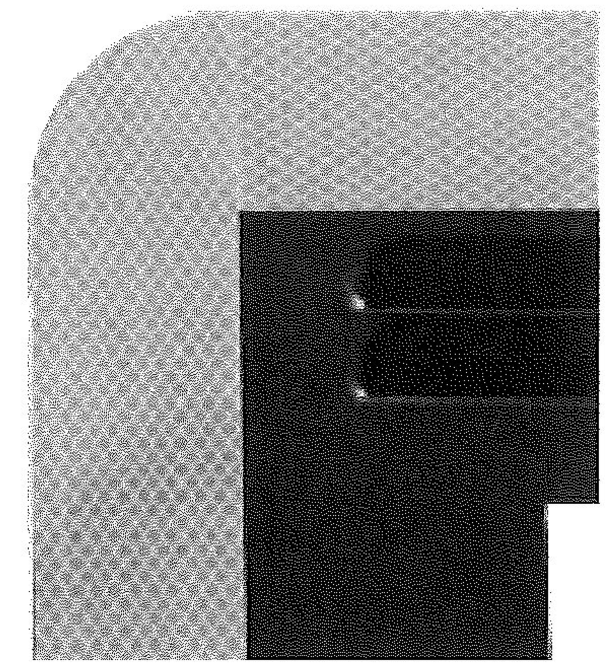
CAD of Examples of Backplates with 2" Tape



Dimensions rounded to the nearest 0.1"
Dimensions shown for 3-section backplate (except height) are typical of all backplates shown for 2" width tape

Retroreflective Tape Specifications

Type:	Prismatic, Series 3930 or 3990
Color:	Yellow (standard), white (optional)
Width:	1, 2, or 3 inches
Manufacturer:	3M



Close-up of Reflective Tape
(louvered backplate)

Retroreflection

Retroreflection occurs when a surface reflects a portion of the light from a source (headlights) directly back to an observer (driver) located near the source.

Retroreflective tape utilizes "cube corner reflection" to create the reflection back toward the source of the light. Small retroreflective "lens elements" embedded in the tape have three mutually perpendicular surfaces that refract a light ray (headlight beam) off the three surfaces and return it toward its source.

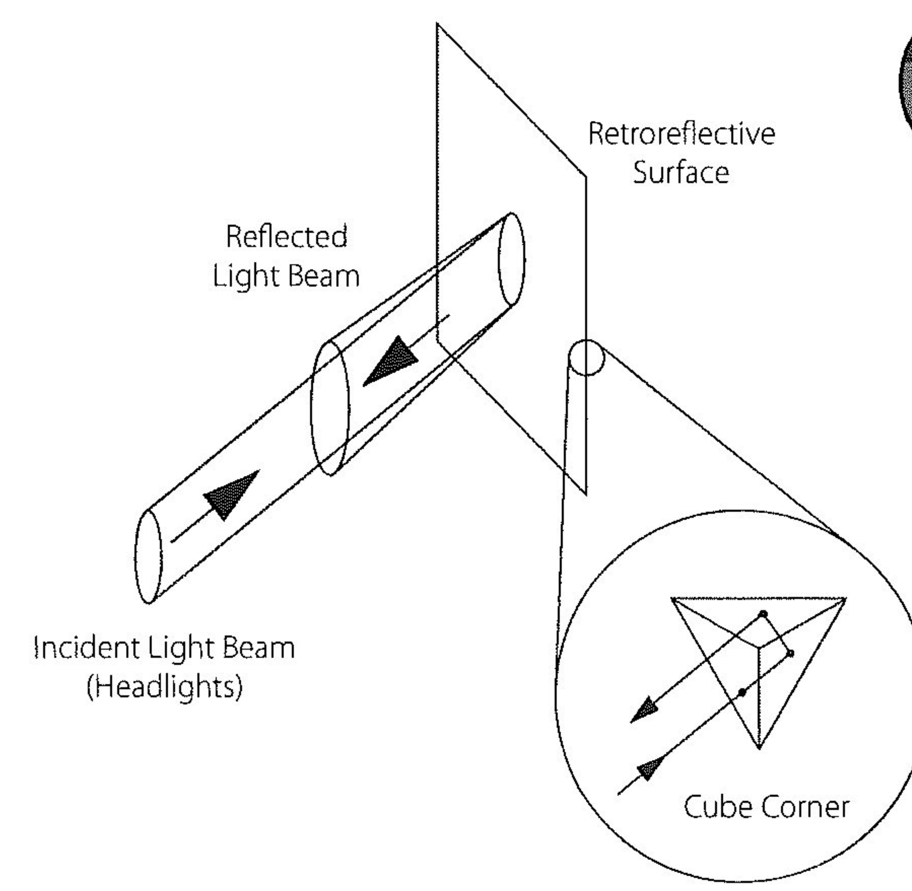


Diagram of Retroreflection

To learn more about McCain's Integrated Traffic Solutions, please contact ***info@mccain-inc.com*** *or call* ***(760) 727-8100***

