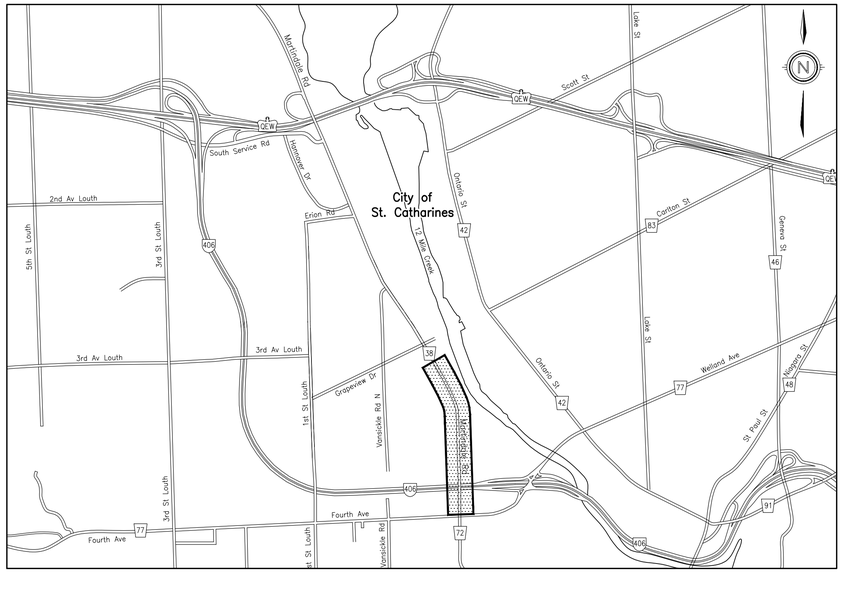
THE REGIONAL MUNICIPALITY OF NIAGARA
PUBLIC WORKS DEPARTMENT

Niagara Region
PUBLIC WORKS

CONTRACT NO. 2019-T-157 (RN19-57)

ROAD RECONSTRUCTION - PHASE 2
ON REGIONAL ROAD 38 (MARTINDALE ROAD)
BETWEEN REGIONAL ROAD 77 (FOURTH AVENUE) AND BARTON STREET
IN THE CITY OF ST. CATHARINES

CATHERINE HABERMEBL, P.ENG.
ACTING COMMISSIONER OF PUBLIC WORKS



LOCATION PLAN - (NOT TO SCALE)

JAMES BRADLEY
REGIONAL CHAIR

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RN19-57

ROAD RECONSTRUCTION - PHASE 2
ON REGIONAL ROAD 38 (MARTINDALE ROAD)
BETWEEN REGIONAL ROAD 77 (FOURTH AVE.) AND BARTON ST.
IN THE CITY OF ST. CATHARINES

NO.	REVISION	DATE	INIT.
1	ISSUED FOR TENDER	2019-04-11	J.P.E.

MISCELLANEOUS

- BOREHOLE
- TESTHOLE
- OBSERVATION WELL
- ADVERTISING SIGN
- BARRIER POST
- BENCH
- BOLLARD
- FLAGPOLE
- GATE
- MAILBOX
- PLANTER
- POLE
- POLEWELL
- TREEGRATE
- TREEGUARD
- WASTE RECEPTICAL — WASTE RECEPTACLE
- BOULDER
- D.L. — DRIPLINE
- SHRUB — SHRUB – CONIFEROUS
- SHRUB — SHRUB – DECIDUOUS
- STUMP
- TREE – DECIDUOUS – 100mm
- TREE – CONIFEROUS – 100mm
- FENCE (OTHER THAN WOOD)
- WOOD FENCE
- EXISTING HANDRAIL
- PROPOSED HANDRAIL
- RAILWAY (SINGLE TRACK)
- LPL — LEFT PROPERTY LINE (PROFILE)
- RPL — RIGHT PROPERTY LINE (PROFILE)
- LSW — LEFT SIDEWALK (PROFILE)
- RSW — RIGHT SIDEWALK (PROFILE)
- GUIDERAIL
- PROPOSED GUIDERAIL
- BANK
- PL — PROPERTY LINE (For Traffic Signal legal approval drawing only)
- EASEMENT
- EXISTING DITCH
- PROPOSED DITCH
- DITCH ON PROFILE
- CENTERLINE OF ROAD
- GRANULAR SHOULDER

WATER SYSTEMS

- EX. 11 1/4 DEGREE BEND
- PROP. 11 1/4 DEGREE BEND
- EX. 22 1/2 DEGREE BEND
- PROP. 22 1/2 DEGREE BEND
- EX. 45 DEGREE BEND
- PROP. 45 DEGREE BEND
- EX. 90 DEGREE BEND
- PROP. 90 DEGREE BEND
- EX. ANODE
- PROP. ANODE
- EX. BLOWOFF
- PROP. BLOWOFF
- EX. CROSS
- PROP. CROSS
- EX. CURBSTOP
- PROP. CURBSTOP
- EX. HYDRANT
- PROP. HYDRANT
- EX. HYDRANT VALVE
- PROP. HYDRANT VALVE
- EX. WATERMAIN CAP
- PROP. WATERMAIN CAP
- EX. PRESSURE VALVE
- PROP. PRESSURE VALVE
- EX. WATERMAIN REDUCER
- PROP. WATERMAIN REDUCER
- EX. WATERMAIN TEE
- PROP. WATERMAIN TEE
- EX. WATERMAIN TAPPING SLEEVE AND VALVE
- PROP. WATERMAIN TAPPING SLEEVE AND VALVE
- EX. WATERMAIN VALVE
- PROP. WATERMAIN VALVE
- EX. WATERMAIN VALVE CHAMBER
- PROP. WATERMAIN VALVE CHAMBER
- EX. WATER WELL
- PROP. WATER WELL
- EX. WATER SAMPLING STATION
- PROP. WATER SAMPLING STATION
- EX. WATER METER
- EX. SPRINKLER
- EXISTING WATERMAIN
- PROPOSED WATERMAIN
- EXISTING WATER SERVICE LATERAL

WASTE WATER / SANITARY

- EX. SANITARY SEWER CAP
- EX. SANITARY SEWER LATERAL CLEANOUT
- PROP. SANITARY SEWER LATERAL CLEANOUT
- EX. MANHOLE COMBINED SEWER
- PROP. MANHOLE COMBINED SEWER
- EX. SANITARY FORCEMAIN VALVE
- PROP. SANITARY FORCEMAIN VALVE
- EX. SANITARY FORCEMAIN VALVE CHAMBER
- PROP. SANITARY FORCEMAIN VALVE CHAMBER
- EX. SANITARY PLUG
- PROP. SANITARY PLUG
- EX. SANITARY SEWER MANHOLE
- PROP. SANITARY SEWER MANHOLE
- EX. UNKNOWN MANHOLE
- EXISTING SANITARY SEWER
- PROPOSED SANITARY SEWER
- SANITARY SEWER LATERAL

DRAINAGE SYSTEMS / STORM

- EX. CATCH BASIN
- PROP. CATCH BASIN
- EX. CATCH BASIN MANHOLE
- PROP. CATCH BASIN MANHOLE
- EX. STORM MANHOLE
- PROP. STORM MANHOLE
- EX. CULVERT END – CLAY
- EX. CULVERT END – CONCRETE
- EX. CULVERT END – CSP
- EX. CULVERT END – PE
- EX. CULVERT END – PVC
- EX. DOUBLE CATCH BASIN
- PROP. DOUBLE CATCH BASIN
- EX. DITCH INLET CATCH BASIN
- PROP. DITCH INLET CATCH BASIN
- EX. RIPRAP LABEL
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- STORM SEWER LATERAL
- CULVERT

SURVEY POINTS

- BENCHMARK
- TURNING POINT
- VERTICAL POINT OF INTERSECTION
- HORIZONTAL CONTROL MONUMENT
- HORIZONTAL VERTICAL CONTROL MONUMENT
- HORIZONTAL PROJECT CONTROL POINT
- HUB ON TANGENT
- NAIL
- CUT CROSS FOUND
- CONCRETE MONUMENT FOUND
- CONCRETE PIN FOUND
- IRON BAR FOUND
- IRON PIPE
- ROCK BAR FOUND
- ROUND IRON BAR FOUND
- ROCK POST FOUND
- ROCK PLUG FOUND
- STANDARD IRON BAR FOUND
- SHORT STANDARD IRON BAR FOUND

EXISTING UTILITIES

- BROAD BAND NETWORK POLE
- BELL MANHOLE
- BELL POLE
- BELL GUYPOLE
- BELL PEDESTAL
- PHONE BOOTH
- BELL JUNCTION BOX
- BELL UNDERGROUND MARKER
- GAS PUMP
- GAS VALVE
- GAS METER
- GAS VENT
- GAS MANHOLE
- GAS MAIN MARKER
- GAS DRIP
- HYDRO UNDERGROUND TRANSFORMER VAULT
- HYDRO POLE
- HYDRO UNDERGROUND MARKER
- HYDRO UNDERGROUND POWER MARKER
- HYDRO GUYWIRE
- HYDRO GUYPOLE
- BELL AND HYDRO POLE
- HYDRO KIOSK
- HYDRO TOWER
- LIGHT STANDARD
- HYDRO JUNCTION BOX
- HYDRO ELECTRIC MANHOLE
- HYDRO HANDHOLE
- HYDRO GROUND ROD
- CABLE TV PEDESTAL
- CABLE TV JUNCTION BOX
- CABLE TV POLE
- FUEL OIL VENT
- BELL CABLE (UNDERGROUND)
- BELL CONDUIT (UNDERGROUND)
- BELL (AERIAL)
- GAS MAIN (UNDERGROUND)
- HYDRO CABLE (UNDERGROUND)
- HYDRO CABLE (AERIAL)
- GUY WIRE (AERIAL)
- TELEVISION CABLE (UNDERGROUND)
- TELEVISION CABLE (AERIAL)
- OIL PIPE LINE

EXISTING TRAFFIC

- POLE MOUNTED TRAFFIC CONTROLLER
- BASE MOUNTED TRAFFIC CONTROLLER
- POWER SUPPLY CABINET
- TRAFFIC POLE
- TRAFFIC SIGN
- JUNCTION BOX
- LUMINAIRE
- PUSH BUTTON
- PUSH BUTTON – AUDIBLE
- PED HEAD – AUDIBLE
- PED HEAD
- PED HEAD – COUNTDOWN
- BEACON
- PARKING METER
- RADIO INTERCONNECT
- SIGNAL HEAD 1
- SIGNAL HEAD 2
- SIGNAL HEAD 3
- SIGNAL HEAD 4
- SIGNAL HEAD 5
- SIGNAL HEAD 6
- SIGNAL HEAD 7
- SIGNAL HEAD 8
- EMERGENCY VEHICLE PRE-EMPTION DETECTOR
- VIDEO CAMERA
- DETECTION CAMERA
- MULTI-LEG DETECTION CAMERA
- GROUND ROD
- TRAFFIC HANDHOLE
- ILLUMINATED TRAFFIC SIGN
- ILLUMINATED TRAFFIC SIGN – DOUBLE

PAVEMENT MARKINGS

- EX. DIRECTIONAL ARROWS
- PROPOSED DIRECTIONAL ARROWS
- EXISTING LINE MARKINGS
- EXISTING 60cm STOP BAR
- PROPOSED LINE MARKINGS
- PROPOSED 60cm STOP BAR

PROPOSED TRAFFIC

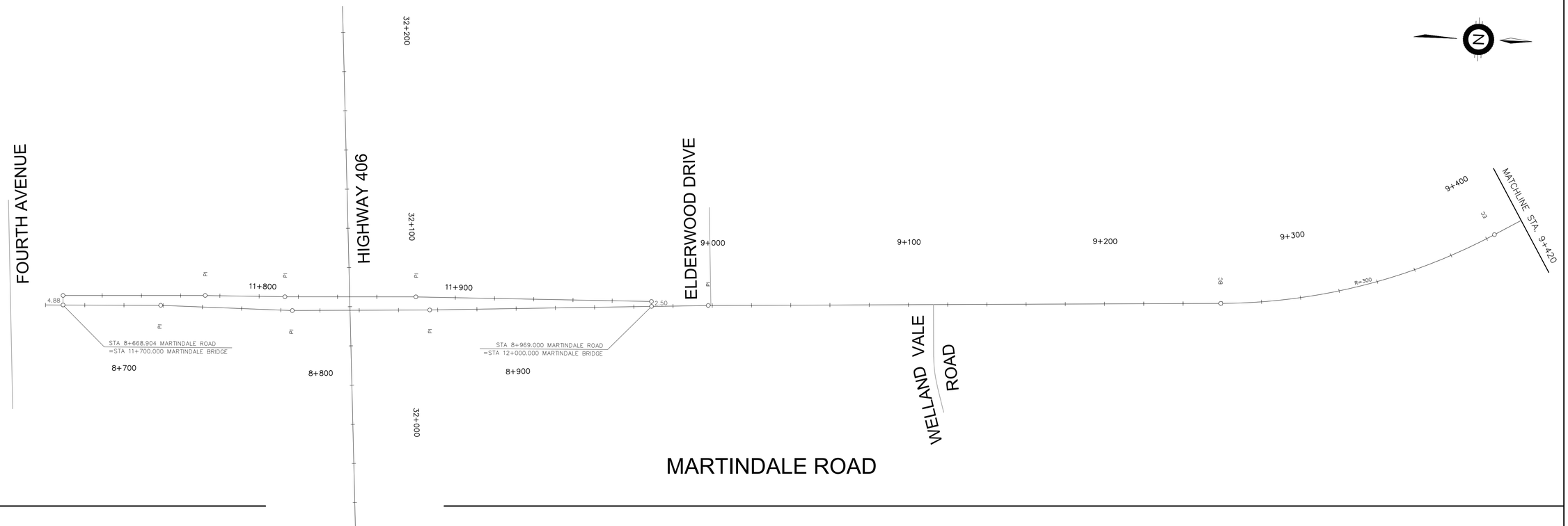
- TRAFFIC CONTROLLER
- TRAFFIC CONTROLLER
- POWER SUPPLY CABINET
- TRAFFIC SIGNAL POLE
- SIGNAL HEAD 1 — HWY SIGNAL HEAD 30cm RED & 20 cm AMBER/GREEN WITH BACKBOARD
- SIGNAL HEAD 2 — HWY SIGNAL HEAD 30cm RED & 20cm AMBER/GREEN ON OVERHEAD SPAN CABLE WITH BACKBOARD
- SIGNAL HEAD 3 — STD. SIGNAL HEAD ALL 200cm LENSES WITH BACKBOARD
- SIGNAL HEAD 4 — STANDARD SIGNAL HEAD ALL 200M LENSES WITHOUT BACKBOARD
- SIGNAL HEAD 5 — HWY SIGNAL HEAD ALL 30cm LENSES WITH BACKBOARD
- SIGNAL HEAD 6 — HWY SIGNAL HEAD WITH ARROW INDICATION(S) ALL 30cm LENSES WITH BACKBOARD
- SIGNAL HEAD 7 — HWY SIGNAL HEAD WITH ARROW INDICATION ALL 30cm LENSES WITH 1 OR MORE PROGRAMMABLE LENSE WITH BACKBOARD
- SIGNAL HEAD 8 — HWY SIGNAL HEAD ALL 30cm LENSES WITH 1 OR MORE PROGRAMMABLE LENSE WITH BACKBOARD
- TRAFFIC SIGN
- ILLUMINATED TRAFFIC SIGN
- ILLUMINATED TRAFFIC SIGN – DOUBLE
- JUNCTION BOX
- LUMINAIRE
- PUSH BUTTON
- PUSH BUTTON – AUDIBLE
- PED HEAD
- PED HEAD – AUDIBLE
- PED HEAD – COUNTDOWN
- VIDEO CAMERA
- DETECTION CAMERA
- MULTI-LEG DETECTION CAMERA
- LOOP DETECTOR
- 50mm CONDUIT
- 1–50mm & 1–100mm CONDUIT
- 50mm INTERCONNECT CONDUIT

Niagara Region PUBLIC WORKS

BLOCK LEGEND SHEET

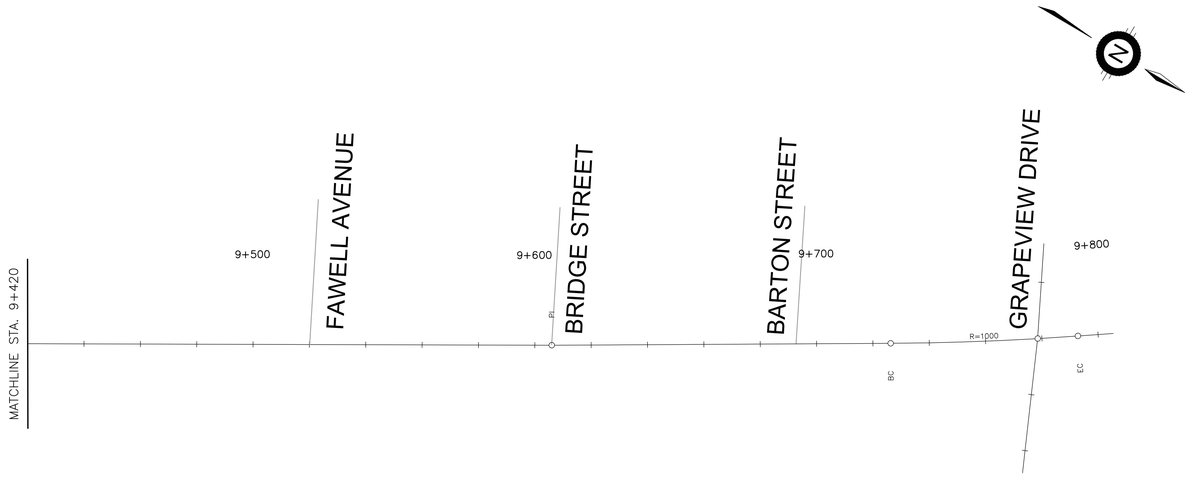
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DATE	2019–04–03
SCALE	
REF. No.	RN19-57
DWG No.	1
REV.	0

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MARTINDALE ROAD			
Tangent Data			
Length:	4.777	Course:	N 02° 08' 41.6208" W
Tangent Data			
Length:	53.987	Course:	N 02° 08' 41.6208" W
Tangent Data			
Length:	67.173	Course:	N 00° 05' 51.1093" W
Tangent Data			
Length:	70.075	Course:	N 02° 35' 09.8260" W
Tangent Data			
Length:	141.992	Course:	N 03° 15' 32.9779" W
Tangent Data			
Length:	261.261	Course:	N 02° 34' 51.1594" W
Circular Curve Data			
Delta:	27° 45' 21.0669"	Type:	LEFT
Radius:	299.999		
Length:	145.329	Tangent:	74.120
Mid-Ord:	8.757	External:	9.021
Chord:	143.912	Course:	N 16° 27' 31.6046" W
Tangent Data			
Length:	201.445	Course:	N 30° 20' 12.6564" W
Tangent Data			
Length:	120.315	Course:	N 30° 49' 58.9967" W
Circular Curve Data			
Delta:	03° 48' 37.4602"	Type:	LEFT
Radius:	1000.000		
Length:	66.504	Tangent:	33.264
Mid-Ord:	0.553	External:	0.553
Chord:	66.492	Course:	N 32° 44' 17.7267" W
Tangent Data			
Length:	122.590	Course:	N 34° 38' 36.4568" W
Tangent Data			
Length:	72.458	Course:	N 02° 19' 32.3537" W
Tangent Data			
Length:	39.819	Course:	N 01° 25' 48.8452" W
Tangent Data			
Length:	67.676	Course:	N 02° 16' 54.7711" W
Tangent Data			
Length:	120.058	Course:	N 01° 13' 10.7312" W

HIGHWAY 406			
	STATION	NORTHING	EASTING
Element: Linear			
PI = ( )	31+549.379	4779682.036	640307.047
TS = ( )	32+787.850	4779763.304	641542.848
Tangent Direction:	S 86°14'15.22" W		
Tangent Length:	1238.471		



NO.	REVISION	DATE	INIT.
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NOTES/LEGEND

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DRAFTING	J.P.E.
DESIGN	W.F.
CHECKED BY	F.W.
APPROVED BY	L.D.S.

BENCHMARK

LICENSED PROFESSIONAL ENGINEER
F. K. Y. WONG
100076535
2019/04/03
PROVINCE OF ONTARIO

wood.

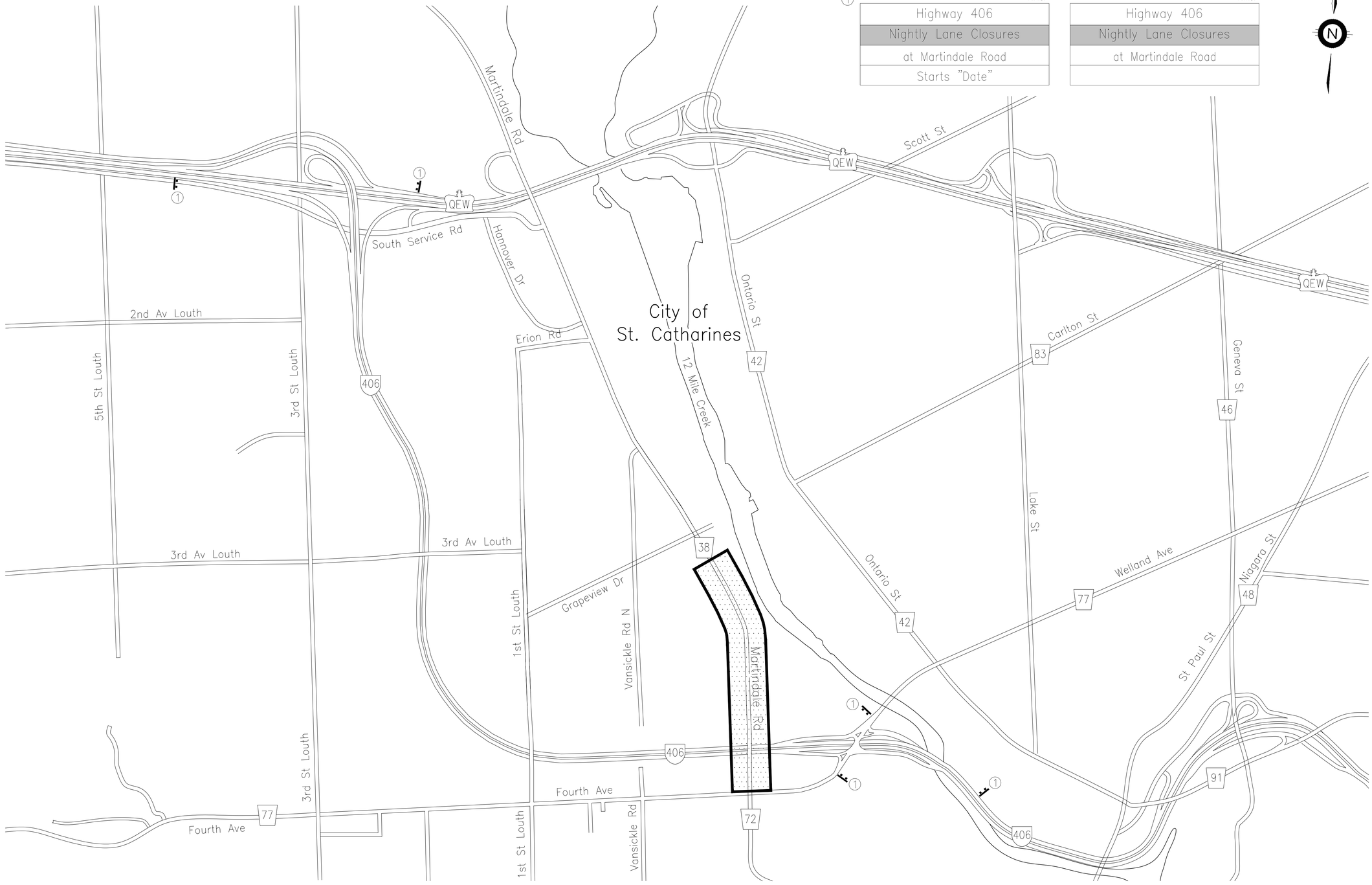
Niagara Region
PUBLIC WORKS

Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Ave to Barton St
City of St. Catharines
Alignments

CONSULTANT FILE No.	TP113112
DATE	2019-04-03
SCALE	1:1000 m
REF. No.	RN19-57
DWG No.	AL01
REV.	0

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①	A.N.S.	A.W.S.
	Highway 406	Highway 406
	Nightly Lane Closures	Nightly Lane Closures
	at Martindale Road	at Martindale Road
	Starts "Date"	



No.	REVISION	DATE	INIT.
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NOTES/LEGEND

1. SIGNAGE TO BE INSTALLED IN ACCORDANCE WITH OTM BOOK 7 TEMPORARY CONDITIONS
2. ADVANCED NOTIFICATION SIGNS (A.N.S.) SHOULD BE INSTALLED A WEEK IN ADVANCE OF THE CLOSURE DATE AND SHOULD BE CHANGED TO ADVANCED WARNING SIGNS (A.W.S.) DURING WORK

DRAFTING	J.P.E.
DESIGN	W.F.
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APPROVED BY	L.D.S.

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F. K. Y. WONG
100076535
2019/04/03
PROVINCE OF ONTARIO

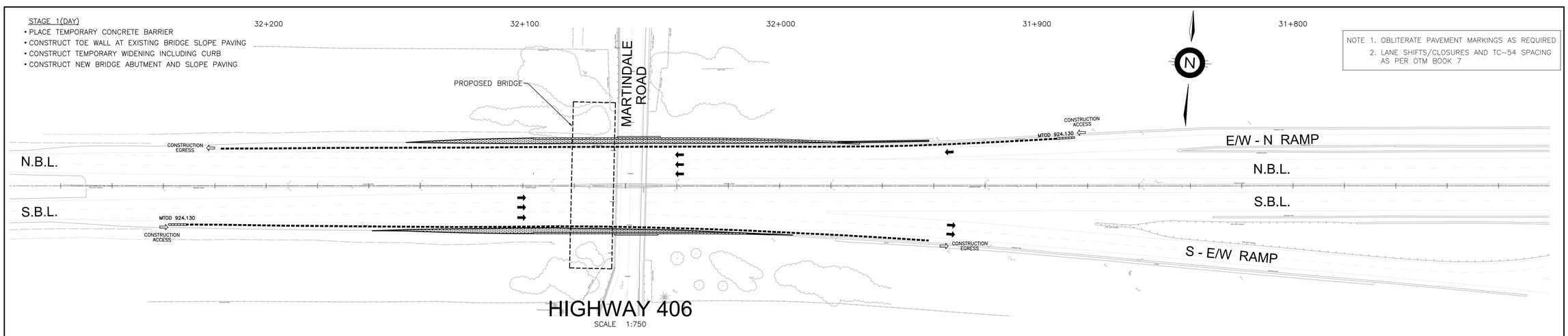
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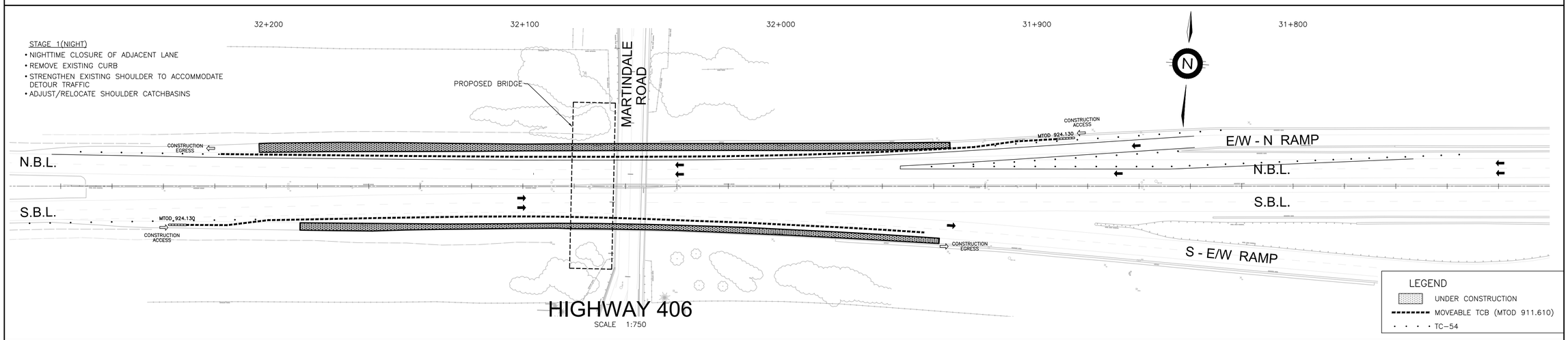
Niagara Region
PUBLIC WORKS

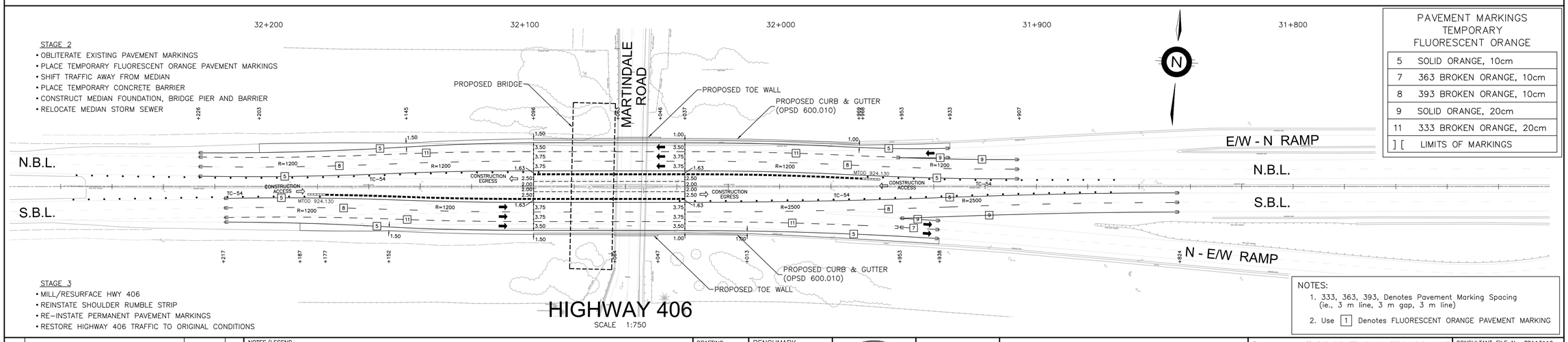
Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
Martindale Road
from Fourth Ave to Barton St
Niagara Region
ADVANCED WARNING SIGNS

CONSULTANT FILE No.	TP113112
DATE	2019-04-03
SCALE	N.T.S
REF. No.	RN19-57
DWG No.	ANS 01
REV.	

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NO.	REVISION	DATE	INIT.
1	ISSUED FOR TENDER	2019-04-11	J.P.E.

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DRAFTING	J.P.E.
DESIGN	W.F.
CHECKED BY	F.W.
APPROVED BY	L.D.S.

BENCHMARK

LICENSED PROFESSIONAL ENGINEER F. K. Y. WONG 100076535 2019/04/03 PROVINCE OF ONTARIO

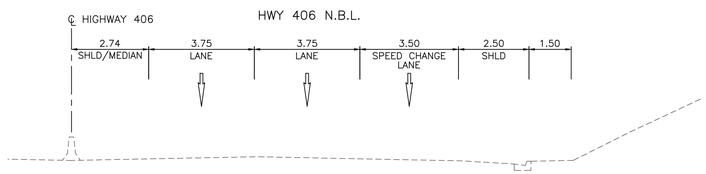
wood.

Niagara Region PUBLIC WORKS

Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Ave to Barton St
City of St. Catharines
HIGHWAY 406 STAGING

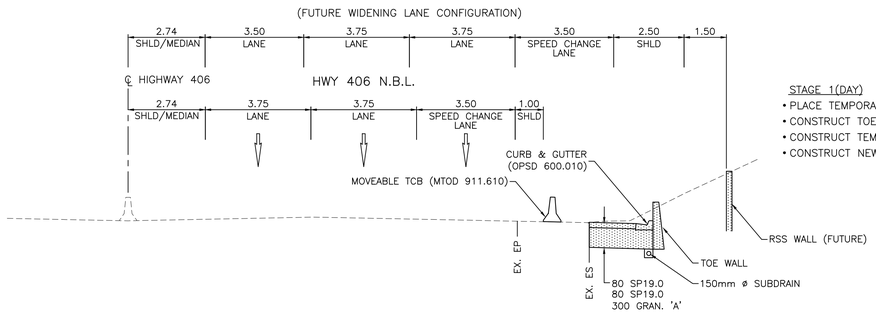
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DATE	2019-04-03
SCALE	AS SHOWN
REF. No.	RN19-57
DWG No.	ST01
REV.	0

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EXISTING LANE CONFIGURATION AT UNDERPASS

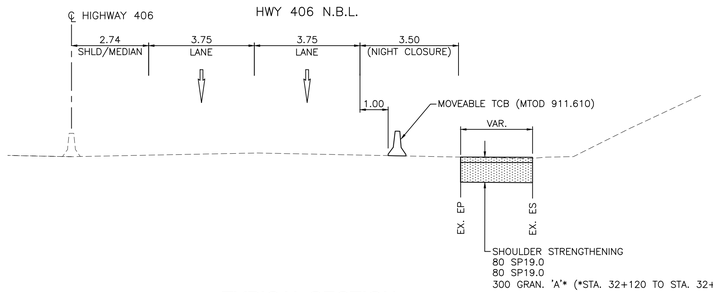
TYPICAL SECTION
SCALE 1:100



LEGEND
UNDER CONSTRUCTION

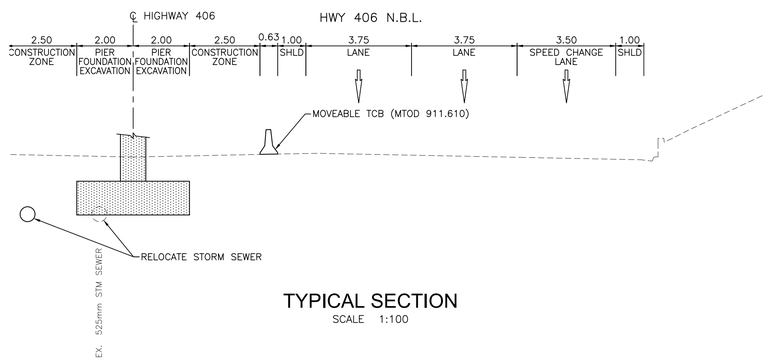
STAGE 1(DAY)
- PLACE TEMPORARY CONCRETE BARRIER
- CONSTRUCT TOE WALL AT EXISTING BRIDGE SLOPE PAVING
- CONSTRUCT TEMPORARY WIDENING INCLUDING CURB
- CONSTRUCT NEW BRIDGE ABUTMENT AND SLOPE PAVING

TYPICAL SECTION
SCALE 1:100



STAGE 1(NIGHT)
- NIGHTTIME CLOSURE OF ADJACENT LANE
- REMOVE EXISTING CURB
- STRENGTHEN EXISTING SHOULDER TO ACCOMMODATE DETOUR TRAFFIC
- ADJUST/RELOCATE SHOULDER CATCHBASINS

TYPICAL SECTION
SCALE 1:100



STAGE 2
- OBLITERATE EXISTING PAVEMENT MARKINGS
- PLACE TEMPORARY FLUORESCENT ORANGE PAVEMENT MARKINGS
- SHIFT TRAFFIC AWAY FROM MEDIAN
- PLACE TEMPORARY CONCRETE BARRIER
- CONSTRUCT MEDIAN FOUNDATION, BRIDGE PIER AND BARRIER
- RELOCATE MEDIAN STORM SEWER

TYPICAL SECTION
SCALE 1:100

STAGE 3
- MILL/RESURFACE HWY 406
- REINSTATE SHOULDER RUMBLE STRIP
- RE-INSTATE PERMANENT PAVEMENT MARKINGS
- RESTORE HIGHWAY 406 TRAFFIC TO ORIGINAL CONDITIONS

NOTE: SIMILAR SCHEME TO BE APPLIED FOR S.B.L.

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DRAFTING	J.P.E.
DESIGN	W.F.
CHECKED BY	F.W.
APPROVED BY	L.D.S.

BENCHMARK

LICENSED PROFESSIONAL ENGINEER
F. K. Y. WONG
100076535
2019/04/03
PROVINCE OF ONTARIO

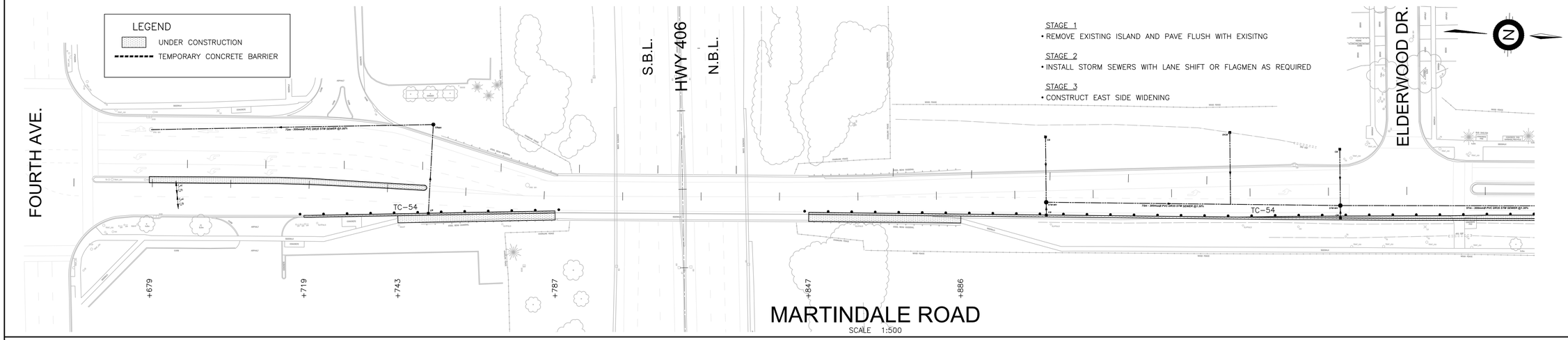
wood.

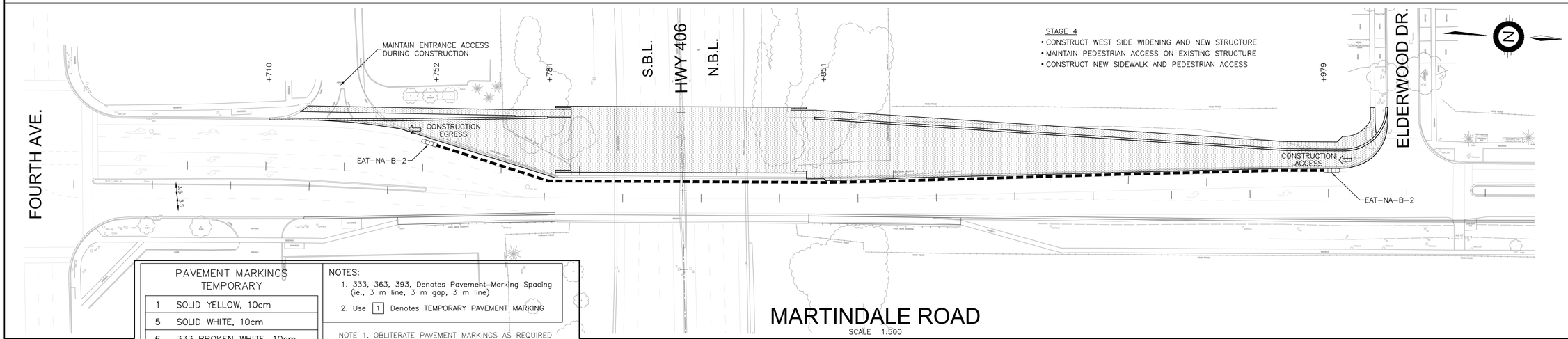
Niagara Region
PUBLIC WORKS

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Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Ave to Barton St
City of St. Catharines
HIGHWAY 406 STAGING

CONSULTANT FILE No.	TP113112
DATE	2019-04-03
SCALE	AS SHOWN
REF. No.	RN19-57
DWG No.	ST02
REV.	0

DRAWING FILE: P:\Work\TP113112\Hwy\Dwg\Contract\Phase 2\TP113112-ST.dwg PLOTTED: Apr 10, 2019 - 1:37pm PLOTTED BY: tappas.ziyange

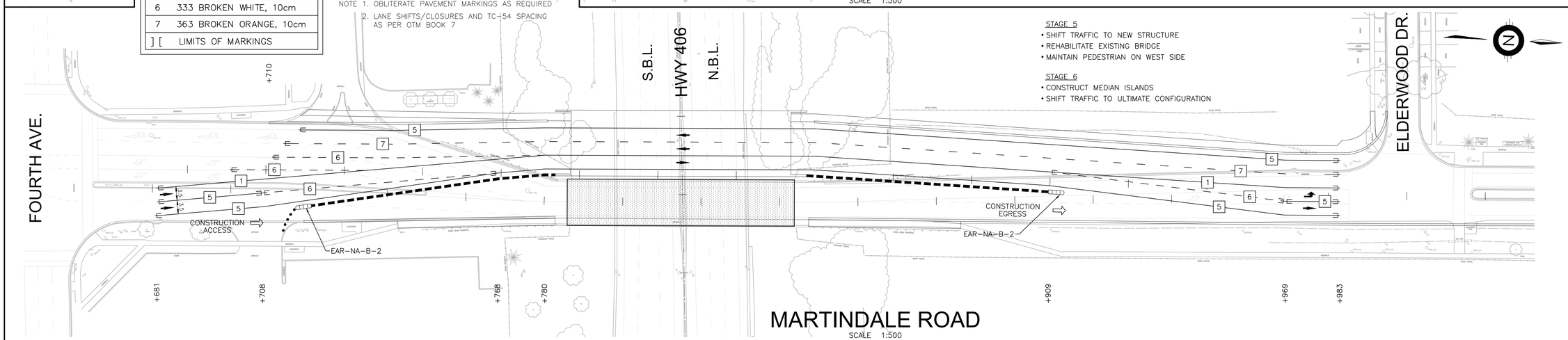




PAVEMENT MARKINGS TEMPORARY	
1	SOLID YELLOW, 10cm
5	SOLID WHITE, 10cm
6	333 BROKEN WHITE, 10cm
7	363 BROKEN ORANGE, 10cm
] [	LIMITS OF MARKINGS

NOTES:
1. 333, 363, 393, Denotes Pavement Marking Spacing (ie., 3 m line, 3 m gap, 3 m line)
2. Use [1] Denotes TEMPORARY PAVEMENT MARKING

NOTE 1. OBLITERATE PAVEMENT MARKINGS AS REQUIRED
2. LANE SHIFTS/CLOSURES AND TC-54 SPACING AS PER OTM BOOK 7



NO.	REVISION	DATE	INIT.
1	ISSUED FOR TENDER	2019-04-11	J.P.E.

NOTES/LEGEND
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DRAFTING	J.P.E.
DESIGN	W.F.
CHECKED BY	F.W.
APPROVED BY	L.D.S.

BENCHMARK

LICENSED PROFESSIONAL ENGINEER
F. K. Y. WONG
100076535
2019/04/03
PROVINCE OF ONTARIO

wood.

Niagara Region
PUBLIC WORKS

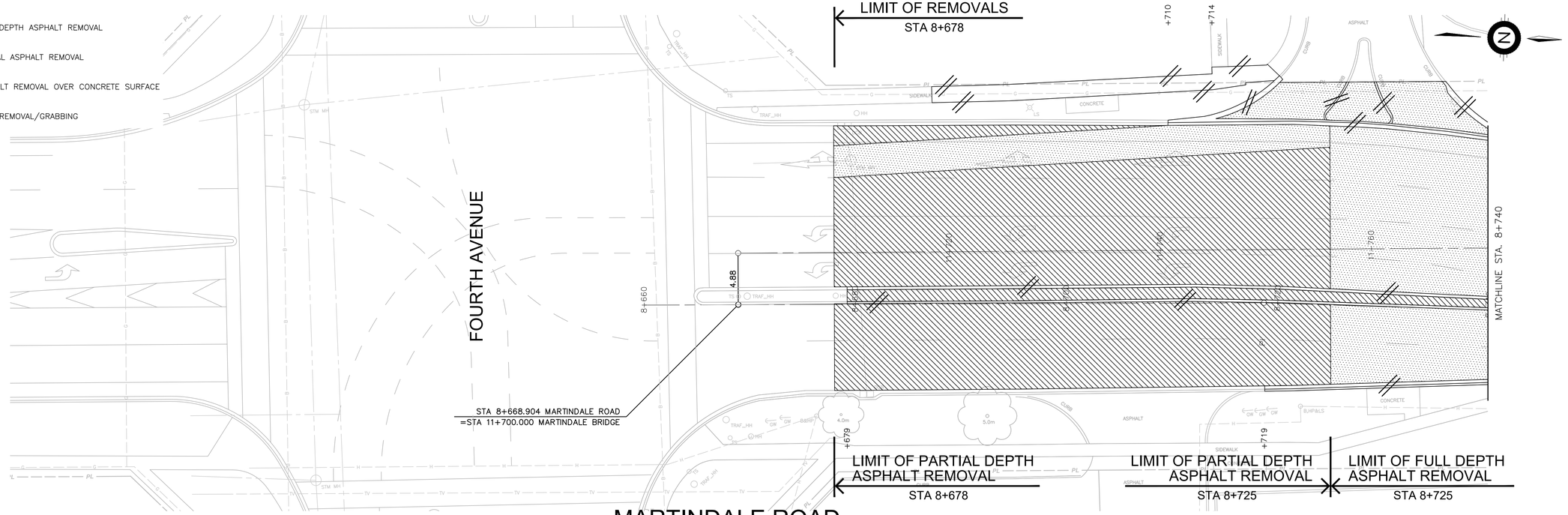
Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Ave to Barton St
City of St. Catharines
MARTINDALE BRIDGE STAGING

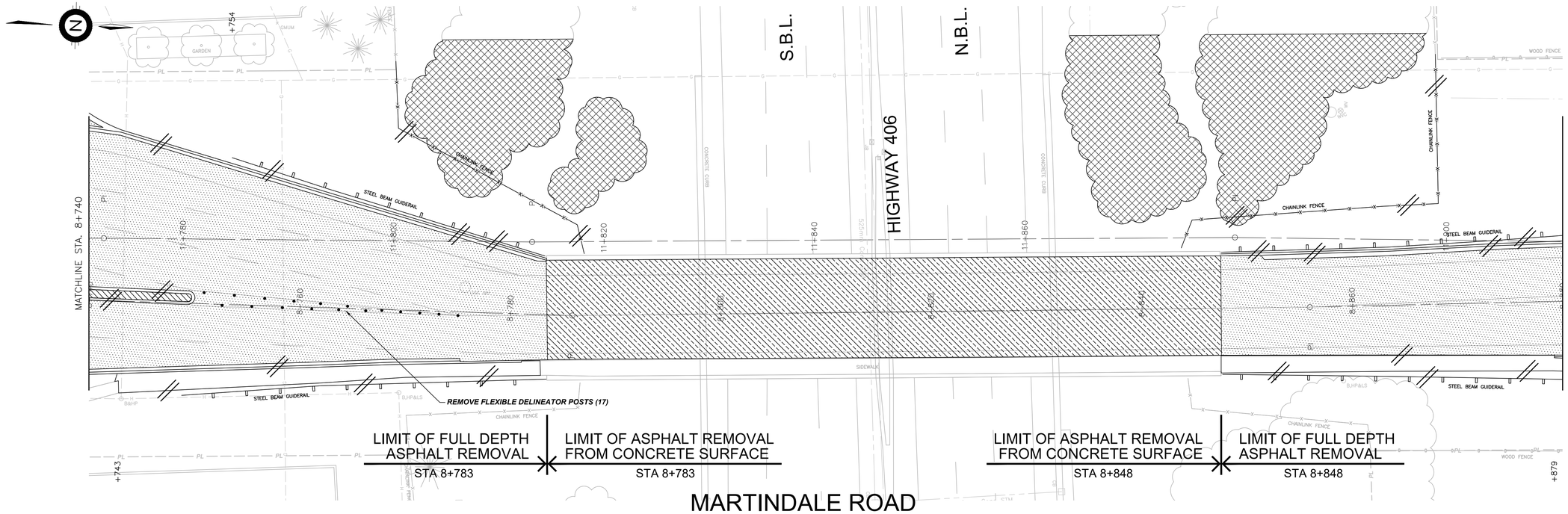
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DATE	2019-04-03
SCALE	AS SHOWN
REF. No.	RN19-57
DWG No.	ST03
REV.	0

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LEGEND

- FULL DEPTH ASPHALT REMOVAL
- PARTIAL ASPHALT REMOVAL
- ASPHALT REMOVAL OVER CONCRETE SURFACE
- TREE REMOVAL/GRABBING





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BENCHMARK

LICENSED PROFESSIONAL ENGINEER
F. K. Y. WONG
100076535
2019/04/23
PROVINCE OF ONTARIO

wood.