McCain

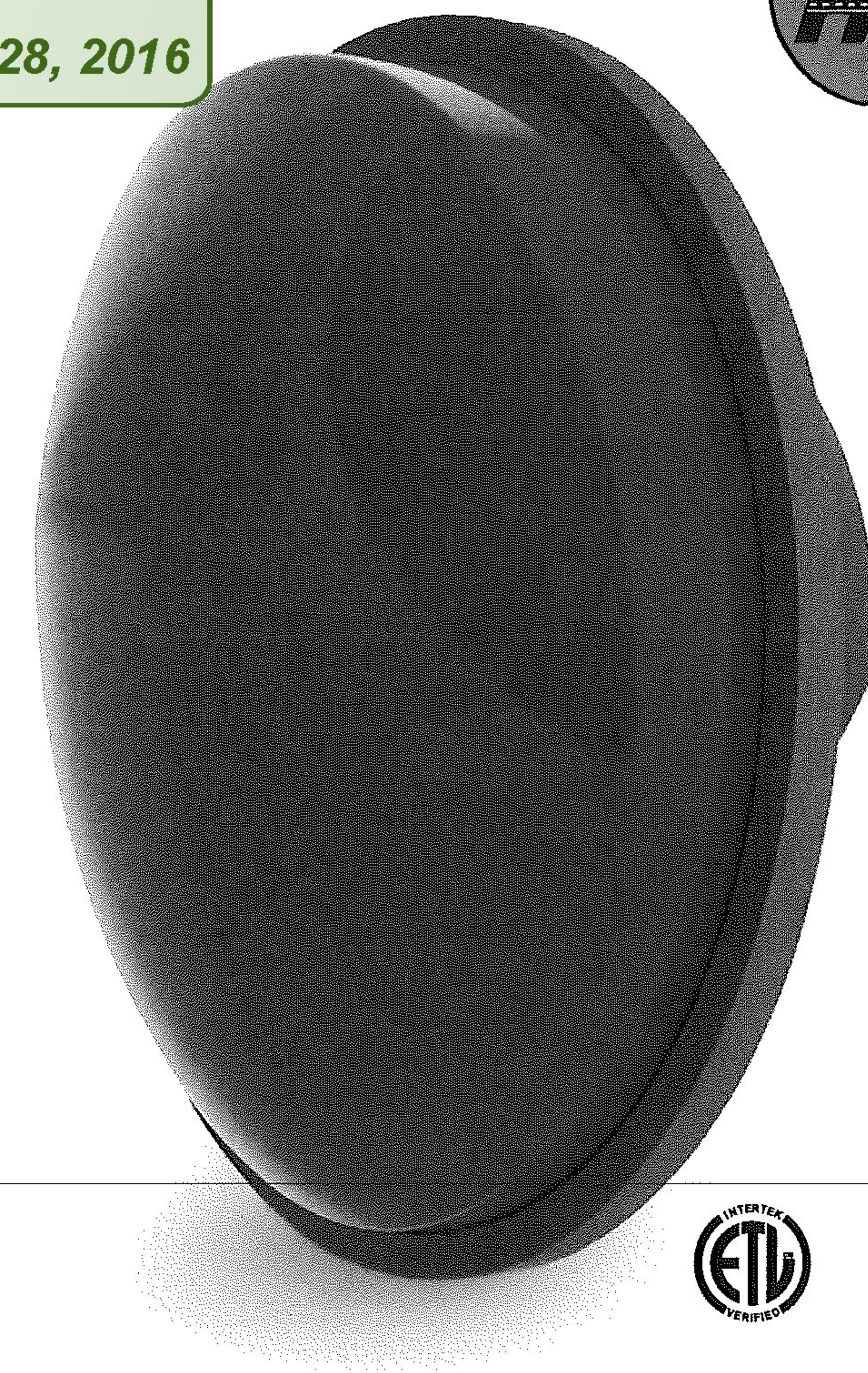
2365 OAK RIDGE WAY // VISTA, CALIFORNIA 92081 // USA // WWW.MCCAIN-INC.COM

EAST COAST SIGNALS APPROVED FOR SUBMITTAL 7-18-16 MSF

APPROVED
By Erin Lewis at 5:12 pm, Jul 28, 2016

GE
Lighting

GTX™ City
VLA Model
LED Signal Modules
8 and 12 inch
Incandescent look (120V)



Robust Features
- Optimal thermal management for longer life.
- Provides performance under extreme field temperature conditions.