Niagara Region
PUBLIC WORKS

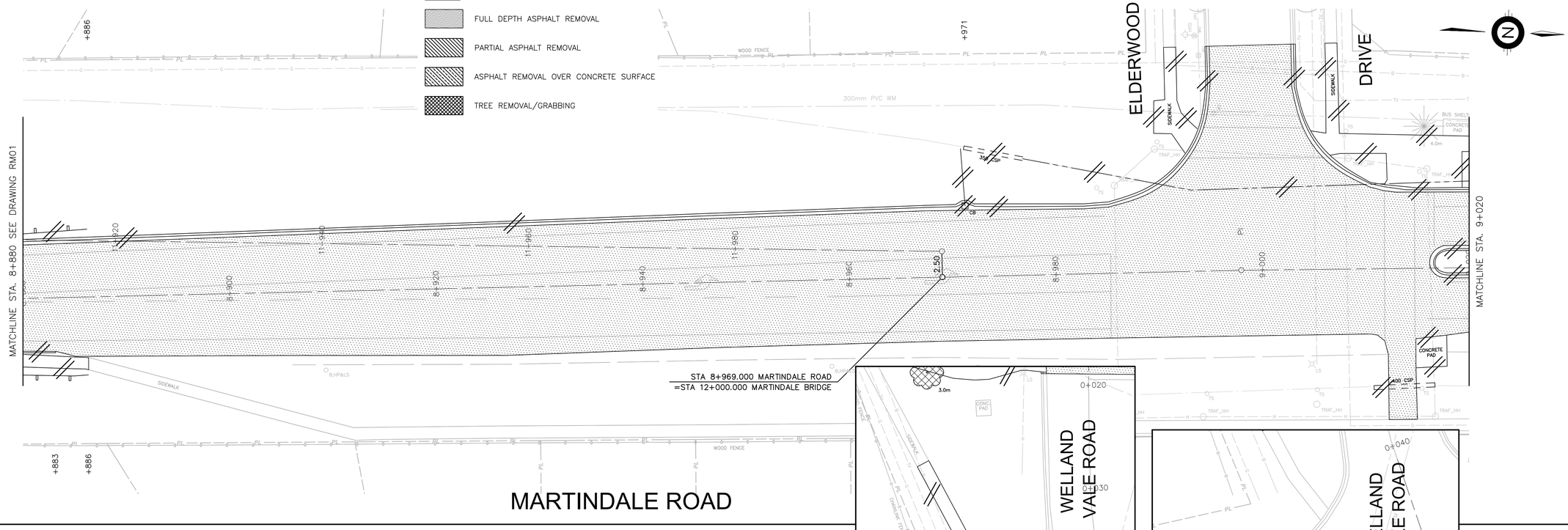
Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Ave to Barton St
City of St. Catharines
REMOVALS

CONSULTANT FILE No.	TP113112
DATE	2019-04-03
SCALE	1:200 m
REF. No.	RN19-57
DWG No.	RM01
REV.	0

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LEGEND

- FULL DEPTH ASPHALT REMOVAL
- PARTIAL ASPHALT REMOVAL
- ASPHALT REMOVAL OVER CONCRETE SURFACE
- TREE REMOVAL/GRABBING



DRAWING FILE: P:\Work\TP113112\Vlwg\Dwg\Contract\Phase 2\TP113112-REM.dwg PLOTTED: Apr 10, 2019 - 2:08pm PLOTTED BY: tapwa.siyonga

NO.	REVISION	DATE	INIT.
1	ISSUED FOR TENDER	2019-04-11	J.P.E.

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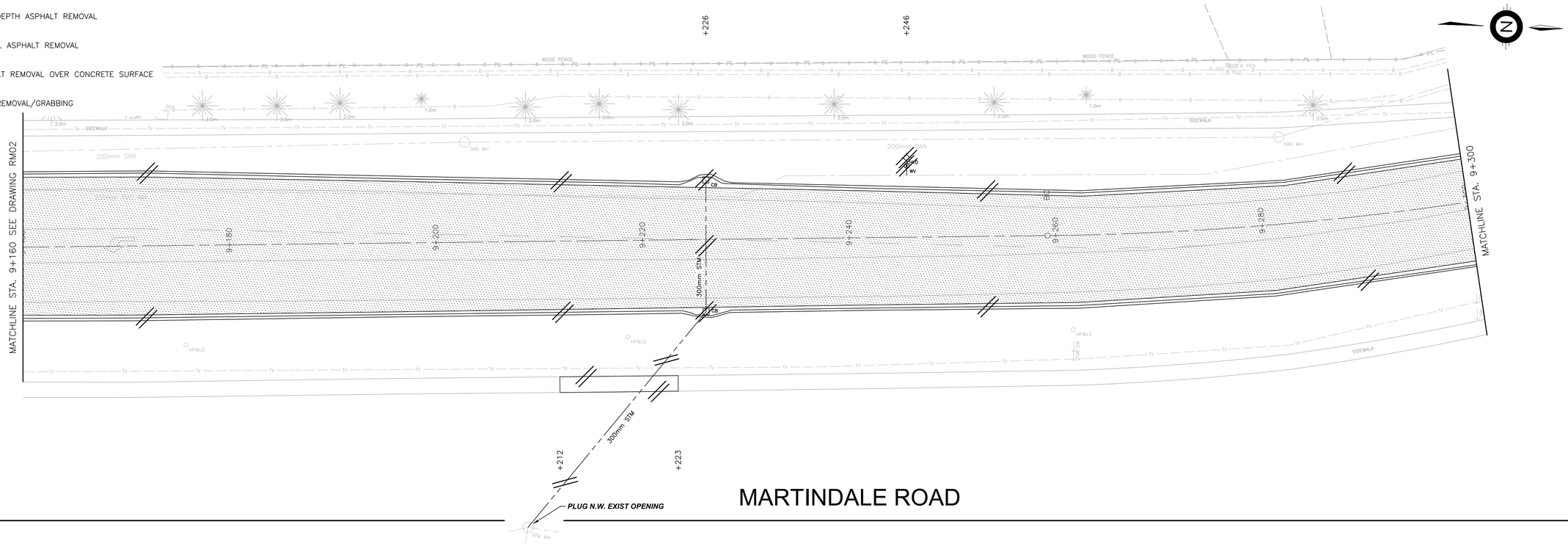
Niagara Region
PUBLIC WORKS

Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Ave to Barton St
City of St. Catharines
REMOVALS

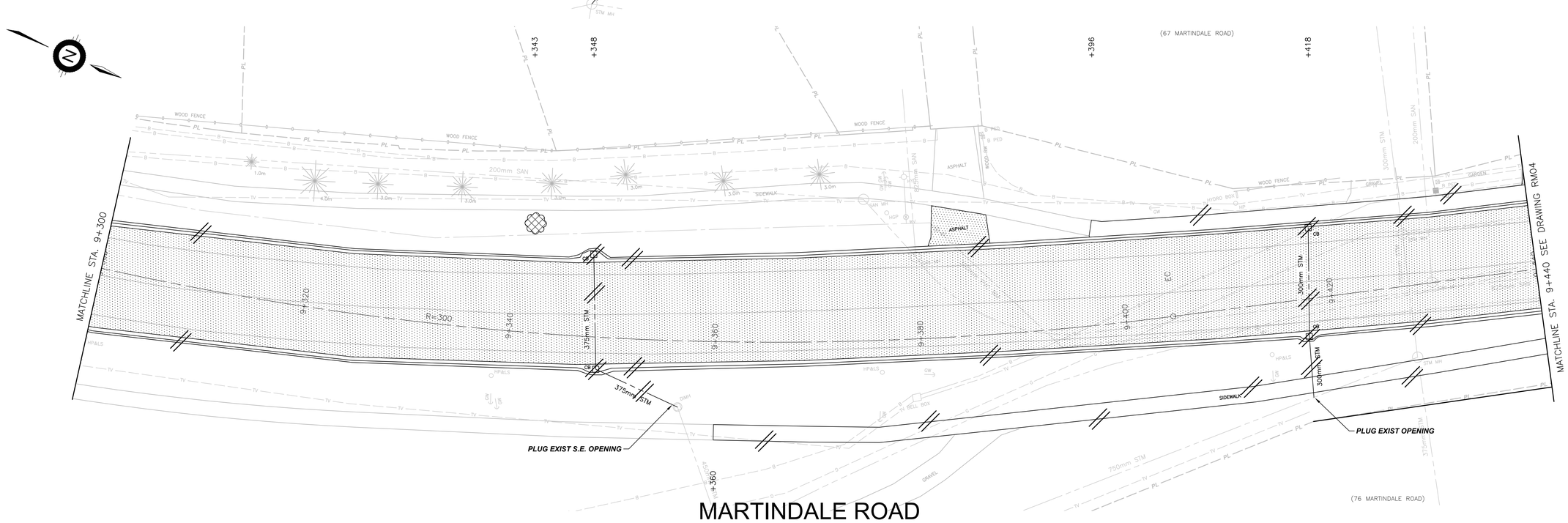
CONSULTANT FILE No.	TP113112
DATE	2019-04-03
SCALE	1:200 m
REF. No.	RN19-57
DWG No.	RM02
REV.	0

LEGEND

- FULL DEPTH ASPHALT REMOVAL
- PARTIAL ASPHALT REMOVAL
- ASPHALT REMOVAL OVER CONCRETE SURFACE
- TREE REMOVAL/GRABBING



MARTINDALE ROAD



MARTINDALE ROAD

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BENCHMARK

LICENSED PROFESSIONAL ENGINEER — F. K. Y. WONG 100076535 — 2019/04/03 — PROVINCE OF ONTARIO

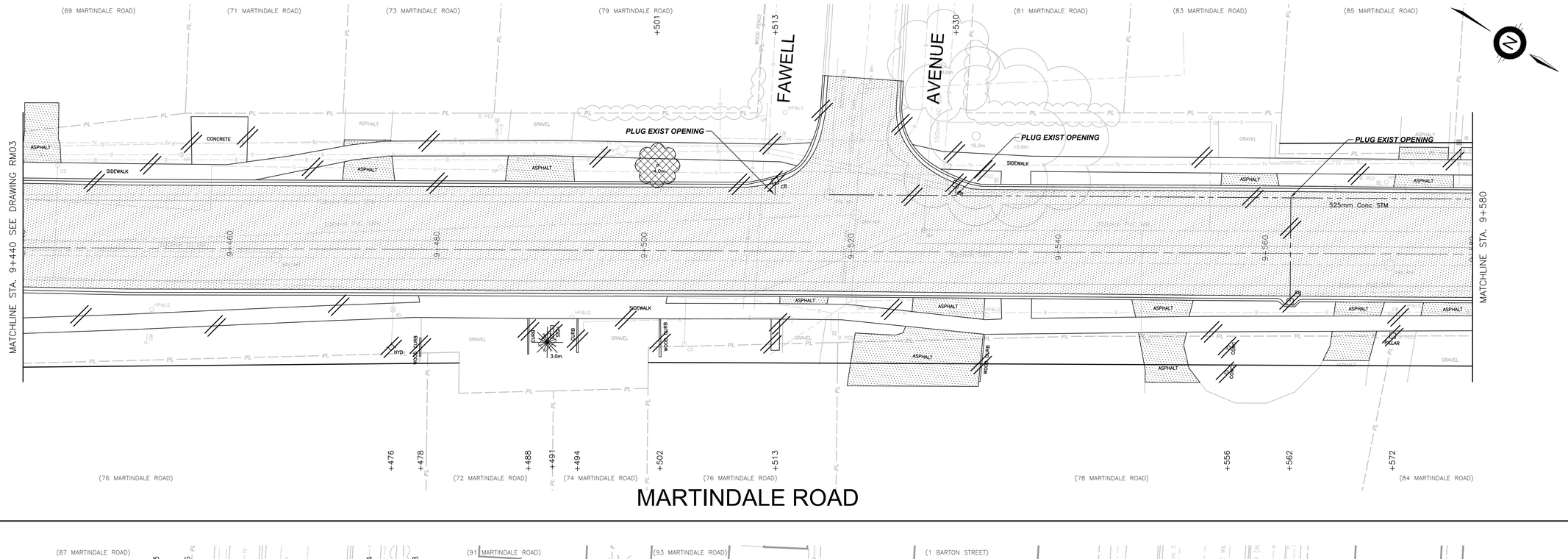
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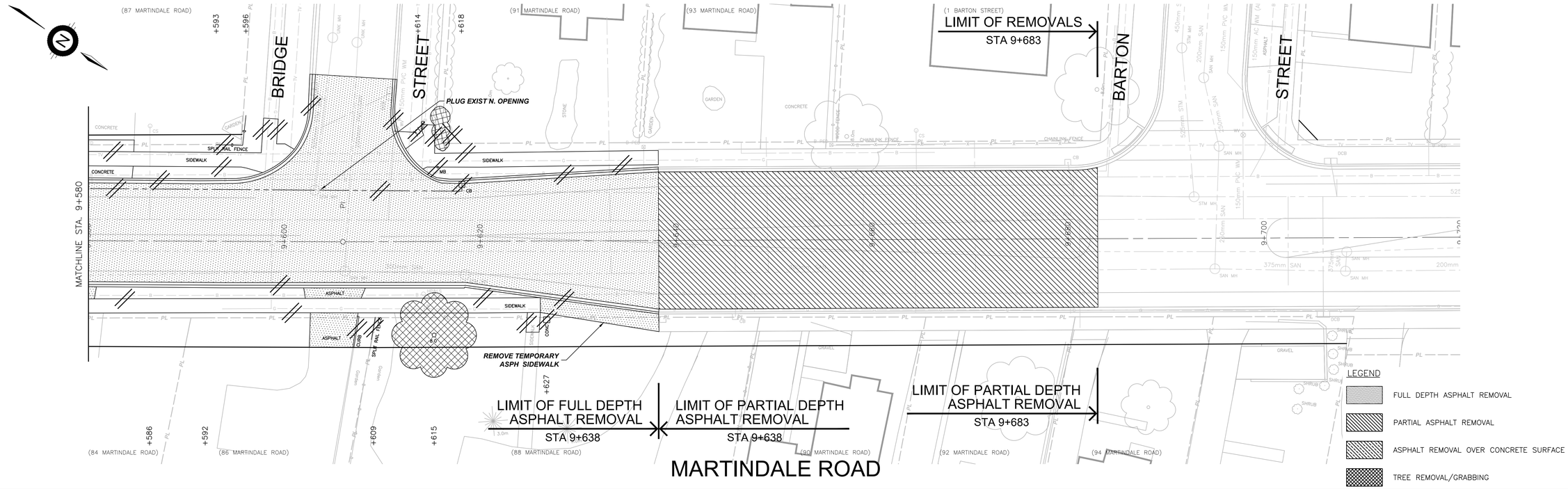
Niagara Region PUBLIC WORKS

Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Ave to Barton St
City of St. Catharines
REMOVALS

CONSULTANT FILE No.	TP113112
DATE	2019-04-03
SCALE	1:200 m
REF. No.	RN19-57
DWG No.	RM03
REV.	0

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NO.	REVISION	DATE	INIT.
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BENCHMARK

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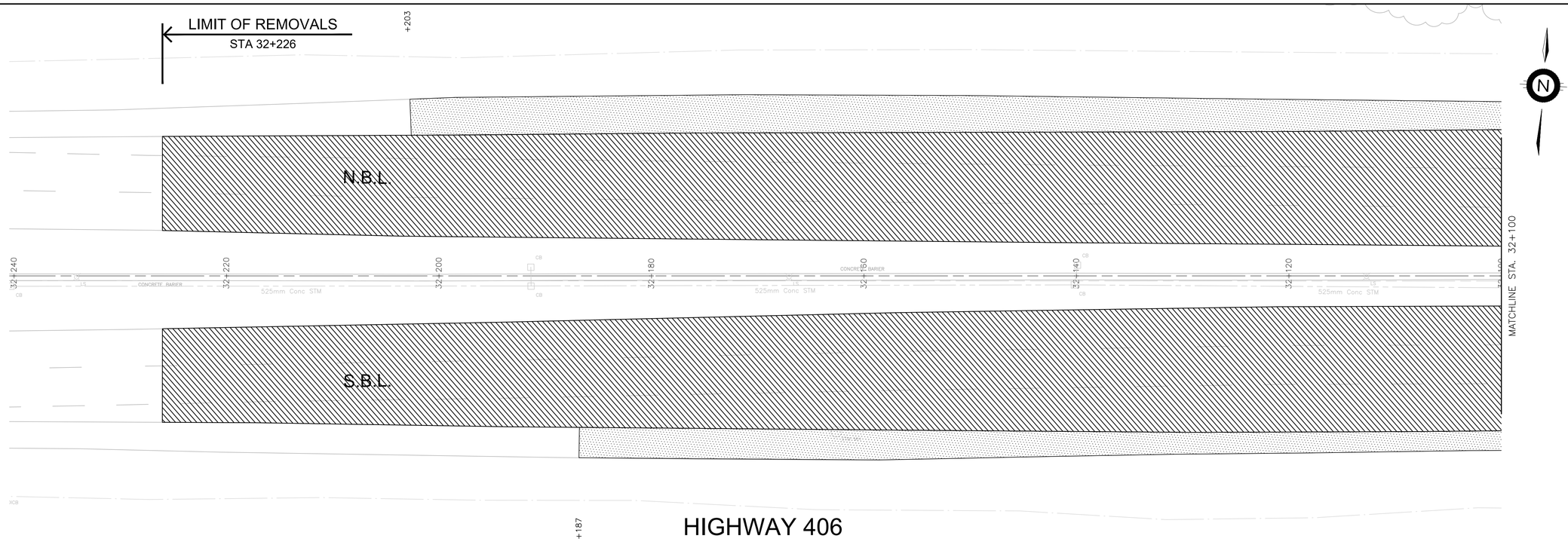
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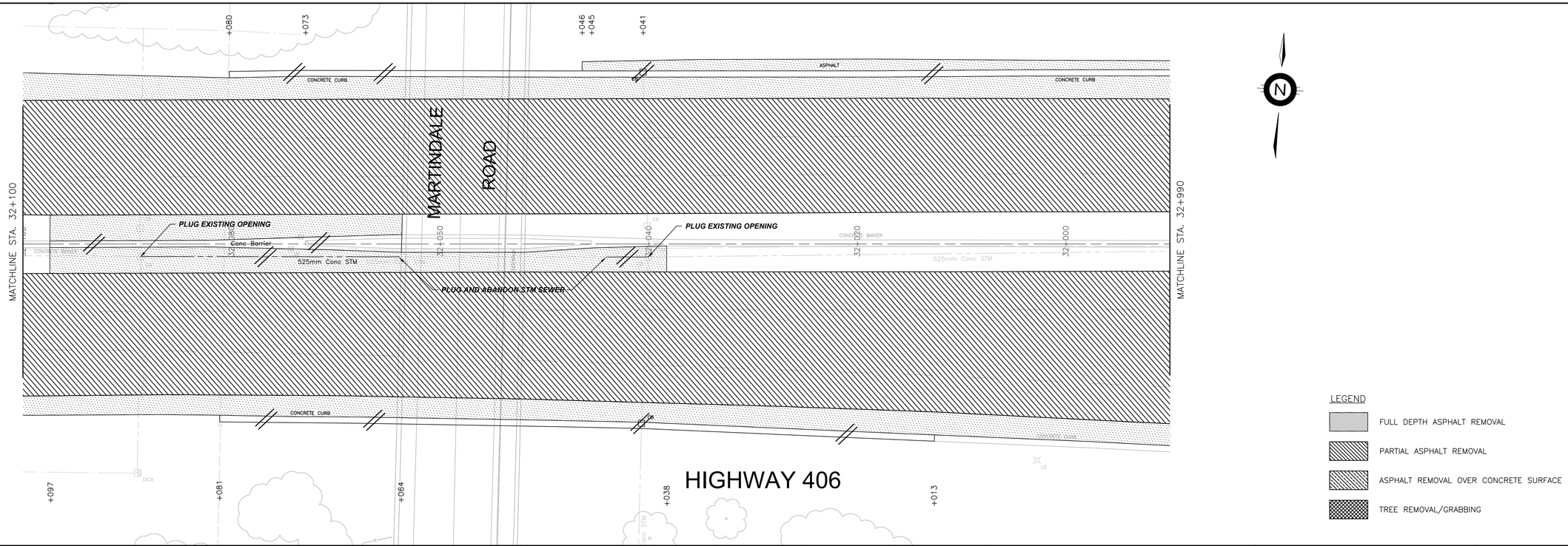
Niagara Region PUBLIC WORKS

Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Ave to Barton St
City of St. Catharines
REMOVALS

CONSULTANT FILE No.	TP113112
DATE	2019-04-03
SCALE	1:200 m
REF. No.	RN19-57
DWG No.	RM04
REV.	0

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NO.	REVISION	DATE	INIT.
1	ISSUED FOR TENDER	2019-04-11	J.P.E.

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F. K. Y. WONG
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2019/04/03
PROVINCE OF ONTARIO

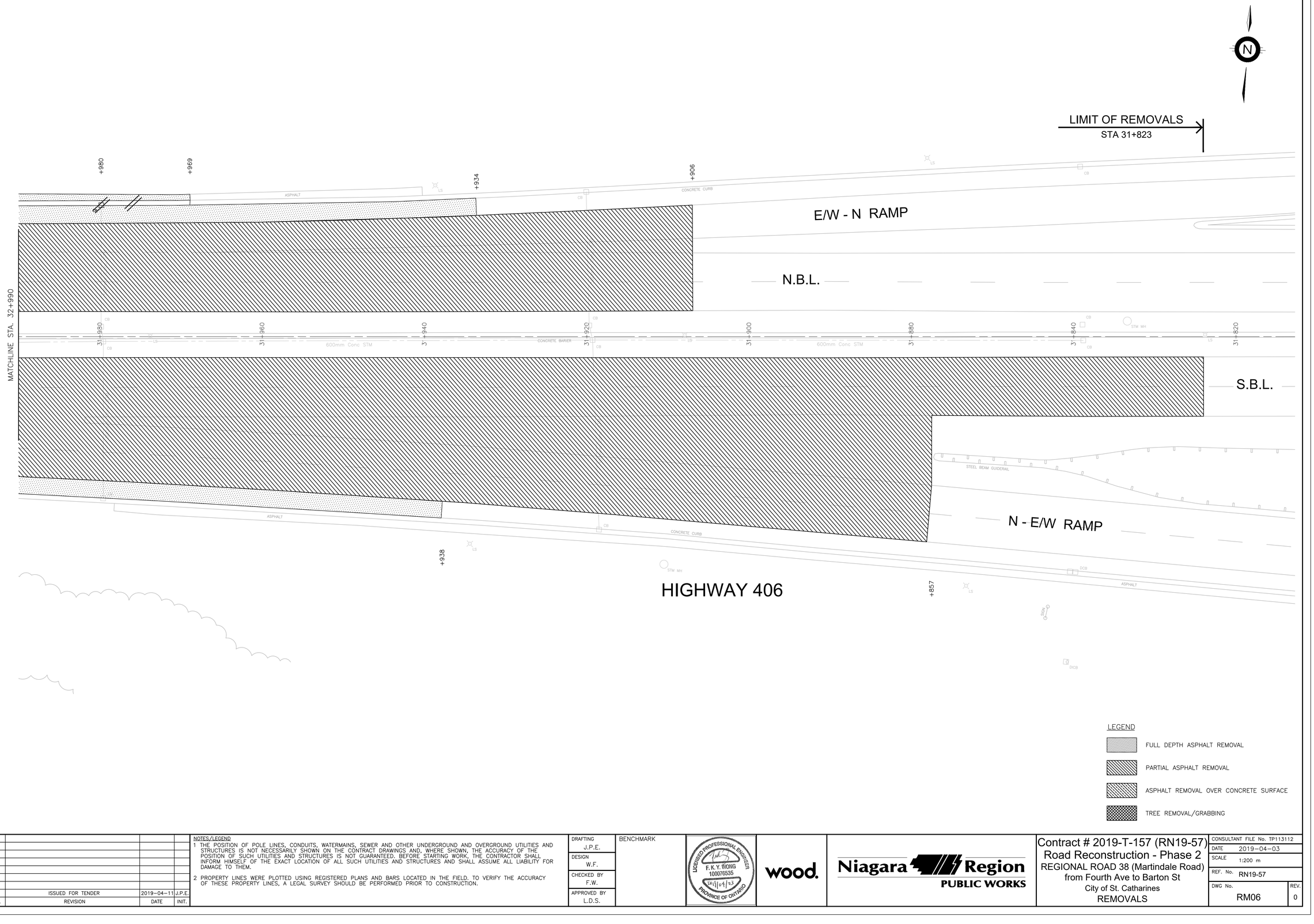
wood.

Niagara Region
PUBLIC WORKS

Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Ave to Barton St
City of St. Catharines
REMOVALS

CONSULTANT FILE No.	TP113112
DATE	2019-04-03
SCALE	1:200 m
REF. No.	RN19-57
DWG No.	RM05
REV.	0

DRAWING FILE: P:\Work\TP113112\Hwy\Dwg\Contract\Phase 2\TP113112-REM.dwg PLOTTED: Apr 10, 2019 - 2:10pm PLOTTED BY: topiwa.ziyenge



LEGEND

- FULL DEPTH ASPHALT REMOVAL
- PARTIAL ASPHALT REMOVAL
- ASPHALT REMOVAL OVER CONCRETE SURFACE
- TREE REMOVAL/GRABBING

NO.	REVISION	DATE	INIT.
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2019/04/03
PROVINCE OF ONTARIO

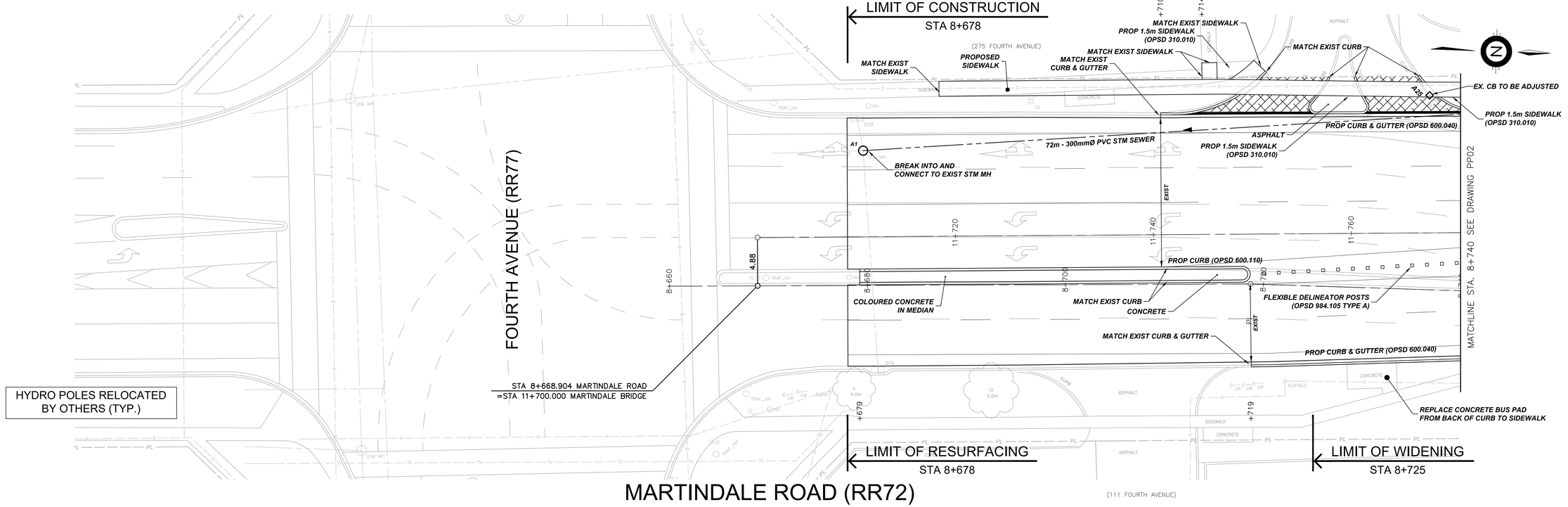
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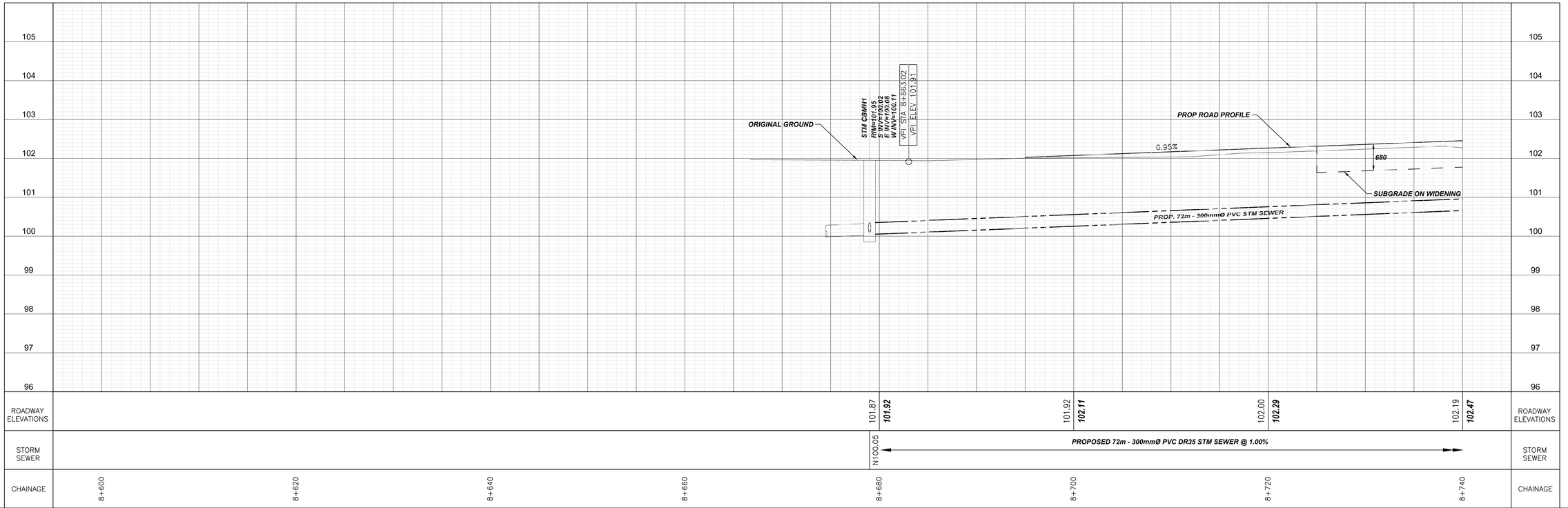
Niagara Region
PUBLIC WORKS

Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Ave to Barton St
City of St. Catharines
REMOVALS

CONSULTANT FILE No.	TP113112
DATE	2019-04-03
SCALE	1:200 m
REF. No.	RN19-57
DWG No.	RM06
REV.	0

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NOTES/LEGEND

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LICENSED PROFESSIONAL ENGINEER F.K.Y. WONG 100076535 PROVINCE OF ONTARIO

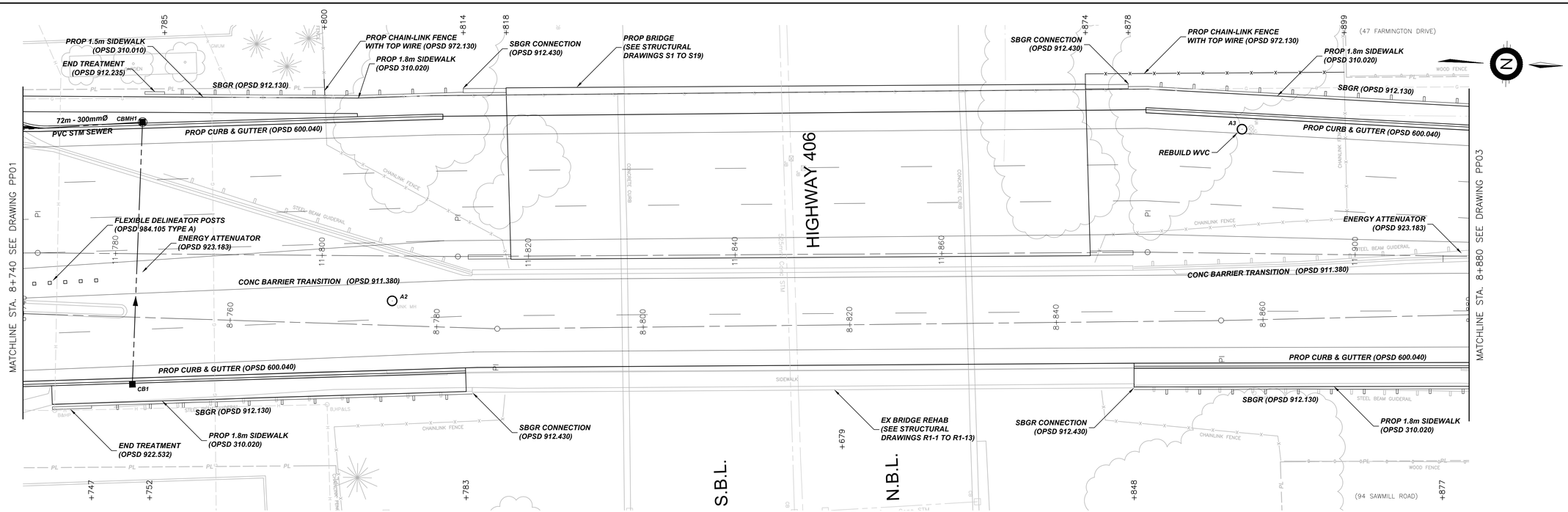
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Niagara Region PUBLIC WORKS

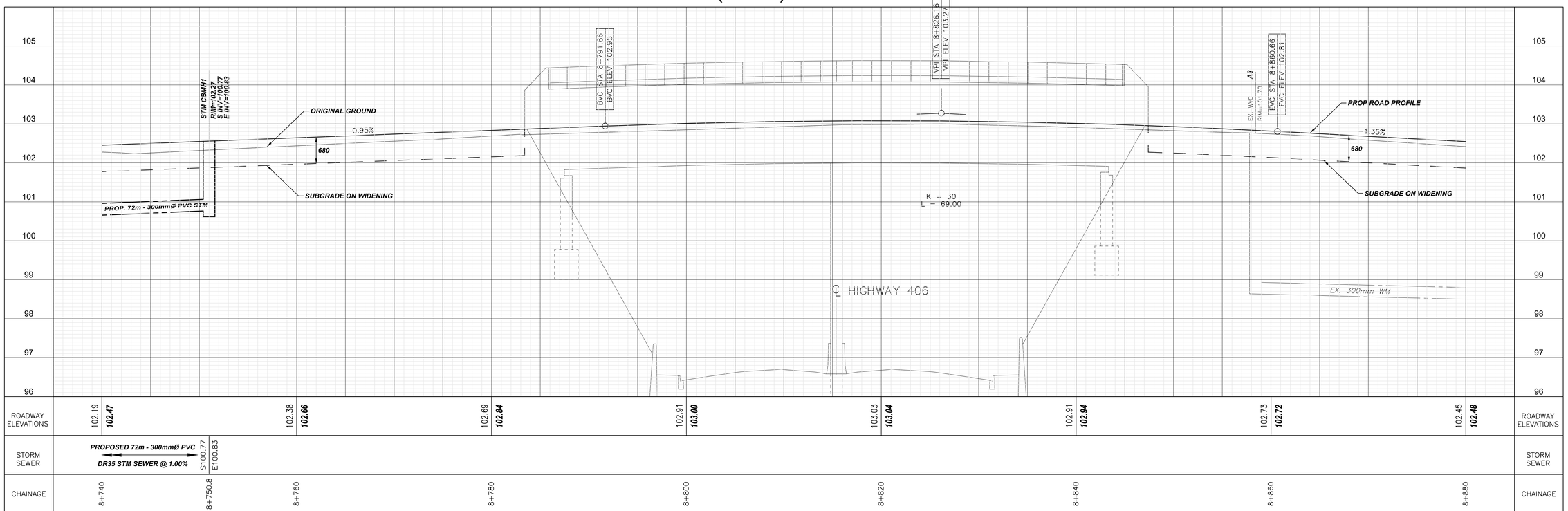
Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
Martindale Road
from Fourth Ave to Barton St
Niagara Region
NEW CONSTRUCTION

CONSULTANT FILE No. TP113112
DATE 2019-04-03
SCALE Hor : 1:200 m
Ver : 1:50 m
REF. No. RN19-57
DWG No. PP01
REV. 0

DRAWING FILE: P:\Work\TP113112\Vway\Dwg\Contract\Phase 2\TP113112-PP.dwg PLOTTED: Apr 10, 2019 - 2:43pm PLOTTED BY: topheo.siyenpe



MARTINDALE ROAD (RR72)



NOTES/LEGEND

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LICENSED PROFESSIONAL ENGINEER F. K. Y. WONG 100076535 2019/04/03 PROVINCE OF ONTARIO

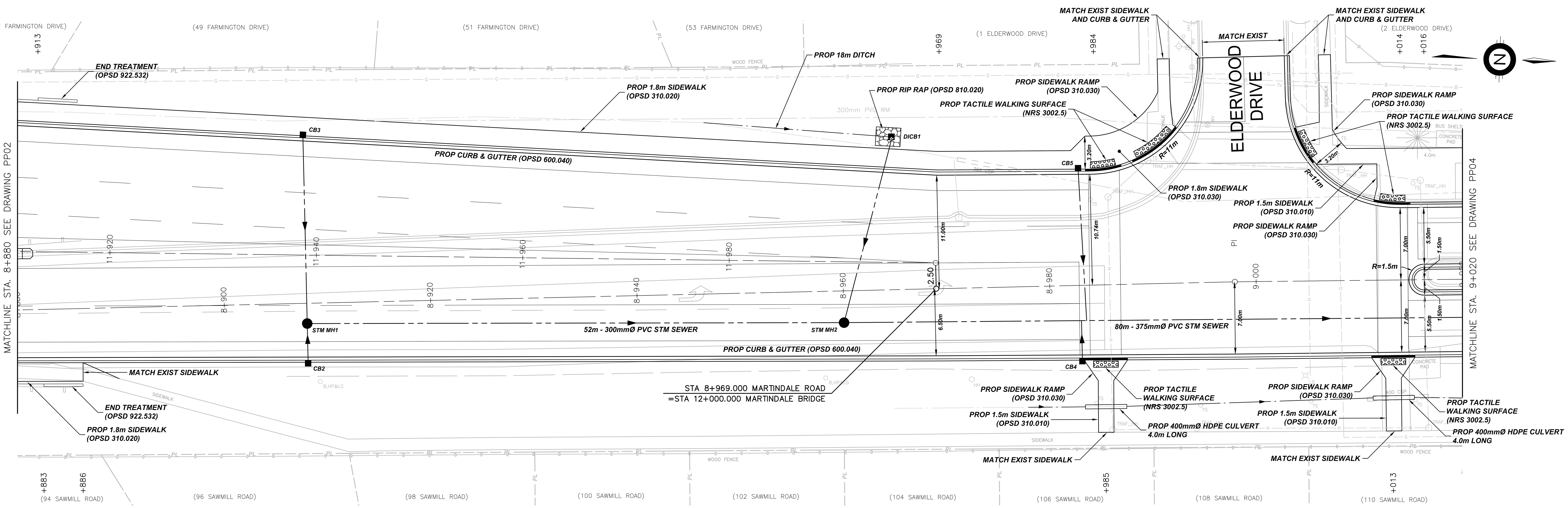
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Niagara Region PUBLIC WORKS

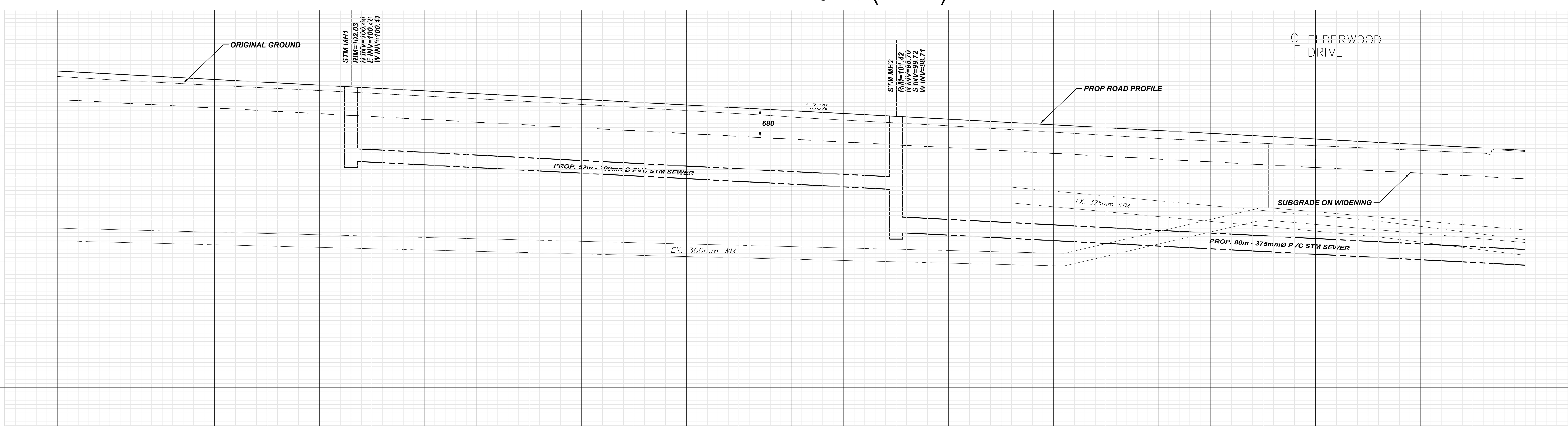
Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
Martindale Road
from Fourth Ave to Barton St
Niagara Region
NEW CONSTRUCTION

CONSULTANT FILE No. TP113112
DATE 2019-04-03
SCALE Hor : 1:200 m
Ver : 1:50 m
REF. No. RN19-57
DWG No. PP02
REV. 0

DRAWING FILE: P:\Work\TP113112\Dwg\Dwg\Contract\Phase 2\TP113112-PP.dwg PLOTTED: Apr 10, 2019 - 2:45pm PLOTTED BY: tsalwa.dyonge



MARTINDALE ROAD (RR72)



	8+880	8+900	8+920	8+940	8+960	8+980	9+000	9+020	
ROADWAY ELEVATIONS	102.45 **102.48**	102.18 **102.24**	101.91 **101.99**	101.62 **101.75**	101.33 **101.51**	101.02 **101.23**	100.77 **100.95**	100.63 **100.67**	ROADWAY ELEVATIONS
STORM SEWER	N100.40	PROPOSED 52m - 300mmØ PVC DR35 STM SEWER @ 1.30%			S99.72 N98.70	PROPOSED 80m - 375mmØ PVC DR35 STM SEWER @ 1.30%			STORM SEWER
CHAINAGE	8+880	8+900	8+920	8+940	8+960	8+980	9+000	9+020	CHAINAGE

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DESIGN W.F.
CHECKED BY F.W.
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BENCHMARK

LICENSED PROFESSIONAL ENGINEER — F. K. Y. WONG 100076535 — 2019/04/03 — PROVINCE OF ONTARIO

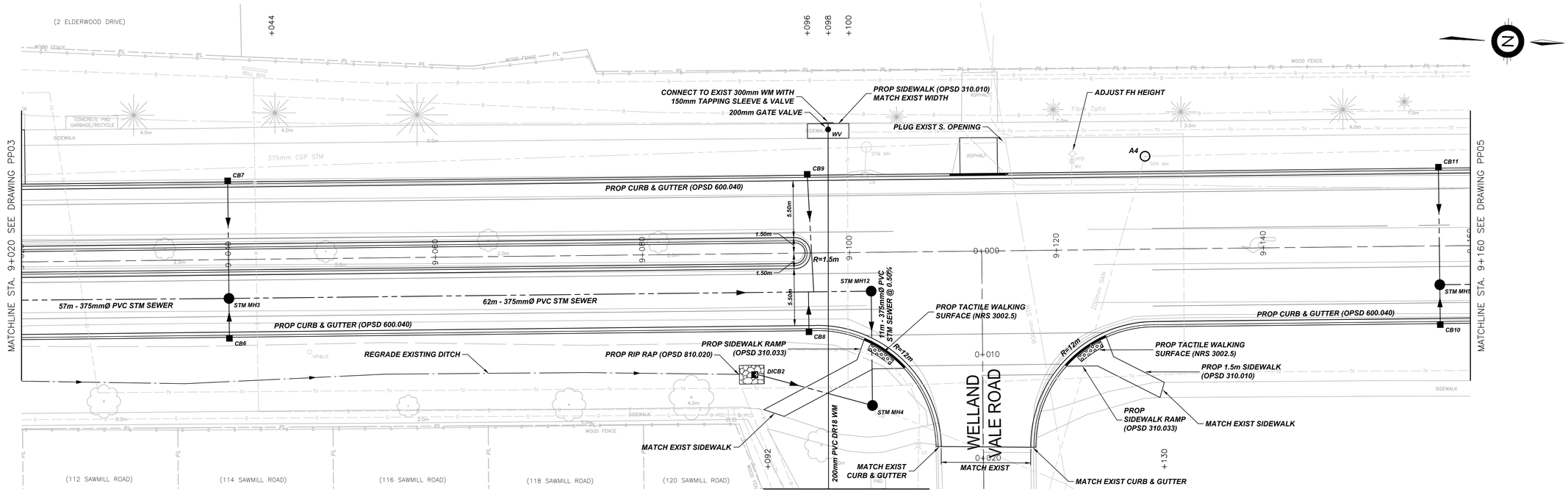
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Niagara Region PUBLIC WORKS

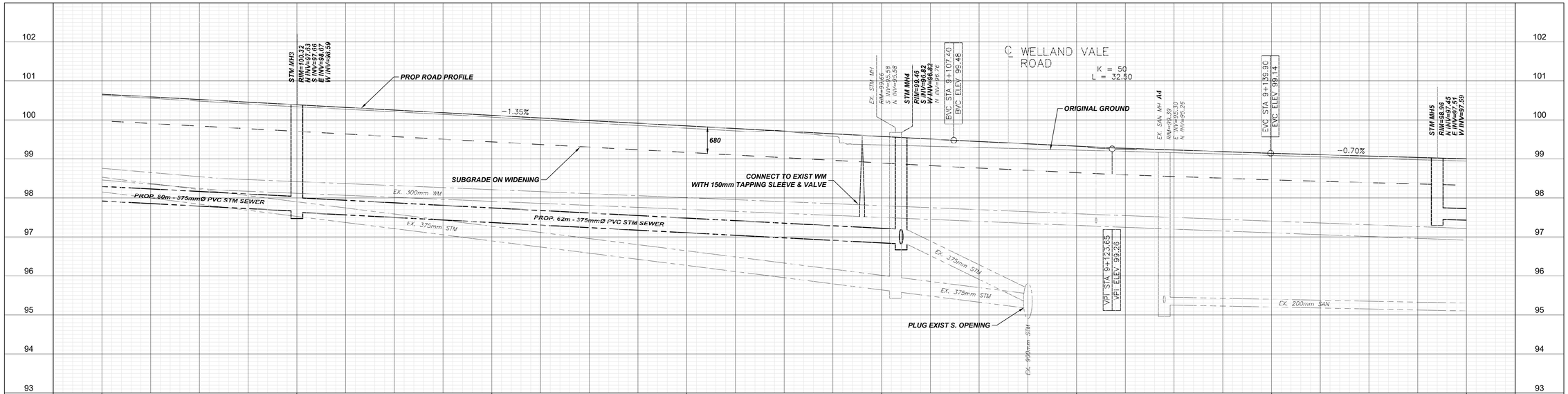
Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
Martindale Road
from Fourth Ave to Barton St
Niagara Region
NEW CONSTRUCTION

CONSULTANT FILE No. TP113112
DATE 2019-04-03
SCALE Hor : 1:200 m Ver : 1:50 m
REF. No. RN19-57
DWG No. PP03
REV. 0

DRAWING FILE: P:\Work\TP113112\Hwy\Dwg\Contract\Phase 2\TP113112-PP.dwg PLOTTED: Apr 10, 2019 - 2:53pm PLOTTED BY: tapiwa.ziyenge



MARTINDALE ROAD (RR38)



no.	REVISION	DATE	INIT.
1	ISSUED FOR TENDER	2019-04-11	J.P.E.

NOTES/LEGEND

1 THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWER AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

2 PROPERTY LINES WERE PLOTTED USING REGISTERED PLANS AND BARS LOCATED IN THE FIELD. TO VERIFY THE ACCURACY OF THESE PROPERTY LINES, A LEGAL SURVEY SHOULD BE PERFORMED PRIOR TO CONSTRUCTION.

DRAFTING	J.P.E.
DESIGN	W.F.
CHECKED BY	F.W.
APPROVED BY	L.D.S.

BENCHMARK

LICENSED PROFESSIONAL ENGINEER F.K.Y. WONG 100076535 PROVINCE OF ONTARIO

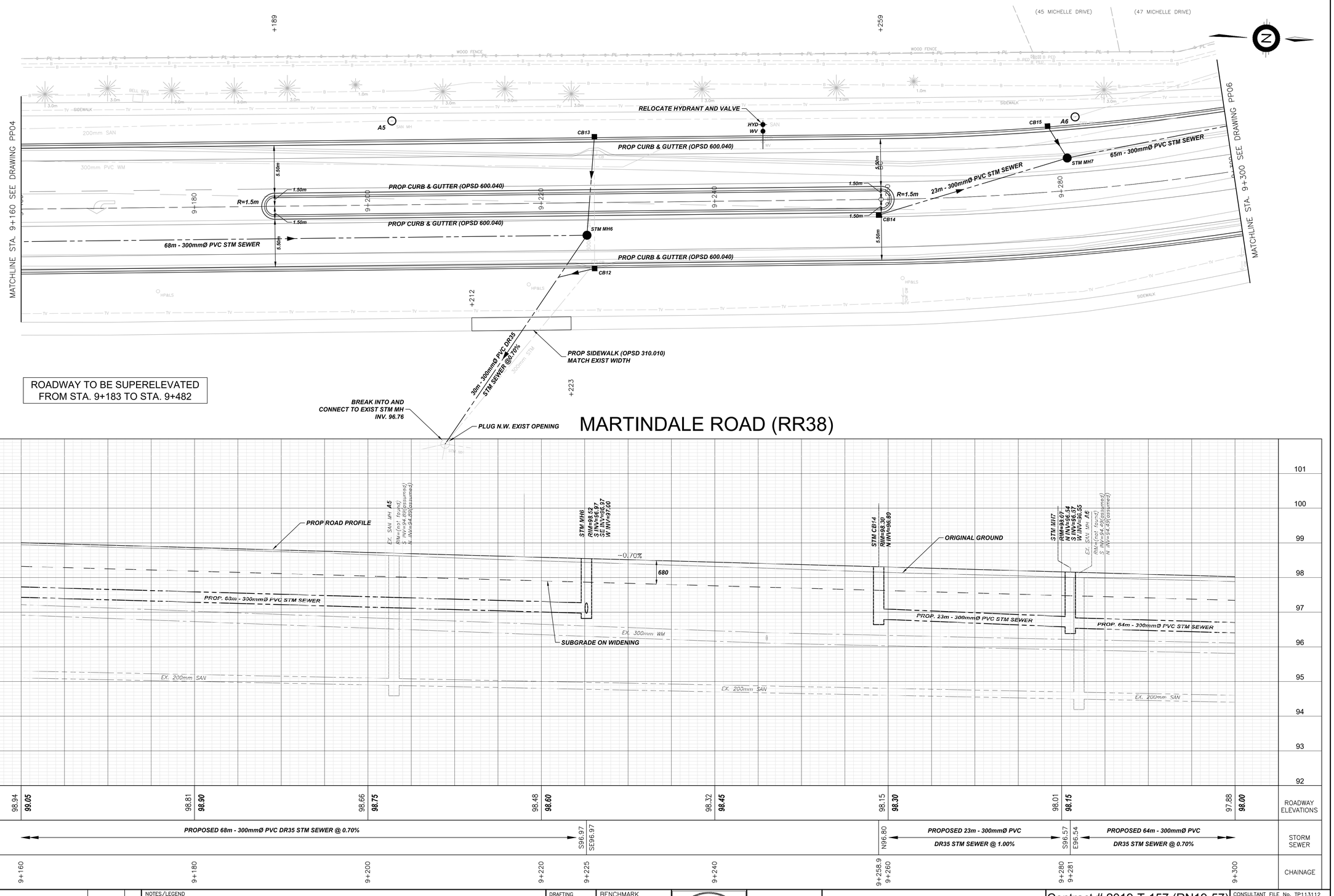
wood.

Niagara Region PUBLIC WORKS

Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
Martindale Road
from Fourth Ave to Barton St
Niagara Region
NEW CONSTRUCTION

CONSULTANT FILE No.	TP113112
DATE	2019-04-03
SCALE	Hor : 1:200 m Ver : 1:50 m
REF. No.	RN19-57
DWG No.	PP04
REV.	0

DRAWING FILE: P:\Work\TP113112\Vway\Dwg\Contract\Phase 2\TP113112-PP.dwg PLOTTED: Apr 10, 2019 - 3:24pm PLOTTED BY: topher.sjoerdsma



MARTINDALE ROAD (RR38)

ROADWAY ELEVATIONS	98.94 **99.05**	98.81 **98.90**	98.66 **98.75**
STORM SEWER	**PROPOSED 68m - 300mmØ PVC DR35 STM SEWER @ 0.70%**		S96.97 SE96.97
CHAINAGE	9+160	9+180	9+200

ROADWAY ELEVATIONS	98.48 **98.60**	98.32 **98.45**	98.15 **98.30**
STORM SEWER			N96.80
CHAINAGE	9+220	9+225	9+240

ROADWAY ELEVATIONS	98.01 **98.15**	97.88 **98.00**	
STORM SEWER	**PROPOSED 23m - 300mmØ PVC DR35 STM SEWER @ 1.00%** S96.57	E96.54 **PROPOSED 64m - 300mmØ PVC DR35 STM SEWER @ 0.70%**	
CHAINAGE	9+258.9 9+260 9+280 9+281	9+300	

NO.	REVISION	DATE	INIT.
1	ISSUED FOR TENDER	2019-04-11	J.P.E.

NOTES/LEGEND

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DRAFTING	J.P.E.
DESIGN	W.F.
CHECKED BY	F.W.
APPROVED BY	L.D.S.

BENCHMARK

LICENSED PROFESSIONAL ENGINEER
F. K. Y. WONG
100076535
2019/04/03
PROVINCE OF ONTARIO

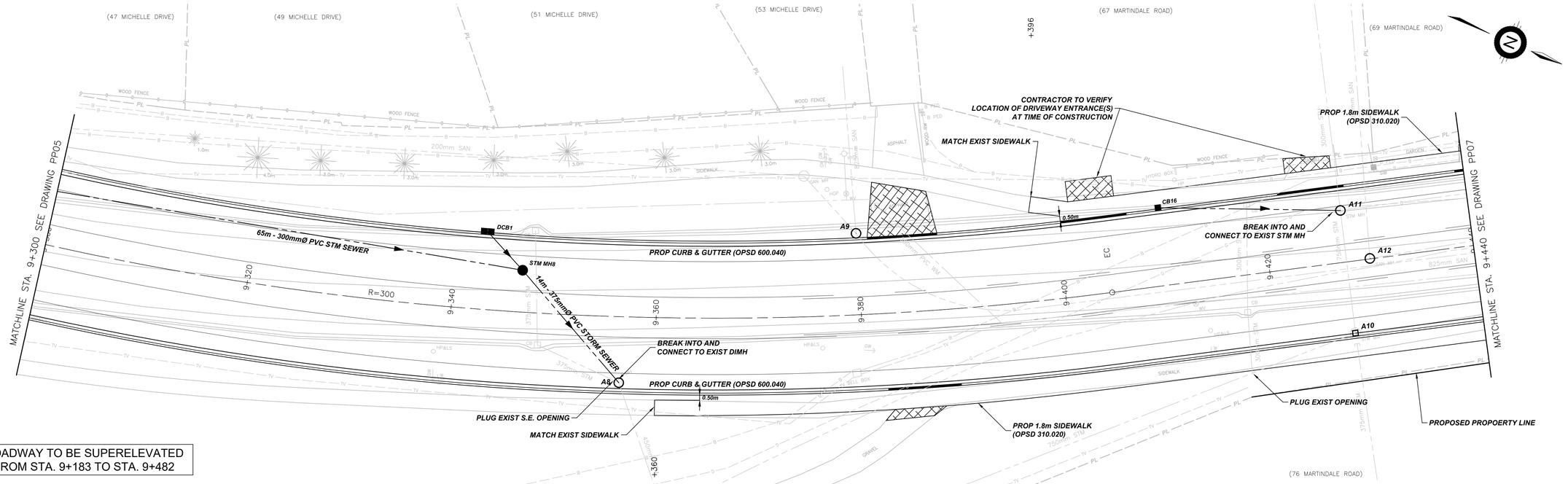
wood.

Niagara Region
PUBLIC WORKS

Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
Martindale Road
from Fourth Ave to Barton St
Niagara Region
NEW CONSTRUCTION

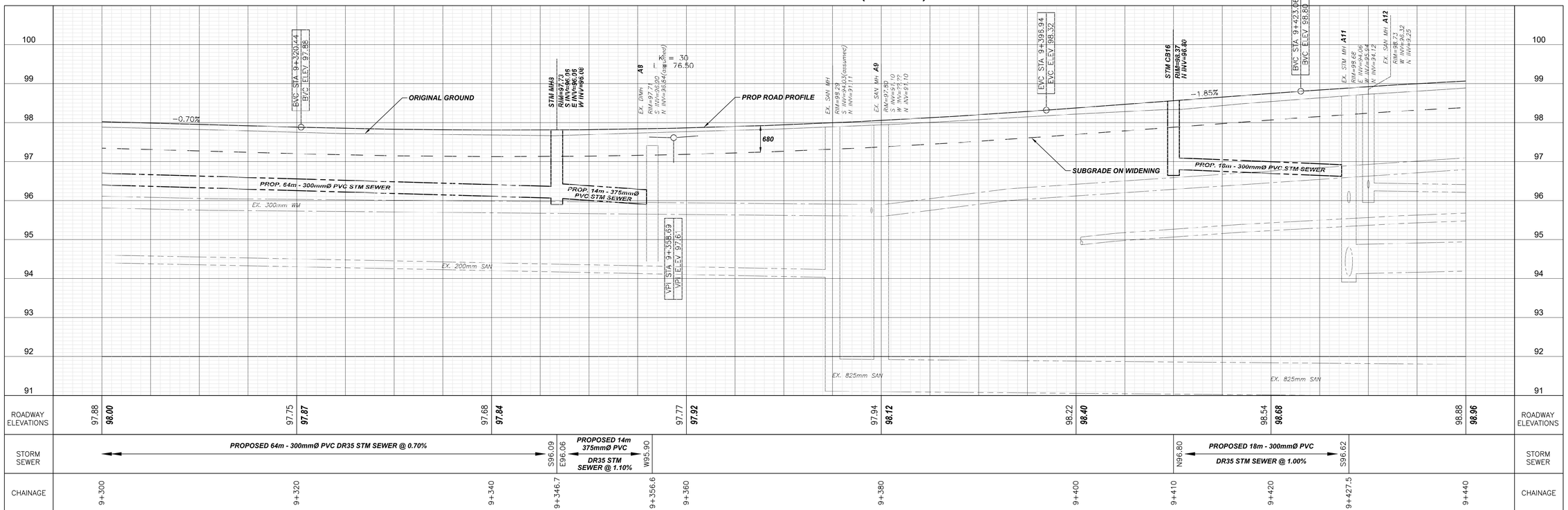
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DATE	2019-04-03
SCALE	Hor : 1:200 m Ver : 1:50 m
REF. No.	RN19-57
DWG No.	PP05
REV.	0

DRAWING FILE: P:\Work\TP113112\Dwg\Dwg\Contract\Phase 2\TP113112_PP.dwg PLOTTED: Apr 11, 2019 - 11:10am PLOTTED BY: topiwo.ziyonge



ROADWAY TO BE SUPERELEVATED
FROM STA. 9+183 TO STA. 9+482

MARTINDALE ROAD (RR38)



ROADWAY ELEVATIONS	97.88 **98.00**	97.75 **97.87**	97.68 **97.84**
STORM SEWER	PROPOSED 64m - 300mmØ PVC DR35 STM SEWER @ 0.70%	S96.09 E96.06	PROPOSED 14m 375mmØ PVC DR35 STM SEWER @ 1.10%
CHAINAGE	9+300	9+320	9+340

ROADWAY ELEVATIONS	97.77 **97.92**	97.94 **98.12**	98.22 **98.40**
STORM SEWER	W95.90		N96.80
CHAINAGE	9+356.6 9+360	9+380	9+400

ROADWAY ELEVATIONS	98.54 **98.68**	98.88 **98.96**	
STORM SEWER	PROPOSED 18m - 300mmØ PVC DR35 STM SEWER @ 1.00%	S96.62	
CHAINAGE	9+410 9+420	9+427.5 9+440	

NOTES/LEGEND

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NO.	REVISION	DATE	INIT.
1	ISSUED FOR TENDER	2019-04-11	J.P.E.

DRAFTING	J.P.E.
DESIGN	W.F.
CHECKED BY	F.W.
APPROVED BY	L.D.S.

BENCHMARK

LICENSED PROFESSIONAL ENGINEER F. K. Y. WONG 100076535 PROVINCE OF ONTARIO

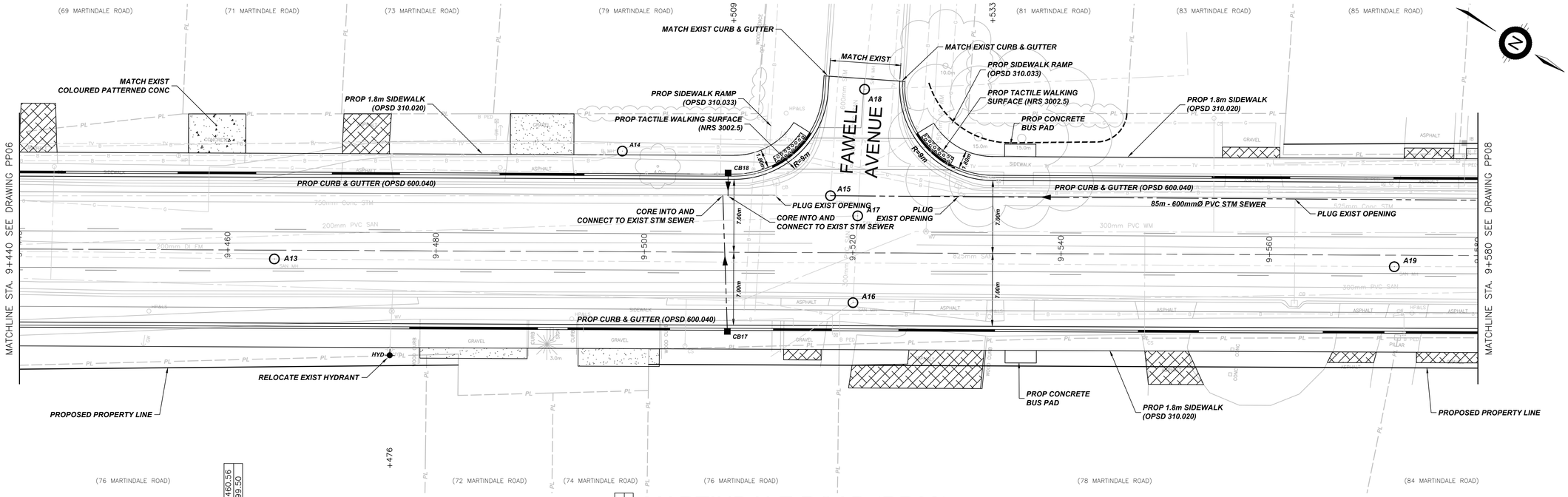
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Niagara Region PUBLIC WORKS

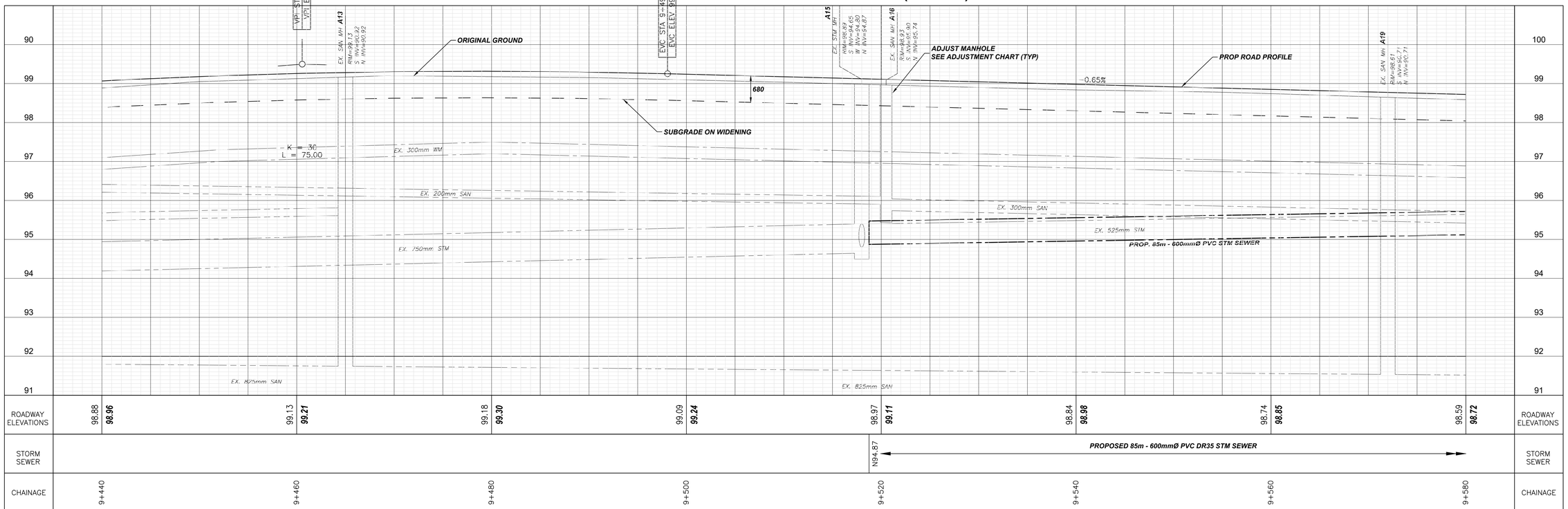
Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
Martindale Road
from Fourth Ave to Barton St
Niagara Region
NEW CONSTRUCTION

CONSULTANT FILE No.	TP113112
DATE	2019-04-03
SCALE	Hor : 1:200 m Ver : 1:50 m
REF. No.	RN19-57
DWG No.	PP06
REV.	0

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MARTINDALE ROAD (RR38)



ROADWAY ELEVATIONS	98.88 **98.96** 99.13 **99.21** 99.18 **99.30** 99.09 **99.24** 98.97 **99.11** 98.84 **98.98** 98.74 **98.85** 98.59 **98.72**	ROADWAY ELEVATIONS
STORM SEWER	N94.87 PROPOSED 85m - 600mmØ PVC DR35 STM SEWER	STORM SEWER
CHAINAGE	9+440 9+460 9+480 9+500 9+520 9+540 9+560 9+580	CHAINAGE

NO.	REVISION	DATE	INIT.
1	ISSUED FOR TENDER	2019-04-11	J.P.E.

NOTES/LEGEND

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DRAFTING	J.P.E.
DESIGN	W.F.
CHECKED BY	F.W.
APPROVED BY	L.D.S.

BENCHMARK

LICENSED PROFESSIONAL ENGINEER F. K. Y. WONG 100076535 2019/04/23 PROVINCE OF ONTARIO

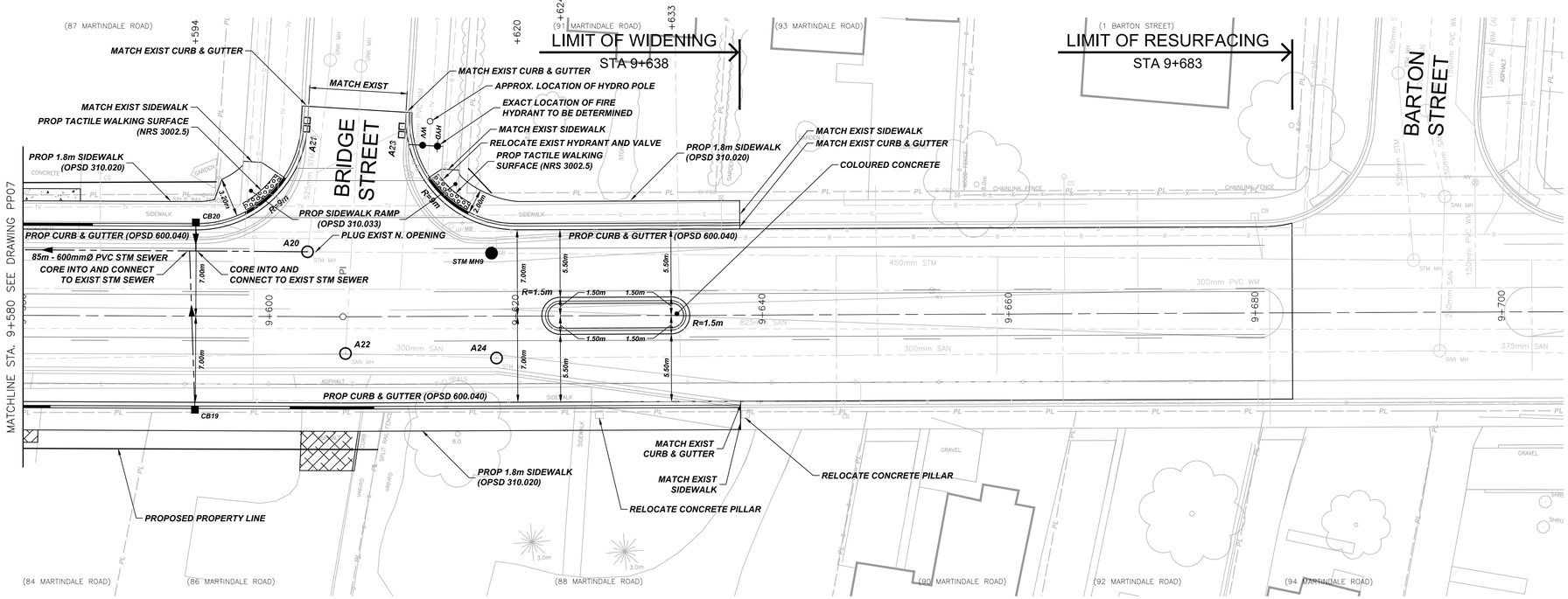
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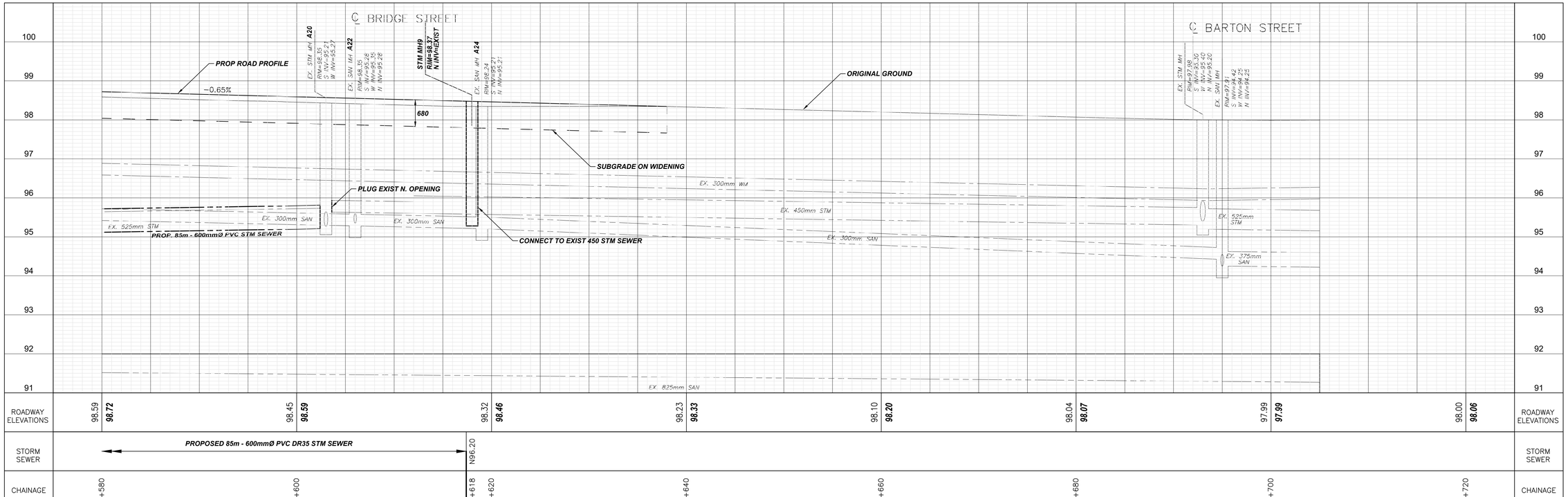
Niagara Region PUBLIC WORKS

Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
Martindale Road
from Fourth Ave to Barton St
Niagara Region
NEW CONSTRUCTION

CONSULTANT FILE No.	TP113112
DATE	2019-04-03
SCALE	Hor : 1:200 m Ver : 1:50 m
REF. No.	RN19-57
DWG No.	PP07
REV.	0

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MARTINDALE ROAD (RR38)

NOTES/LEGEND

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NO.	REVISION	DATE	INIT.
1	ISSUED FOR TENDER	2019-04-11	J.P.E.

DRAFTING	J.P.E.
DESIGN	W.F.
CHECKED BY	F.W.
APPROVED BY	L.D.S.

BENCHMARK

LICENSED PROFESSIONAL ENGINEER F.K.Y. WONG 100076535 PROVINCE OF ONTARIO

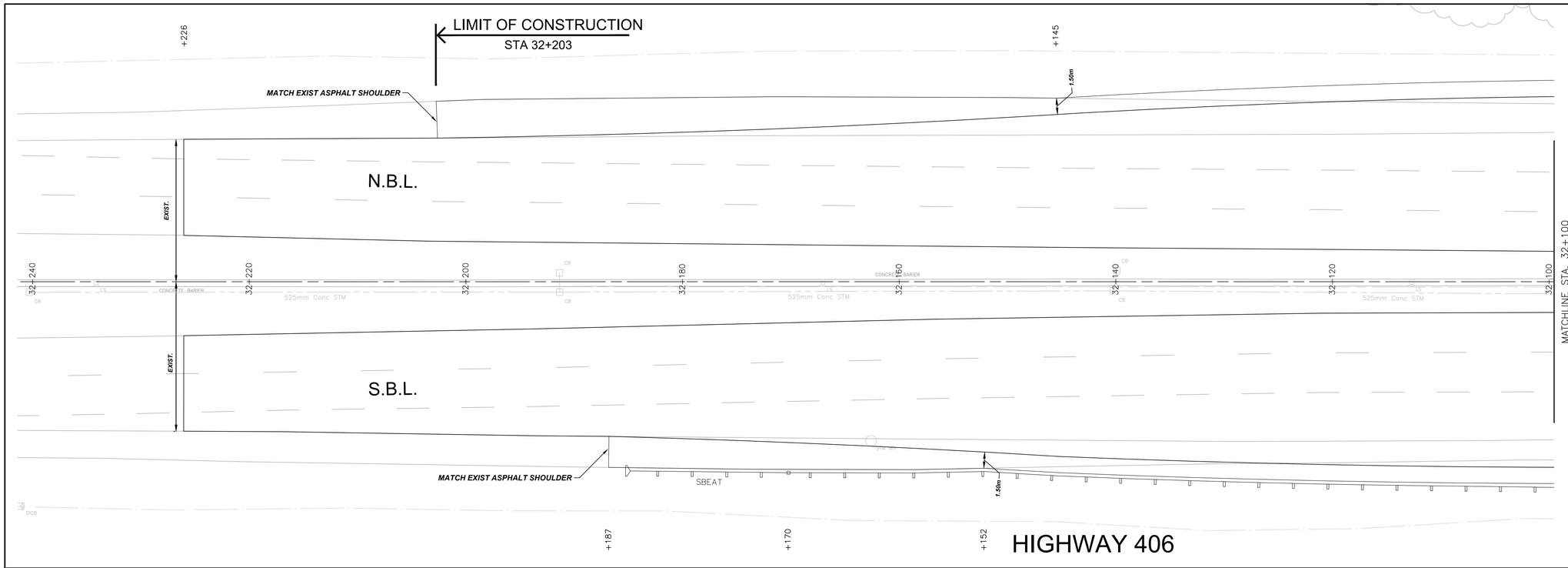
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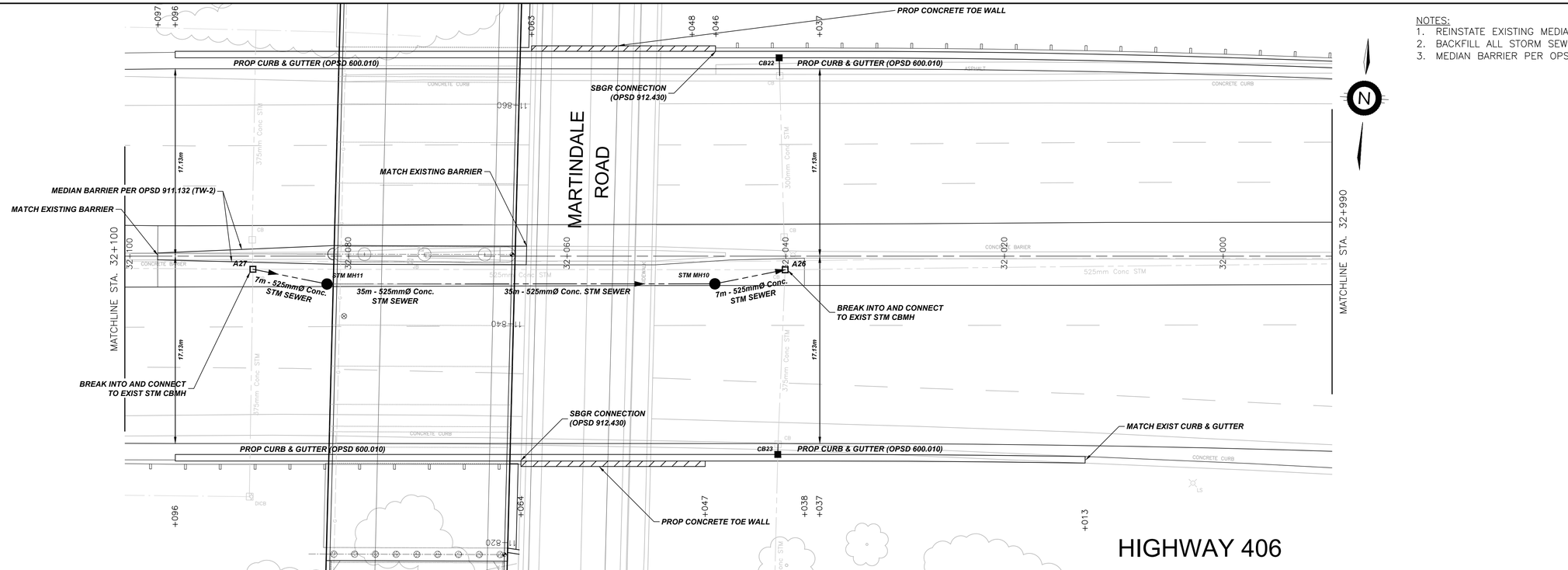
Niagara Region PUBLIC WORKS

Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
Martindale Road
from Fourth Ave to Barton St
Niagara Region
NEW CONSTRUCTION

CONSULTANT FILE No.	TP113112
DATE	2019-04-03
SCALE	Hor : 1:200 m Ver : 1:50 m
REF. No.	RN19-57
DWG No.	PP08
REV.	0

DRAWING FILE: P:\Work\TP113112\Vway\Dwg\Contract\Phase 2\TP113112-PP.dwg PLOTTED: Apr 11, 2019 - 8:44am PLOTTED BY: topher.dyemje





NOTES:
1. REINSTATE EXISTING MEDIAN SHOULDER PER MTOD 503.020
2. BACKFILL ALL STORM SEWER WITH GRANULAR 'A'
3. MEDIAN BARRIER PER OPSD 911.132 (TW-2)

NO.	REVISION	DATE	INIT.
1	ISSUED FOR TENDER	2019-04-11	J.P.E.

NOTES/LEGEND
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DRAFTING	J.P.E.
DESIGN	W.F.
CHECKED BY	F.W.
APPROVED BY	L.D.S.

BENCHMARK

LICENSED PROFESSIONAL ENGINEER
F. K. Y. WONG
100076535
2019/04/23
PROVINCE OF ONTARIO

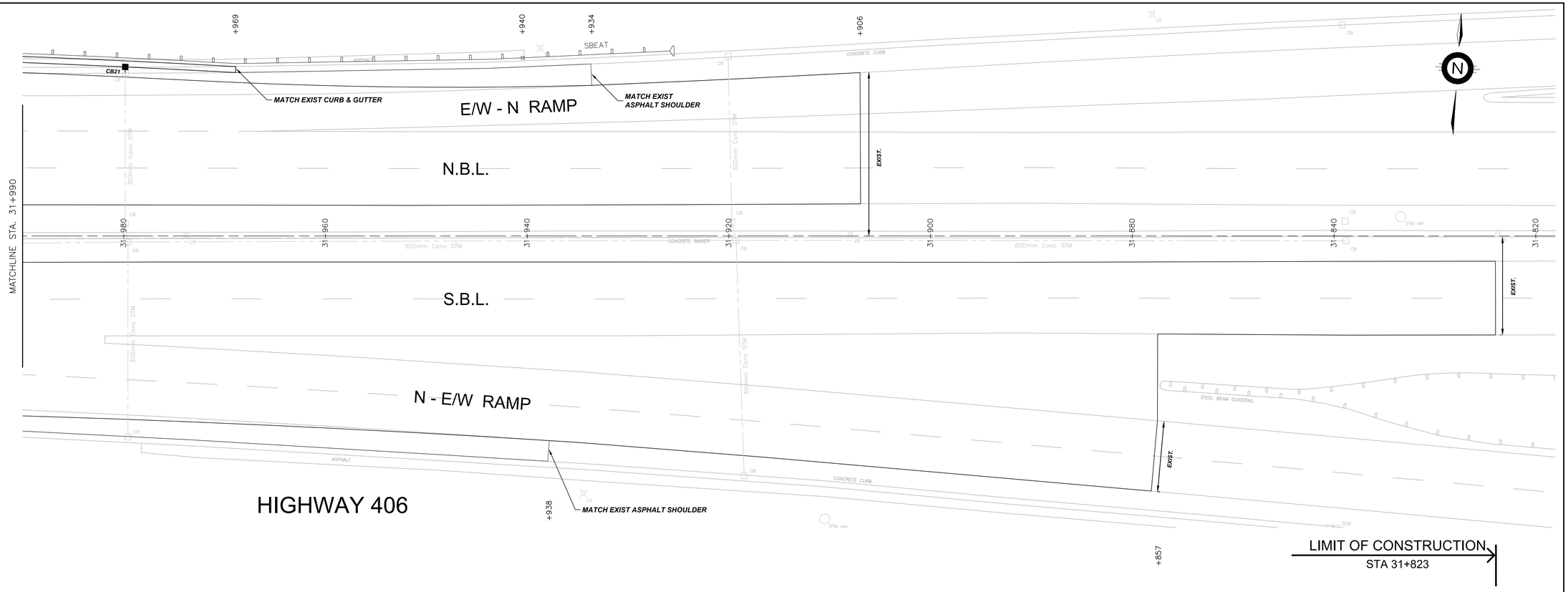
wood.

Niagara Region
PUBLIC WORKS

Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Ave to Barton St
City of St. Catharines
NEW CONSTRUCTION

CONSULTANT FILE No.	TP113112
DATE	2019-04-03
SCALE	1:200 m
REF. No.	RN19-57
DWG No.	PP09
REV.	0

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no.	REVISION	DATE	INIT.
1	ISSUED FOR TENDER	2019-04-11	J.P.E.

NOTES/LEGEND

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DRAFTING	J.P.E.
DESIGN	W.F.
CHECKED BY	F.W.
APPROVED BY	L.D.S.

BENCHMARK

LICENSED PROFESSIONAL ENGINEER
F.K.Y. WONG
100076535
2019/04/03
PROVINCE OF ONTARIO

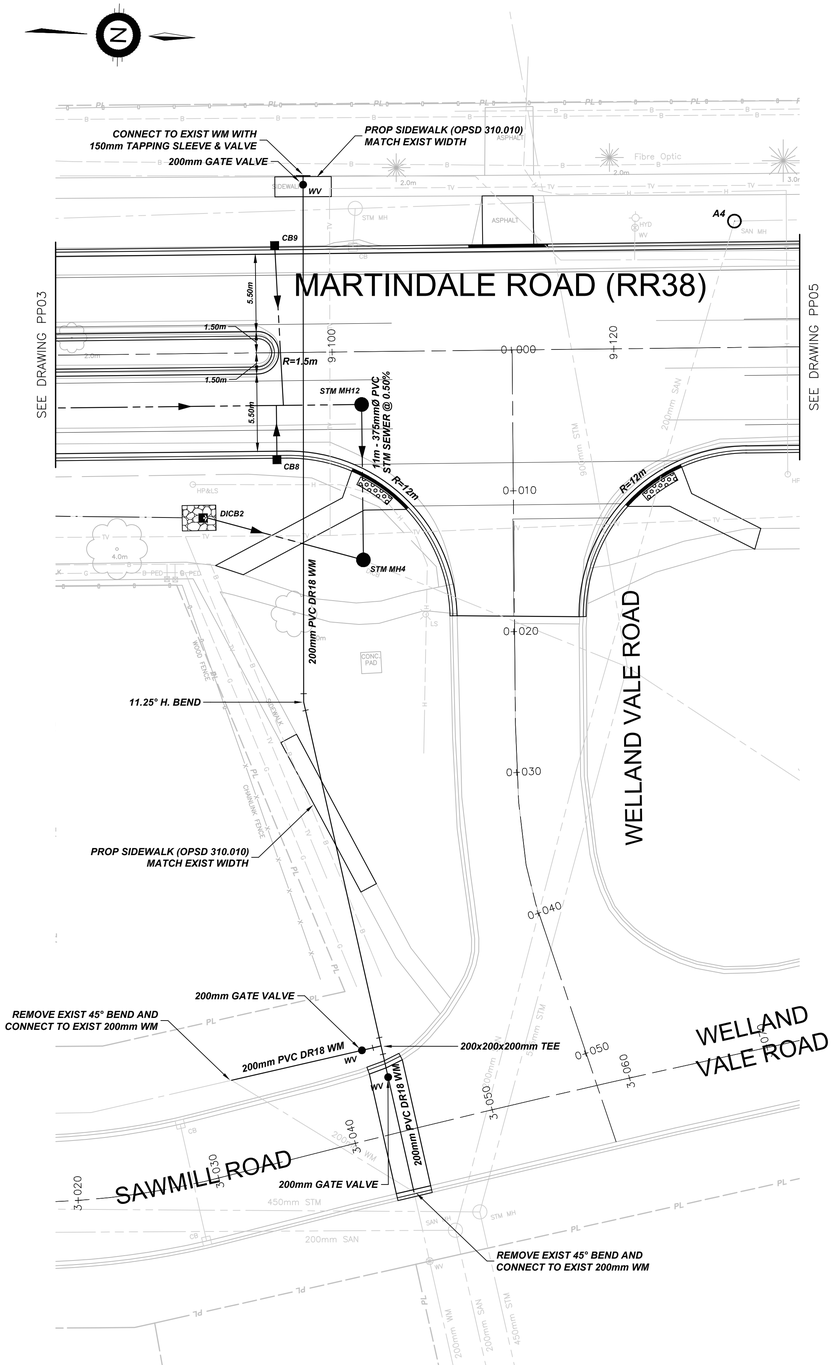
wood.