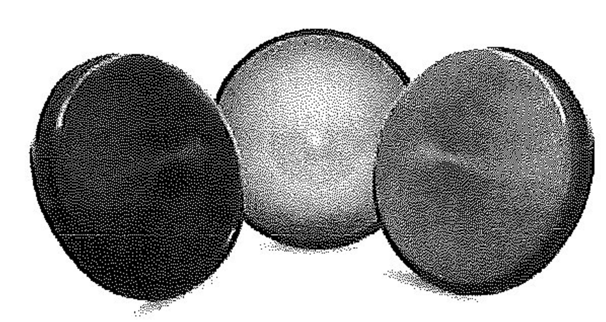
Innovative Design
- Low profile module permits efficient installation into existing traffic housings.
- Power consumption levels allow compatibility with most controllers.
- Mask compatible to fit your unique signaling needs.*

Outstanding Performance
- High-brightness central light source and custom optical lensing distribute light uniformly and efficiently.
- Rigorously tested for long life design and low maintenance costs.
- Excellent color uniformity.

Meets Rigorous Certification & Testing Standards
- Intertek ETL Verified compliant.
- Compliant with ITE VTCSH LED Circular Signal Supplement dated June 27th 2005.
- CSA approved version available.

* Sold separately. Refer to masks datasheet TRAF208.

imagination at work



The Greatest Signals Stand the Test of Time.™

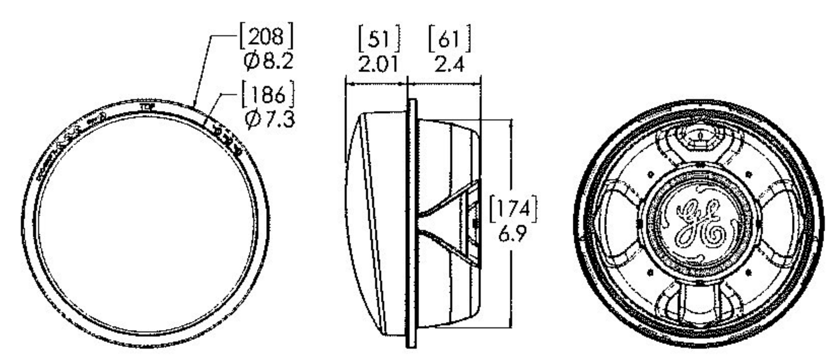
EAST COAST SIGNALS APPROVED FOR SUBMITTAL 7-18-16 MSF

GTX™ City LED Signal Modules

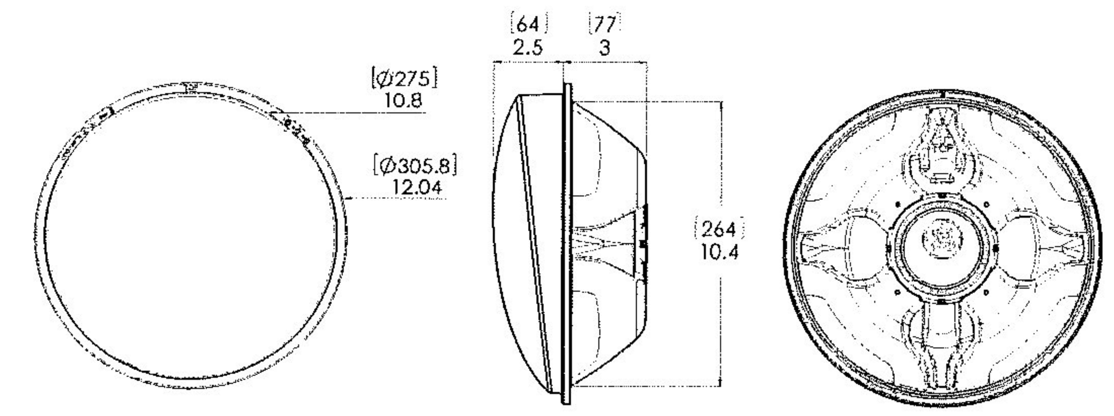
• 8 and 12 inch

Mechanical Outline

Dimensions in inches [mm]