Niagara Region
PUBLIC WORKS

Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Ave to Barton St
City of St. Catharines
NEW CONSTRUCTION

CONSULTANT FILE No.	TP113112
DATE	2019-04-03
SCALE	1:200 m
REF. No.	RN19-57
DWG No.	PP10
REV.	0

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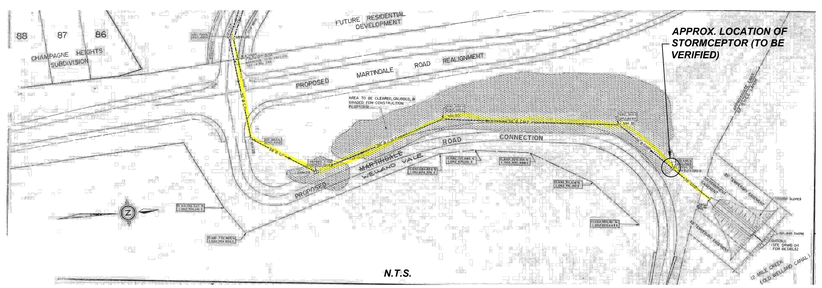


STORM SEWER DATA

MH #	STATION	OFFSET	STANDARD DRAWING	INVERTS		FRAME & COVER STD. DRAWING	TOP OF FRAME ELEV.	REMARKS
				INLETS	OUTLETS			
CB1	8+751	6.5m R	705.010		W101.09	400.081	102.02	
CBMH1	8+750.8	18.89m L	701.010	E100.83	S100.77	400.081	102.27	
CB2	8+908	5.8m R	705.010		W100.50	400.081	101.91	
CB3	8+908	16.3m L	705.010		E100.50	400.081	101.89	
MH1	8+908	2.0m R	701.010	E100.48 W100.41	N100.40	401.010	102.03	
MH2	8+960	3.1m R	701.010	S99.72 W98.71	N98.70	401.010	101.42	
DICB1	8+960	15.0m L	705.010		W98.90	400.081	99.95	
CB4	8+983	7.3m R	705.010		W98.77	400.081	100.00	
CB5	8+983	11.4m L	705.010		E98.69	400.081	99.92	
CB6	9+040	7.6m R	705.010		W98.70	400.081	100.21	
CB7	9+040	7.6m L	705.010		E98.70	400.081	100.21	
MH3	9+040	3.8m R	701.010	S97.66 E98.67 W98.59	N97.63	401.010	100.32	
CB8	9+096	7.6m R	705.010		W97.90	400.081	99.43	
CB9	9+096	7.6m L	705.010		E97.90	400.081	99.43	
DICB2	9+091	11.7m R	705.010		N97.86	400.081	98.79	
MH12	9+102	3.8m R	701.010	S96.82	E96.82	401.010	99.46	
MH4	9+102	14.8m R	701.010	S97.75 W96.71	EXIST	401.010	99.20	
CB10	9+157	7.6m R	705.010		W97.55	400.081	98.85	
CB11	9+157	7.6m L	705.010		E97.70	400.081	98.85	
MH5	9+157	3.8m R	701.010	E97.51 W97.59	N97.45	401.010	98.96	
MH6	9+225	3.5m R	701.010	S97.02 W97.04	SE97.02	401.010	98.52	
CB12	9+226	7.6m R	705.010		S97.10	400.081	98.61	
CB13	9+226	7.6m L	705.010		E97.10	400.081	98.41	
CB14	9+259	1.8m R	705.010		N96.80	400.081	98.30	
CB15	9+279	7.6m L	705.010		E96.60	400.081	97.97	
MH7	9+281	3.8m L	701.010	S96.57 W96.55	N96.54	401.010	98.07	
DCB1	9+343	7.6m L	705.010		E96.11	400.081(2)	97.61	
MH8	9+347	4.1m L	701.010	S96.09 W96.08	E96.06	401.010	97.73	
CB16	9+410	7.6m L	705.010		N96.80	400.081	98.37	
CB17	9+508	7.6m R	705.010		W97.50	400.081	99.01	
CB18	9+508	7.6m L	705.010		E97.50	400.081	99.01	
CB19	9+594	7.6m R	705.010		W97.00	400.081	98.44	
CB20	9+594	7.6m L	705.010		E96.90	400.081	98.44	
MH9	9+618	5.2m L	701.010		EXIST	401.010	98.37	
CB21	31+980	16.8m R	705.010		EXIST	400.010	95.25	
CB22	32+041	18.1m R	705.010		EXIST	400.010	96.06	
CB23	31+041	18.1m R	705.010		EXIST	400.010	96.06	
MH10	32+046	2.6m L	701.010	W93.72	E93.72	401.010	96.25	
MH11	32+082	2.6m L	701.010	W94.08	E94.08	401.010	96.69	
STC1	–	–	701.010	W94.08	E94.08	401.010	96.69	

ADJUSTMENTS

ADJ #	STATION	OFFSET	FRAME & COVER STD. DRAWING	TOP OF FRAME		REMARKS
				EXIST	PROP	
A1	8+679.6	13.61m L	EXIST	101.95	101.95	BREAK INTO STM MH
A25	8+736.2	19.63m L	EXIST	101.79	101.92	STM CB
A2	8+775.6	2.37m L	EXIST	102.61	102.74	MH
A3	8+858.2	18.47m L	EXIST	101.72	102.47	WVC
A4	9+128.7	8.97m L	EXIST	99.39	99.31	SAN MH
A5	9+202.9	9.69m L	EXIST	98.63	998.64	SAN MH
A6	9+282.3	8.40m L	EXIST	98.21	98.17	SAN MH
A8	9+357	6.4m L	EXIST	95.30	95.30	DIMH
A9	9+380	7.9m L	EXIST	97.80	98.15	SAN MH
A10	9+428	7.0m R	400.010	98.87	98.67	STM MH
A11	9+428	5.1m L	EXIST	98.68	98.71	STM MH
A12	9+430	0.1m L	EXIST	98.73	98.30	SAN MH
A13	9+465	0.8m R	EXIST	99.13	99.25	SAN MH
A14	9+498	9.7m L	EXIST	99.27	99.29	BELL MH
A15	9+518	5.5m L	EXIST	98.89	99.03	STM MH
A16	9+520	4.8m R	EXIST	98.94	99.00	SAN MH
A17	9+521	3.6m L	EXIST	98.92	99.03	SAN MH
A18	9+521	15.7m L	EXIST	99.19	99.19	SAN MH
A19	9+572	1.1m R	EXIST	98.66	98.75	SAN MH
A20	9+603	5.3m L	EXIST	98.35	97.46	STM MH
A21	9+603	15.5m L	EXIST	98.40	98.42	STM DCB
A22	9+606	3.0m R	EXIST	98.35	98.49	SAN MH
A23	9+611	15.0m L	EXIST	98.39	98.41	STM DCB
A24	9+618	3.4m R	EXIST	98.24	98.40	SAN MH
A26	32+040	1.2m L	EXIST	96.21	96.21	BREAK INTO STM CBMH
A27	32+088	1.2m L	EXIST	96.82	96.82	BREAK INTO STM CBMH



NO.	REVISION	DATE	INIT.
1	ISSUED FOR TENDER	2019-04-11	J.P.E.

NOTES/LEGEND

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DRAFTING J.P.E.
DESIGN W.F.
CHECKED BY F.W.
APPROVED BY L.D.S.

BENCHMARK

LICENSED PROFESSIONAL ENGINEER F. K. Y. WONG 100076535 2019/04/03 PROVINCE OF ONTARIO

wood.

Niagara Region PUBLIC WORKS

Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Ave to Barton St
City of St. Catharines
NEW CONSTRUCTION

CONSULTANT FILE No. TP113112
DATE 2019-04-03
SCALE
REF. No. RN19-57
DWG No. PP11
REV. 0

DRAWING FILE: P:\Work\TP\113112\Dwg\Dwg\Contract\Phase 2\TP113112-PP.dwg PLOTTED: Apr 11, 2019 - 8:56am PLOTTED BY: topher.zyenge

1	SOLID YELLOW,10cm
2	SOLID DOUBLE YELLOW,10cm
3	363 BROKEN YELLOW,10cm
4	SOLID YELLOW,20cm
5	SOLID WHITE,10cm
6	333 BROKEN WHITE,10cm
7	363 BROKEN WHITE,10cm
8	393 BROKEN WHITE,10cm
9	SOLID WHITE,20cm
10	111 BROKEN WHITE,10cm
11	333 BROKEN WHITE,20cm
12	333 BROKEN WHITE,30cm
13	SOLID WHITE,30cm
14	SOLID WHITE,45cm
15	SOLID WHITE,60cm
	SYMBOLS
	LIMITS OF MARKINGS

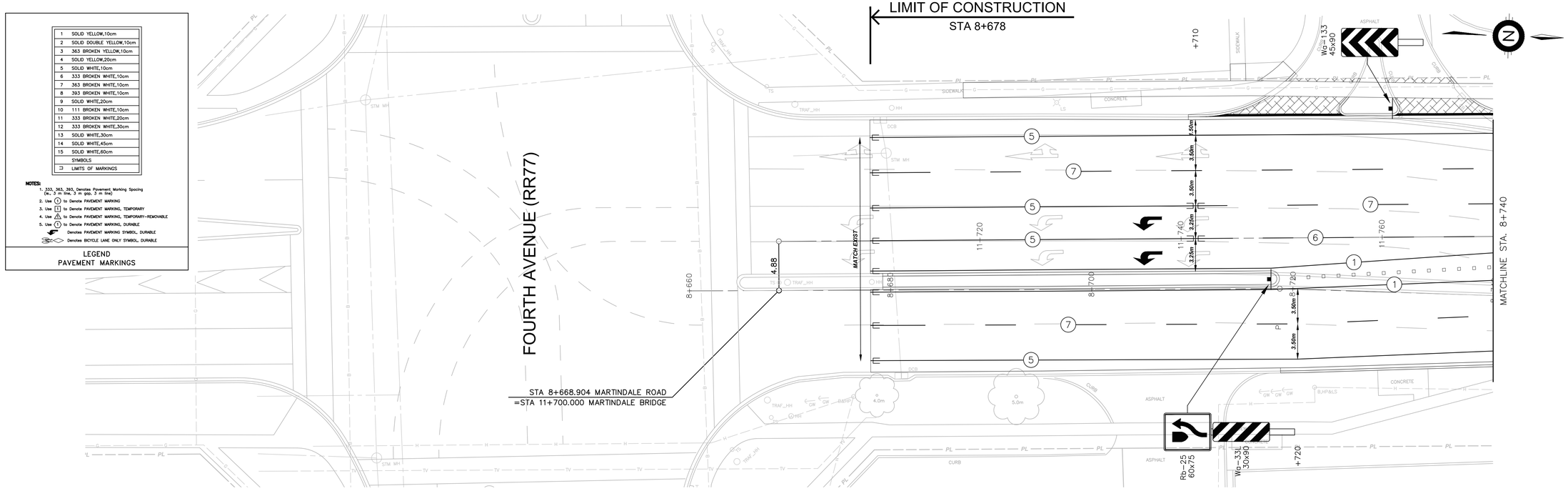
NOTES:

1. 333, 363, 393, Denotes Pavement Marking Spacing (ie., 3 m line, 3 m gap, 3 m line)
2. Use (1) to Denote PAVEMENT MARKING
3. Use [1] to Denote PAVEMENT MARKING, TEMPORARY
4. Use ⚠1 to Denote PAVEMENT MARKING, TEMPORARY-REMOVABLE
5. Use (1) to Denote PAVEMENT MARKING, DURABLE

Denotes PAVEMENT MARKING SYMBOL, DURABLE

Denotes BICYCLE LANE ONLY SYMBOL, DURABLE

LEGEND
PAVEMENT MARKINGS





NO.	REVISION	DATE	INIT.
1	ISSUED FOR TENDER	2019-04-11	J.P.E.

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DRAFTING	J.P.E.
DESIGN	W.F.
CHECKED BY	F.W.
APPROVED BY	L.D.S.

BENCHMARK

LICENSED PROFESSIONAL ENGINEER
F. K. Y. WONG
100076535
2019/04/03
PROVINCE OF ONTARIO

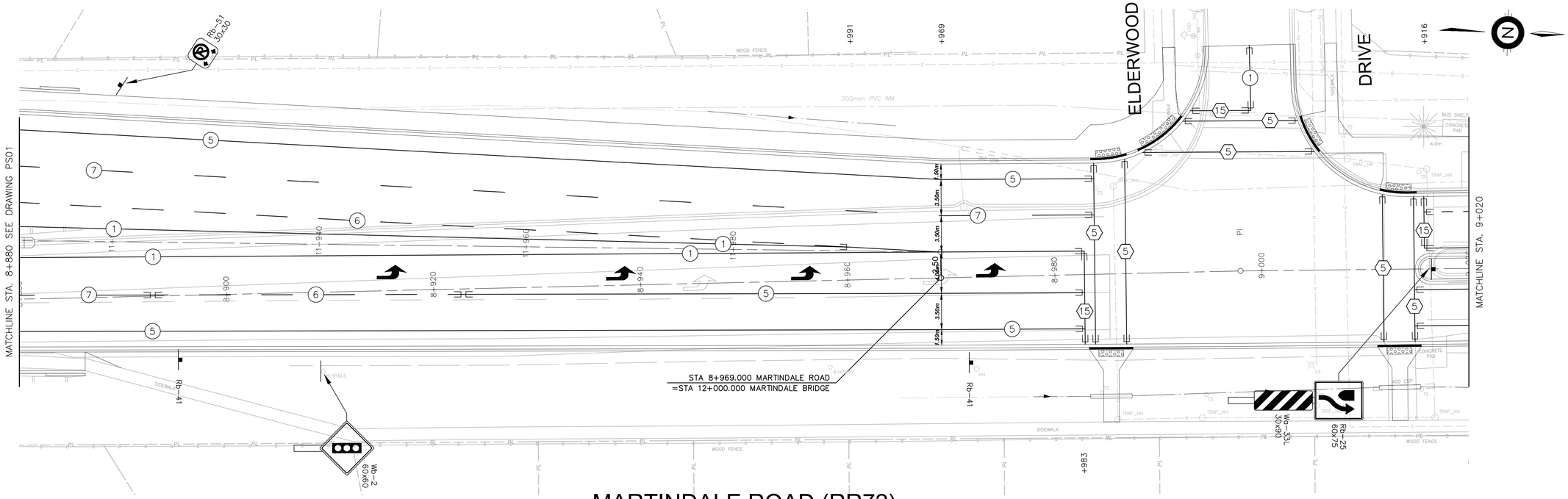
wood.

Niagara Region
PUBLIC WORKS

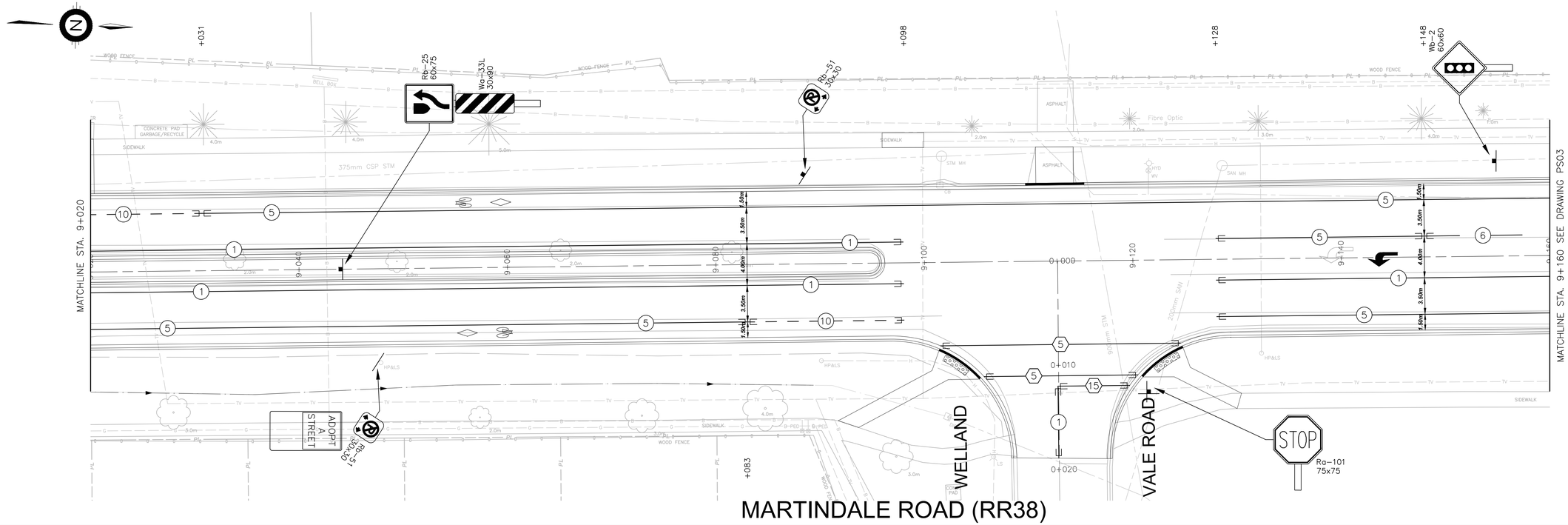
Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Ave to Barton St
City of St. Catharines
PAVEMENT MARKINGS & SIGNS

CONSULTANT FILE No.	TP113112
DATE	2019-04-03
SCALE	1:200 m
REF. No.	RN19-57
DWG No.	PS01
REV.	0

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MARTINDALE ROAD (RR72)



MARTINDALE ROAD (RR38)

NO.	REVISION	DATE	INIT.
1	ISSUED FOR TENDER	2019-04-11	J.P.E.

NOTES/LEGEND

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DRAFTING	J.P.E.
DESIGN	W.F.
CHECKED BY	F.W.
APPROVED BY	L.D.S.

BENCHMARK

LICENSED PROFESSIONAL ENGINEER
F. K. Y. WONG
100076535
2019/04/23
PROVINCE OF ONTARIO

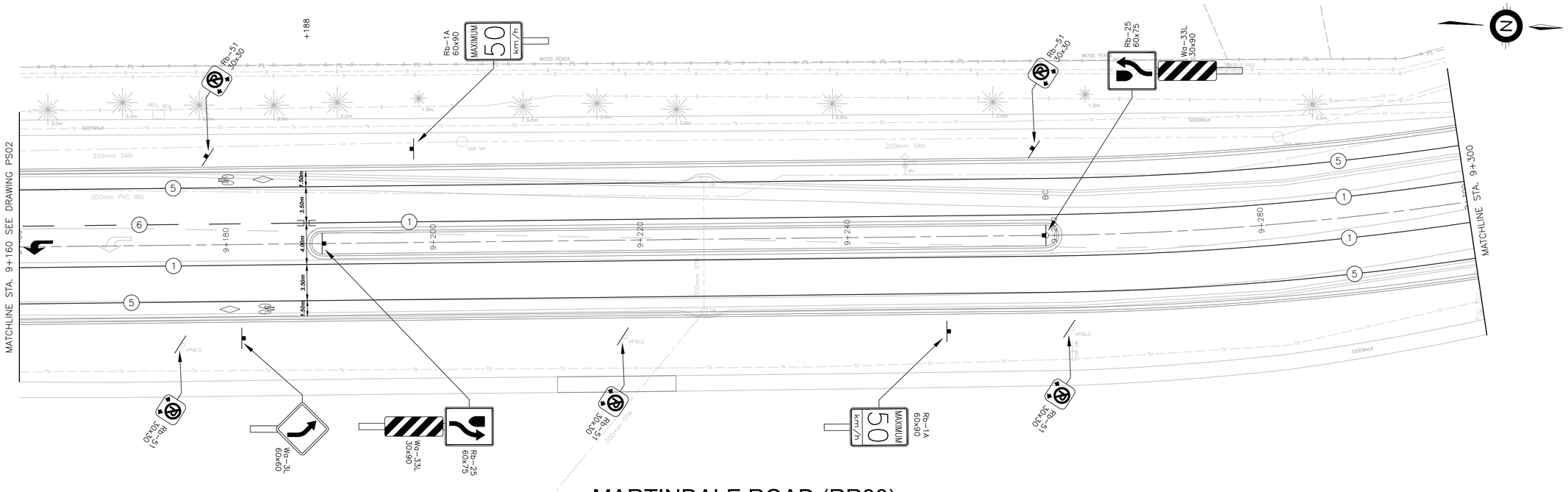
wood.

Niagara Region
PUBLIC WORKS

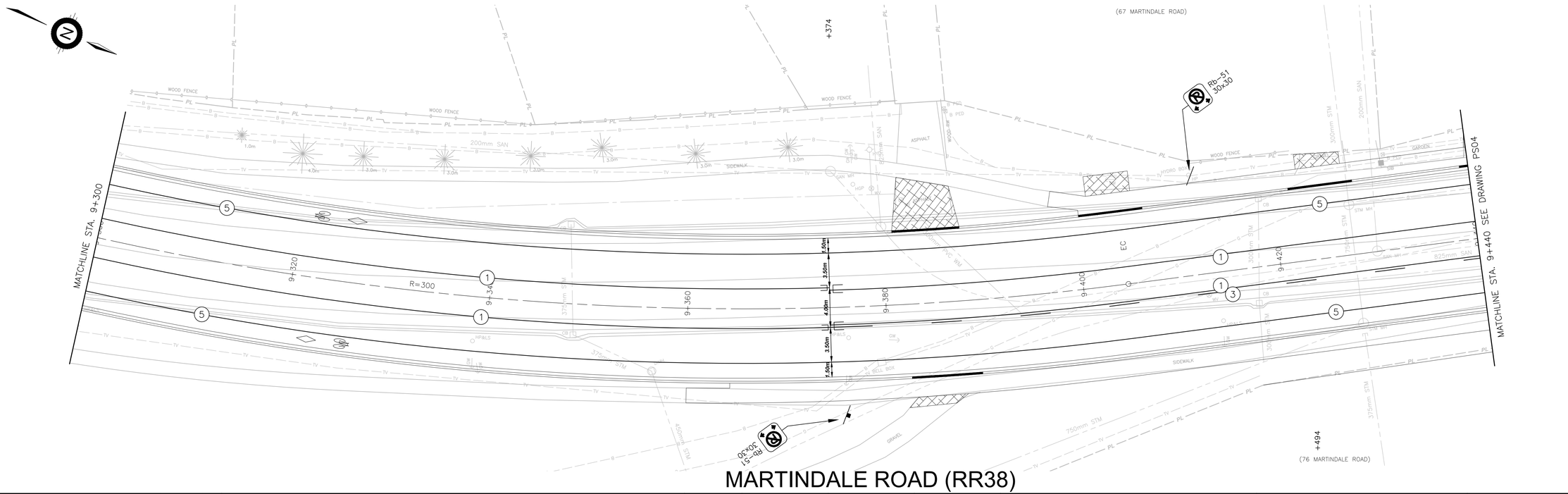
Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Ave to Barton St
City of St. Catharines
PAVEMENT MARKINGS & SIGNS

CONSULTANT FILE No.	TP113112
DATE	2019-04-03
SCALE	1:200 m
REF. No.	RN19-57
DWG No.	PS02
REV.	0

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MARTINDALE ROAD (RR38)



MARTINDALE ROAD (RR38)

NO.	REVISION	DATE	INIT.
1	ISSUED FOR TENDER	2019-04-11	J.P.E.

NOTES/LEGEND

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DRAFTING J.P.E.
DESIGN W.F.
CHECKED BY F.W.
APPROVED BY L.D.S.

BENCHMARK

LICENSED PROFESSIONAL ENGINEER
F. K. Y. WONG
100076535
2019/04/23
PROVINCE OF ONTARIO

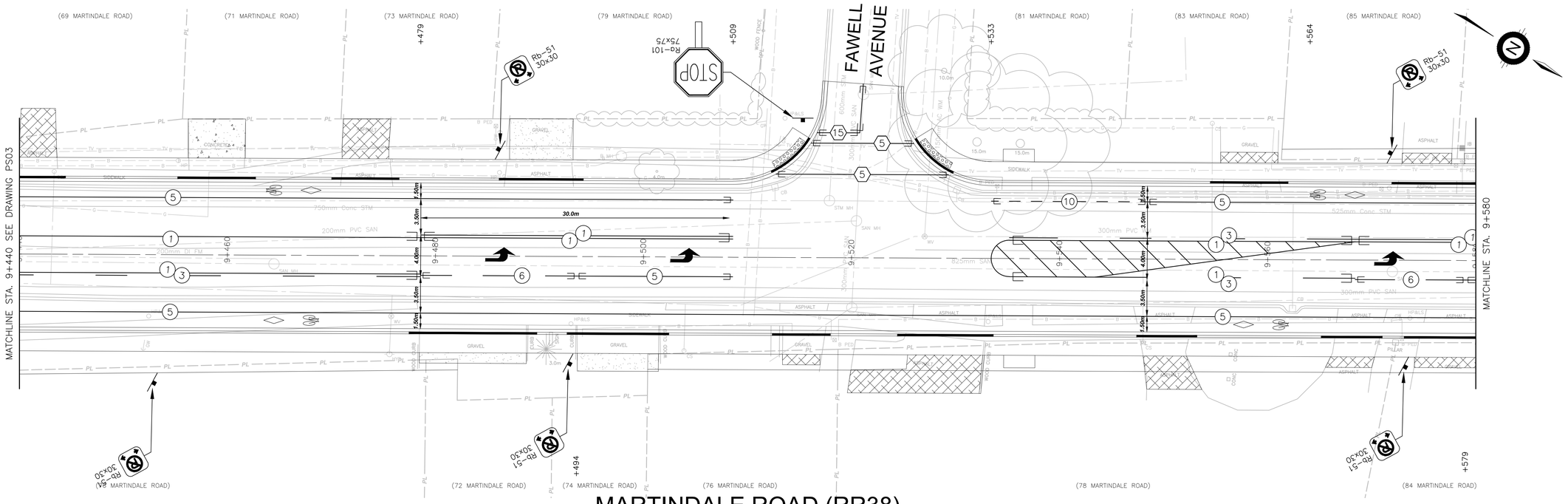
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Niagara Region
PUBLIC WORKS

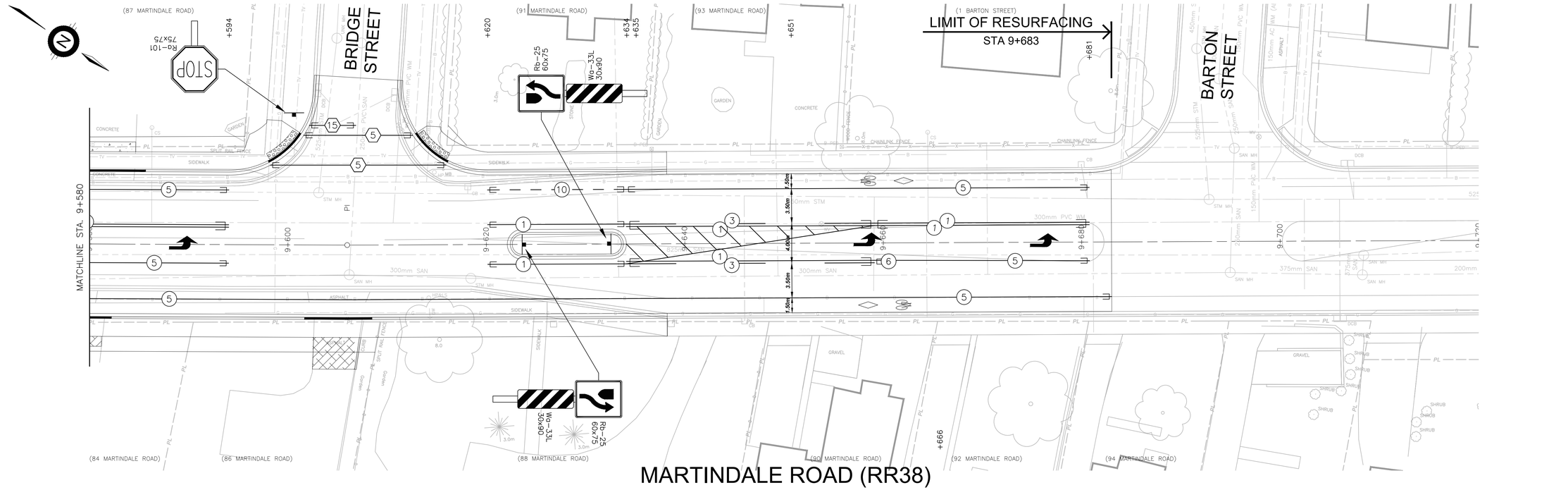
Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Ave to Barton St
City of St. Catharines
PAVEMENT MARKINGS & SIGNS

CONSULTANT FILE No. TP113112
DATE 2019-04-03
SCALE 1:200 m
REF. No. RN19-57
DWG No. PS03
REV. 0

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MARTINDALE ROAD (RR38)



MARTINDALE ROAD (RR38)

NO.	REVISION	DATE	INIT.
1	ISSUED FOR TENDER	2019-04-11	J.P.E.

NOTES/LEGEND

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DESIGN	W.F.
CHECKED BY	F.W.
APPROVED BY	L.D.S.

BENCHMARK

LICENSED PROFESSIONAL ENGINEER F. K. Y. WONG 100076535 2019/04/23 PROVINCE OF ONTARIO

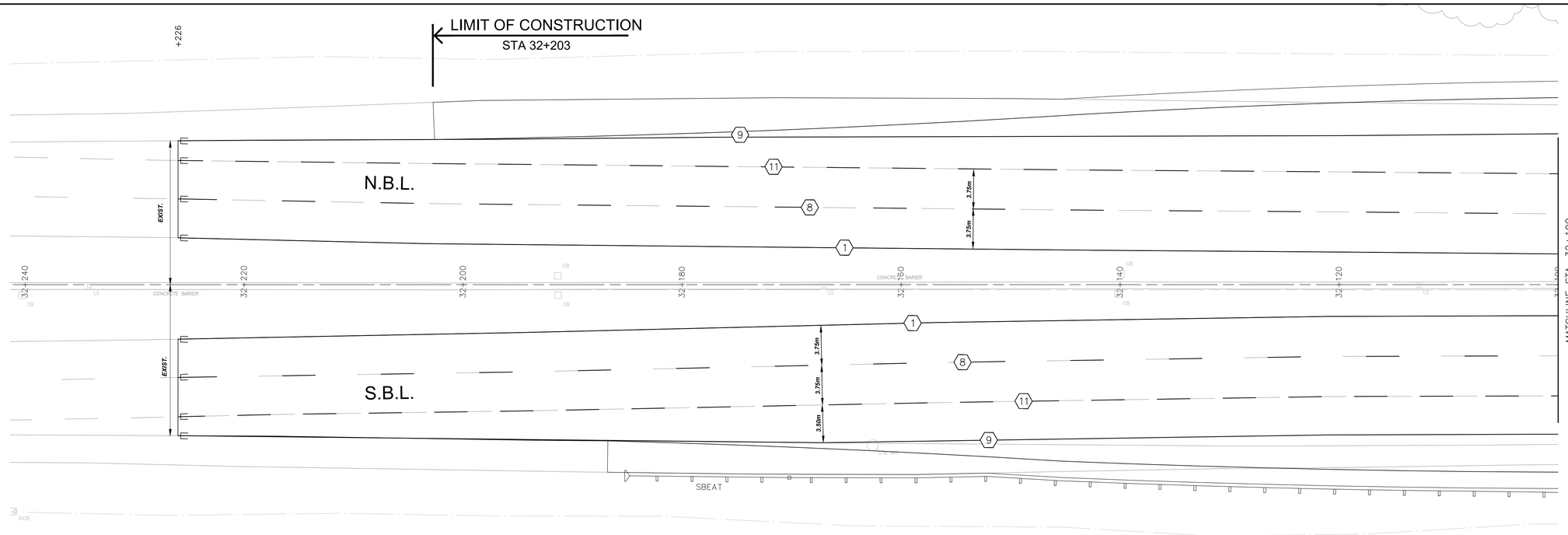
wood.

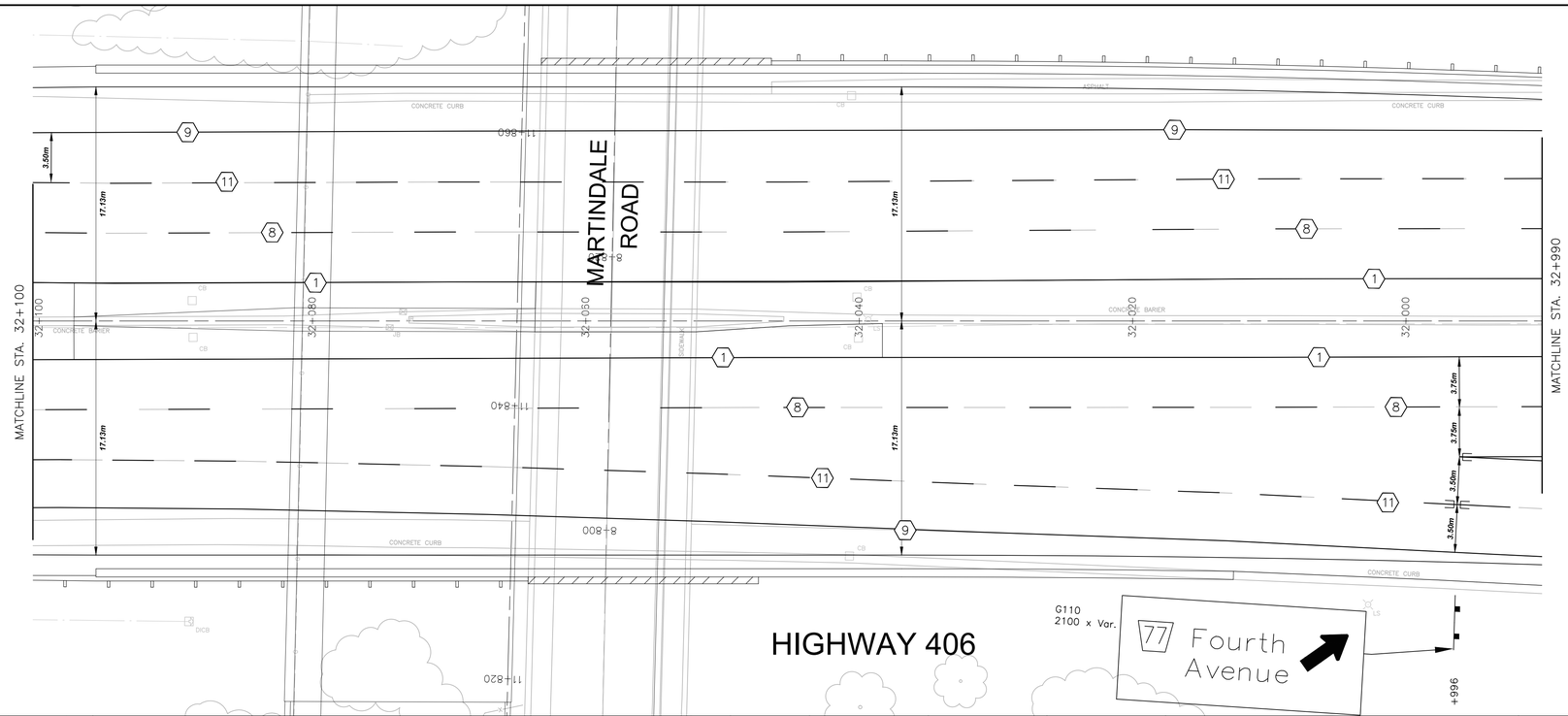
Niagara Region PUBLIC WORKS

Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Ave to Barton St
City of St. Catharines
PAVEMENT MARKINGS & SIGNS

CONSULTANT FILE No.	TP113112
DATE	2019-04-03
SCALE	1:200 m
REF. No.	RN19-57
DWG No.	PS04
REV.	0

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NO.	REVISION	DATE	INIT.
1	ISSUED FOR TENDER	2019-04-11	J.P.E.

NOTES/LEGEND

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APPROVED BY	L.D.S.

BENCHMARK

LICENSED PROFESSIONAL ENGINEER
F. K. Y. WONG
100076535
2019/04/23
PROVINCE OF ONTARIO

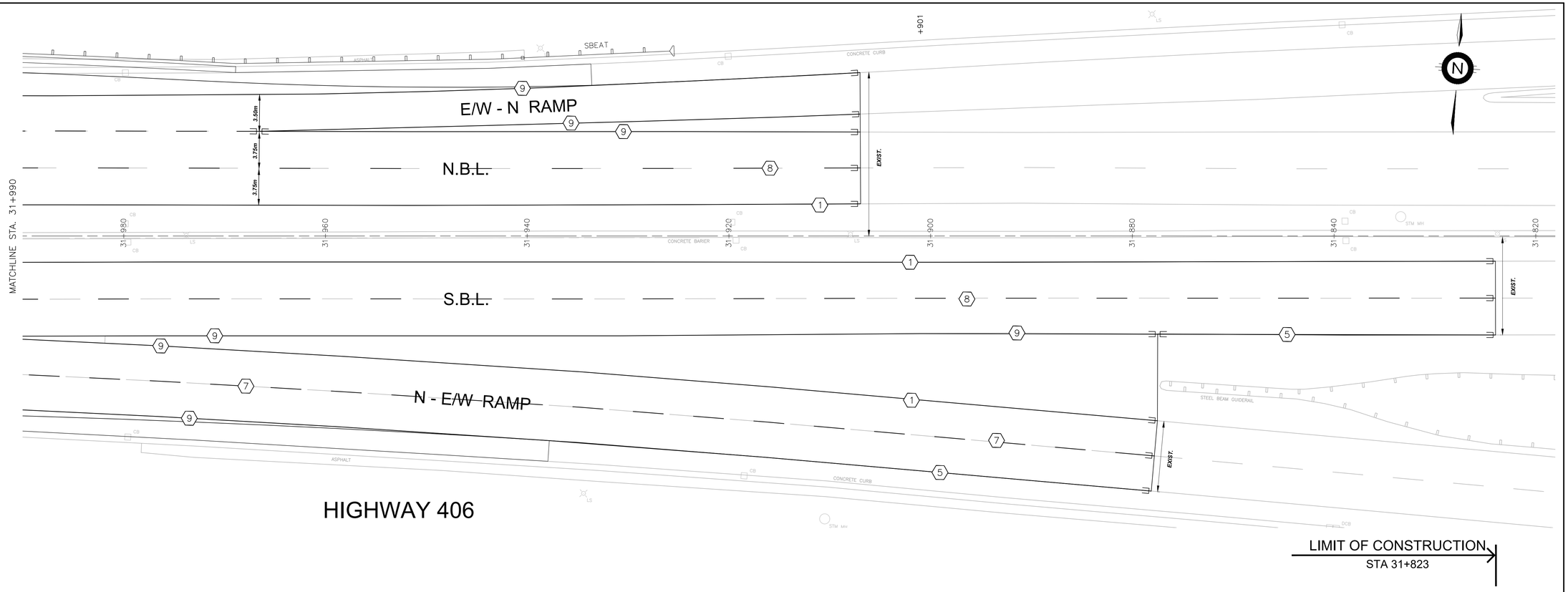
wood.

Niagara Region
PUBLIC WORKS

Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Ave to Barton St
City of St. Catharines
PAVEMENT MARKINGS & SIGNS

CONSULTANT FILE No.	TP113112
DATE	2019-04-03
SCALE	1:200 m
REF. No.	RN19-57
DWG No.	PS05
REV.	0

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no.	REVISION	DATE	INIT.
1	ISSUED FOR TENDER	2019-04-11	J.P.E.

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DRAFTING	J.P.E.
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CHECKED BY	F.W.
APPROVED BY	L.D.S.

BENCHMARK

LICENSED PROFESSIONAL ENGINEER
F.K.Y. WONG
100076535
2019/04/03
PROVINCE OF ONTARIO

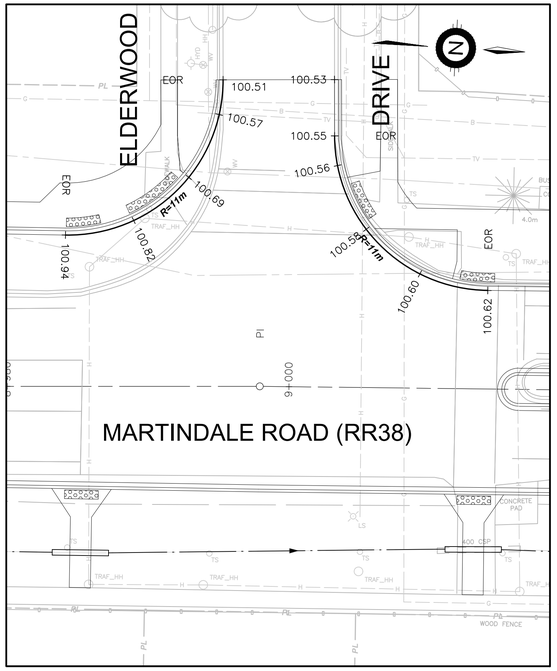
wood.

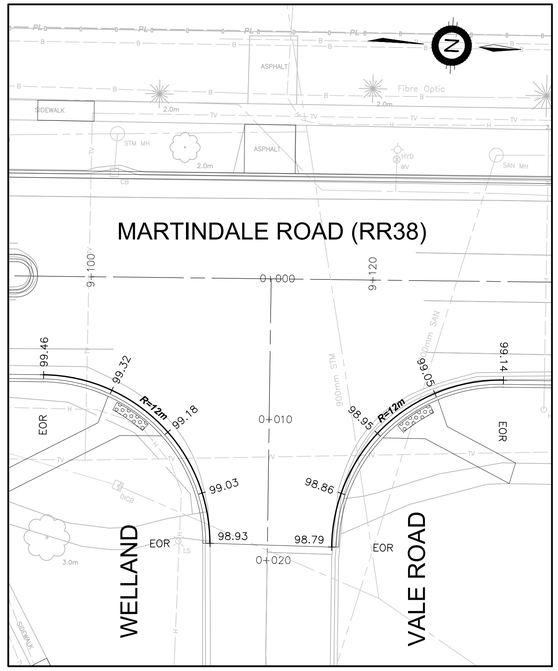
Niagara Region
PUBLIC WORKS

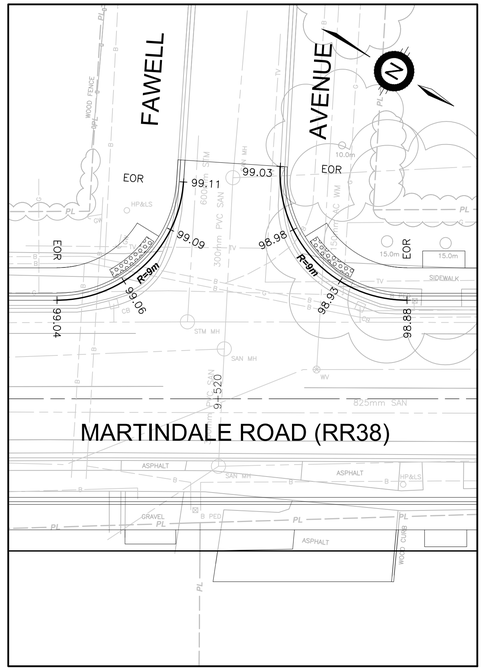
Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Ave to Barton St
City of St. Catharines
PAVEMENT MARKINGS & SIGNS

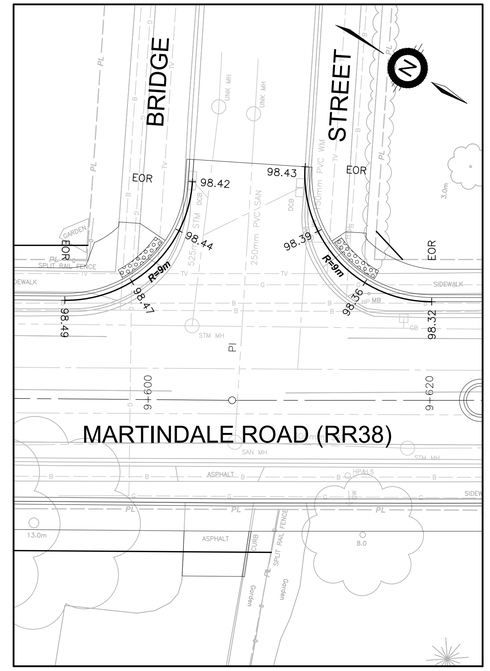
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DATE	2019-04-03
SCALE	1:200 m
REF. No.	RN19-57
DWG No.	PS06
REV.	0

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no.	REVISION	DATE	INIT.
1	ISSUED FOR TENDER	2019-04-11	J.P.E.

NOTES/LEGEND

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DRAFTING	J.P.E.
DESIGN	W.F.
CHECKED BY	F.W.
APPROVED BY	L.D.S.

BENCHMARK

LICENSED PROFESSIONAL ENGINEER
F.K.Y. WONG
100076535
2019/04/23
PROVINCE OF ONTARIO

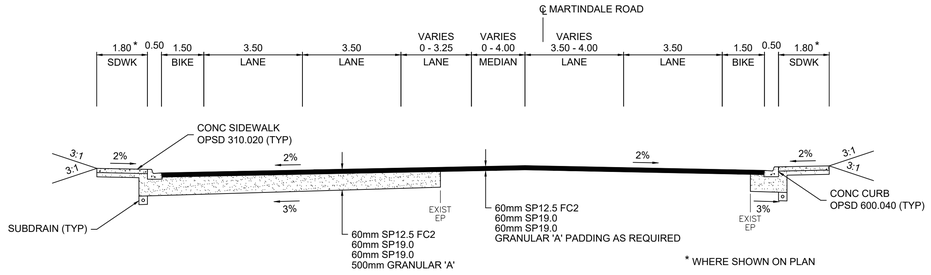
wood.

Niagara Region
PUBLIC WORKS

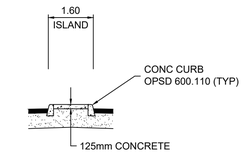
Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Ave to Barton St
City of St. Catharines
SPLINE ELEVATIONS

CONSULTANT FILE No.	TP113112
DATE	2019-04-03
SCALE	1:200 m
REF. No.	RN19-57
DWG No.	SP01
REV.	0

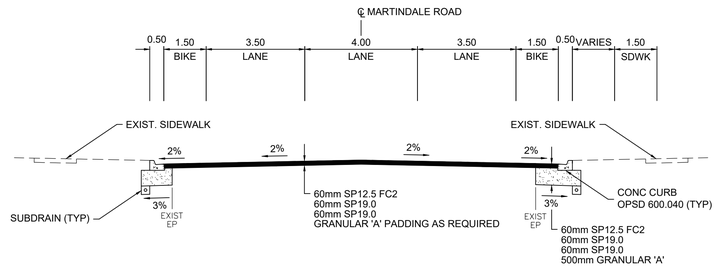
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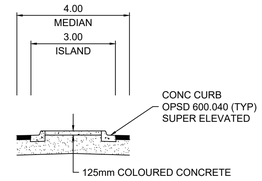
MARTINDALE ROAD
STA. 8+725 TO STA. 8+783
STA. 8+847 TO STA. 9+000



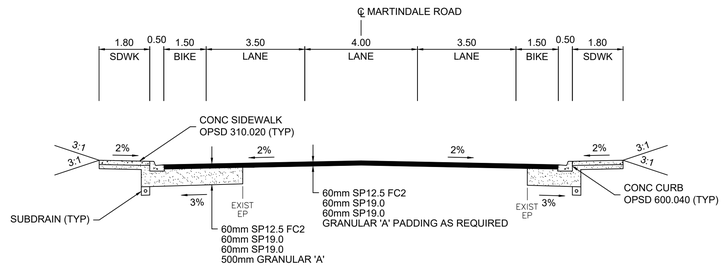
ISLAND DETAIL
STA. 8+679 TO STA. 8+719



MARTINDALE ROAD
STA. 9+000 TO STA. 9+360



ISLAND DETAIL
STA. 9+015 TO STA. 9+096 STA. 9+188 TO STA. 9+261
STA. 9+622 TO STA. 9+634



MARTINDALE ROAD
STA. 9+360 TO STA. 9+638

PAVEMENT AND GRANULAR SUMMARY

	SURFACE		BINDER		GRANULAR 'A'	PAVEMENT REMOVAL
	HL3F	SP12.5 FC2	SP19.0	SP19.0		
STA 8+678 TO STA 8+725		60	60			60mm PARTIAL DEPTH
STA 8+725 TO STA 9+638		60	60	60	500*	FULL DEPTH ASPHALT
STA 9+638 TO STA 9+683		60				60mm PARTIAL DEPTH
EXIST BRIDGE – STA 8+783 TO STA 8+848		40 + 40	10 WATERPROOFING			
PROP BRIDGE – STA 11+813 TO STA 11+880		40 + 40	10 WATERPROOFING			
SIDEWALK		CONCRETE AS PER OPSS			150	
ISLANDS		125mm CONCRETE			100 MIN	
ENTRANCES – CONCRETE		150mm CONCRETE			75	
HWY 406 RESURFACING		40				40mm PARTIAL DEPTH

*WIDENING ONLY

NO.	REVISION	DATE	INIT.
1	ISSUED FOR TENDER	2019-04-11	J.P.E.

GRANULAR DRIVEWAYS AND PARKING:
RESIDENTIAL - 300mm
COMMERCIAL - 400mm
INDUSTRIAL - 450mm

ASPHALT DRIVEWAYS AND PARKING:
RESIDENTIAL - 50 HL-3F, 200mm GRANULAR 'A'
COMMERCIAL - 40 HL-3F, 50 HL-8 HS, 300mm GRANULAR 'A'
INDUSTRIAL - 40 HL-3F, 50 HL-8 HS, 375mm GRANULAR 'A'

DRAFTING J.P.E.
DESIGN W.F.
CHECKED BY F.W.
APPROVED BY L.D.S.

BENCHMARK

LICENSED PROFESSIONAL ENGINEER F. K. Y. WONG 100076535 2019/04/03 PROVINCE OF ONTARIO

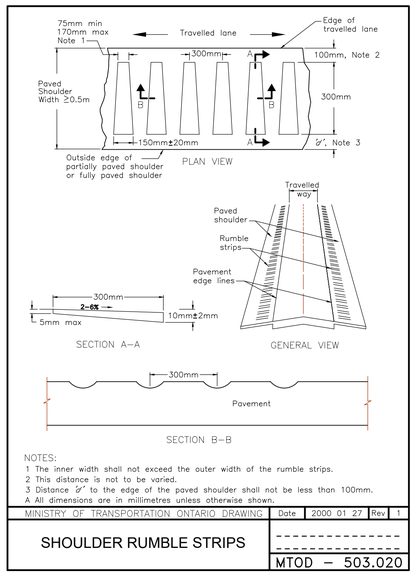
wood.

Niagara Region PUBLIC WORKS

Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Ave to Barton St
City of St. Catharines
Typical Sections

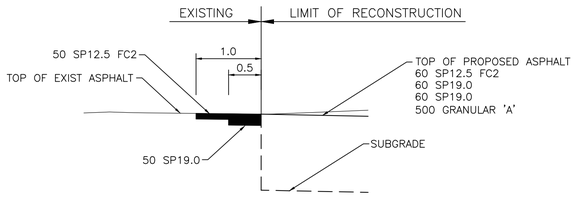
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DATE 2019-04-03
SCALE 1:100 m
REF. No. RN19-57
DWG No. TS01
REV. 0

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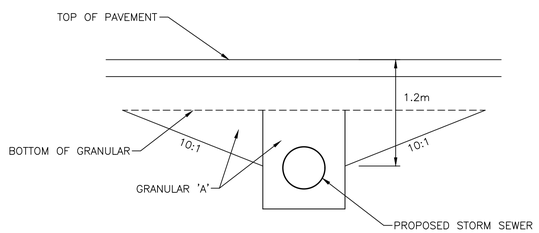


NOTES:
1 The inner width shall not exceed the outer width of the rumble strips.
2 This distance is not to be varied.
3 Distance 'd' to the edge of the paved shoulder shall not be less than 100mm.
A All dimensions are in millimetres unless otherwise shown.

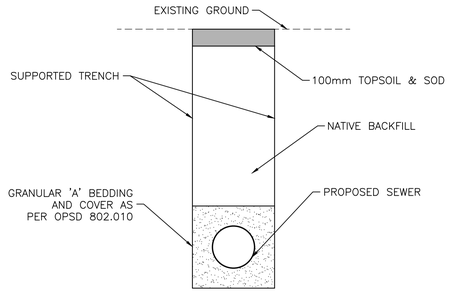
MINISTRY OF TRANSPORTATION ONTARIO DRAWING	Date	2000 01 27	Rev.	1
SHOULDER RUMBLE STRIPS	MTOD – 503.020			



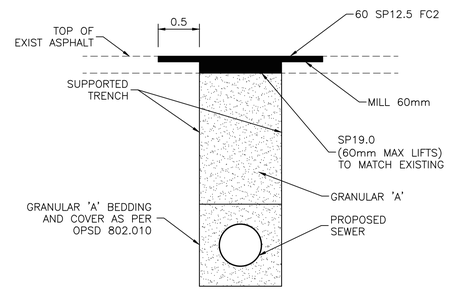
PAVEMENT TRANSITION DETAIL
N.T.S.



STORM SEWER FROST TAPER
WHERE DEPTH OF COVER <1.2m
N.T.S.



TRENCH RESTORATION DETAIL
BOULEVARD
N.T.S.



TRENCH RESTORATION DETAIL
ROAD
N.T.S.

NO.	REVISION	DATE	INIT.
1	ISSUED FOR TENDER	2019–04–11	J.P.E.

DRAFTING	J.P.E.
DESIGN	W.F.
CHECKED BY	F.W.
APPROVED BY	L.D.S.

BENCHMARK

LICENSED PROFESSIONAL ENGINEER
F. K. Y. WONG
100076535
2019/04/23
PROVINCE OF ONTARIO

wood.

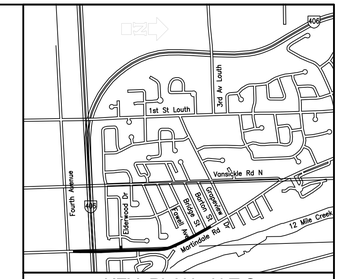
Niagara Region
PUBLIC WORKS

Contract # 2019-T-157 (RN19-57)
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Ave to Barton St
City of St. Catharines
Typical Sections

CONSULTANT FILE No.	TP113112
DATE	2019–04–03
SCALE	AS SHOWN
REF. No.	RN19-57
DWG No.	TD01
REV.	0

DRAWING FILE: P:\Work\TP113112\Hwy\Dwg\Contract\Phase 2\TP113112-TS.dwg PLOTTED: Apr 11, 2019 – 10:44am PLOTTED BY: tsykes.ziyange

POLE ASSEMBLIES								
POLE No.	POLE DESCRIPTION	STATION	O/S FROM C/L	POLE BASE	LUMINAIRE MAST ARM	LUMINAIRE	STANDARDS	COMMENTS
P1	10.5m DIRECT BURIED SECTIONAL STEEL POLE	8+737.632	21.270	N/A	3.0m	160W LED	OPSS 615, OPSS 617	INSTALL GROUND ROD
P2	10.5m DIRECT BURIED SECTIONAL STEEL POLE	8+768.019	22.385	N/A	3.0m	160W LED	OPSS 615, OPSS 617	INSTALL GROUND ROD
P3	9.8m ALUMINUM POLE	8+815.056	23.023	ON BRIDGE STRUCTURE	3.0m	160W LED	OPSS 615, OPSS 617	
P4	9.8m ALUMINUM POLE	8+815.091	6.541	ON BRIDGE STRUCTURE	3.0m	160W LED	OPSS 615, OPSS 617	
P5	10.5m DIRECT BURIED SECTIONAL STEEL POLE	8+858.150	22.561	N/A	3.0m	160W LED	OPSS 615, OPSS 617	INSTALL GROUND ROD
P6	10.5m DIRECT BURIED SECTIONAL STEEL POLE	8+912.500	18.610	N/A	3.0m	160W LED	OPSS 615, OPSS 617	INSTALL GROUND ROD
P7	7.3m DIRECT BURIED SECTIONAL STEEL POLE	8+917.838	18.356	N/A	-	-	NRS 2130, 2440, 2441 OPSS 614, 615	POWER SUPPLY POLE INSTALL 2 GROUND RODS
P8	10.5m DIRECT BURIED SECTIONAL STEEL POLE	8+954.346	14.754	N/A	3.0m	160W LED	OPSS 615, OPSS 617	INSTALL GROUND ROD
P9	10.5m DIRECT BURIED SECTIONAL STEEL POLE	9+051.829	℄ MEDIAN	N/A	2 X 3.0m	2 X 160W LED	OPSS 615, OPSS 617	INSTALL GROUND ROD
P10	10.5m DIRECT BURIED SECTIONAL STEEL POLE	9+092.559	℄ MEDIAN	N/A	2 X 3.0m	2 X 160W LED	OPSS 615, OPSS 617	INSTALL GROUND ROD
P11	10.5m DIRECT BURIED SECTIONAL STEEL POLE	9+131.895	9.257	N/A	3.0m	160W LED	OPSS 615, OPSS 617	INSTALL GROUND ROD
P12	10.5m DIRECT BURIED SECTIONAL STEEL POLE	9+154.036	9.073	N/A	3.0m	160W LED	OPSS 615, OPSS 617	INSTALL GROUND ROD
P13	10.5m DIRECT BURIED SECTIONAL STEEL POLE	9+219.206	℄ MEDIAN	N/A	2 X 3.0m	2 X 160W LED	OPSS 615, OPSS 617	INSTALL GROUND ROD
P14	10.5m DIRECT BURIED SECTIONAL STEEL POLE	9+256.838	℄ MEDIAN	N/A	2 X 3.0m	2 X 160W LED	OPSS 615, OPSS 617	INSTALL GROUND ROD
P15	10.5m DIRECT BURIED SECTIONAL STEEL POLE	9+300.315	10.337	N/A	3.0m	160W LED	OPSS 615, OPSS 617	INSTALL GROUND ROD
P16	10.5m DIRECT BURIED SECTIONAL STEEL POLE	9+338.866	9.273	N/A	3.0m	160W LED	OPSS 615, OPSS 617	INSTALL GROUND ROD
P17	7.3m DIRECT BURIED SECTIONAL STEEL POLE	8+773.839	8.619	N/A	-	-	-	MTO POWER SUPPLY POLE INSTALL 2 GROUND RODS
EP1	EXISTING POLE	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING		
EP2	EXISTING POLE	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING		
EP3	EXISTING POLE	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING		
HP1	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	EXISTING	160W LED	OPSS 617	
HP2	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	EXISTING	160W LED	OPSS 617	
HP3	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	EXISTING	160W LED	OPSS 617	
HP4	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	EXISTING	160W LED	OPSS 617	
HP5	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	EXISTING	160W LED	OPSS 617	
HP6	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	EXISTING	160W LED	OPSS 617	
HP7	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	N/A	N/A		
HP8	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	N/A	N/A		
HP9	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	EXISTING	160W LED	OPSS 617	
HP10	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	EXISTING	160W LED	OPSS 617	
HP11	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	N/A	N/A		
HP12	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	N/A	N/A		
HP13	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	EXISTING	160W LED	OPSS 617	
HP14	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	EXISTING	160W LED	OPSS 617	
HP15	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	EXISTING	160W LED	OPSS 617	
HP16	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	3.0m	160W LED	OPSS 617	
HP17	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	EXISTING	160W LED	OPSS 617	
HP18	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	3.0m	160W LED	OPSS 617	
HP19	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	EXISTING	160W LED	OPSS 617	
HP20	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	3.0m	160W LED	OPSS 617	
HP21	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	EXISTING	160W LED	OPSS 617	
HP22	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	3.0m	160W LED	OPSS 617	
HP23	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	EXISTING	160W LED	OPSS 617	
HP24	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	EXISTING	160W LED	OPSS 617	
HP25	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	3.0m	160W LED	OPSS 617	
HP26	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	EXISTING	160W LED	OPSS 617	
HP27	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	3.0m	160W LED	OPSS 617	
HP28	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	EXISTING	EXISTING	OPSS 617	
HP29	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	EXISTING	EXISTING	OPSS 617	
HP30	EXISTING HYDRO POLE	EXISTING	EXISTING	N/A	EXISTING	EXISTING	OPSS 617	



KEY PLAN - N.T.S.

JUNCTION BOX ASSEMBLIES				
JB No.	STATION	O/S FROM C/L	STANDARDS	COMMENTS
JB1	8+740.469	19.066	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
JB2	8+766.029	22.309	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
JB3	8+777.931	23.894	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
JB4	8+817.087	22.988	OPSS 601, 602, 603, 604	6" X 6" ON BRIDGE STRUCTURE
JB5	8+817.005	6.076	OPSS 601, 602, 603, 604	6" X 6" ON BRIDGE STRUCTURE
JB6	8+854.241	22.902	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
JB7	8+852.922	7.396	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
JB8	8+889.356	20.288	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
JB9	8+888.746	8.665	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
JB10	8+914.293	18.498	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
JB11	8+916.388	7.267	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
JB12	8+952.355	14.944	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
JB13	8+986.77	13.894	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
JB14	9+012.87	13.445	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
JB15	9+053.829	9.305	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
JB16	9+053.829	℄ MEDIAN	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
JB17	9+090.559	9.305	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
JB18	9+090.559	℄ MEDIAN	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
JB19	9+129.911	9.271	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
JB20	9+172.143	9.176	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
JB21	9.221.206	8.893	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
JB22	9.221.206	℄ MEDIAN	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
JB23	9+254.838	8.893	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
JB24	9+254.838	℄ MEDIAN	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
JB25	9+298.265	10.309	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
JB26	9+337.237	9.237	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
FJB1	8+778.135	22.990	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
FJB2	8+851.817	23.021	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
FJB3	8+986.804	14.869	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
FJB4	9+012.854	14.439	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
FJB5	9+275.519	9.454	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
FJB6	9+596.666	10.610	OPSS 601, 602, 603, 604	HUBBELL QUAZITE
FJB7	9+616.612	10.706	OPSS 601, 602, 603, 604	HUBBELL QUAZITE

U TECH ENGINEERS INC.
60 LEGENDARY CIRCLE
BRAMPTON, ON L6Y 0S1
TEL: 905-497-8414
WEB: www.utecheng.ca

No.	REVISION	DATE	INIT.
2	ISSUED FOR TENDER	2019/04/11	U.P.
1	90% SUBMISSION	2018/11/30	U.P.

NOTES:
1. THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWER AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.
2. PROPERTY LINES WERE PLOTTED USING REGISTERED PLANS AND BARS LOCATED IN THE FIELD. TO VERIFY THE ACCURACY OF THESE PROPERTY LINES, A LEGAL SURVEY SHOULD BE PERFORMED PRIOR TO CONSTRUCTION.

DRAFTING S.S.
DESIGN U.P.
CHECKED BY J.J.
APPROVED BY U.P.

LICENSED PROFESSIONAL ENGINEER
U. PADMANATH
100120747
APR. 11 / 2019
PROVINCE OF ONTARIO

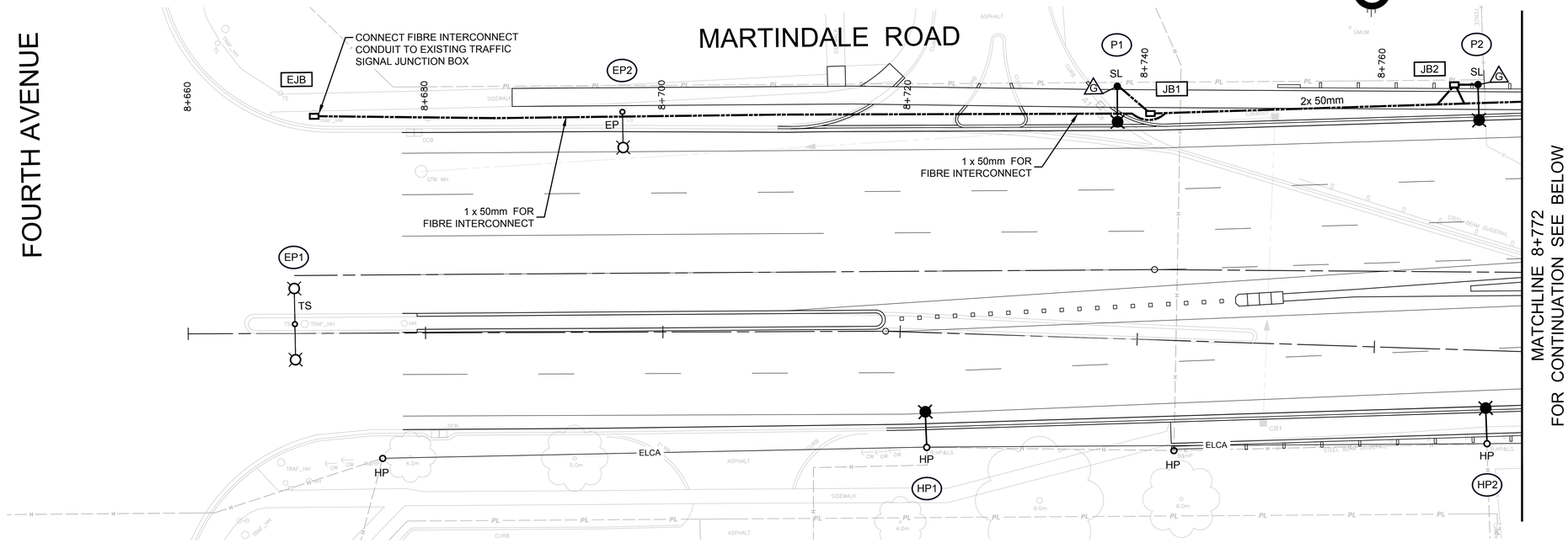
U TECH ENGINEERS INC.

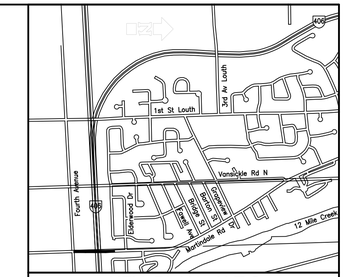
wood.

Niagara Region PUBLIC WORKS

Contract # 2019-T-157
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Avenue to Barton Street
City of St. Catharines
ELECTRICAL CHARTS

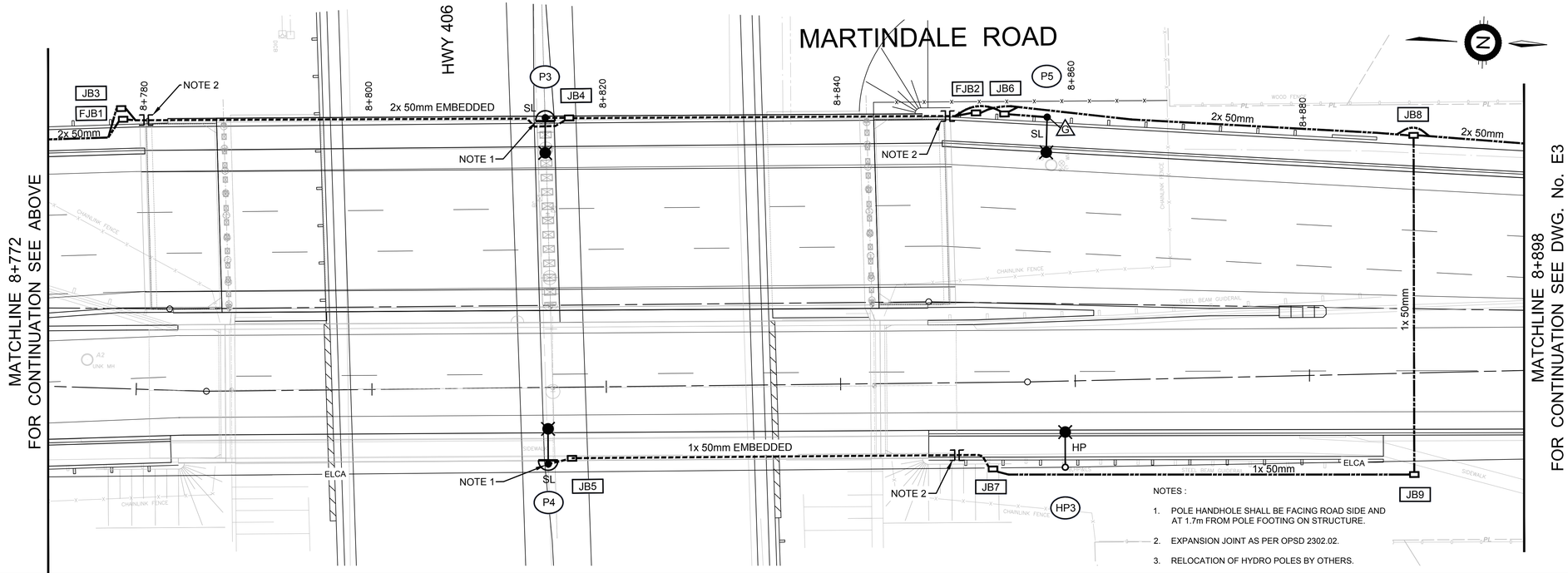
CONSULTANT FILE No. TP113112
DATE 2019-04-11
SCALE NTS
REF. No. RN19-57
DWG No. E1
REV. 0





LEGEND

- SL — PROPOSED 10.5m (35 ft.) DIRECT BURIED SECTIONAL STEEL STREET LIGHT POLE C/W 3.0m BRACKET & 160W LED LUMINAIRE
- HP — EXISTING HYDRO POLE C/W 3.0m BRACKET & 160W LED LUMINAIRE
- TS — TRAFFIC SIGNAL POLE WITH LUMINAIRE
- SL — PROPOSED 9.8m BASE MOUNTED ALUMINUM STREET LIGHT POLE MOUNTED ON BRIDGE STRUCTURE C/W 3.0m BRACKET & 160W LED LUMINAIRE
- JUNCTION BOX (13" x 24" x 18") SUPPLIED BY REGION
- PROPOSED METERED POWER SUPPLY AS PER NRS 2130 AND NRS 2440
- # X 50mm — 50mm PVC CONDUIT
- # X 100mm — 100mm PVC CONDUIT
- 50mm PVC EMBEDDED CONDUIT
- EXISTING 50mm PVC CONDUIT
- LCA — PROPOSED LIGHTING CONDUCTOR AERIAL
- ELCA — EXISTING LIGHTING CONDUCTOR AERIAL
- EXISTING LUMINAIRE TO BE REMOVED
- EP — EXISTING LUMINAIRE TO REMAIN
- Px — PROPOSED POLE IDENTIFICATION CODE
- EPx — EXISTING POLE IDENTIFICATION CODE
- HPx — HYDRO POLE IDENTIFICATION CODE
- JBx — JUNCTION BOX IDENTIFICATION CODE FOR STREET LIGHTS
- G — GROUND ROD (3m LONG x 20mm Ø COPPER) / GROUND PLATE (10" x 16" COPPER)
- FJBx — JUNCTION BOX IDENTIFICATION CODE FOR FIBRE INTERCONNECT
- EFJBx — EXISTING JUNCTION BOX IDENTIFICATION CODE FOR FIBRE INTERCONNECT



NOTES :

1. POLE HANDHOLE SHALL BE FACING ROAD SIDE AND AT 1.7m FROM POLE FOOTING ON STRUCTURE.
2. EXPANSION JOINT AS PER OPSD 2302.02.
3. RELOCATION OF HYDRO POLES BY OTHERS.

U TECH ENGINEERS INC.
60 LEGENDARY CIRCLE
BRAMPTON, ON L6Y 0S1
TEL: 905-497-8414
WEB: www.utecheng.ca

No.	REVISION	DATE	INIT.
3	ISSUED FOR TENDER	2019/04/11	U.P.
2	90% SUBMISSION	2018/11/30	U.P.
1	60% SUBMISSION	2018/09/24	U.P.

NOTES:

A. THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWER AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

B. PROPERTY LINES WERE PLOTTED USING REGISTERED PLANS AND BARS LOCATED IN THE FIELD. TO VERIFY THE ACCURACY OF THESE PROPERTY LINES, A LEGAL SURVEY SHOULD BE PERFORMED PRIOR TO CONSTRUCTION.

DRAFTING	S.S
DESIGN	U.P.
CHECKED BY	J.J
APPROVED BY	U.P.

LICENSED PROFESSIONAL ENGINEER — U. PADMANATH — 100120747 — Apr. 11 / 2019 — PROVINCE OF ONTARIO

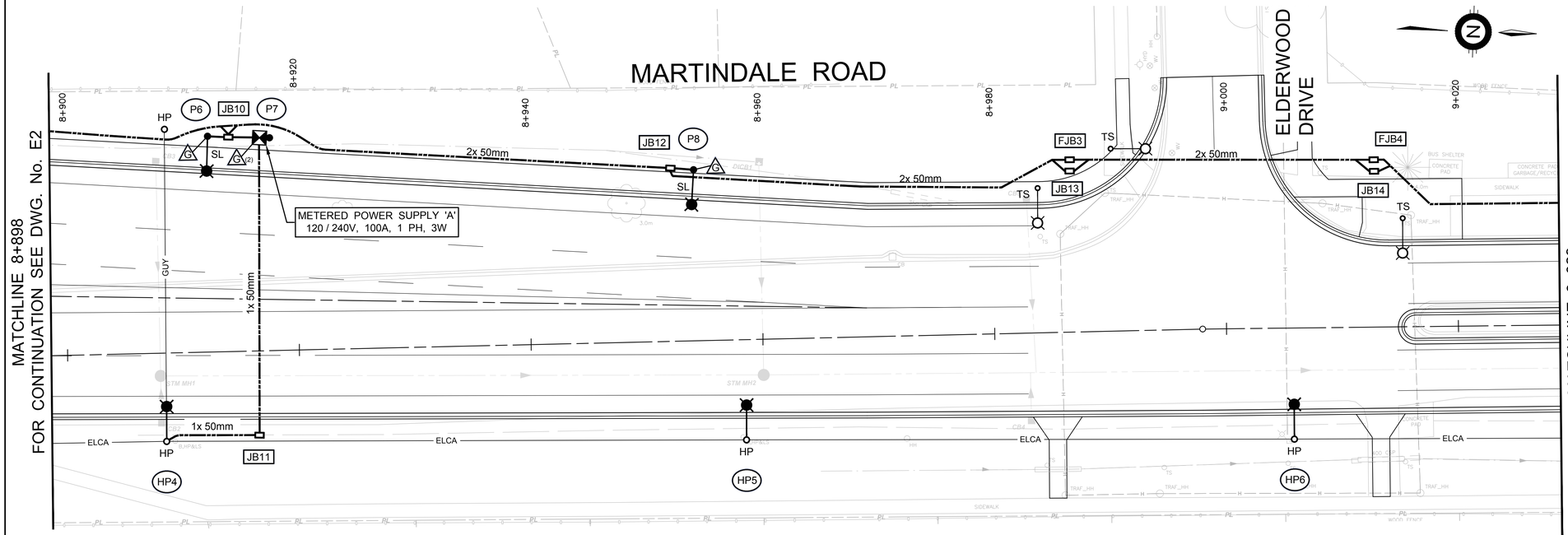
U TECH ENGINEERS INC.

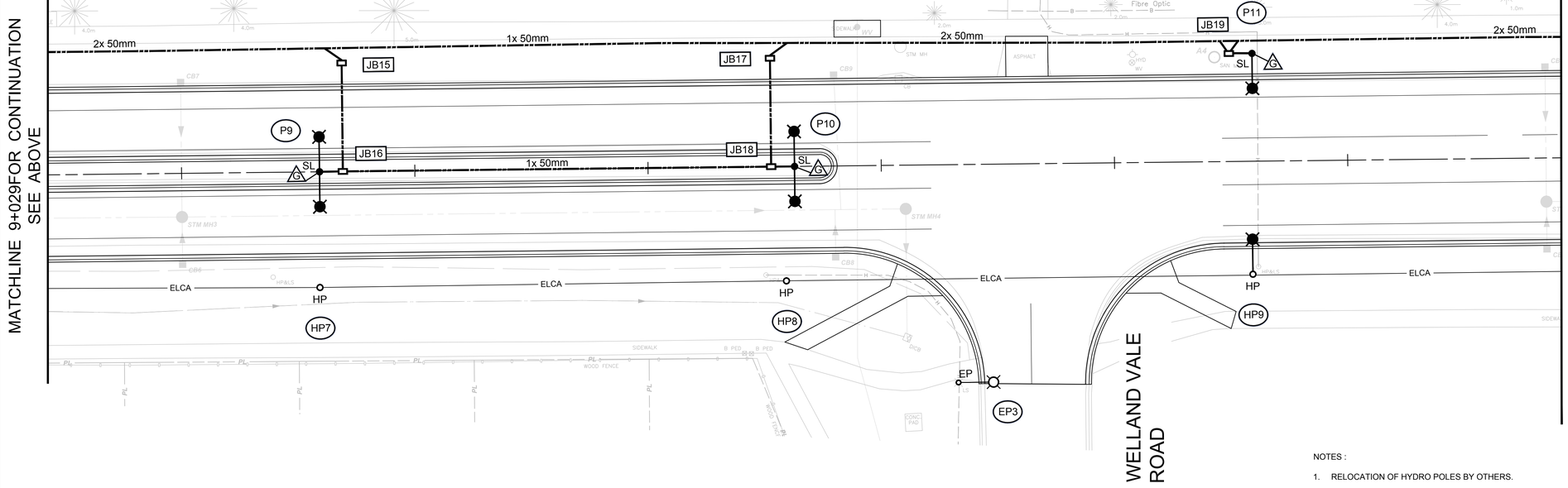
wood.

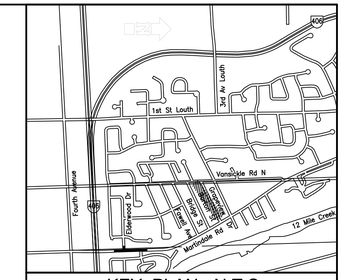
Niagara Region PUBLIC WORKS

Contract # 2019-T-157
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Avenue to Barton Street
City of St. Catharines
ELECTRICAL LAYOUT - 1

CONSULTANT FILE No.	TP113112
DATE	2019-04-11
SCALE	1 : 200
REF. No.	RN19-57
DWG No.	E2
REV.	0







KEY PLAN - N.T.S.

LEGEND

- SL — PROPOSED 10.5m (35 ft.) DIRECT BURIED SECTIONAL STEEL STREET LIGHT POLE C/W 3.0m BRACKET & 160W LED LUMINAIRE
- HP — EXISTING HYDRO POLE C/W 3.0m BRACKET & 160W LED LUMINAIRE
- TS — TRAFFIC SIGNAL POLE WITH LUMINAIRE
- SL — PROPOSED 9.8m BASE MOUNTED ALUMINUM STREET LIGHT POLE MOUNTED ON BRIDGE STRUCTURE C/W 3.0m BRACKET & 160W LED LUMINAIRE
- JUNCTION BOX (13" x 24" x 18") SUPPLIED BY REGION
- PROPOSED METERED POWER SUPPLY AS PER NRS 2130 AND NRS 2440
- # X 50mm — 50mm PVC CONDUIT
- # X 100mm — 100mm PVC CONDUIT
- 50mm PVC EMBEDDED CONDUIT
- EXISTING 50mm PVC CONDUIT
- LCA — PROPOSED LIGHTING CONDUCTOR AERIAL
- ELCA — EXISTING LIGHTING CONDUCTOR AERIAL
- EXISTING LUMINAIRE TO BE REMOVED
- EP — EXISTING LUMINAIRE TO REMAIN
- Px — PROPOSED POLE IDENTIFICATION CODE
- EPx — EXISTING POLE IDENTIFICATION CODE
- HPx — HYDRO POLE IDENTIFICATION CODE
- JBx — JUNCTION BOX IDENTIFICATION CODE FOR STREET LIGHTS
- G — GROUND ROD (3m LONG x 20mm Ø COPPER) / GROUND PLATE (10" x 16" COPPER)
- FJBx — JUNCTION BOX IDENTIFICATION CODE FOR FIBRE INTERCONNECT
- EFJBx — EXISTING JUNCTION BOX IDENTIFICATION CODE FOR FIBRE INTERCONNECT

NOTES :

1. RELOCATION OF HYDRO POLES BY OTHERS.

U TECH ENGINEERS INC.
60 LEGENDARY CIRCLE
BRAMPTON, ON L6Y 0S1
TEL: 905-497-8414
WEB: www.utecheng.ca

No.	REVISION	DATE	INIT.
3	ISSUED FOR TENDER	2019/04/11	U.P.
2	90% SUBMISSION	2018/11/30	U.P.
1	60% SUBMISSION	2018/09/24	U.P.

NOTES:

A. THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWER AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

B. PROPERTY LINES WERE PLOTTED USING REGISTERED PLANS AND BARS LOCATED IN THE FIELD. TO VERIFY THE ACCURACY OF THESE PROPERTY LINES, A LEGAL SURVEY SHOULD BE PERFORMED PRIOR TO CONSTRUCTION.

DRAFTING	S.S
DESIGN	U.P.
CHECKED BY	J.J
APPROVED BY	U.P.

LICENSED PROFESSIONAL ENGINEER — U. PADMANATH — 100120747 — Rev. 11/2019 — PROVINCE OF ONTARIO

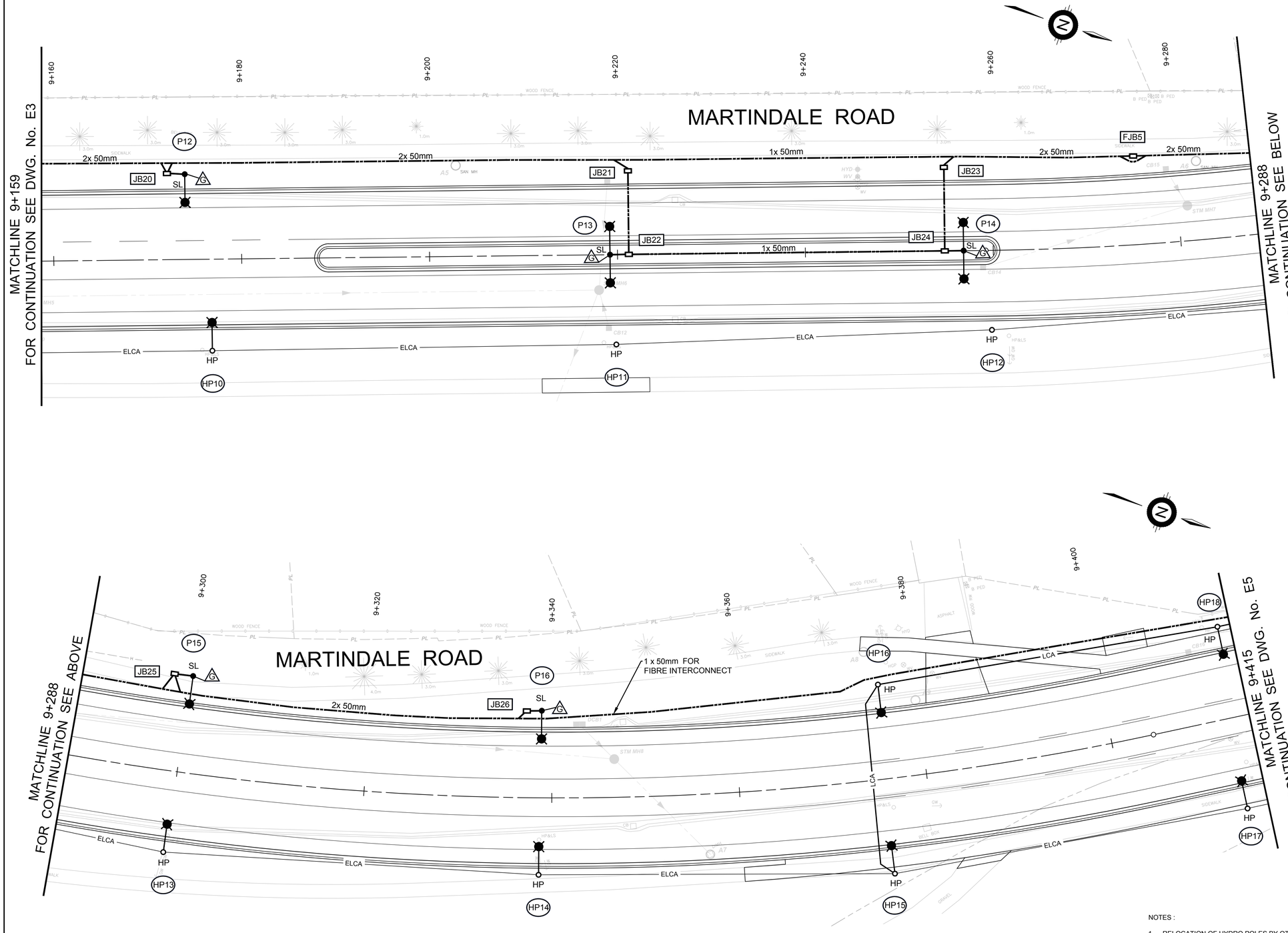
U TECH ENGINEERS INC.

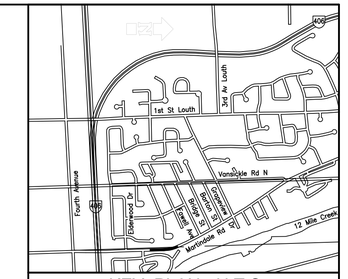
wood.

Niagara Region PUBLIC WORKS

Contract # 2019-T-157
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Avenue to Barton Street
City of St. Catharines
ELECTRICAL LAYOUT - 2

CONSULTANT FILE No.	TP113112
DATE	2019-04-11
SCALE	1 : 200
REF. No.	RN19-57
DWG No.	E3
REV.	0





LEGEND

- SL — PROPOSED 10.5m (35 ft.) DIRECT BURIED SECTIONAL STEEL STREET LIGHT POLE C/W 3.0m BRACKET & 160W LED LUMINAIRE
- HP — EXISTING HYDRO POLE C/W 3.0m BRACKET & 160W LED LUMINAIRE
- TS — TRAFFIC SIGNAL POLE WITH LUMINAIRE
- SL — PROPOSED 9.8m BASE MOUNTED ALUMINUM STREET LIGHT POLE MOUNTED ON BRIDGE STRUCTURE C/W 3.0m BRACKET & 160W LED LUMINAIRE
- JUNCTION BOX (13" x 24" x 18") SUPPLIED BY REGION
- PROPOSED METERED POWER SUPPLY AS PER NRS 2130 AND NRS 2440
- # X 50mm — 50mm PVC CONDUIT
- # X 100mm — 100mm PVC CONDUIT
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- EXISTING 50mm PVC CONDUIT
- LCA — PROPOSED LIGHTING CONDUCTOR AERIAL
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NOTES :

1. RELOCATION OF HYDRO POLES BY OTHERS.

U TECH ENGINEERS INC.
60 LEGENDARY CIRCLE
BRAMPTON, ON L6Y 0S1
TEL: 905-497-8414
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No.	REVISION	DATE	INIT.
3	ISSUED FOR TENDER	2019/04/11	U.P.
2	90% SUBMISSION	2018/11/30	U.P.
1	60% SUBMISSION	2018/09/24	U.P.

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B. PROPERTY LINES WERE PLOTTED USING REGISTERED PLANS AND BARS LOCATED IN THE FIELD. TO VERIFY THE ACCURACY OF THESE PROPERTY LINES, A LEGAL SURVEY SHOULD BE PERFORMED PRIOR TO CONSTRUCTION.

DRAFTING	S.S
DESIGN	U.P.
CHECKED BY	J.J
APPROVED BY	U.P.

LICENSED PROFESSIONAL ENGINEER — U. PADMANATH — 100120747 — DEC. 11 / 2019 — PROVINCE OF ONTARIO

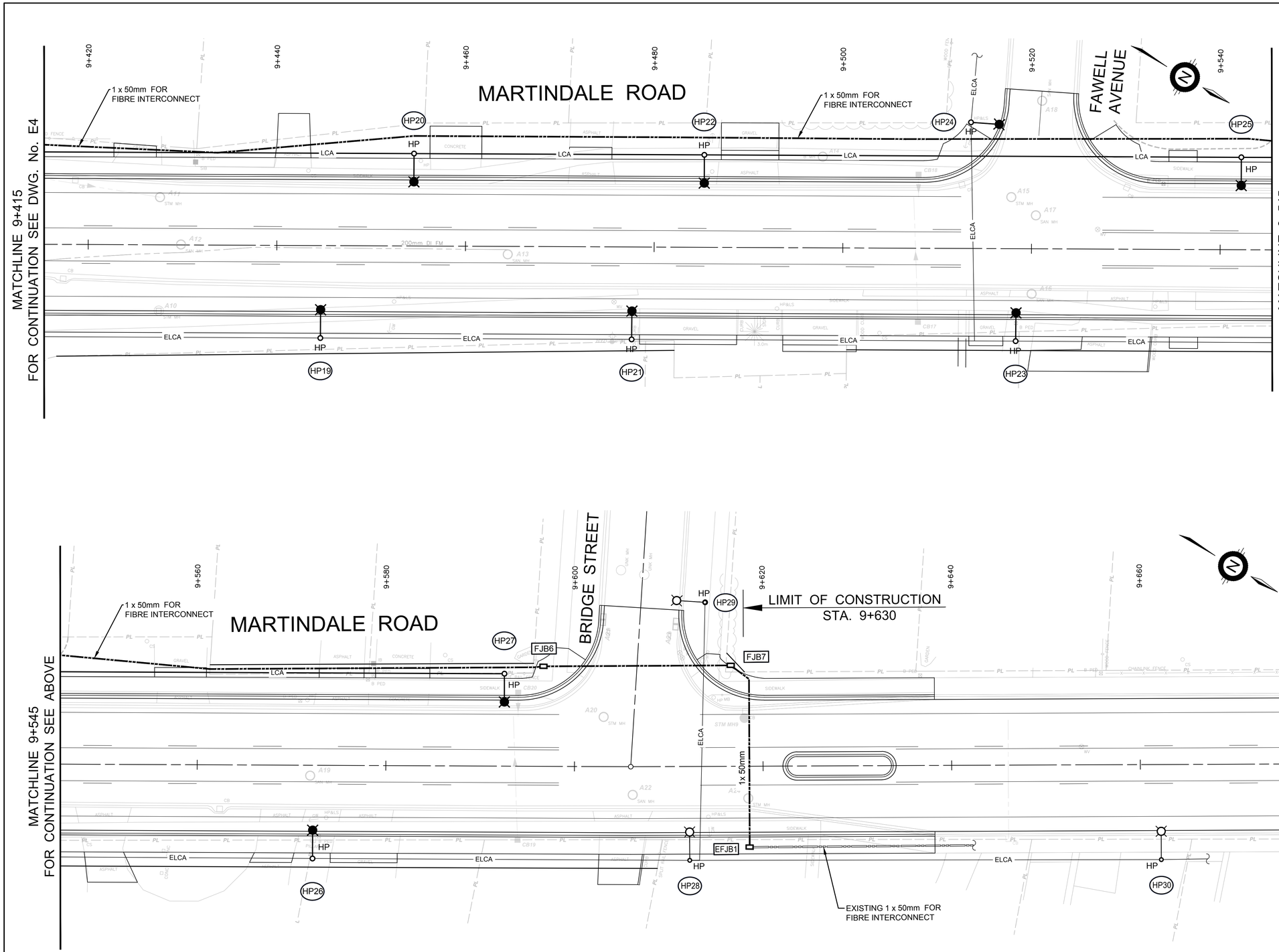
U TECH ENGINEERS INC.

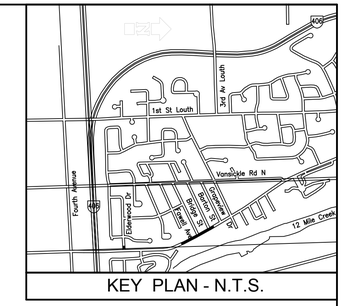
wood.

Niagara Region PUBLIC WORKS

Contract # 2019-T-157
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Avenue to Barton Street
City of St. Catharines
ELECTRICAL LAYOUT - 3

CONSULTANT FILE No.	TP113112
DATE	2019-04-11
SCALE	1 : 200
REF. No.	RN19-57
DWG No.	E4
REV.	0





LEGEND

- SL — PROPOSED 10.5m (35 ft.) DIRECT BURIED SECTIONAL STEEL STREET LIGHT POLE C/W 3.0m BRACKET & 160W LED LUMINAIRE
- HP — EXISTING HYDRO POLE C/W 3.0m BRACKET & 160W LED LUMINAIRE
- TS — TRAFFIC SIGNAL POLE WITH LUMINAIRE
- SL — PROPOSED 9.8m BASE MOUNTED ALUMINUM STREET LIGHT POLE MOUNTED ON BRIDGE STRUCTURE C/W 3.0m BRACKET & 160W LED LUMINAIRE
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NOTES :

1. RELOCATION OF HYDRO POLES BY OTHERS.

U TECH ENGINEERS INC.
60 LEGENDARY CIRCLE
BRAMPTON, ON L6Y 0S1
TEL: 905-497-8414
WEB: www.utecheng.ca

No.	REVISION	DATE	INIT.
3	ISSUED FOR TENDER	2019/04/11	U.P.
2	90% SUBMISSION	2018/11/30	U.P.
1	60% SUBMISSION	2018/09/24	U.P.

NOTES:

A. THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWER AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

B. PROPERTY LINES WERE PLOTTED USING REGISTERED PLANS AND BARS LOCATED IN THE FIELD. TO VERIFY THE ACCURACY OF THESE PROPERTY LINES, A LEGAL SURVEY SHOULD BE PERFORMED PRIOR TO CONSTRUCTION.