8 inch



12 inch

Design Compliance

Test type	Compliance
Luminous Intensity	ITE VTCSH- LED Circular Signal Supplement -June 2005
Chromaticity	ITE VTCSH- LED Circular -June 2005
Moisture Resistance	Blown Wind Rain MIL-STD-810F method 506.4
Mechanical Vibration	MIL-STD-883 Method 2007
Electronic Noise	FCC Title 47 Sub. B Sec 15[1]
Transient Voltage Protection	Sec. 2.1.6 NEMA TS2-2003, 300V, 2500W Sec. 2 .1.6 NEMA TS2-2003, 600V, 10µF Sec. 2.1.8 NEMA TS2-2003, 1kV, 2Ω
Controller Compatibility	ITE VTCSH- LED Circular Signal Supplement -June 2005
Wiring	NFPA 70, National Electric Code
Transient Suppression	Sec. 8.2 IEC 61000-4-5 & Sec. 6.1.2 ANSI/IEEE C62.41.2 - 2002, 3KV, 2 Ω Sec. 8.0 IEC 61000-4-12 & Sec. 6.1.1 ANSI/IEEE C62.41.2 - 2002, 6KV, 30 Ω

Operating Specifications

Parameter	Rating
Operating Temperature Range*	-40 to +74°C (-40 to +165°F)
Operating Voltage Range	80 to 135 V (60Hz AC)
Power Factor (PF)	> 90%
Total Harmonic Distortion (THD)	< 20%
Minimum Voltage Turn-Off (VTO)	35 V
Turn-On / Turn-Off Time	< 75 ms
Lens & Shell Material	UV Stabilized Polycarbonate
Wiring	8in lamp: 40in, 20 AWG, Color Coded with Strain Relief ** 12in lamp: 40in, 20 AWG, Color Coded with Strain Relief **

* Operating Temperature Range per ITE 2005, Section 3.3.2
** For CSA approved version : 40in, 18AWG, Color Coded with Strain Relief

Product Information

Model Number	Front Shell	Size (in)	AC Voltage Nominal	Power (W) Nominal	Wavelength (nm) nominal	Maintained Intensity (Cd) Minimum[2]
DR4-RTFB-VLA	Tinted	8	120V - 60Hz	6.7	628	165
DR4-RCFB-VLA	Clear					
DR4-YZFB-VLA	Tinted	8	120V - 60Hz	10.9	588	410
DR4-YTFB-VLA	Tinted	8	120V - 60Hz	7.9	589	410
DR4-YCFB-VLA	Clear					
DR4-GTFB-VLA	Tinted	8	120V - 60Hz	7.3	499	215
DR4-GCFB-VLA	Clear					
DR6-RTFB-VLA	Tinted	12	120V – 60Hz	6.7	625	365
DR6-RCFB-VLA	Clear					
DR6-YZFB-VLA	Tinted	12	120V - 60Hz	10.9	588	910
DR6-YTFB-VLA	Tinted	12	120V – 60Hz	9.9	589	910
DR6-YCFB-VLA	Clear					
DR6-GTFB-VLA	Tinted	12	120V – 60Hz	8.4	501	475
DR6-GCFB-VLA	Clear					

Standard product equipped with universal connectors (insulated spade-quick disconnect).
All colors available in tinted or clear lens.
[1] Class A
[2] Measured at vertical angle of -2.5° and at horizontal angle of 0°.

Distributed by:

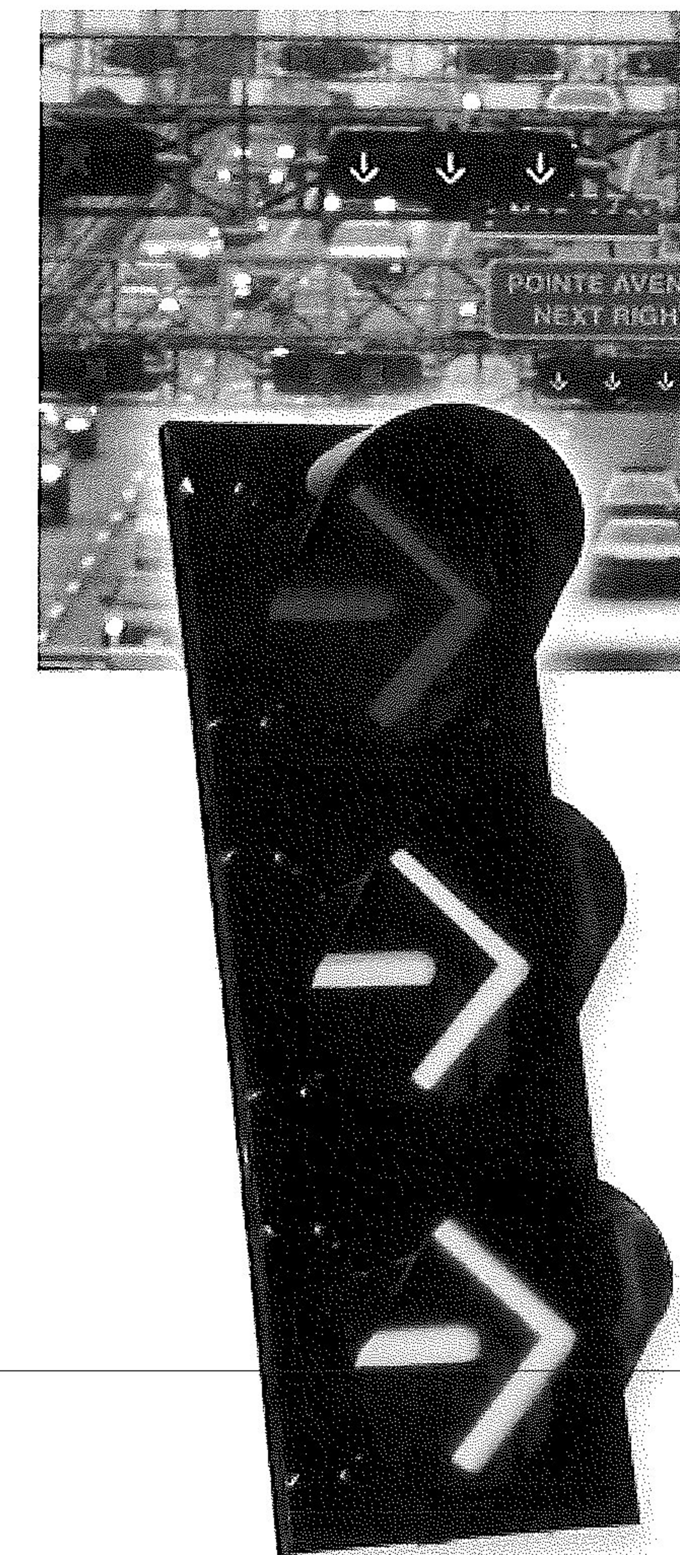
Highway Tech
6 Sabattus Road - P.O. Box 1209 - Sabattus, ME 04280
ME Office - Tel. (207) 375-8248 - Fax (866) 232-7014
NY Office - Tel. (607) 299-4604 - Fax (866) 350-3162

GE Lighting • 1-888-MY-GE-LED • www.gelighting.com
1-888-69-43-533 for North America · or · +1.216.266.2419

EAST COAST SIGNALS APPROVED FOR SUBMITTAL 7-18-16 MSF

GE
Lighting Solutions

APPROVED
By Erin Lewis at 5:12 pm, Jul 28, 2016



Incandescent look

GT1™ LED Arrow Signals

12 inch Red, Yellow, Green

Excellent Appearance & Visibility

- Efficient optical design allows omnidirectional arrow placement with maximum light output and expanded view
- Expanded view for fixed and span wire applications meets new ITE requirements
- Excellent color uniformity creates an incandescent look for easy readability
- Improved luminous intensity uniformity exceeds new ITE requirements
- New or retrofit use

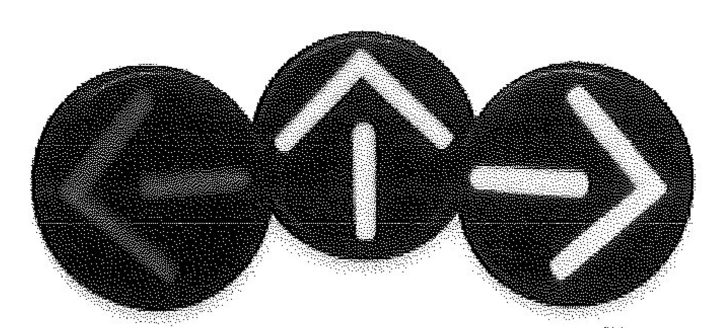
Outstanding Reliability & Robust Operation

- High efficiency and high-brightness LED light source
- Improved failed state impedance protection detects the loss of LED load
- Optimized thermal management for longer life
- O-ring gasket and over-molded electrical connector provide increased moisture and dust protection
- Provides performance under extreme field temperature conditions

Meets Rigorous Certification & Testing Standards

- Intertek ETL Verified compliant
- DOE compliant
- CSA approved
- Using MIL-STD-810F for environmental robustness, passed reliability and qualification testing including high temperature, high humidity cycling
- Compliant with the new ITE VTCSH LED Vehicle Arrow Traffic Signal Supplement dated July 1, 2007

imagination at work



The Greatest Signals Stand the Test of Time.™

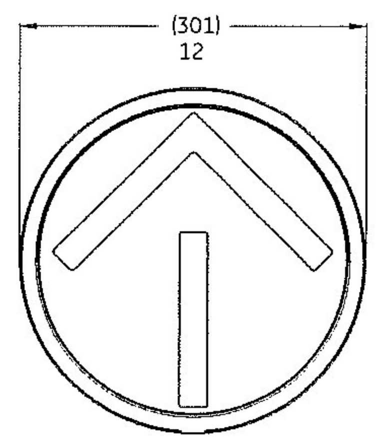
EAST COAST SIGNALS APPROVED FOR SUBMITTAL 7-18-16 MSF

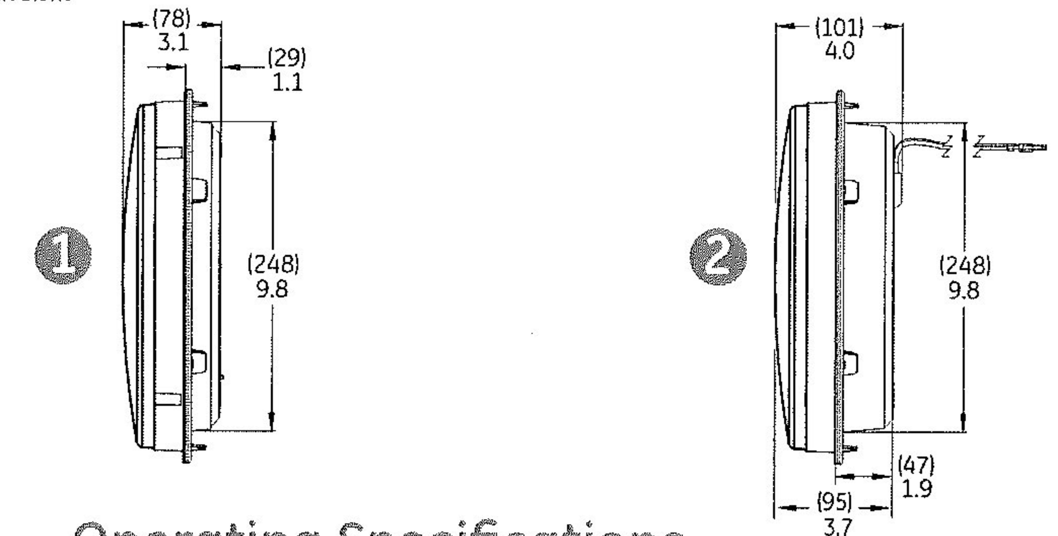
GT1™ LED Arrow Signals

- 12 inch module

Mechanical Outline

Dimensions in inches. (mm) indicates metric equivalent





Design Compliance

Test type	Compliance
Luminous Intensity	ITE VTCSH-LED Vehicle Arrow Traffic Signal Supplement, July 2007
Chromaticity	ITE VTCSH-LED Vehicle Arrow Traffic Signal Supplement, July 2007
Moisture Resistance	NEMA STD 250 Type 4 – 1991 Blown Wind Rain MIL-STD-810F method 506.4
Mechanical Vibration	MIL-STD-883 Method 2007
Electronic Noise	FCC Title 47 Sub. B Sec.15[1]
Transient Voltage Protection	Sec. 2.1.6 NEMA TS2-2003, 300V, 2500W Sec. 2.1.6 NEMA TS2-2003, 600V, 10µF Sec. 2.1.8 NEMA TS2-2003
Controller Compatibility	ITE VTCSH-LED Vehicle Arrow Traffic Signal Supplement, July 2007
Wiring	NFPA 70, National Electric Code
Transient Suppression	Sec. 8.2 IEC 1000-4-5 & Sec. 6.1.2 ANSI/IEEE C62.41.2 - 2002, 3KV, 2Ω Sec. 8.0 IEC 1000-4-12 & Sec. 6.1.1 ANSI/IEEE C62.41.2 - 2002, 6KV, 30Ω

Operating Specifications

Parameter	Rating
Operating Temperature Range*	-40 to +74°C (-40 to +165°F)
Operating Voltage Range	80 to 135 V (60Hz AC)
Power Factor (PF)	> 90 %
Total Harmonic Distortion (THD)	< 20 %
Voltage Turn-Off (VTO)	35 V
Turn-On / Turn-Off Time	< 75msec
Lens & Shell Material	UV Stabilized Polycarbonate
Wiring	16 AWG, Color Coded with Strain Relief