DRAFTING	S.S
DESIGN	U.P.
CHECKED BY	J.J
APPROVED BY	U.P.

LICENSED PROFESSIONAL ENGINEER — U. PAMANATH — 100120747 — Apr. 11 / 2019 — PROVINCE OF ONTARIO

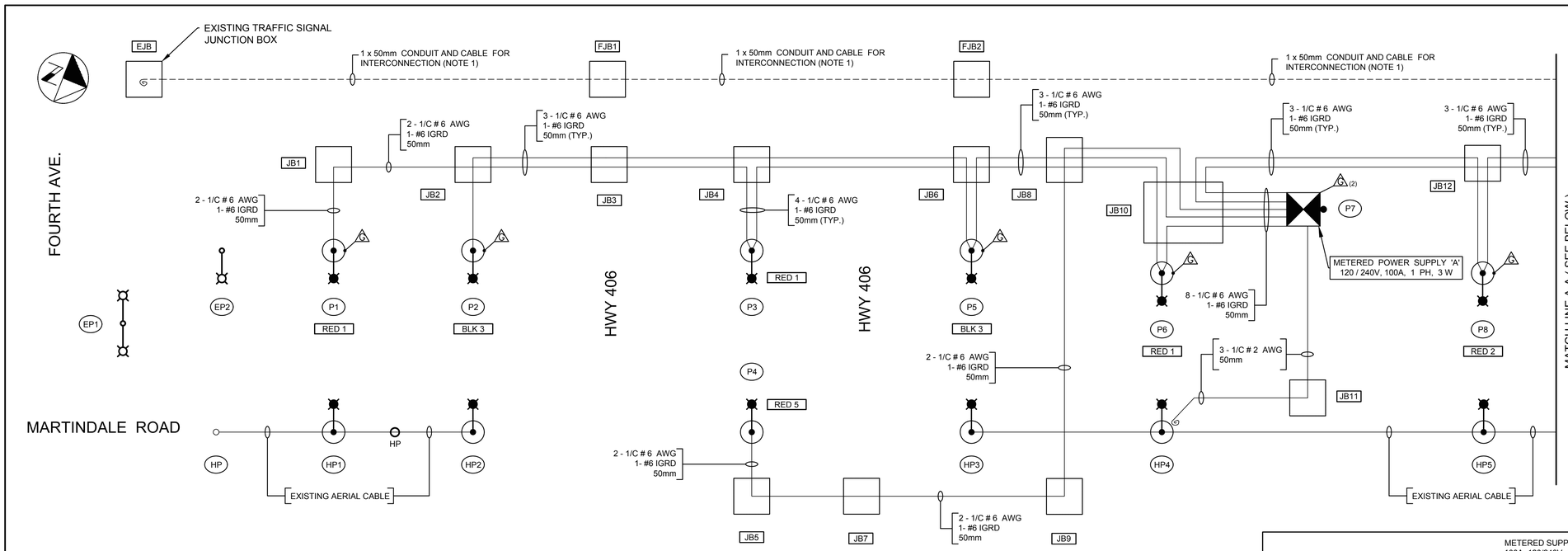
U TECH ENGINEERS INC.

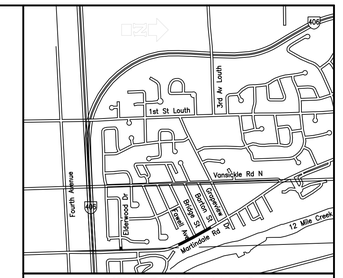
wood.

Niagara Region PUBLIC WORKS

Contract # 2019-T-157
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Avenue to Barton Street
City of St. Catharines
ELECTRICAL LAYOUT - 4

CONSULTANT FILE No.	TP113112
DATE	2019-04-11
SCALE	1 : 200
REF. No.	RN19-57
DWG No.	E5
REV.	0

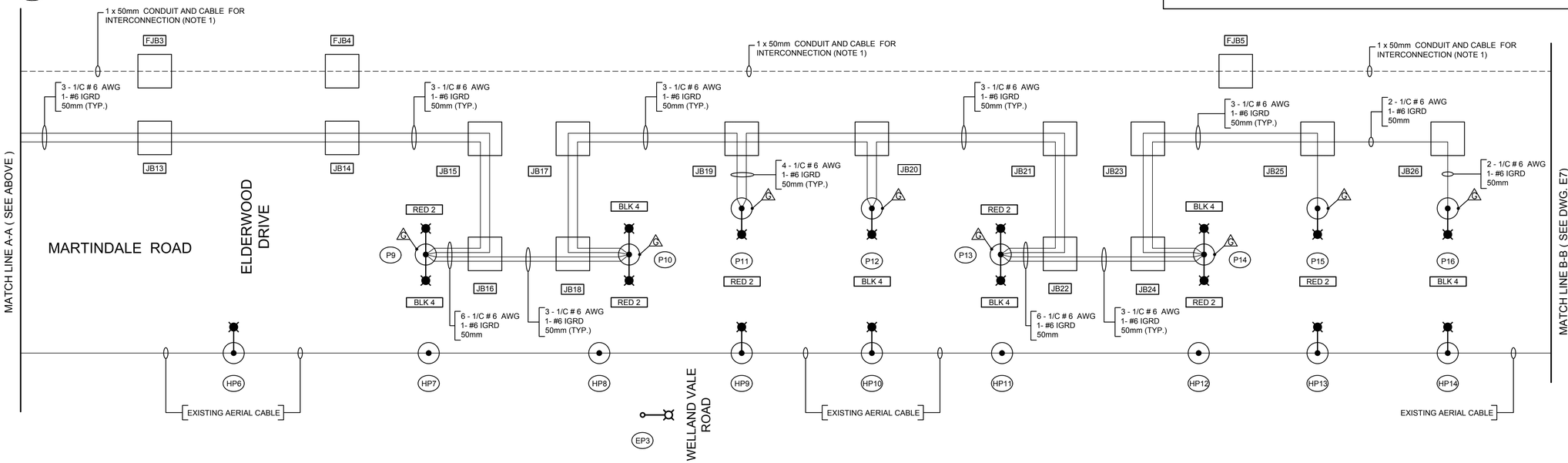




NOTES :

1. INTERCONNECTION CABLE WILL BE SUPPLIED BY THE REGION AND SHALL BE INSTALLED BY THE CONTRACTOR.

METERED SUPPLY "A" 100A, 120/240V, 1Ø, 3W									
CIRCUIT LOAD (W)	LUMINAIRE WATTAGE (W)	DESCRIPTION	CIRCUIT NUMBER	BREAKER AMPHERE RATING	BREAKER AMPHERE RATING	CIRCUIT NUMBER	DESCRIPTION	LUMINAIRE WATTAGE (W)	* CIRCUIT LOAD (W)
480	3 x 160	P1, P3, P6	RED 1	40A	40A	RED 2	P8, P9, P10, P11, P13, P14, P15	7 x 160	1120
320	2 x 160	P2, P5	BLK 3	40A	40A	BLK 4	P9, P10, P12, P13, P14, P16	6 x 160	960
160	1 x 160	P4	RED 5	40A	-	RED 6			
			BLK 7	-	-	BLK 8			
TOTAL LOAD = 3,040 W									



U TECH ENGINEERS INC.
60 LEGENDARY CIRCLE
BRAMPTON, ON L6Y 0S1
TEL: 905-497-8414
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No.	REVISION	DATE	INIT.
2	ISSUED FOR TENDER	2019/04/11	U.P.
1	90% SUBMISSION	2018/11/30	U.P.

NOTES:
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DRAFTING	S.S.
DESIGN	U.P.
CHECKED BY	J.J.
APPROVED BY	U.P.

LICENSED PROFESSIONAL ENGINEER · U. PADMANATH · 100120747 · Apr. 11 / 2019 · PROVINCE OF ONTARIO

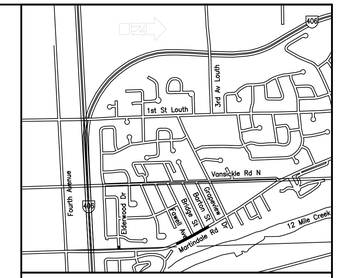
U TECH ENGINEERS INC.

wood.

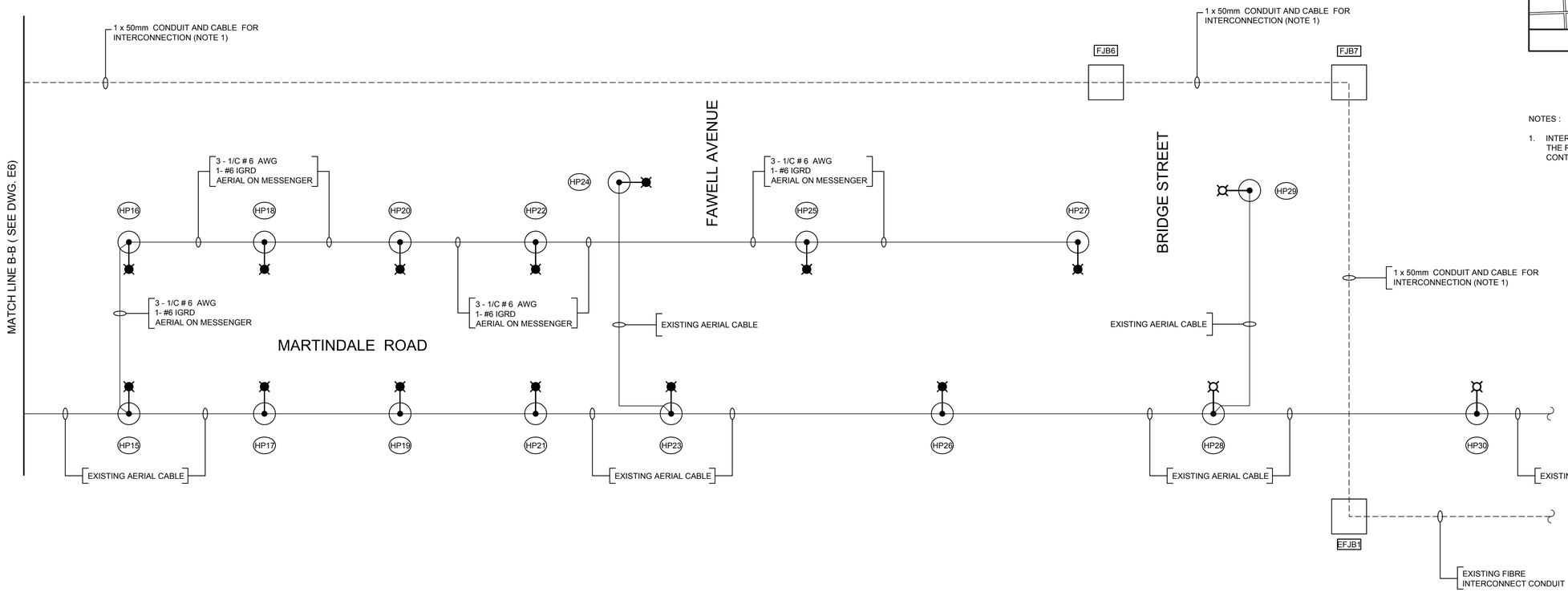
Niagara Region PUBLIC WORKS

Contract # 2019-T-157
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Avenue to Barton Street
City of St. Catharines
WIRING DIAGRAM - 1

CONSULTANT FILE No.	TP113112
DATE	2019-04-11
SCALE	NTS
REF. No.	RN19-57
DWG No.	E6
REV.	0



KEY PLAN - N.T.S.



NOTES :

1. INTERCONNECTION CABLE WILL BE SUPPLIED BY THE REGION AND SHALL BE INSTALLED BY THE CONTRACTOR.

U TECH ENGINEERS INC.

60 LEGENDARY CIRCLE
BRAMPTON, ON L6Y 0S1
TEL: 905-497-8414
WEB: www.utecheng.ca

No.	REVISION	DATE	INIT.
2	ISSUED FOR TENDER	2019/04/11	U.P.
1	90% SUBMISSION	2018/11/30	U.P.

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DRAFTING	S.S.
DESIGN	U.P.
CHECKED BY	J.J.
APPROVED BY	U.P.

LICENSED PROFESSIONAL ENGINEER — U. PADMANATH — 100120747 — Apr. 11 / 2019 — PROVINCE OF ONTARIO

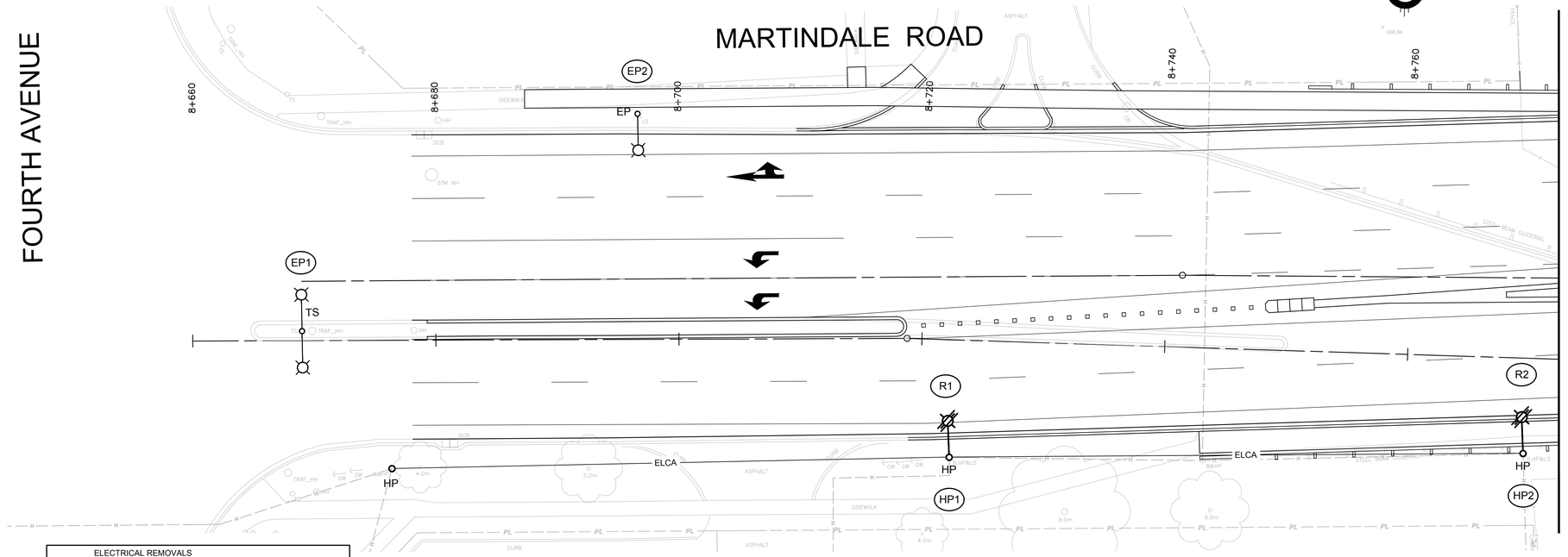
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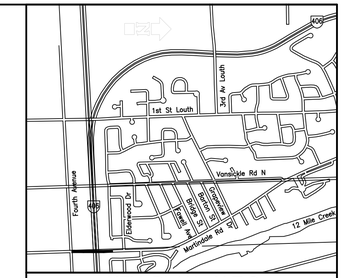
wood.

Niagara Region PUBLIC WORKS

Contract # 2019-T-157
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Avenue to Barton Street
City of St. Catharines
WIRING DIAGRAM - 2

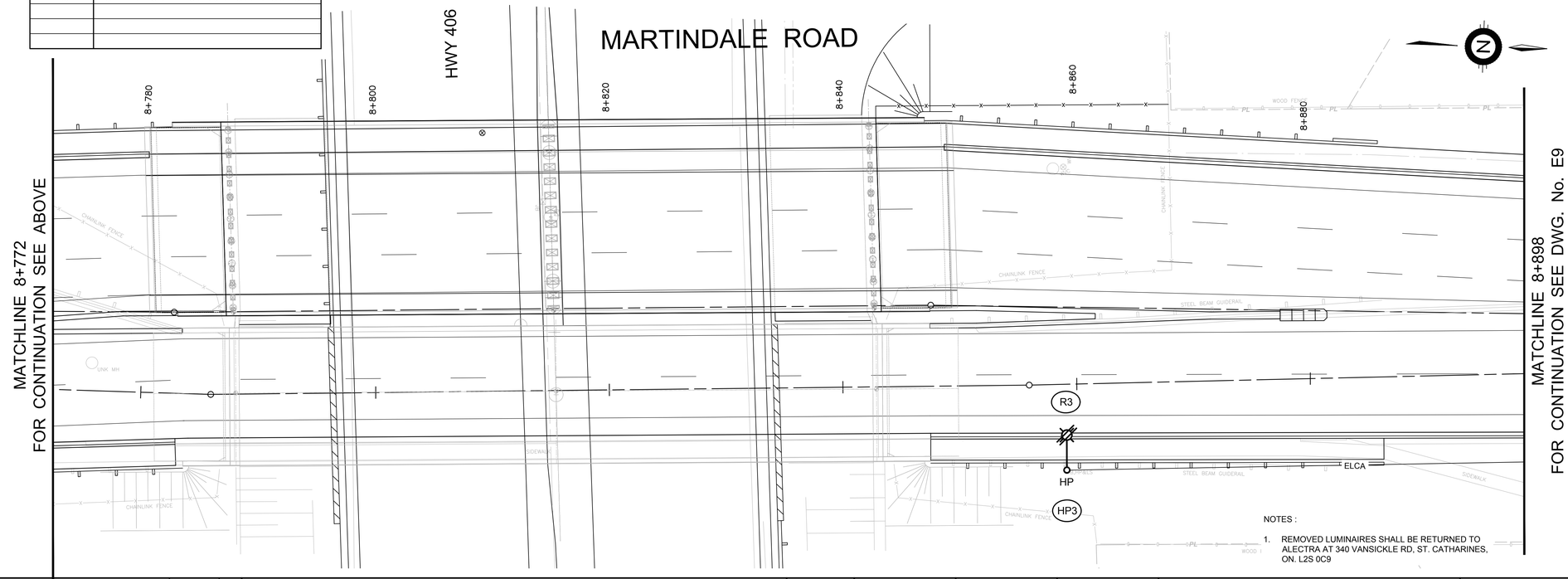
CONSULTANT FILE No.	TP113112
DATE	2019-04-11
SCALE	NTS
REF. No.	RN19-57
DWG No.	E7
REV.	0





KEY PLAN - N.T.S.

ELECTRICAL REMOVALS	
REMOVAL	DESCRIPTION
R1	LUMINAIRE TO BE REMOVED & RETURNED TO ALECTRA
R2	LUMINAIRE TO BE REMOVED & RETURNED TO ALECTRA
R3	LUMINAIRE TO BE REMOVED & RETURNED TO ALECTRA



NOTES :

1. REMOVED LUMINAIRES SHALL BE RETURNED TO ALECTRA AT 340 VANSICKLE RD, ST. CATHARINES, ON. L2S 0C9

LEGEND

- SL — PROPOSED 10.5m (35 ft.) DIRECT BURIED SECTIONAL STEEL STREET LIGHT POLE C/W 3.0m BRACKET & 160W LED LUMINAIRE
- HP — EXISTING HYDRO POLE C/W 3.0m BRACKET & 160W LED LUMINAIRE
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U TECH ENGINEERS INC.
60 LEGENDARY CIRCLE
BRAMPTON, ON L6Y 0S1
TEL: 905-497-8414
WEB: www.utecheng.ca

No.	REVISION	DATE	INIT.
2	ISSUED FOR TENDER	2019/04/11	U.P.
1	90% SUBMISSION	2018/11/30	U.P.

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DRAFTING	S.S
DESIGN	U.P.
CHECKED BY	J.J
APPROVED BY	U.P.

LICENCED PROFESSIONAL ENGINEER — U. PADMANATH — 100120747 — Apr. 11 / 2019 — PROVINCE OF ONTARIO

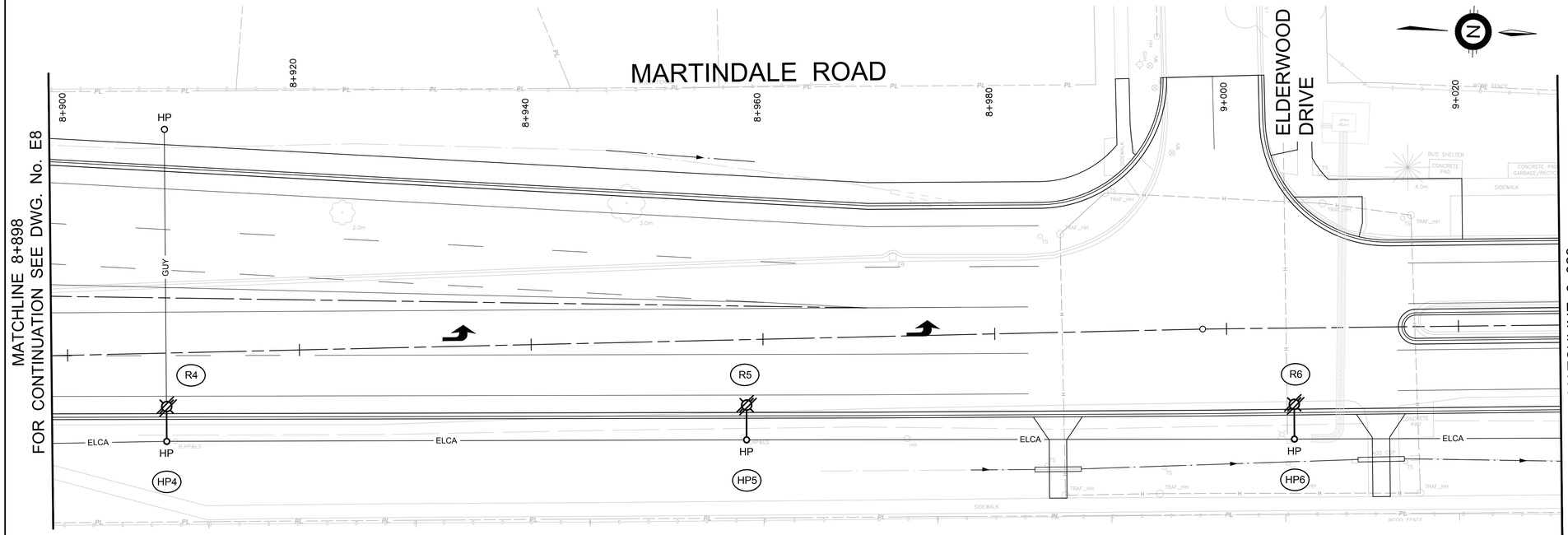
U TECH ENGINEERS INC.

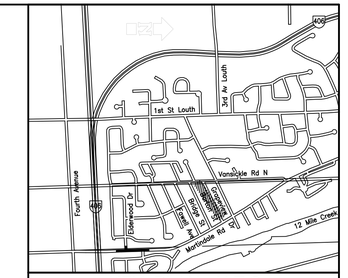
wood.

Niagara Region PUBLIC WORKS

Contract # 2019-T-157
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Avenue to Barton Street
City of St. Catharines
ELECTRICAL REMOVALS - 1

CONSULTANT FILE No.	TP113112
DATE	2019-04-11
SCALE	1 : 200
REF. No.	RN19-57
DWG No.	E8
REV.	0





KEY PLAN - N.T.S.

LEGEND

- SL — PROPOSED 10.5m (35 ft.) DIRECT BURIED SECTIONAL STEEL STREET LIGHT POLE C/W 3.0m BRACKET & 160W LED LUMINAIRE
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NOTES :

1. REMOVED LUMINAIRES SHALL BE RETURNED TO ALECTRA AT 340 VANSICKLE RD, ST. CATHARINES, ON. L2S 0C9

ELECTRICAL REMOVALS	
REMOVAL	DESCRIPTION
R4	LUMINAIRE TO BE REMOVED & RETURNED TO ALECTRA
R5	LUMINAIRE TO BE REMOVED & RETURNED TO ALECTRA
R6	LUMINAIRE TO BE REMOVED & RETURNED TO ALECTRA
R7	LUMINAIRE AND ARM TO BE REMOVED & RETURNED TO ALECTRA
R8	LUMINAIRE TO BE REMOVED & RETURNED TO ALECTRA

U TECH ENGINEERS INC.
60 LEGENDARY CIRCLE
BRAMPTON, ON L6Y 0S1
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WEB: www.utecheng.ca

No.	REVISION	DATE	INIT.
2	ISSUED FOR TENDER	2019/04/11	U.P.
1	90% SUBMISSION	2018/11/30	U.P.

NOTES:
A. THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWER AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.
B. PROPERTY LINES WERE PLOTTED USING REGISTERED PLANS AND BARS LOCATED IN THE FIELD. TO VERIFY THE ACCURACY OF THESE PROPERTY LINES, A LEGAL SURVEY SHOULD BE PERFORMED PRIOR TO CONSTRUCTION.

DRAFTING	S.S
DESIGN	U.P.
CHECKED BY	J.J
APPROVED BY	U.P.

LICENSED PROFESSIONAL ENGINEER — U. PADMANATH — 100120747 — Apr. 11 / 2019 — PROVINCE OF ONTARIO

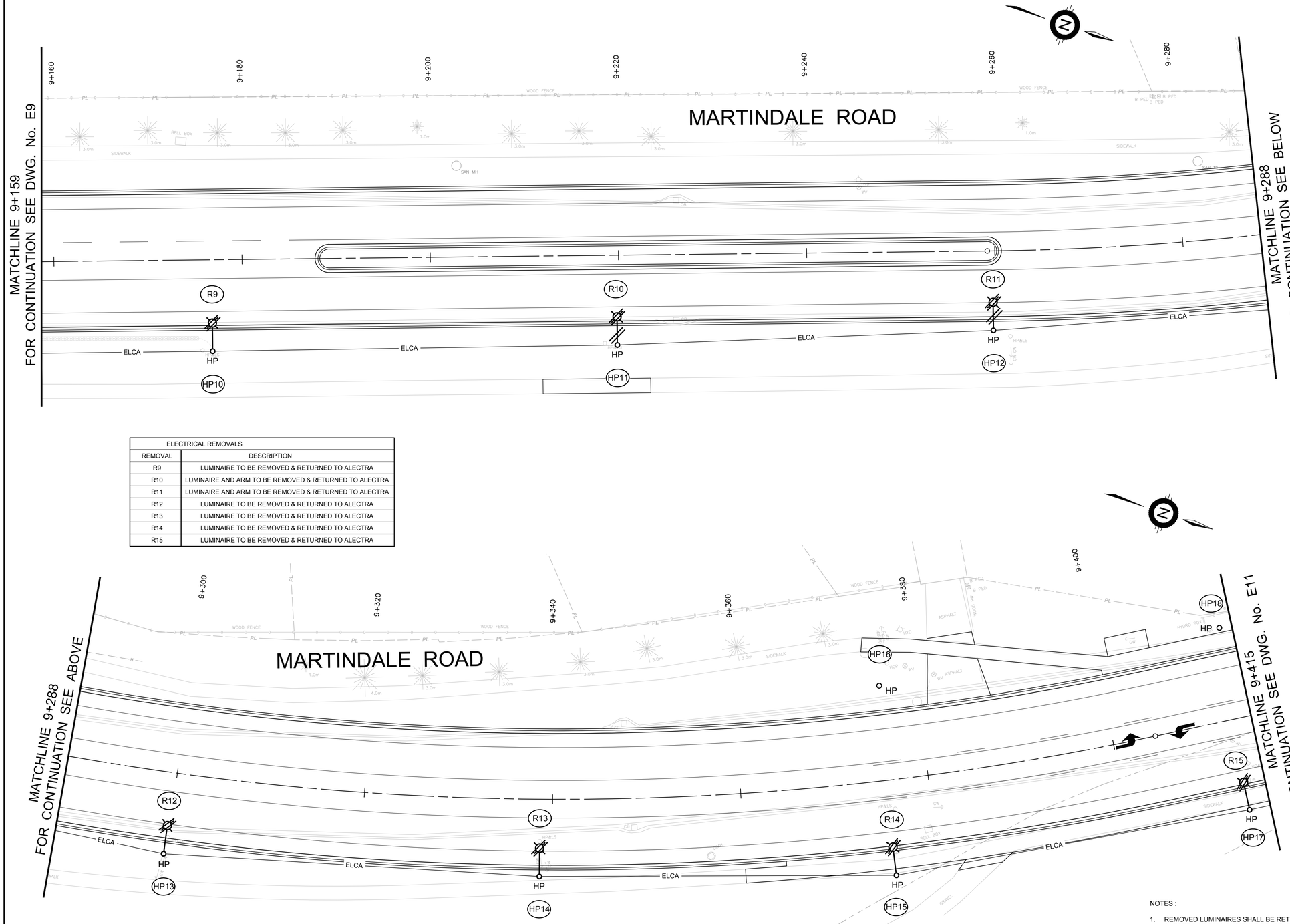
U TECH ENGINEERS INC.

wood.

Niagara Region PUBLIC WORKS

Contract # 2019-T-157
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Avenue to Barton Street
City of St. Catharines
ELECTRICAL REMOVALS - 2

CONSULTANT FILE No.	TP113112
DATE	2019-04-11
SCALE	1 : 200
REF. No.	RN19-57
DWG No.	E9
REV.	0



KEY PLAN - N.T.S.

LEGEND

- SL — PROPOSED 10.5m (35 ft.) DIRECT BURIED SECTIONAL STEEL STREET LIGHT POLE C/W 3.0m BRACKET & 160W LED LUMINAIRE
- HP — EXISTING HYDRO POLE C/W 3.0m BRACKET & 160W LED LUMINAIRE
- TS — TRAFFIC SIGNAL POLE WITH LUMINAIRE
- SL — PROPOSED 9.8m BASE MOUNTED ALUMINUM STREET LIGHT POLE MOUNTED ON BRIDGE STRUCTURE C/W 3.0m BRACKET & 160W LED LUMINAIRE
- JUNCTION BOX (13" x 24" x 18") SUPPLIED BY REGION
- PROPOSED METERED POWER SUPPLY AS PER NRS 2130 AND NRS 2440
- # X 50mm — 50mm PVC CONDUIT
- # X 100mm — 100mm PVC CONDUIT
- 50mm PVC EMBEDDED CONDUIT
- EXISTING 50mm PVC CONDUIT
- LCA — PROPOSED LIGHTING CONDUCTOR AERIAL
- ELCA — EXISTING LIGHTING CONDUCTOR AERIAL
- EXISTING LUMINAIRE TO BE REMOVED
- EP — EXISTING LUMINAIRE TO REMAIN
- Px — PROPOSED POLE IDENTIFICATION CODE
- EPx — EXISTING POLE IDENTIFICATION CODE
- HPx — HYDRO POLE IDENTIFICATION CODE
- JBx — JUNCTION BOX IDENTIFICATION CODE FOR STREET LIGHTS
- G — GROUND ROD (3m LONG x 20mm Ø COPPER) / GROUND PLATE (10" x 16" COPPER)
- FJBx — JUNCTION BOX IDENTIFICATION CODE FOR FIBRE INTERCONNECT
- EFJBx — EXISTING JUNCTION BOX IDENTIFICATION CODE FOR FIBRE INTERCONNECT

ELECTRICAL REMOVALS	
REMOVAL	DESCRIPTION
R9	LUMINAIRE TO BE REMOVED & RETURNED TO ALECTRA
R10	LUMINAIRE AND ARM TO BE REMOVED & RETURNED TO ALECTRA
R11	LUMINAIRE AND ARM TO BE REMOVED & RETURNED TO ALECTRA
R12	LUMINAIRE TO BE REMOVED & RETURNED TO ALECTRA
R13	LUMINAIRE TO BE REMOVED & RETURNED TO ALECTRA
R14	LUMINAIRE TO BE REMOVED & RETURNED TO ALECTRA
R15	LUMINAIRE TO BE REMOVED & RETURNED TO ALECTRA

NOTES :

1. REMOVED LUMINAIRES SHALL BE RETURNED TO ALECTRA AT 340 VANSICKLE RD, ST. CATHARINES, ON. L2S 0C9

U TECH ENGINEERS INC.
60 LEGENDARY CIRCLE
BRAMPTON, ON L6Y 0S1
TEL: 905-497-8414
WEB: www.utecheng.ca

No.	REVISION	DATE	INIT.
2	ISSUED FOR TENDER	2019/04/11	U.P.
1	90% SUBMISSION	2018/11/30	U.P.

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DRAFTING	S.S
DESIGN	U.P.
CHECKED BY	J.J
APPROVED BY	U.P.

LICENSED PROFESSIONAL ENGINEER — U. PADMANATH — 100120747 — Apr. 11 / 2019 — PROVINCE OF ONTARIO

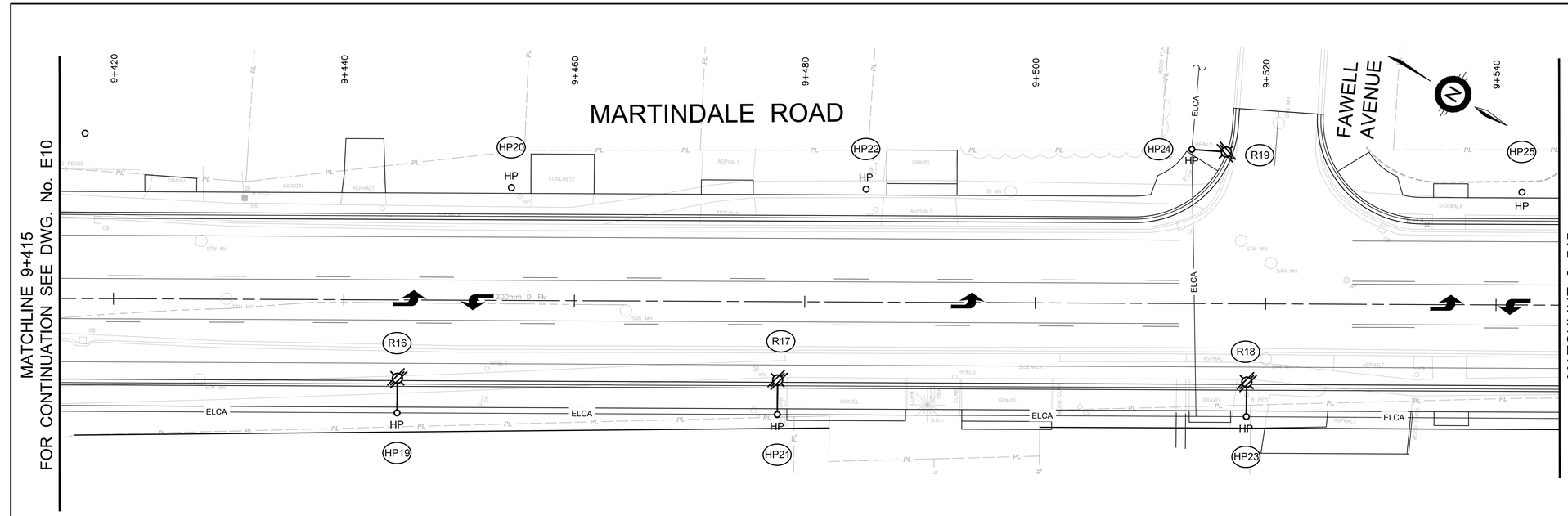
U TECH ENGINEERS INC.

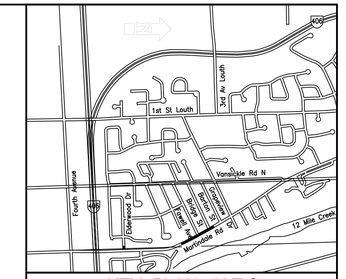
wood.

Niagara Region PUBLIC WORKS

Contract # 2019-T-157
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Avenue to Barton Street
City of St. Catharines
ELECTRICAL REMOVALS - 3

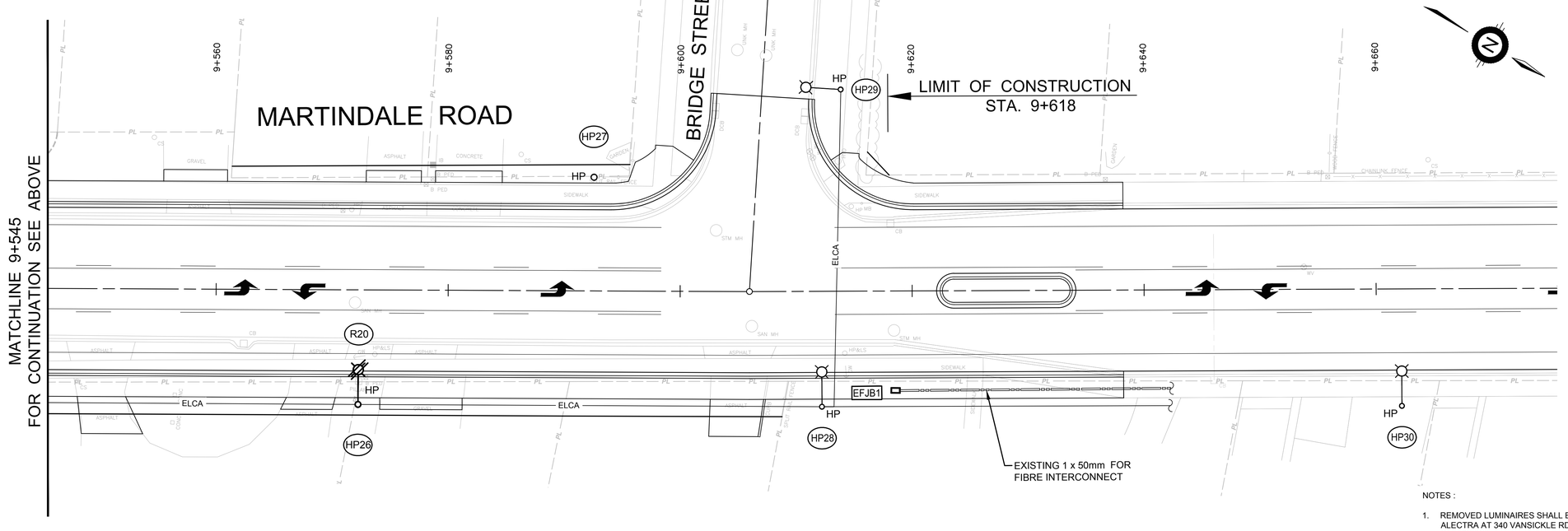
CONSULTANT FILE No.	TP113112
DATE	2019-04-11
SCALE	1 : 200
REF. No.	RN19-57
DWG No.	E10
REV.	0





KEY PLAN - N.T.S.

ELECTRICAL REMOVALS	
REMOVAL	DESCRIPTION
R16	LUMINAIRE TO BE REMOVED & RETURNED TO ALECTRA
R17	LUMINAIRE TO BE REMOVED & RETURNED TO ALECTRA
R18	LUMINAIRE TO BE REMOVED & RETURNED TO ALECTRA
R19	LUMINAIRE TO BE REMOVED & RETURNED TO ALECTRA
R20	LUMINAIRE TO BE REMOVED & RETURNED TO ALECTRA



LEGEND

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NOTES :

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No.	REVISION	DATE	INIT.
2	ISSUED FOR TENDER	2019/04/11	U.P.
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DRAFTING S.S
DESIGN U.P.
CHECKED BY J.J
APPROVED BY U.P.

LICENSED PROFESSIONAL ENGINEER U. PADMANATH 100120747 Apr. 11 / 2019 PROVINCE OF ONTARIO

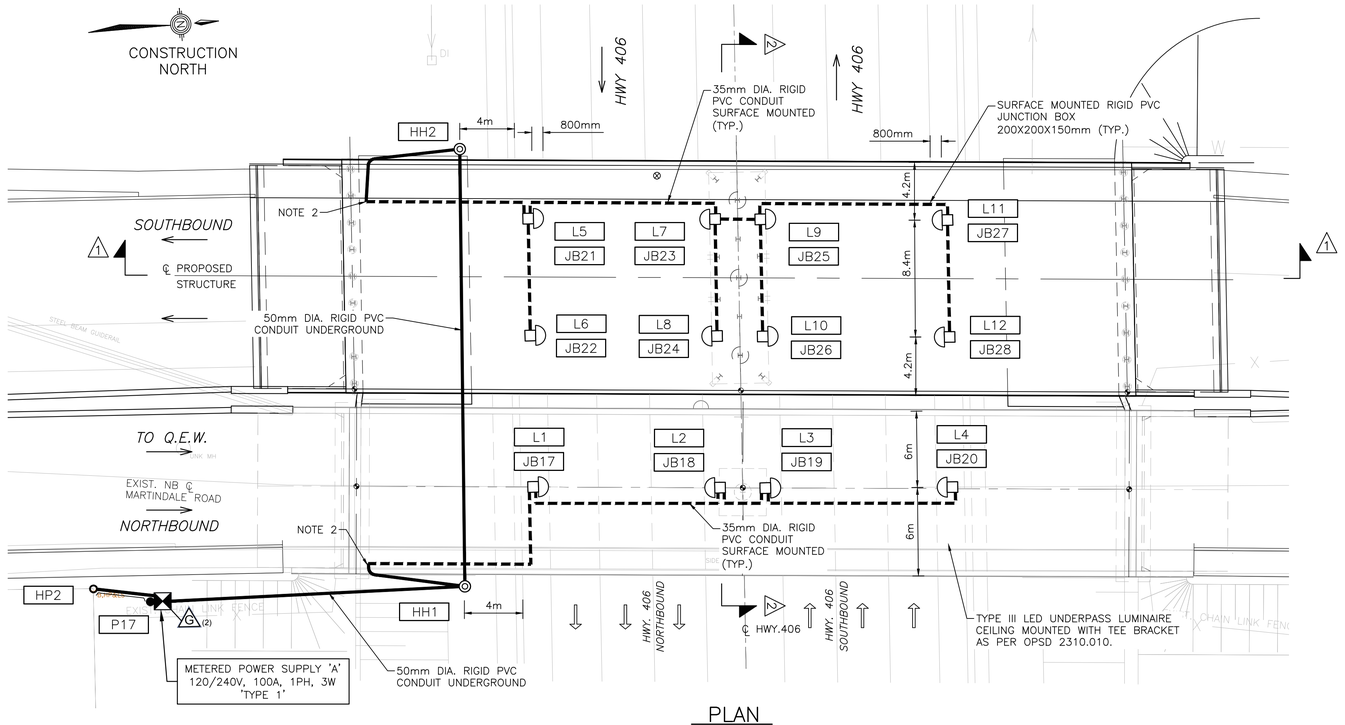
U TECH ENGINEERS INC.

wood.

Niagara Region PUBLIC WORKS

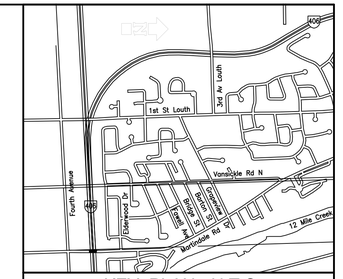
Contract # 2019-T-157
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
from Fourth Avenue to Barton Street
City of St. Catharines
ELECTRICAL REMOVALS - 4

CONSULTANT FILE No.	TP113112
DATE	2019-04-11
SCALE	1 : 200
REF. No.	RN19-57
DWG No.	E11
REV.	0



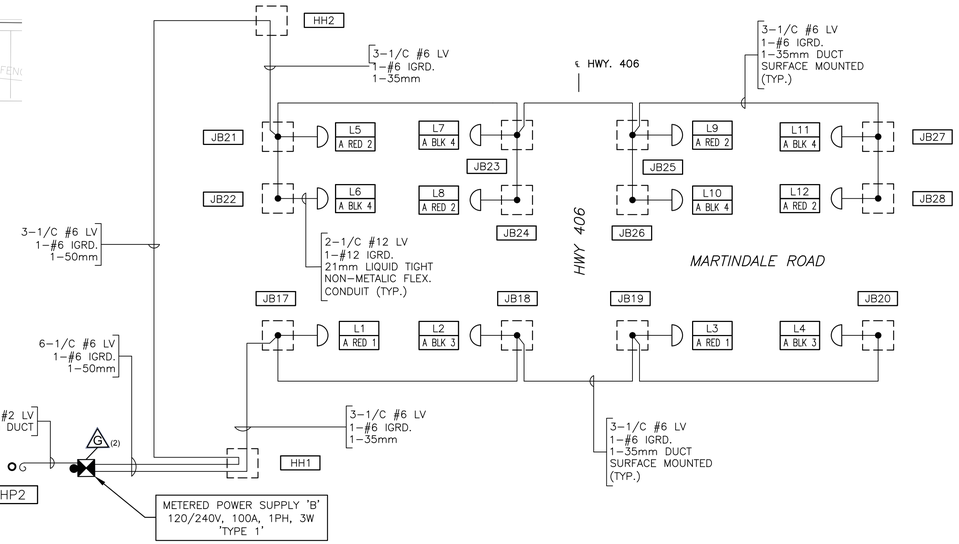
PLAN
SCALE 1:200

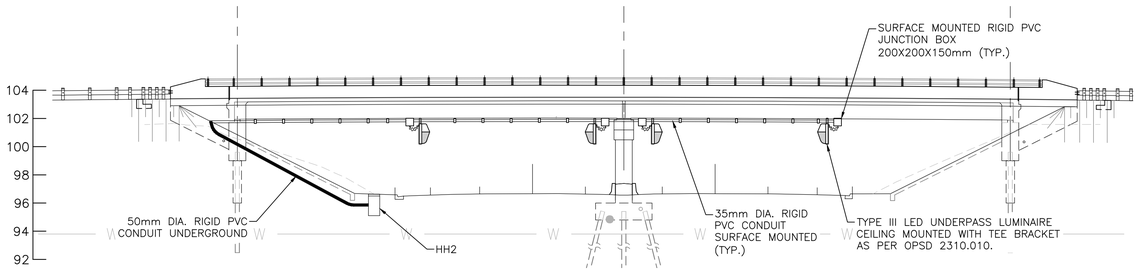
600X600mm PRECAST CONCRETE HANDHOLE
UNDERPASS LUMINAIRE WITH JUNCTION BOX
35mm SURFACE MOUNTED CONDUIT
50mm DIRECT BURIED CONDUIT
HH2 HANDHOLE IDENTIFICATION CODE
L5 LUMINAIRE IDENTIFICATION CODE
JB21 JUNCTION BOX IDENTIFICATION CODE



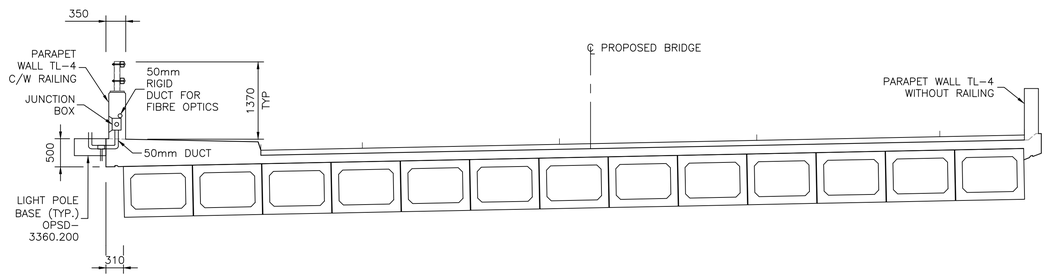
KEY PLAN - N.T.S.