*Performed in compliance with ITE test method described in the technical notes

Product Information

Model Number	Size (in)	AC Voltage Nominal	Power (W) Nominal	Wavelength (nm) Dominant	Maintained Intensity (Cd) Minimum	Luminous Intensity Spec	Mechanical Outline
DR6-RTAAN-17A	12	120V – 60Hz	5	626	58	A & B	1
DR6-YTAAN-17A*	12	120V – 60Hz	9	589	146	A & B	1
DR6-YTAAN-17A-YX	12	120V – 60Hz	6	589	146	A	2
DR6-GTAAN-17A	12	120V – 60Hz	5	500	76	A & B	1
DR6-GCAAN-17A	12	120V – 60Hz	5	500	76	A & B	1

Standard product equipped with universal connectors (spade-quick disconnect).
All lamps available in tinted or clear lens.
* Luminous intensity measured at T_a = 25°C for yellow (these models are not Intertek ETL Verified compliant).
[1] Class A

Distributed by:

Highway Tech
6 Sabattus Road - P.O. Box 1209 - Sabattus, ME 04280
ME Office - Tel. (207) 375-8248 - Fax (866) 232-7014
NY Office - Tel. (607) 299-4604 - Fax (866) 350-3162

GE Lighting Solutions • 1-888-MY-GE-LED • www.gelightingsolutions.com
1-888-69-43-533

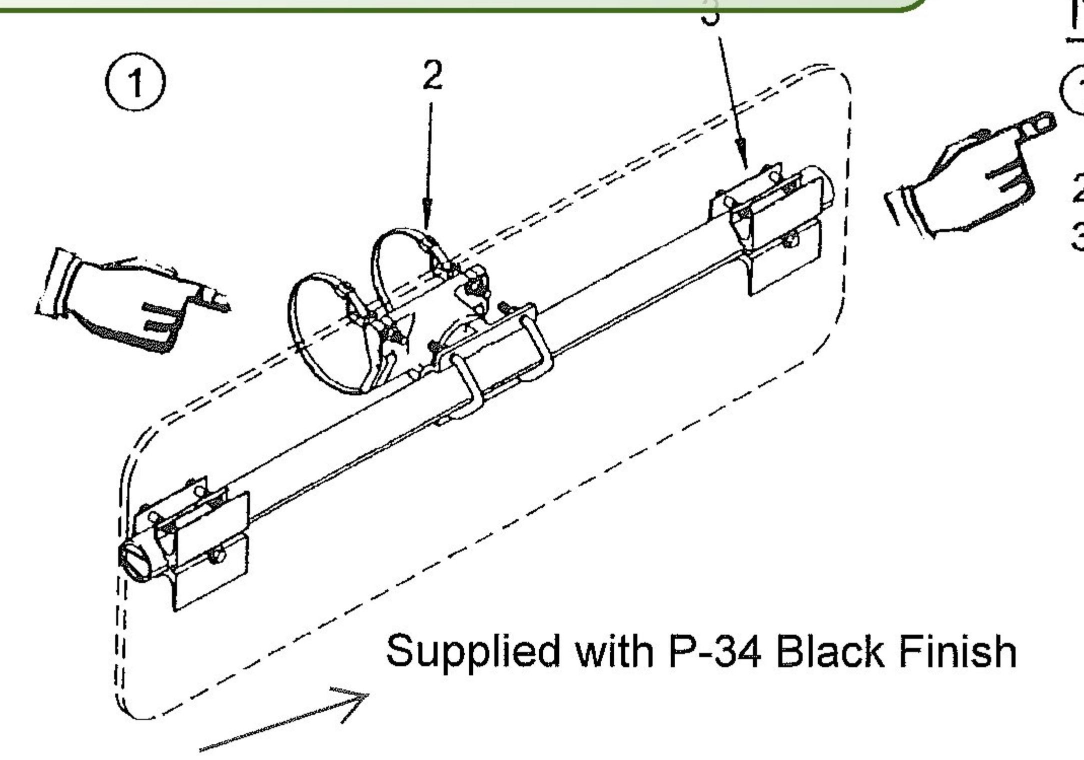
TRAF064-R050913

EAST COAST SIGNALS APPROVED FOR SUBMITTAL 7-18-16 MSF

pelco PELCO PRODUCTS INC

SIGN MOUNTINGS
Astro Sign-Brac® Band Mount

APPROVED
By Erin Lewis at 5:17 pm, Jul 28, 2016



Supplied with P-34 Black Finish

ITEM	DESCRIPTION	PART NO.
1	ASTRO SIGN-BRAC, Band Mount for Overhead Street Name Signs	AB-0128
2	CLAMP KIT, Band Mount	AB-3004
3	SIGN CLAMP, 4" w/ AB-5010 Hardware Kit	AB-0502