METERED SUPPLY "B" 100A, 120/240V, 1ø, 3W									
CIRCUIT LOAD (W)	LUMINAIRE WATTAGE (W)	DESCRIPTION	CIRCUIT NUMBER	BREAKER AMPHERE RATING	BREAKER AMPHERE RATING	CIRCUIT NUMBER	DESCRIPTION	LUMINAIRE WATTAGE (W)	* CIRCUIT LOAD (W)
48	2 x 24	L1, L3	RED 1	40A	40A	RED 2	L5, L8, L9, L12	4 x 24	96
48	2 x 24	L2, L4	BLK 3	40A	40A	BLK 4	L6, L7, L10, L11	4 x 24	96
			RED 5			RED 6			
			BLK 7			BLK 8			
LOAD SUMMARY RED = 144 W BLK = 144 W TOTAL LOAD = 288 W									

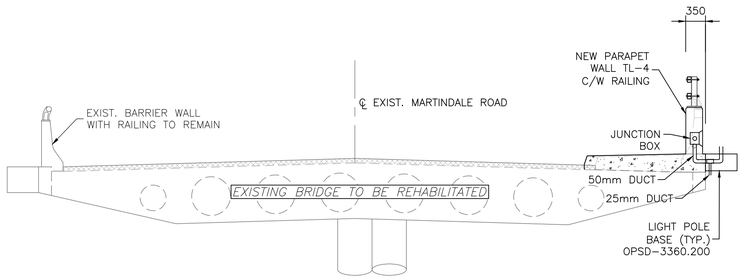




ELEVATION 1 (TAKEN AT PROPOSED BRIDGE ℄)
SCALE 1:200



PROPOSED BRIDGE SECTION 2
SCALE 1:50



EXISTING BRIDGE REHABILITATED SECTION 2
SCALE 1:50

NOTES

1. HANDHOLES HH1 TO HH2 SHALL BE 600X600mm PRECAST CONCRETE AS PER OPSD 2112.040.
2. PROVIDE EXPANSION COUPLING FOR TRANSITION BETWEEN UNDERGROUND DUCT AND SURFACE MOUNTED CONDUIT.
3. EMBEDDED ELECTRICAL WORK IN PARAPET WALL STRUCTURE SHALL BE AS PER OPSD 2302.045.

U TECH ENGINEERS INC.
60 LEGENDARY CIRCLE
BRAMPTON, ON L6Y 0S1
TEL: 905-497-8414
WEB: www.utecheng.ca

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2	ISSUED FOR TENDER	2019/04/11	U.P.
1	90% SUBMISSION	2018/12/12	U.P.

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DRAFTING S.S
DESIGN U.P.
CHECKED BY J.J
APPROVED BY U.P.

LICENCED PROFESSIONAL ENGINEER U. PADMANATH 100120747 Apr. 11 / 2019 PROVINCE OF ONTARIO

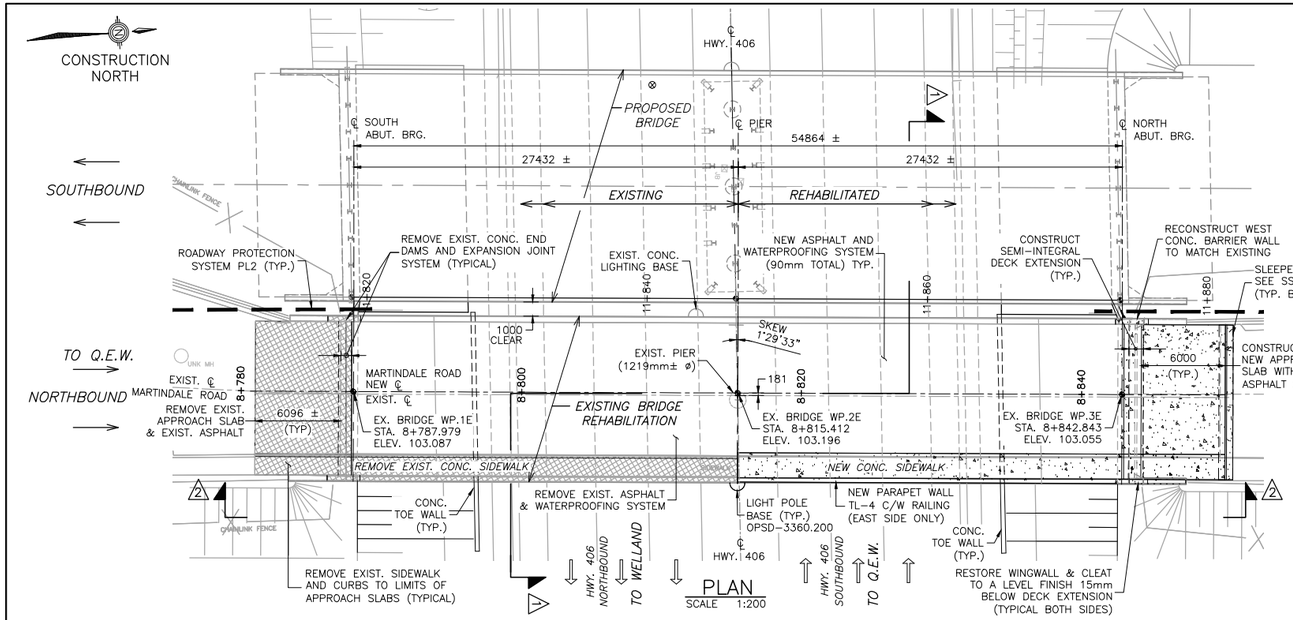
U TECH ENGINEERS INC.

wood.

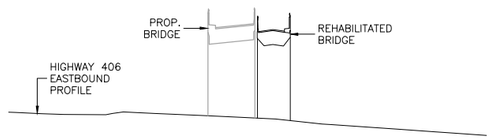
Niagara Region PUBLIC WORKS

Contract # 2019-T-157
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
HWY 406 AT REGIONAL ROAD 38
City of St. Catharines
UNDERPASS LIGHTING

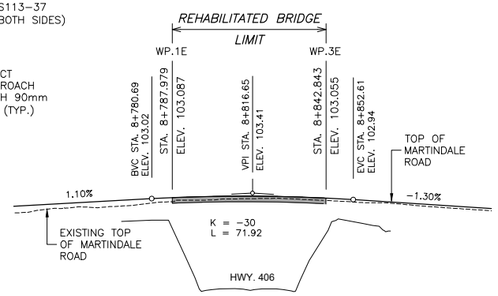
CONSULTANT FILE No.	TP113112
DATE	2019-04-11
SCALE	1 : 200
REF. No.	RN19-57
DWG No.	E12
REV.	0



PLAN
SCALE 1:200



HIGHWAY 406 – NORTHBOUND PROFILE
SCALE N.T.S.



MARTINDALE ROAD – NORTHBOUND PROFILE
SCALE N.T.S.

EXIST. BRIDGE WORKING POINT DATA				
W.P.	STATION	EASTING	NORTHING	ELEV.
1E	8+787.979	641036.110	4779702.626	103.087
2E	8+815.412	641035.012	4779730.036	103.196
3E	8+842.843	641033.915	4779757.446	103.055

NOTES: a. ALL STATIONS ARE MEASURED ON NEW CENTRE LINE OF MARTINDALE ROAD – NORTHBOUND PROFILE.
b. WORKING POINT ELEVATIONS ARE AT TOP OF ASPHALT ON MARTINDALE ROAD – NORTHBOUND PROFILE.

GENERAL NOTES

1. EXISTING STRUCTURE INFORMATION WAS TAKEN FROM IMAGE DRAWINGS, CONTRACT No. 80-81, WP No. 46-74-09, PROVIDED BY MTO, DATED MARCH 1978.
2. CLASS OF CONCRETE
   30 MPa. UNLESS OTHERWISE NOTED.
3. CLEAR COVER TO REINFORCING STEEL
   – DECK EXTENSION, APPROACH SLAB ..... 70 ±20
   – REMAINDER ..... 70 ±20 UNLESS OTHERWISE NOTED
4. REINFORCING STEEL
   – REINFORCING STEEL SHALL BE GRADE 400W UNLESS OTHERWISE SPECIFIED.
   – UNLESS SHOWN OTHERWISE, TENSION LAP SPLICES SHALL BE CLASS B.
   – BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS USING MINIMUM BEND DIAMETERS, WHILE STIRRUPS AND TIES SHALL HAVE MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL STANDARD DRAWING SS12-1, UNLESS INDICATED OTHERWISE.
   – STAINLESS REINFORCING STEEL SHALL BE TYPE 316LN OR DUPLEX 2205 AND HAVE A MINIMUM YIELD STRENGTH OF 500 MPa, UNLESS OTHERWISE SPECIFIED.
5. GLASS FIBRE REINFORCED POLYMER (GFRP)
   – GLASS FIBRE REINFORCED POLYMER (GFRP) REINFORCING BARS SHALL BE GRADE III
   – THE MINIMUM DIAMETER, TENSILE MODULUS OF ELASTICITY AND GUARANTEED MINIMUM TENSILE STRENGTH SHALL BE AS SPECIFIED IN THE CONTRACT DOCUMENTS.
   – BAR MARKS WITH PREFIX "GIII" DENOTES GRADE III GFRP BAR.

CONSTRUCTION NOTES

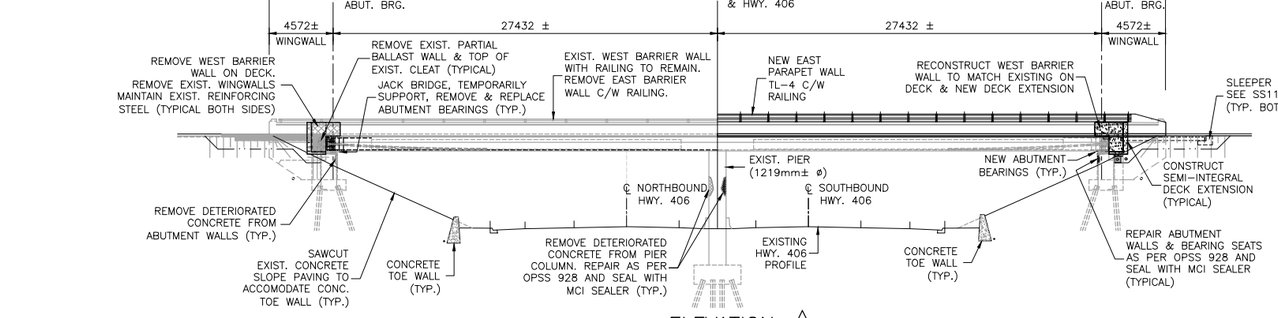
1. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, DETAILS AND ELEVATIONS OF THE EXISTING STRUCTURE ON SITE, THAT ARE RELEVANT TO THE WORK SHOWN ON THE DRAWINGS PRIOR TO COMMENCEMENT OF WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE CONTRACT ADMINISTRATOR BEFORE PROCEEDING WITH THE WORK.
   PROPOSED ADJUSTMENT OF THE WORK REQUIRED TO MATCH THE EXISTING STRUCTURE SHALL BE SUBMITTED FOR APPROVAL.
2. FOR TRAFFIC STAGING AND MAINTENANCE OF TRAFFIC, SEE HIGHWAY DRAWING.
3. CONTRACTOR TO PROVIDE ROADWAY PROTECTION DURING CONSTRUCTION STAGING. TEMPORARY ROADWAY PROTECTION SHALL BE DESIGNED TO PERFORMANCE LEVEL 2.
4. TYPICAL AREAS OF REPAIR ARE INDICATED ON DRAWINGS. WHERE REPAIR LIMITS ARE NOT SHOWN, LIMITS SHALL BE IDENTIFIED BY THE CONTRACT ADMINISTRATOR.
5. SAWCUTS SHALL BE 25mm DEEP OR TO THE FIRST LAYER OF REINFORCING STEEL, WHICHEVER IS LESS, OR AS OTHERWISE SPECIFIED.
6. ALL EXISTING CONCRETE SURFACES AGAINST WHICH NEW CONCRETE IS TO BE PLACED SHALL BE UNIFORMLY ROUGHENED BY MEANS OF SCABBLING, CHIPPING, OR BRUSH HAMMERING. A SURFACE PROFILE OF 5mm (±2mm) SHALL BE ACHIEVED BY EXPOSING THE AGGREGATES ACROSS THE ENTIRE SURFACE.
7. ALL CONCRETE SURFACES TO BE ABRASIVE BLAST CLEANED AND A BONDING AGENT SHALL BE APPLIED BEFORE CASTING NEW CONCRETE.
8. ABRASIVE BLAST CLEAN ALL REINFORCING STEEL THAT IS TO BE RETAINED.
9. NO BACKFILL SHALL BE PLACED UNTIL THE CONCRETE STRENGTH OF THE NEW SEMI-INTEGRAL ABUTMENT HAS REACHED 20 MPa. BACKFILLING SHALL OCCUR AT EACH END OF THE DECK SIMULTANEOUSLY. AT NO TIME SHALL THE DIFFERENCE IN THE HEIGHT OF BACKFILL BE GREATER THAN 500mm.
10. ALL EXPOSED EDGES TO HAVE 20mm CHAMFER UNLESS NOTED OTHERWISE.
11. INSTALL DEBRIS CONTAINMENT SYSTEM TO PROTECT HIGHWAY TRAFFIC DURING REMOVAL AND CONSTRUCTION WORK.

LIST OF DRAWINGS

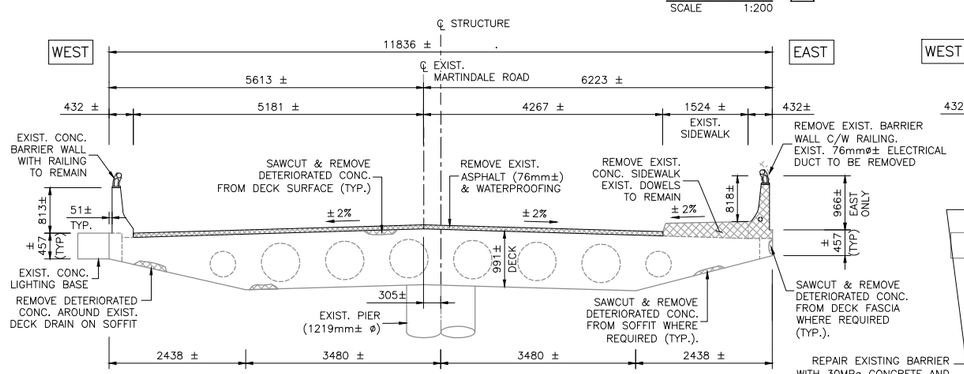
R1-1. GENERAL ARRANGEMENT
R1-2. REMOVAL DETAILS 1
R1-3. REMOVAL DETAILS 2
R1-4. REHABILITATION
R1-5. JACKING / TEMPORARY SUPPORT
R1-6. DECK DETAILS
R1-7. PARAPET WALL FOR COMBINATION TRAFFIC/BICYCLE RAIL ON SIDEWALK, TL-4 (SS110-83 M)
R1-8. RAILING ON PARAPET FOR COMBINATION TRAFFIC/BICYCLE RAIL, TL-4 (SS110-85)
R1-9. 6000mm APPROACH SLAB (SS116-1)
R1-10. EXPANSION JOINT AND SLEEPER SLAB (SS113-37)
R1-11. STRIP SEAL EXPANSION JOINT FOR SLEEPER SLAB (SS113-19)
R1-12. SEQUENCE OF EXPANSION JOINT INSTALLATION (SS113-38)
R1-13. MISCELLANEOUS REPAIR DETAILS
R1-14. ELECTRICAL EMBEDDED WORK

APPLICABLE STANDARD DRAWINGS

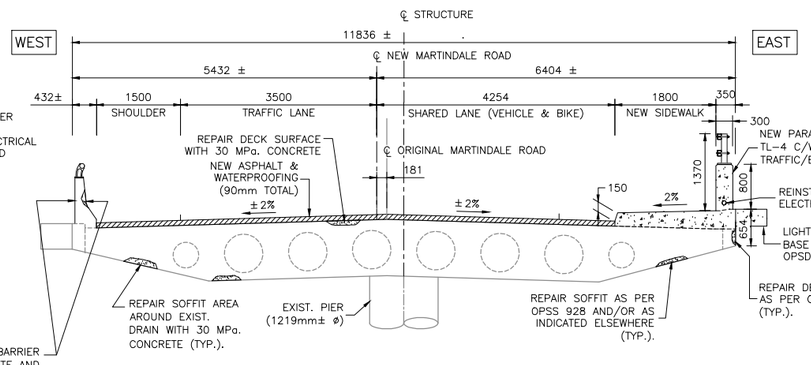
OPSD-3360.200 – DECK – LIGHT POLE BASES – STRUCTURES WITH PARAPET WALLS.
OPSD-3370.100 – DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE WITH PROTECTION BOARD.
OPSD-3370.101 – DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE AT ACTIVE CRACKS GREATER THAN 2mm WIDE AND CONSTRUCTION JOINTS.



ELEVATION 2
SCALE 1:200



EXISTING SECTION 1
SCALE 1:50



REHABILITATED SECTION 1
SCALE 1:50

LEGEND

REMOVAL
NEW CONCRETE
NEW ASPHALT AND WATERPROOFING

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

NO.	REVISION	DATE	INIT.
4	ISSUED FOR TENDER	2019-APR.	N.T.
3	ISSUED FOR 90% MTO EXECUTIVE REVIEW	2019-02-05	N.T.
2	ISSUED FOR 90% MTO REVIEW	2018-DEC.	C.B.
1	ISSUED FOR 60% MTO REVIEW	2015-10-06	C.B.

NOTES/LEGEND
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DRAFTING	C.B.
DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

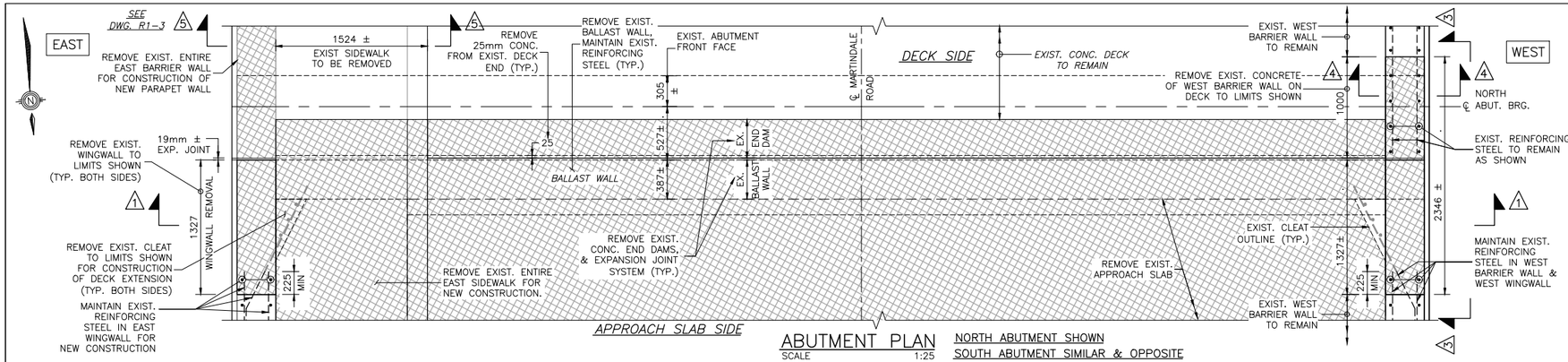
wood.

Niagara Region PUBLIC WORKS

Contract # ____-__-___
Phase 2
BRIDGE REHABILITATION
Martindale Road at Highway 406
Niagara Region
GENERAL ARRANGEMENT

SITE NO.	18-235/1
	METRIC
CONSULTANT FILE No.	TP113112
DATE	NOVEMBER 2018
SCALE	AS SHOWN
REF. No.	RN __-__
DWG No.	R1-1
REV.	

AutoCAD drawing: P:\Work\TP113112\Str\Dwg\Contract\REHAB BRIDGE\TP113112-R1-1.dwg Mar. 26/19 11:27am peter.bulnes



ABUTMENT PLAN

SCALE 1:25

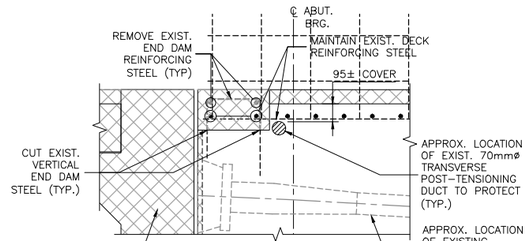
NORTH ABUTMENT SHOWN
SOUTH ABUTMENT SIMILAR & OPPOSITE

NOTES

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH GENERAL ARRANGEMENT AND DETAILS DRAWINGS.
2. COVER METERS OR OTHER METHODS SHALL BE USED TO LOCATE EXISTING POST–TENSIONING DUCTS IN DECK PRIOR TO REMOVALS. DO NOT REMOVE CONCRETE WITHIN 25mm OF POST–TENSIONING DUCTS.

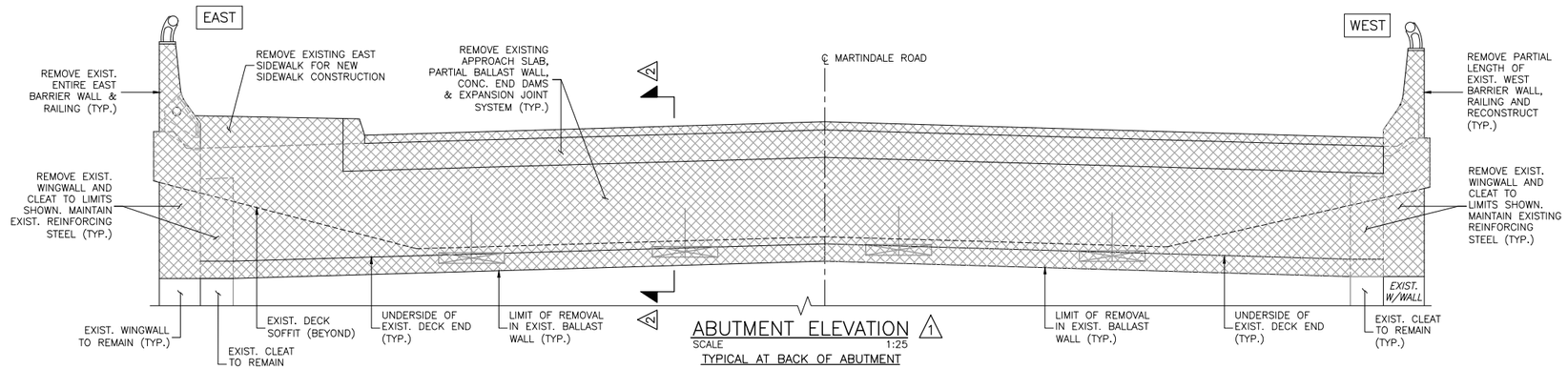
LEGEND

- REMOVAL
- EXISTING REINFORCING STEEL
- EXISTING STEEL TO BE REMOVED



TYPICAL ENLARGED PARTIAL ELEVATION A

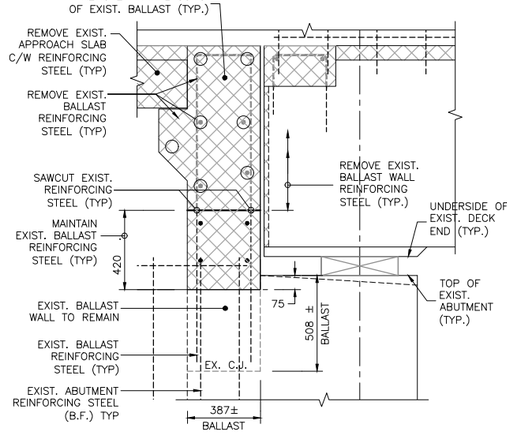
SCALE 1:15



ABUTMENT ELEVATION 1

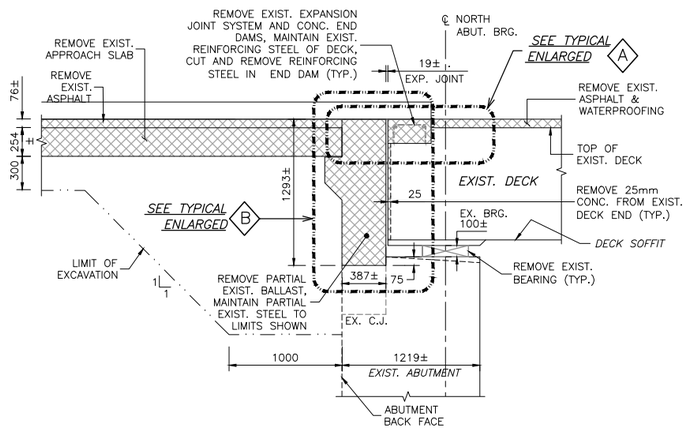
SCALE 1:25

TYPICAL AT BACK OF ABUTMENT



TYPICAL ENLARGED PARTIAL ELEVATION B

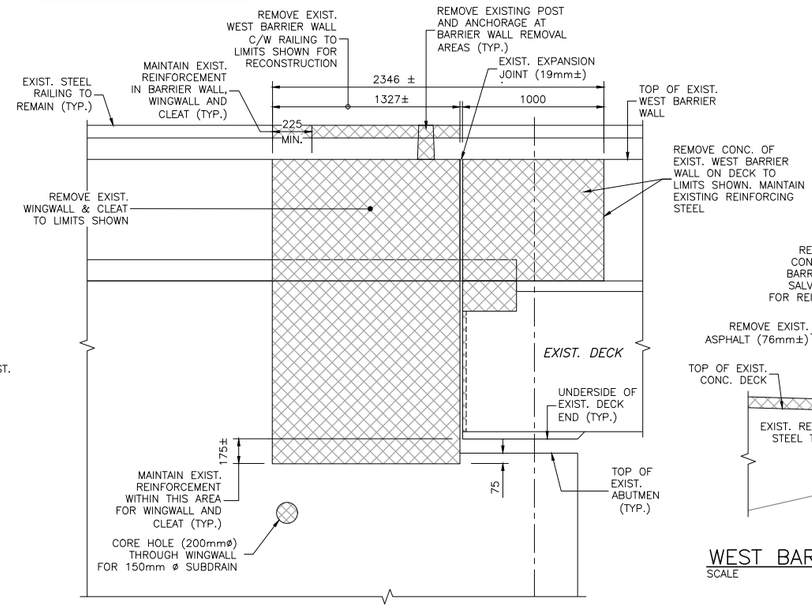
SCALE 1:15



TYPICAL

ABUTMENT & DECK REMOVALS 2

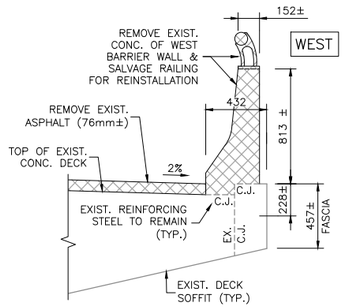
SCALE 1:25



WEST WINGWALL & BARRIER REMOVALS 3

SCALE 1:20

NORTH ABUTMENT SHOWN
SOUTH ABUTMENT SIMILAR & OPPOSITE



WEST BARRIER REMOVALS 4

SCALE 1:20

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

NO.	REVISION	DATE	INIT.
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3	ISSUED FOR 90% MTO EXECUTIVE REVIEW	2019–02–05	N.T.
2	ISSUED FOR 90% MTO REVIEW	2018–DEC.	C.B.
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DRAFTING	C.B.
DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

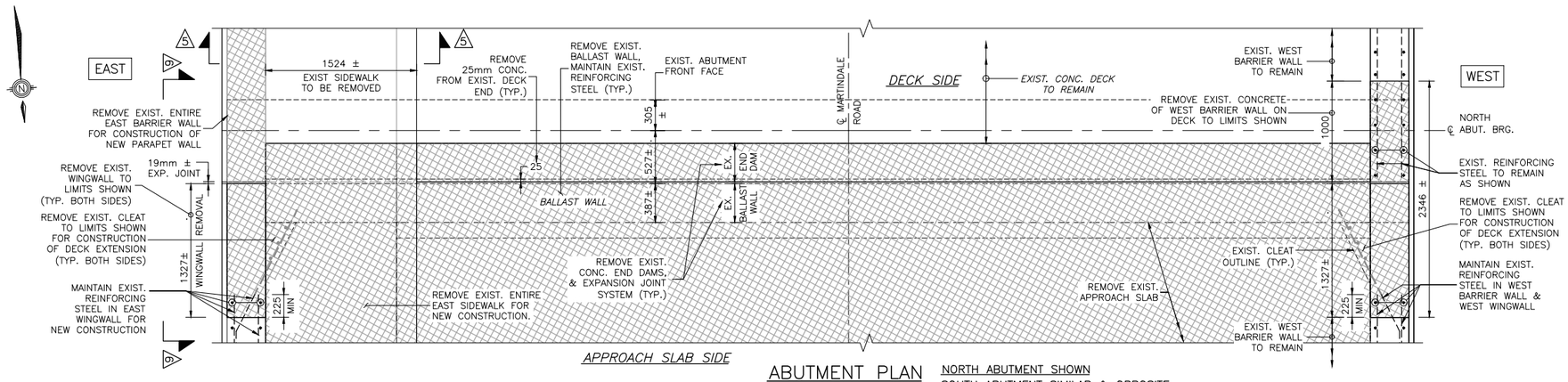
wood.

Niagara Region PUBLIC WORKS

Contract # ____-_-___
Phase 2
BRIDGE REHABILITATION
Martindale Road at Highway 406
Niagara Region
REMOVAL DETAILS 1

SITE NO.	18–235/1
	METRIC
CONSULTANT FILE No.	PT113112
DATE	NOVEMBER 2018
SCALE	AS SHOWN
REF. No.	RN __-__
DWG No.	R1-2
REV.	

AutoCAD drawings: P:\Work\PT113112\Str\Dwg\Contract\REHAB BRIDGE\PT113112–R2.dwg Mar 26/19 11:29am peter.butrus



ABUTMENT PLAN
SCALE 1:25

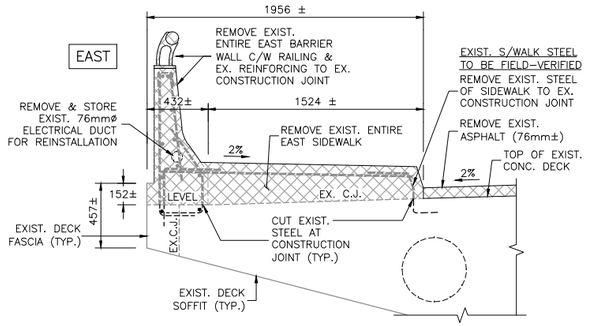
NORTH ABUTMENT SHOWN
SOUTH ABUTMENT SIMILAR & OPPOSITE

NOTES

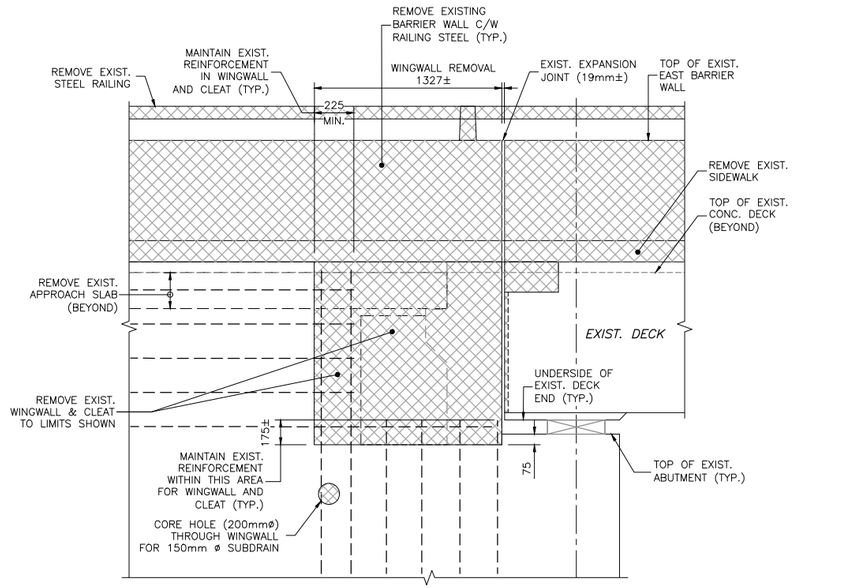
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LEGEND

- REMOVAL
- EXISTING REINFORCING STEEL
- EXISTING STEEL TO BE REMOVED



EAST SIDEWALK & BARRIER REMOVALS ⚠5
SCALE 1:20



EAST WINGWALL & BARRIER REMOVALS ⚠6
SCALE 1:20

NORTH ABUTMENT SHOWN
SOUTH ABUTMENT SIMILAR & OPPOSITE

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

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DRAFTING	C.B.
DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

wood.

Niagara Region PUBLIC WORKS

Contract # ____-_-___
Phase 2
BRIDGE REHABILITATION
Martindale Road at Highway 406
Niagara Region
REMOVAL DETAILS 2

SITE NO.	18-235/1
	METRIC
CONSULTANT FILE No.	TP113112
DATE	NOVEMBER 2018
SCALE	AS SHOWN
REF. No.	RN __-__
DWG No.	R1-3
REV.	

AutoCAD drawing: P:\Work\TP113112\Str\Dwg\Contract\REHAB BRIDGE\TP113112-R3.dwg Mar 26/19 11:30am peter.butrus

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

NOTES

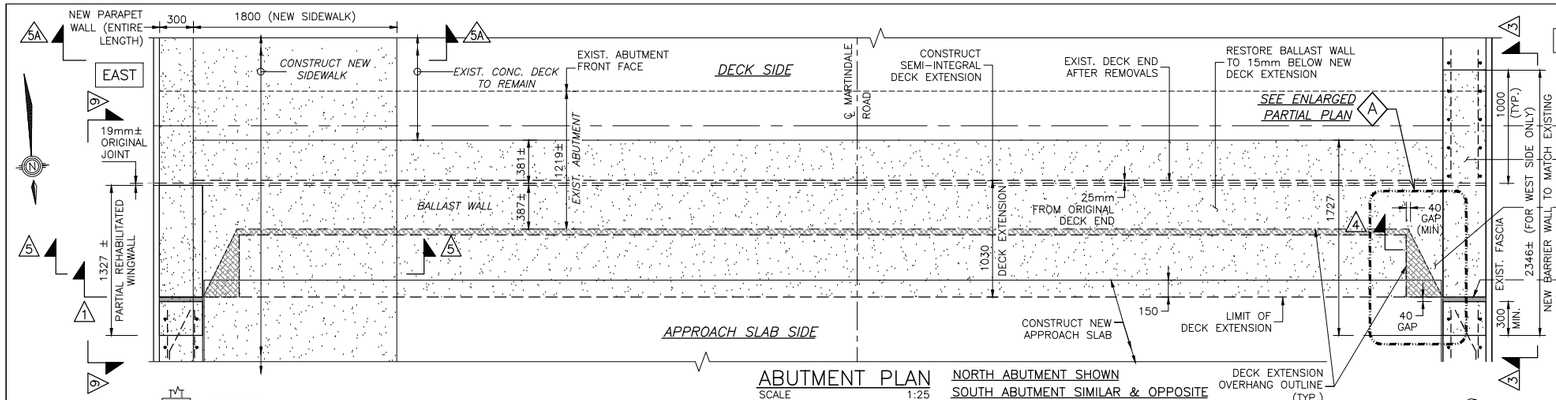
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ABBREVIATION LEGEND

ABUT.	ABUTMENT
BRG.	BEARING
EQ. SP.	EQUAL SPACE
EXIST.	EXISTING
MIN.	MINIMUM
IF	INSIDE FACE
OF	OUTSIDE FACE
TYP.	TYPICAL

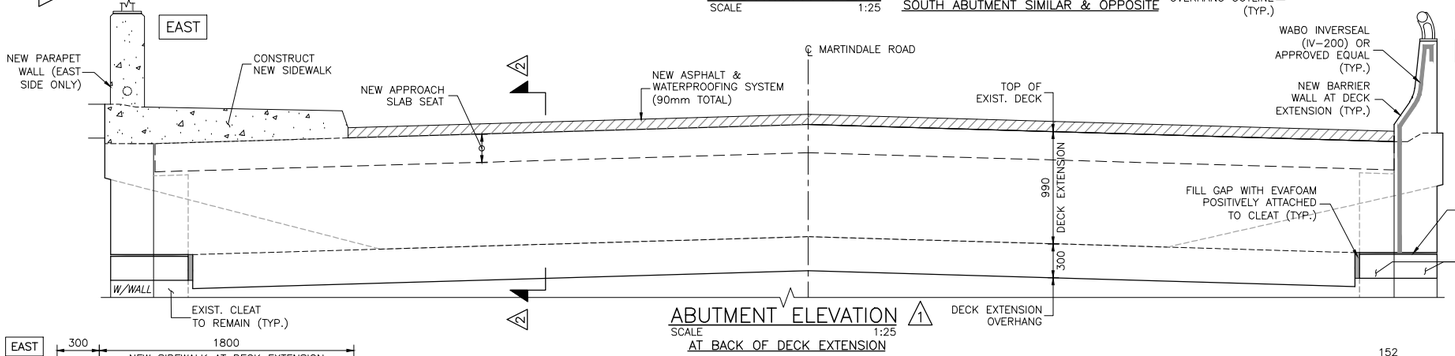
LEGEND

- NEW ASPHALT & WATERPROOFING
- NEW CONCRETE
- EVAFOAM
- EXISTING REINFORCING STEEL
- NEW REINFORCING STEEL



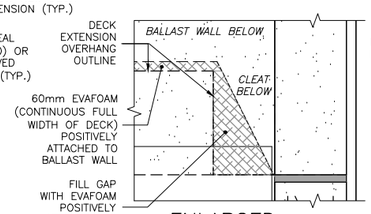
ABUTMENT PLAN
SCALE 1:25

NORTH ABUTMENT SHOWN
SOUTH ABUTMENT SIMILAR & OPPOSITE

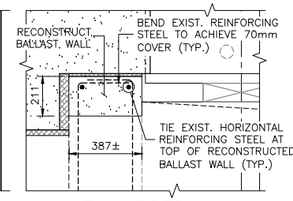


ABUTMENT ELEVATION
SCALE 1:25

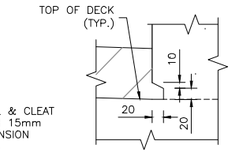
AT BACK OF DECK EXTENSION



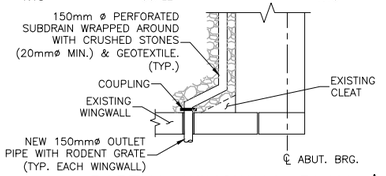
ENLARGED PARTIAL PLAN A
SCALE 1:15



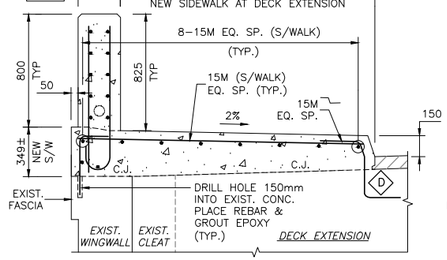
ENLARGED PARTIAL ELEVATION B
SCALE 1:15



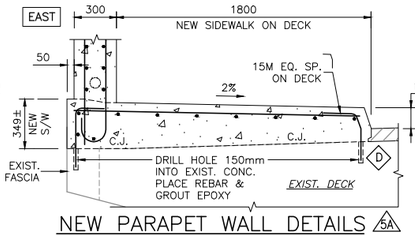
CHASE DETAIL D
N.T.S.



PARTIAL WINGWALL PLAN 7
SCALE 1:50

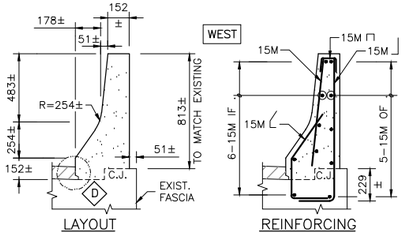


NEW PARAPET WALL DETAILS 5
SCALE 1:20



NEW PARAPET WALL DETAILS 5A
SCALE 1:20

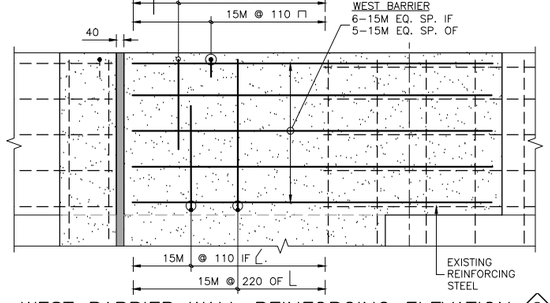
NOTE
FOR REINFORCING DETAILS OF PARAPET WALL, SEE ALSO DWGS. R1-6 & R1-7 (TYP.)



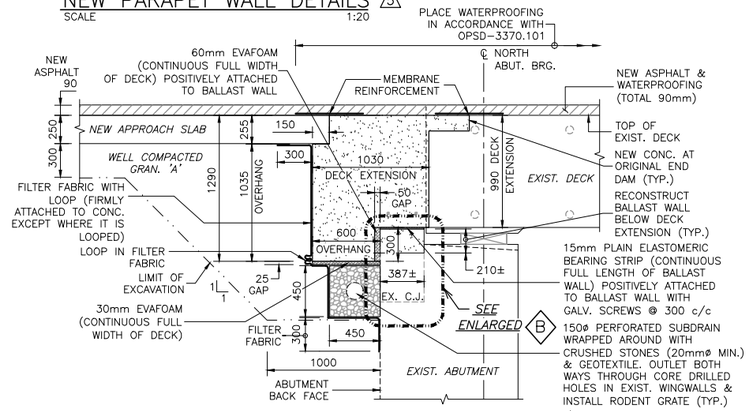
LAYOUT

REINFORCING

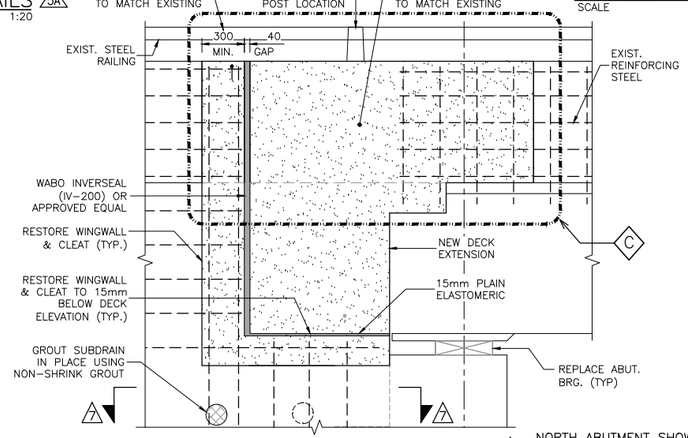
BARRIER RECONSTRUCTION 4
SCALE 1:20



WEST BARRIER WALL REINFORCING ELEVATION C
SCALE 1:15

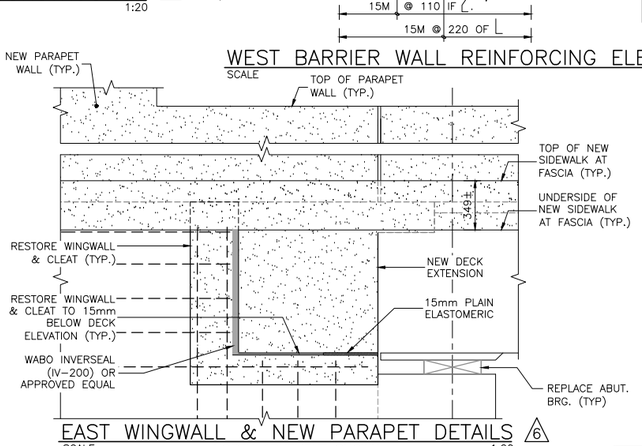


ABUTMENT & DECK REHABILITATION 2
SCALE 1:25



WEST WINGWALL & BARRIER REHABILITATION 3
SCALE 1:20

NORTH ABUTMENT SHOWN
SOUTH ABUTMENT SIMILAR & OPPOSITE



EAST WINGWALL & NEW PARAPET DETAILS 6
SCALE 1:20

NORTH ABUTMENT SHOWN
SOUTH ABUTMENT SIMILAR & OPPOSITE

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DRAFTING	C.B.
DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

wood.

Niagara Region PUBLIC WORKS

Contract # ____-__-____
Phase 2
BRIDGE REHABILITATION
Martindale Road at Highway 406
Niagara Region
REHABILITATION

SITE NO.	18-235/1
	METRIC
CONSULTANT FILE No.	TP113112
DATE	NOVEMBER 2018
SCALE	AS SHOWN
REF. No.	RN __-__
DWG No.	R1-4
REV.	