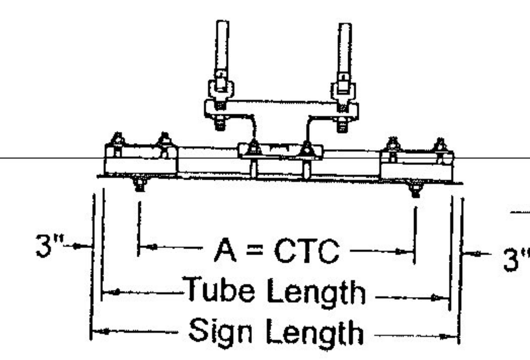
Notes:

1. All assemblies are supplied standard with stainless fasteners and natural aluminum alodine coating. Stainless upgrade to include stainless steel clamp screws.
2. Suggested maximum sign face of 16 sq. ft. per bracket.
3. Sign-Brac assemblies are available with Stellar Series Clamp Kits. To order, use prefix AS with part number.
4. Please specify options when ordering.

OPTIONS
CTC DIMENSIONS (see charts)
BAND LENGTH: 29", 36", 42", 48", or 56"
STAINLESS UPGRADE
PAINT

SIGNS 1'-6" to 3'-0" LONG		
SIGN LENGTH	TUBE LENGTH	CTC A
1'-6"	16"	12"
2'-0"	22"	18"
2'-6"	28"	24"
3'-0"	34"	30"

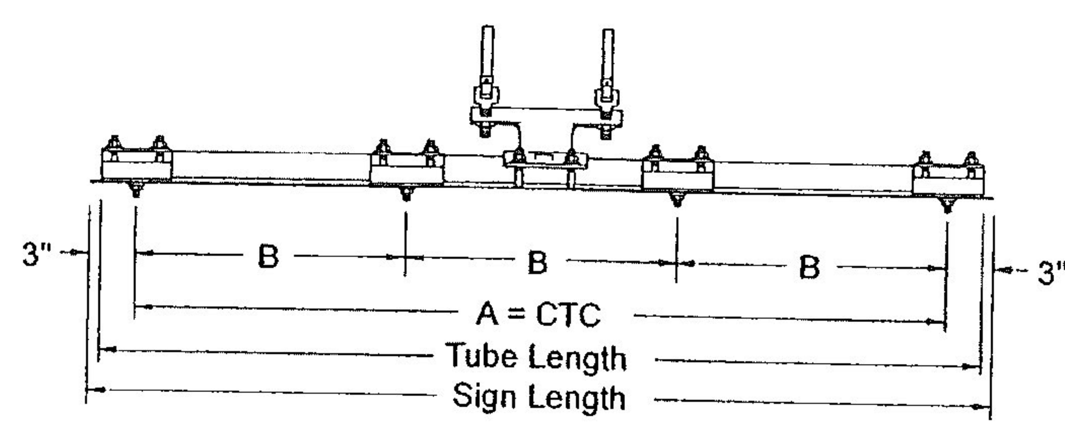
Maximum sign height: 48"



Highway Tech Signal Equipment Sales, In
6 Sabattus Road / P.O. Box 1209
Sabattus, ME 04280
Tel. (207) 375-8248
Fax (207) 375-8279

SIGNS 3'-6" to 8'-0" LONG			
SIGN LENGTH	TUBE LENGTH	CTC A	B
3'-6"	40"	36"	12"
4'-0"	46"	42"	14"
4'-6"	52"	48"	16"
5'-0"	58"	54"	18"
5'6"	64"	60"	20"
6'-0"	70"	66"	22"
6'-6"	76"	72"	24"
7'-0"	82"	78"	26"
7'6"	88"	84"	28"
8'-0"	94"	90"	30"

Maximum sign height: 24"



SIGNS 8' to 10' LONG				
SIGN LENGTH	TUBE LENGTH	CTC A	B	C
8'-6"	100"	96"	19"	20"
9'-0"	106"	102"	20"	22"
9'-6"	112"	108"	21"	24"
10'-0"	118"	114"	22"	26"

Maximum sign height: 16"