AutoCAD drawings: P:\Work\TP113112\Str\Dwg\Contract\REHAB BRIDGE\TP113112-R4.dwg Mar. 26/19 11:32am peter.bufrus

JACKING AND TEMPORARY SUPPORT LOADS	
SERVICEABILITY LIMIT STATES LOADING	J1
DEAD LOAD	1400 kN
TOTAL LOAD (DEAD + LIVE)	–

BEARING DATA									
TYPE	SIZE (mm)	SLS LOADING (kN)		ULS LOADING (kN)		MOVEMENT (mm)	ROTATION (rad.)	MAXIMUM SHEAR RATE AT 20° C	NUMBER REQUIRED
		DEAD	TOTAL	DEAD	TOTAL				
LAMINATED ELASTOMERIC	550x450x100	1050	1450	1300	2000	35	0.0130	2.47	8

JACKING NOTES:

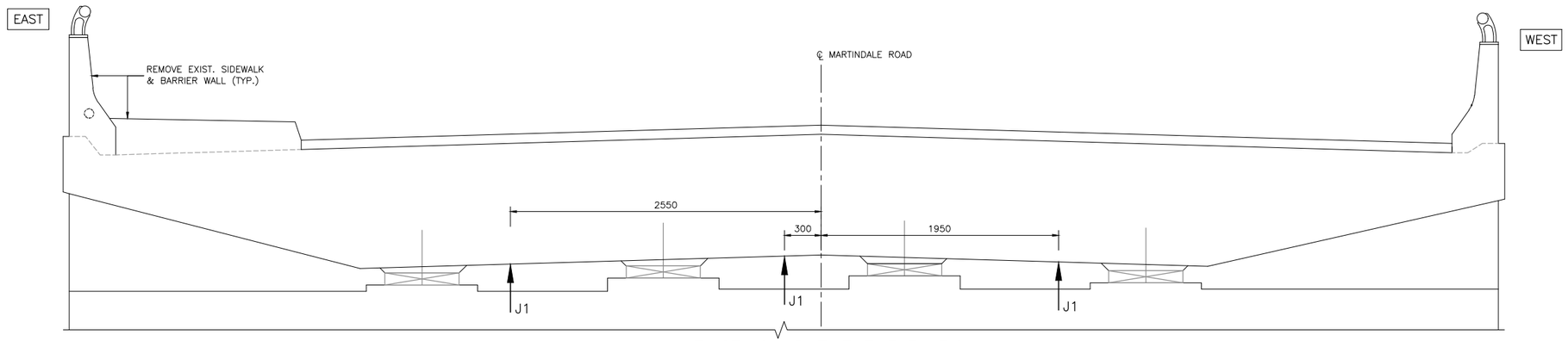
1. THE JACKING SYSTEM AND TEMPORARY SUPPORTS ARE TO BE DESIGNED BY THE CONTRACTOR.
2. JACKING SYSTEM AND TEMPORARY SUPPORTS SHALL BE CAPABLE OF SUPPORTING 200% OF THE SPECIFIED LOADS.
3. JACKING SYSTEM AND TEMPORARY SUPPORTS SHALL BE DESIGNED TO ALLOW ACCESS TO COMPLETE THE REQUIRED REPAIRS TO THE DECK SOFFIT AND ABUTMENTS.
4. VERTICAL CLEARANCE BETWEEN ABUTMENT BEARING SEAT AND DECK SOFFIT IS 150mm±. LOW PROFILE JACKS WILL BE REQUIRED. MULTIPLE JACKS MAY BE REQUIRED AT EACH JACKING / TEMPORARY SUPPORT LOCATION.
5. THE CONTRACTOR IS ALLOWED TO REMOVE CONCRETE FROM THE ABUTMENT SEAT TO INCREASE THE VERTICAL CLEARANCE HOWEVER REMOVAL SHALL BE LIMITED TO TOP OF REINFORCING STEEL.

LEGEND

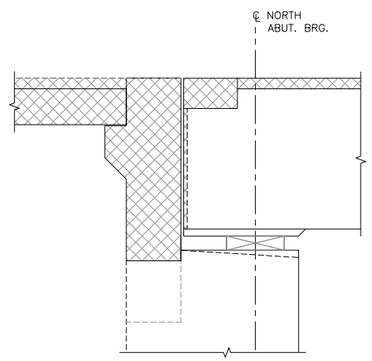
REMOVAL

CONSTRUCTION SEQUENCE FOR BEARING REPLACEMENT

1. REMOVE DETERIORATED CONCRETE FROM DECK SOFFIT AND ABUTMENT BEARING SEAT (AT JACK LOCATIONS). REPAIR WITH 30 MPa CONCRETE. CONCRETE REPAIRS AT THE JACKING AND TEMPORARY SUPPORT LOCATIONS MUST ACHIEVE A MINIMUM COMPRESSIVE STRENGTH OF 20 MPa. PRIOR TO JACKING.
2. REMOVE ANY DEBRIS BETWEEN THE DECK AND BALLAST WALLS AND ADJUST RAILINGS AS REQUIRED TO ALLOW FREE MOVEMENT PRIOR TO JACKING.
3. INSTALL JACKS AT ABUTMENT AND SHIMS ON ABUTMENT BEARING SEAT AND DECK SOFFIT AS REQUIRED.
4. JACK UP THE ENTIRE WIDTH OF THE DECK SIMULTANEOUSLY BY MAX. 7mm AND TRANSFER LOADING TO THE TEMPORARY SUPPORTS.
5. REPLACE BEARINGS. GRINDING OF THE DECK SOFFIT AND ABUTMENT BEARING SEAT TO ACCOMMODATE THE NEW BEARINGS IS ACCEPTABLE PROVIDED THAT THE SURFACE IS INTENTIONALLY ROUGHENED.
6. LOWER THE DECK AND TRANSFER LOAD TO THE BEARINGS. BEARINGS SHALL BE IN FULL CONTACT AT EACH LOCATION.
7. REMOVE JACKING SYSTEM INCLUDING ANCHORS INTO CONCRETE AND REPAIR HOLES WITH APPROVED NON-SHRINK GROUT.



EXISTING ABUTMENT ELEVATION
SCALE 1:20



EXISTING ABUTMENT SECTION /1
SCALE 1:20

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

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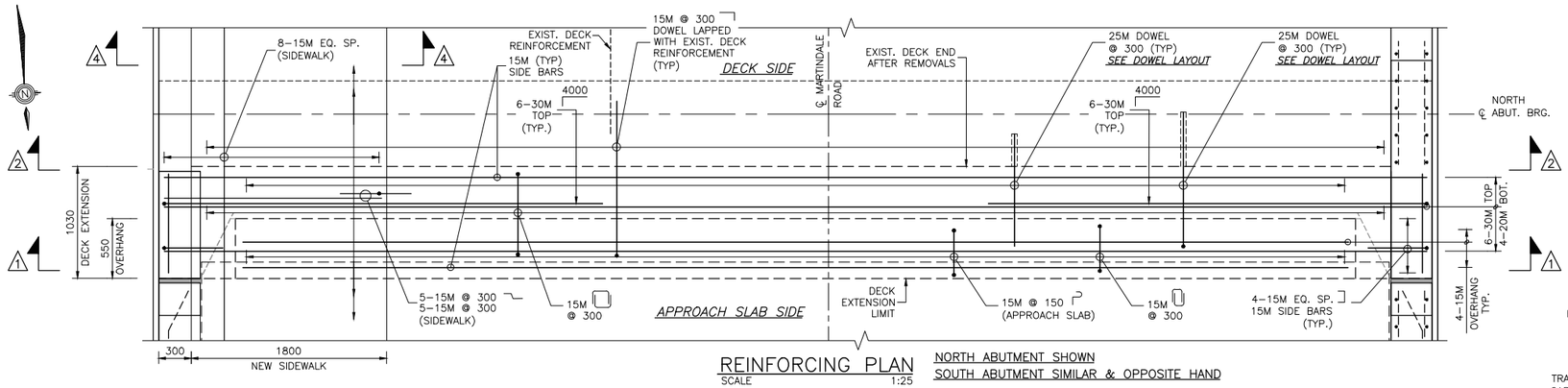
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Niagara Region PUBLIC WORKS

Contract # ____-_-___
Phase 2
BRIDGE REHABILITATION
Martindale Road at Highway 406
Niagara Region
JACKING / TEMPORARY SUPPORT

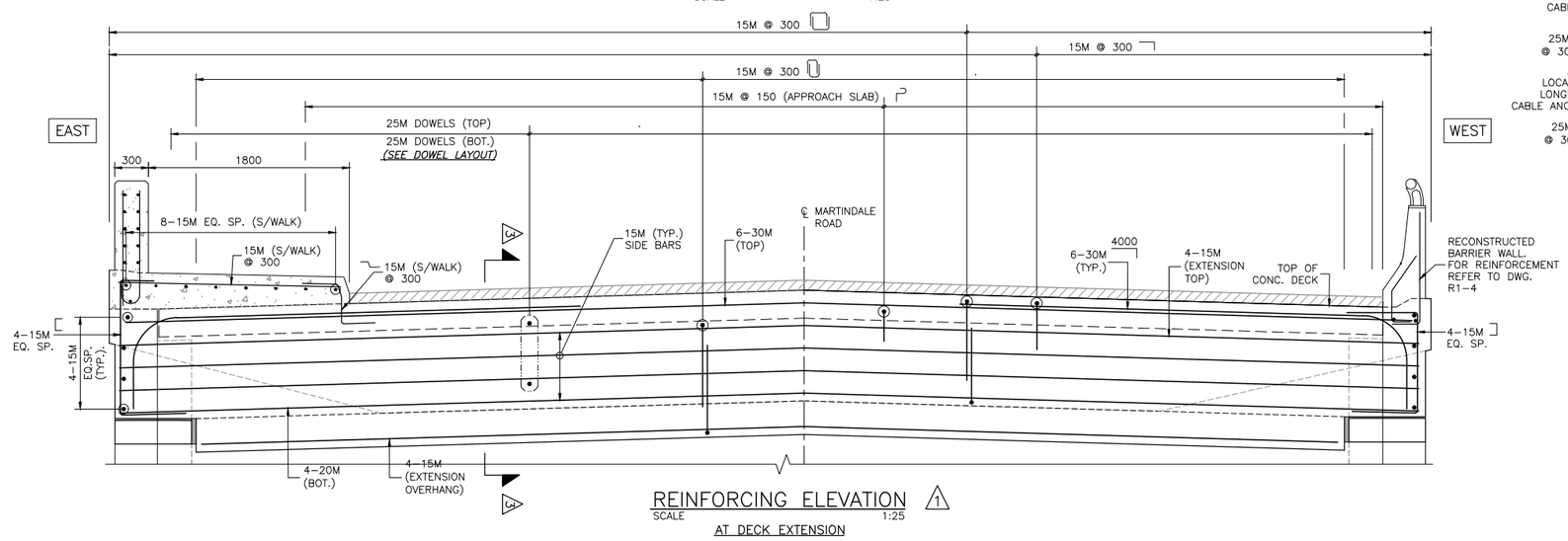
SITE NO.	18-235/1
	METRIC
CONSULTANT FILE No.	TP113112
DATE	NOVEMBER 2018
SCALE	AS SHOWN
REF. No.	RN __-__
DWG No.	R1-5
REV.	

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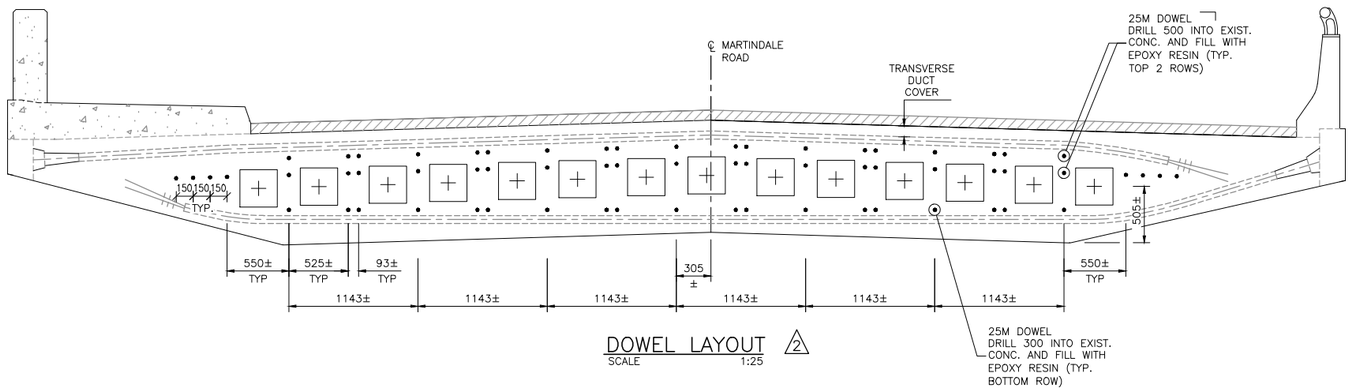
REINFORCING PLAN
SCALE 1:25

NORTH ABUTMENT SHOWN
SOUTH ABUTMENT SIMILAR & OPPOSITE HAND

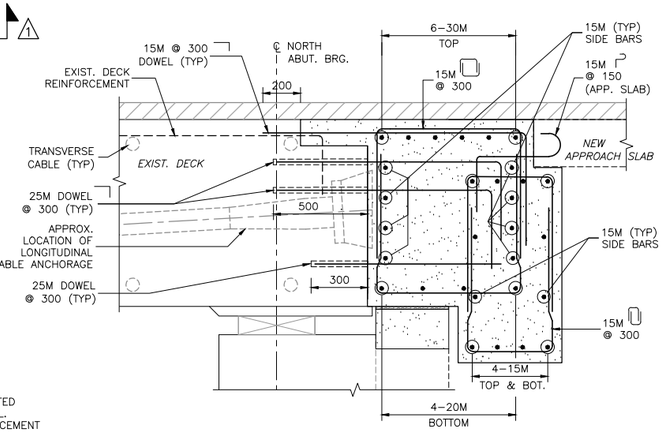


REINFORCING ELEVATION
SCALE 1:25

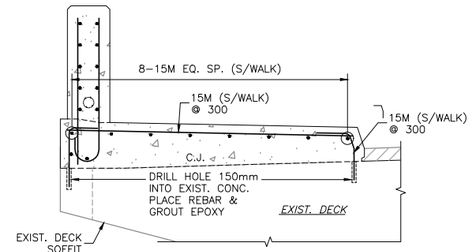
AT DECK EXTENSION



DOWEL LAYOUT
SCALE 1:25



REINFORCING SECTION
SCALE 1:15



SIDEWALK ON DECK SECTION
SCALE 1:20

NOTES
1. THIS DRAWING TO BE READ IN CONJUNCTION WITH GENERAL ARRANGEMENT AND DETAILS DRAWINGS.
2. COVER METERS OR OTHER METHODS SHALL BE USED TO LOCATE EXISTING REINFORCEMENT AND POST–TENSIONING DUCTS IN DECK PRIOR TO DRILLING HOLES TO REDUCE THE RISK OF DRILL HOLES HITTING EXISTING REINFORCEMENT.

ABBREVIATION LEGEND

ABUT.	ABUTMENT
BRG.	BEARING
EQ. SP.	EQUAL SPACE
EXIST.	EXISTING
MIN.	MINIMUM
IF	INSIDE FACE
OF	OUTSIDE FACE
TYP.	TYPICAL

LEGEND
- NEW ASPHALT & WATERPROOFING
- NEW CONCRETE
- EVAFOAM
- EXISTING REINFORCING STEEL
- NEW REINFORCING STEEL

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

no.	REVISION	DATE	INIT.
4	ISSUED FOR TENDER	2019–APR.	N.T.
3	ISSUED FOR 90% MTO EXECUTIVE REVIEW	2019–02–05	N.T.
2	ISSUED FOR 90% MTO REVIEW	2018–DEC.	C.B.
1	ISSUED FOR 60% MTO REVIEW	2015–10–06	C.B.

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DRAFTING	C.B.
DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

wood.

Niagara Region PUBLIC WORKS

Contract # ____-_-___
Phase 2
BRIDGE REHABILITATION
Martindale Road at Highway 406
Niagara Region
DECK DETAILS

SITE NO.	18–235/1
	METRIC
CONSULTANT FILE No.	TP113112
DATE	NOVEMBER 2018
SCALE	AS SHOWN
REF. No.	RN __–__
DWG No.	R1-6
REV.	

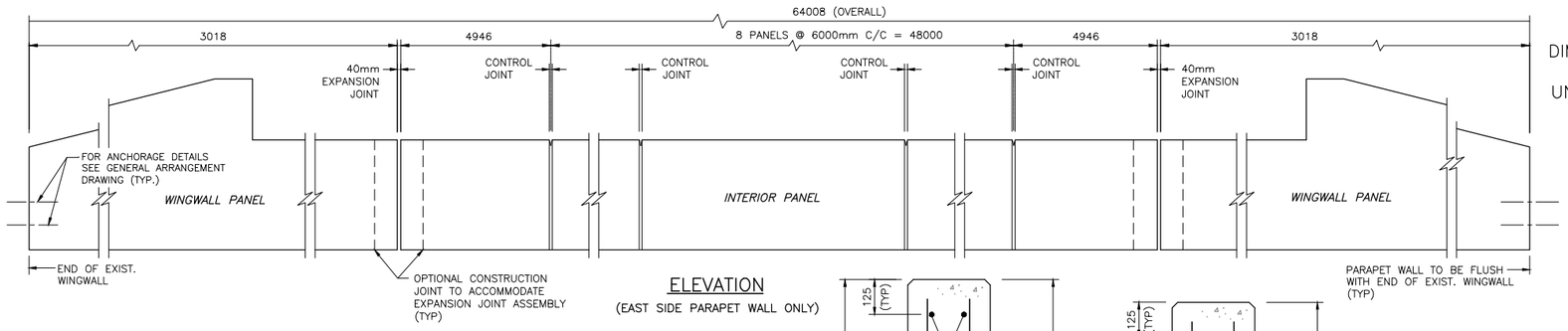
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METRIC

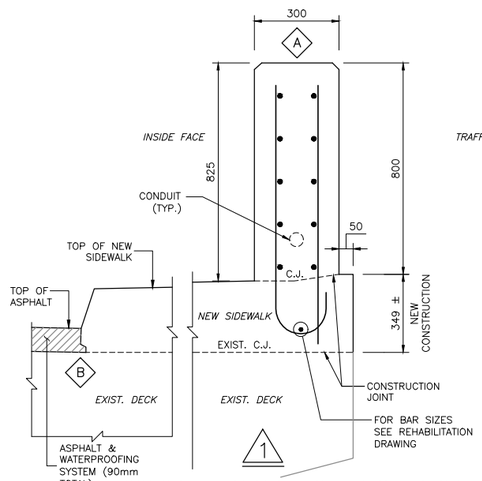
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

NOTES:

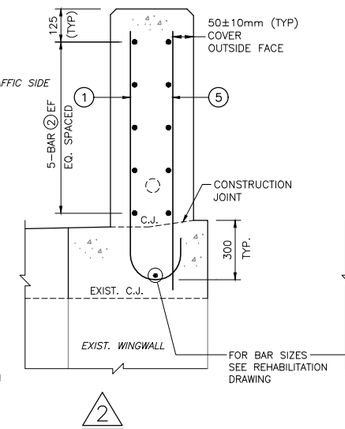
1. SYSTEM CONFIGURATION MEETS THE REQUIREMENTS OF NCHRP 350.
2. CONCRETE COVER TO REINFORCING 60±10mm EXCEPT AS NOTED.
3. REINFORCING SHALL BE GLASS FIBRE REINFORCED POLYMER (GFRP) GRADE III. SIZE IN THE BAR SCHEDULE INDICATES GFRP GRADE AND DESIGNATED BAR DIAMETER AND SHALL HAVE A CROSS SECTIONAL AREA ACCORDING TO CAN/CSA S-807.
4. BAR LAP SPLICE FOR HORIZONTAL REINFORCEMENT MUST NOT LAP THROUGH CONTROL JOINT.
5. MINIMUM BAR LAP SPLICE TO BE 550mm, UNLESS OTHERWISE SHOWN.
6. LENGTH OF HORIZONTAL BAR TO SUIT CONTRACTOR'S OPERATIONS. BAR LENGTHS NEED NOT MATCH DISTANCE BETWEEN CONTROL JOINTS.
7. CONTROL JOINT TO BE FORMED.
8. SAWCUTS NOT PERMITTED.
9. CONTROL JOINT FORM HARDWARE NOT TO BE LEFT IN PLACE.
10. OPTIONAL CONSTRUCTION JOINTS TO BE LOCATED WITHIN LIMITS OF CONCRETE DAMS ON DECK OR BALLAST WALL.
11. CHASE REQUIRED ON HIGH AND LOW SIDE OF CROSSFALL.
12. THIS STANDARD DRAWING MAY BE SUBSTITUTED WITH STANDARD DRAWING SS110-84.
13. THE CONTRACT ADMINISTRATOR SHALL SELECT FIVE (5) SAMPLES AT RANDOM, FROM EACH GFRP BAR MARK IDENTIFIED WITH AN (*), FOR QUALITY ASSURANCE TESTING. THE CONTRACTOR NEEDS TO ALLOW FOR THIS WHEN CALCULATING THE NUMBER OF BARS TO BE DELIVERED TO THE SITE.
14. LEGEND:
    - EF – DENOTES EACH FACE
    - IF – DENOTES INSIDE FACE
    - OF – DENOTES OUTSIDE FACE
    - CJ – DENOTES CONSTRUCTION JOINT

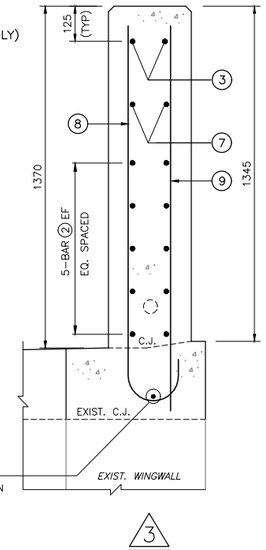


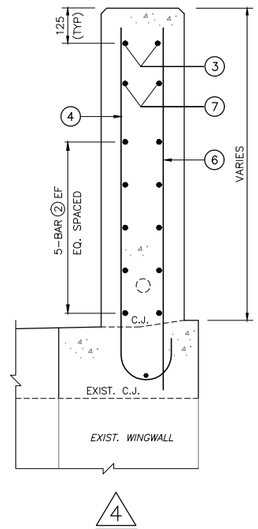
ELEVATION
(EAST SIDE PARAPET WALL ONLY)



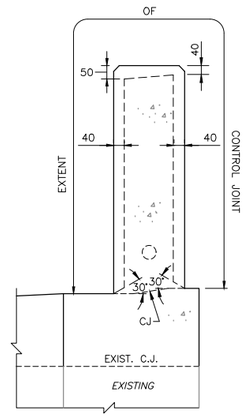
CONCRETE PARAPET ON EXIST. DECK
TYPICAL DIMENSIONS
(FOR BAR NUMBERS SEE 2)







CONCRETE PARAPET ON EXIST. WINGWALL
TYPICAL REINFORCEMENT



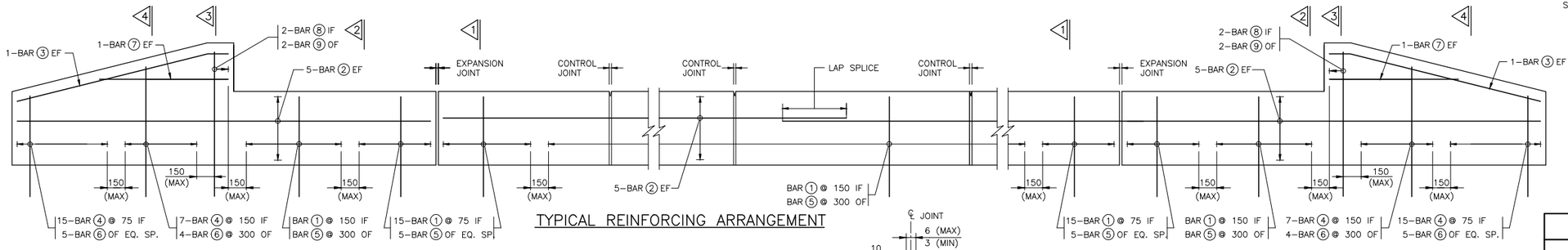
EXTENT OF CONTROL JOINT IN PARAPET WALL

BAR MARK	SIZE	SHAPE
① *	GIII–20M	80, 190, 945
② *	GIII–15M	STRAIGHT
③	GIII–15M	2190, 530, 230
④ *	GIII–20M	80, 190, VARIES
⑤ *	GIII–15M	STRAIGHT
⑥	GIII–15M	STRAIGHT LENGTH VARIES
⑦	GIII–15M	STRAIGHT
⑧	GIII–20M	80, 190, 1490
⑨	GIII–15M	STRAIGHT

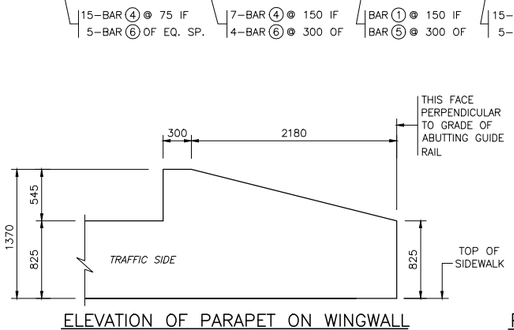
(*) SEE NOTE 13.

APPLICABLE STANDARD DRAWING:

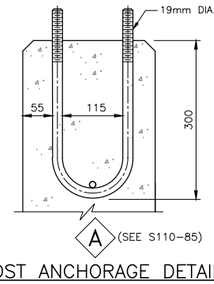
SS110-85 RAILING ON PARAPET/BARRIER FOR COMBINATION TRAFFIC/BICYCLE RAIL, TL-4



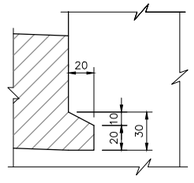
TYPICAL REINFORCING ARRANGEMENT



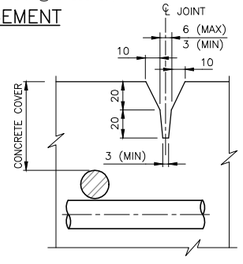
ELEVATION OF PARAPET ON WINGWALL



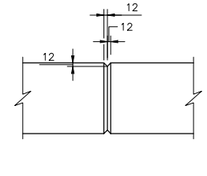
POST ANCHORAGE DETAIL



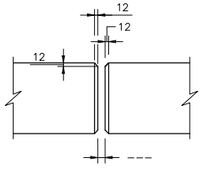
CHASE DETAIL



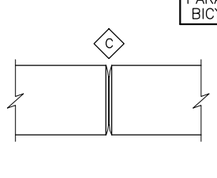
CONTROL JOINT DETAIL



TYPICAL OPTIONAL CONSTRUCTION JOINT



TYPICAL EXPANSION JOINT



TYPICAL CONTROL JOINT

MODIFIED	
STANDARD DRAWING MAY 2018	SS110–83
PARAPET WALL FOR COMBINATION TRAFFIC/ BICYCLE RAIL, TL–4 (GFRP GRADE III REBAR)	

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

NO.	REVISION	DATE	INIT.
4	ISSUED FOR TENDER	2019–APR.	N.T.
3	ISSUED FOR 90% MTO EXECUTIVE REVIEW	2019–02–05	N.T.
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DRAFTING	C.B.
DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

wood.

Niagara Region PUBLIC WORKS

Contract # ___-_-___
Phase 2
BRIDGE REHABILITATION
Martindale Road at Highway 406
Niagara Region
PARAPET WALL FOR COMBINATION TRAFFIC / BICYCLE RAIL ON SIDEWALK, TL-4

SITE NO.	18–235/1
	METRIC
CONSULTANT FILE No.	TP113112
DATE	NOVEMBER 2018
SCALE	AS SHOWN
REF. No.	RN __-__
DWG No.	R1-7
REV.	

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METRIC

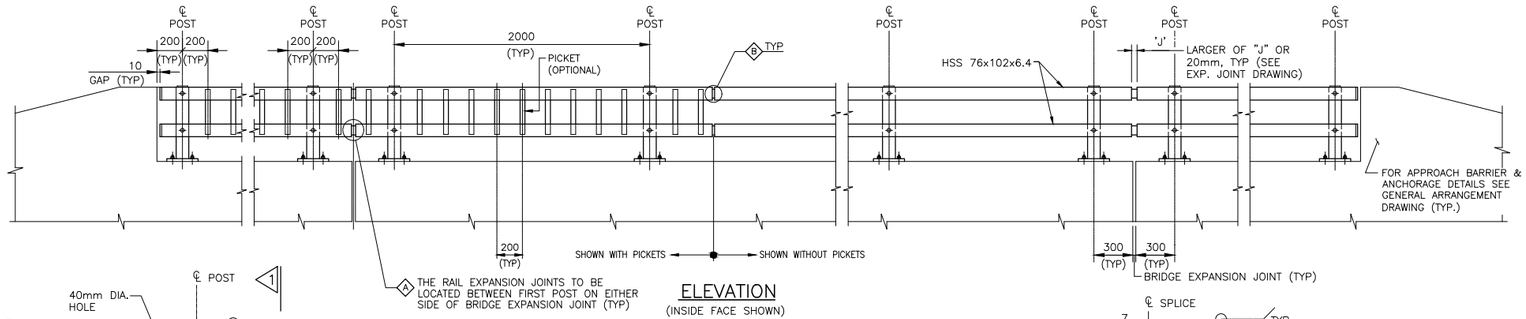
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

NOTES:

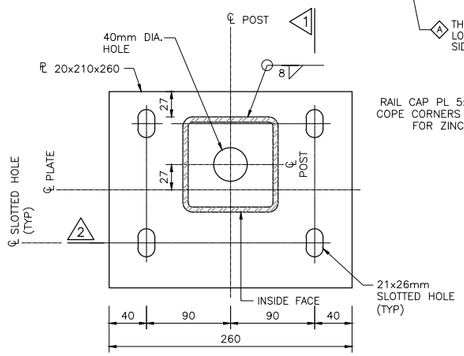
1. THIS STANDARD TO BE READ IN CONJUNCTION WITH SS110–83.
2. RAIL ELEMENTS AND POSTS SHALL BE HOLLOW STRUCTURAL SECTIONS GRADE 350W, CLASS C.
3. STEEL PLATES SHALL BE GRADE 350W.
4. ANCHOR STUDS, WASHERS AND NUTS SHALL BE ACCORDING TO ASTM A449.
5. BOLTS, WASHERS AND NUTS FOR FASTENING GUIDE RAILS TO POST SHALL CONFORM TO ASTM A307.
6. RAIL SHALL BE SUPPLIED IN LENGTHS TO BE ATTACHED TO A MINIMUM OF THREE (3) POSTS EXCEPT WHEN THE WINGWALL LENGTH OF A BRIDGE WITH EXPANSION JOINTS DOES NOT PERMIT THIS. IN THIS CASE, THE RAIL LENGTH SHALL BE ATTACHED TO TWO (2) POSTS ON THE WINGWALL.
7. GALVANIZING ON MATING SURFACES OF RAILS TO HAVE UNIFORM THICKNESS NOT EXCEEDING 0.15 mm TO ENSURE SLIDING FIT.
8. RAIL, POSTS AND RAIL SPLICES SHALL BE HOT DIP GALVANIZED. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION.
9. BOLTS, ANCHOR STUDS, PLATES, WASHERS AND NUTS SHALL BE HOT DIP GALVANIZED. LOCKNUTS SHALL BE ZINC PLATED ACCORDING TO ASTM–B695.
10. RAILS SHALL BE PREBENT TO FOLLOW ROAD CURVATURE WHERE RADIUS IS LESS THAN 150 METRES.
11. RAIL POSTS SHALL BE SET PERPENDICULAR TO GRADE.
12. RAIL MAY BE CUT AS REQUIRED IN FIELD. CUT TO BE SURFACE TREATED WITH A ZINC TOUCH–UP SOLDER, GALVAGUARD OR APPROVED EQUIVALENT.
13. WHEN CONNECTING TO EXISTING RAILING, RAIL MUST BE MADE CONTINUOUS AND POST SPACING DETERMINED WITH REFERENCE TO EXISTING POSTS.
14. GROUT SHALL NOT BE USED UNDER BASE PLATES. THIN PAD OF OF EPOXY GROUT MAY BE USED WHEN REQUIRED FOR FILLING THE VOIDS UNDER THE BASE PLATE.
15. BOLTS IN RAIL SPLICES SHALL BE TIGHTENED TO A CONDITION THAT WILL ALLOW RAIL MOVEMENT.
16. HOLES FOR HSS RAILING SHALL BE DRILLED IN FIELD
17. POST ANCHORING NUTS SHALL BE TIGHTENED TO A SNUG FIT CONDITION AND GIVEN AN ADDITIONAL 1/3 OF A TURN

ADDITIONAL NOTES FOR PICKET:

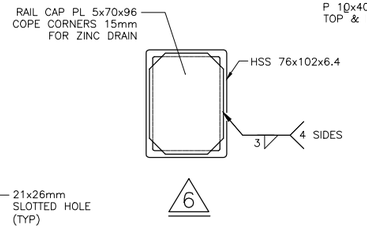
1. PICKET SHALL BE 38x12 STEEL BAR GRADE 300W.
2. HOT DIP GALVANIZING OF RAILING SHALL BE AFTER ADDITION OF PICKETS.



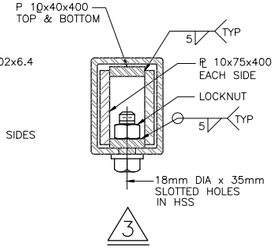
ELEVATION
(INSIDE FACE SHOWN)

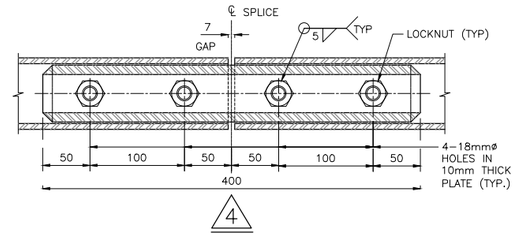


BASE PLATE

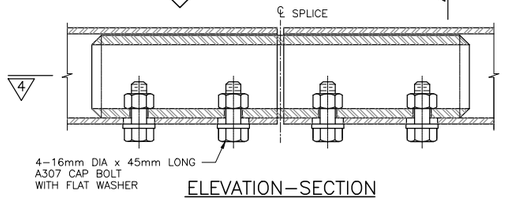


RAIL CAP

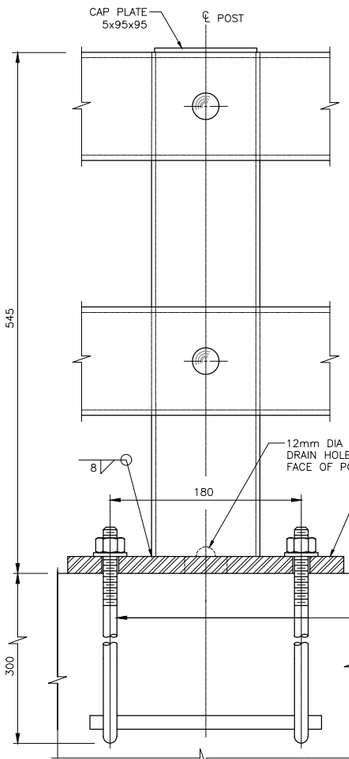




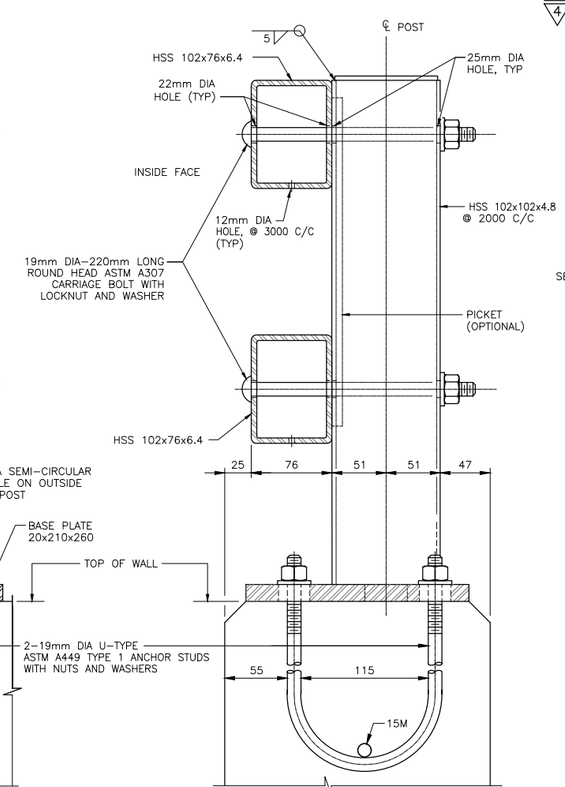
B RAIL SPLICE DETAIL



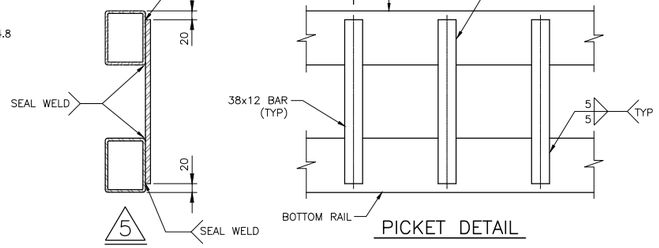
ELEVATION–SECTION



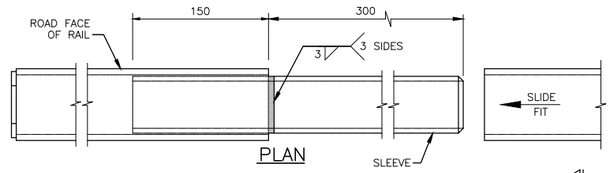
FRONT ELEVATION 2



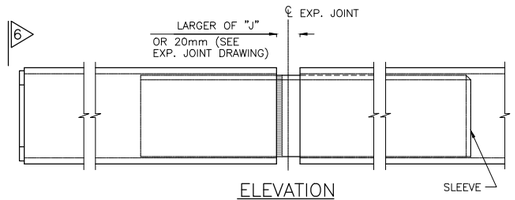
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PICKET DETAIL

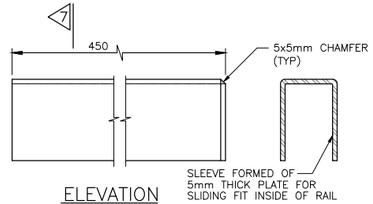


PLAN



ELEVATION

A EXPANSION JOINT ASSEMBLY



ELEVATION

EXPANSION JOINT SLEEVE 7

MODIFIED	
STANDARD DRAWING SEPTEMBER 2016	SS110–85
RAILING ON PARAPET FOR COMBINATION TRAFFIC/BICYCLE RAIL, TL–4	

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

NO.	REVISION	DATE	INIT.
4	ISSUED FOR TENDER	2019–APR.	N.T.
3	ISSUED FOR 90% MTO EXECUTIVE REVIEW	2019–02–05	N.T.
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DRAFTING	C.B.
DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

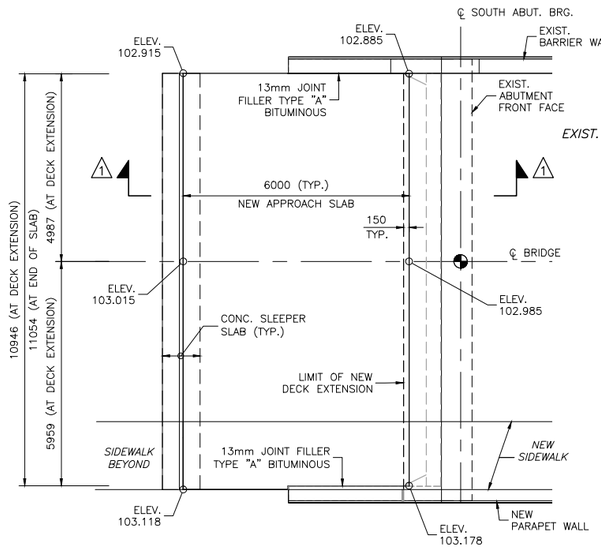
wood.

Niagara Region PUBLIC WORKS

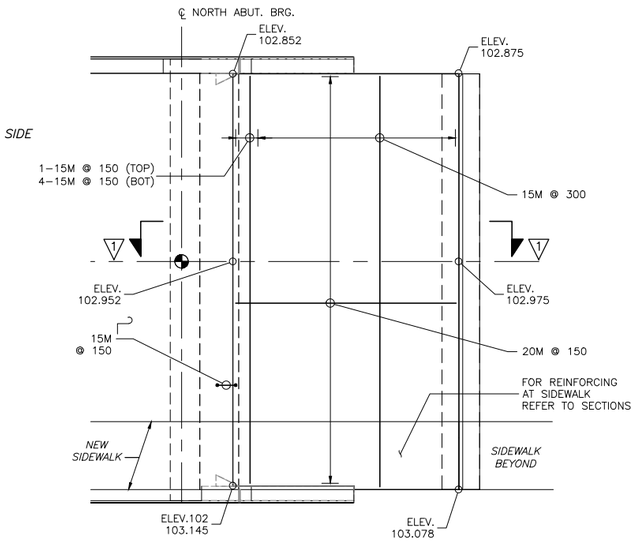
Contract # ____-__-____
Phase 2
BRIDGE REHABILITATION
Martindale Road at Highway 406
Niagara Region
RAILING ON PARAPET FOR COMBINATION TRAFFIC / BICYCLE RAIL, TL4

SITE NO. 18–235/1	
METRIC	
CONSULTANT FILE No. TP113112	
DATE	NOVEMBER 2018
SCALE	AS SHOWN
REF. No.	RN __–__
DWG No.	R1–8
REV.	

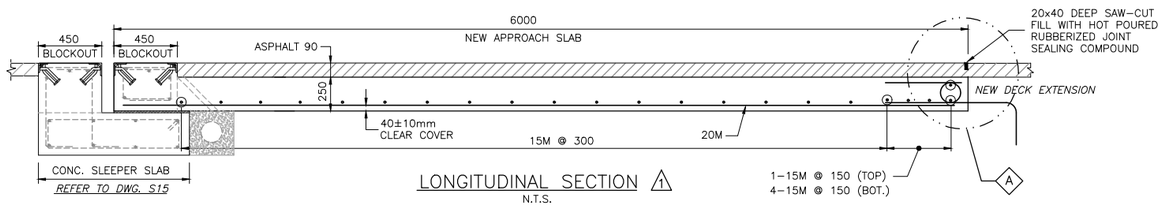
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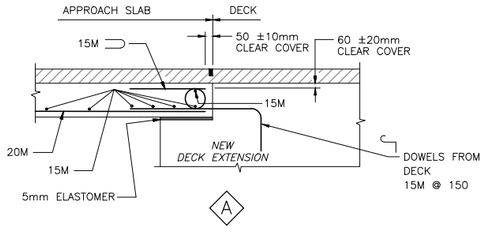
LAYOUT PLAN
SCALE 1:75



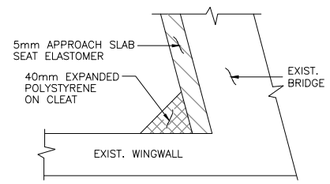
REINFORCING PLAN
SCALE 1:75



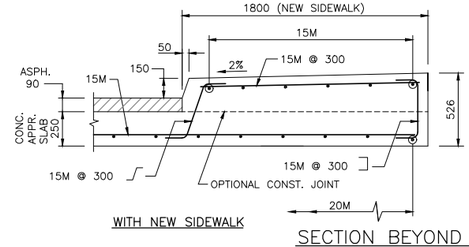
LONGITUDINAL SECTION ⚠
N.T.S.



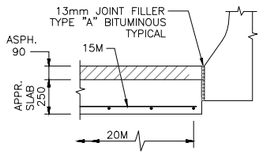
FOR BRIDGES WITHOUT EXPANSION JOINTS



DETAIL AT CLEAT

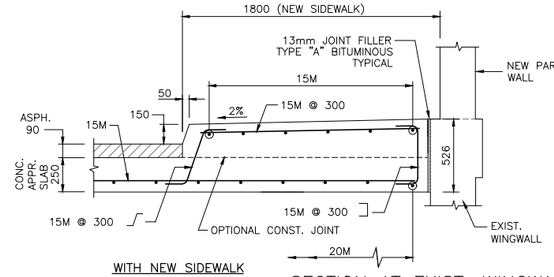


WITH NEW SIDEWALK

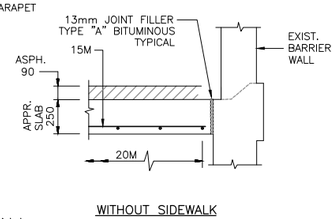


WITH ROADSIDE BARRIER

SECTION BEYOND WINGWALL



WITH NEW SIDEWALK



WITHOUT SIDEWALK

SECTION AT EXIST. WINGWALL

NOTES:

1. CLEAR COVER TO REINFORCING STEEL 70 ± 20 mm EXCEPT AS NOTED.
2. LAYOUT OF REINFORCING STEEL WILL BE SIMILAR FOR LEFT HAND AND ZERO DEGREE SKEW.
3. STAINLESS STEEL BARS SHALL BE TYPE 316 LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500 MPA. REINFORCING STEEL SHALL BE GRADE 400W.
4. WATERPROOFING AT JOINT BETWEEN BRIDGE AND APPROACH SLAB TO BE IN ACCORDANCE WITH OPSD–3370.100
5. WATERPROOFING FOR BRIDGES WITHOUT EXPANSION JOINTS (RIGID FRAMES AND INTEGRAL ABUTMENTS) TO BE IN ACCORDANCE WITH OPSD–3370.101
6. BARS MARK WITH PREFIX "S" DENOTE STAINLESS STEEL BARS.
7. THIS DRAWING TO BE READ IN CONJUNCTION WITH GENERAL ARRANGEMENT AND DETAILS DRAWINGS.

APPLICABLE STANDARD DRAWINGS

OPSD–3370.100 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE WITH PROTECTION BOARD

OPSD–3370.101 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE AT ACTIVE CRACKS GREATER THAN 2mm WIDE AND CONSTRUCTION JOINTS

MODIFIED	
STANDARD DRAWING MARCH 2016	SS116–1
6000mm APPROACH SLAB	

no.	REVISION	DATE	INIT.
4	ISSUED FOR TENDER	2019–APR.	N.T.
3	ISSUED FOR 90% MTO EXECUTIVE REVIEW	2019–02–05	N.T.
2	ISSUED FOR 90% MTO REVIEW	2018–DEC.	C.B.
1	ISSUED FOR 60% MTO REVIEW	2015–10–06	C.B.

NOTES/LEGEND
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DRAFTING	C.B.
DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

wood.

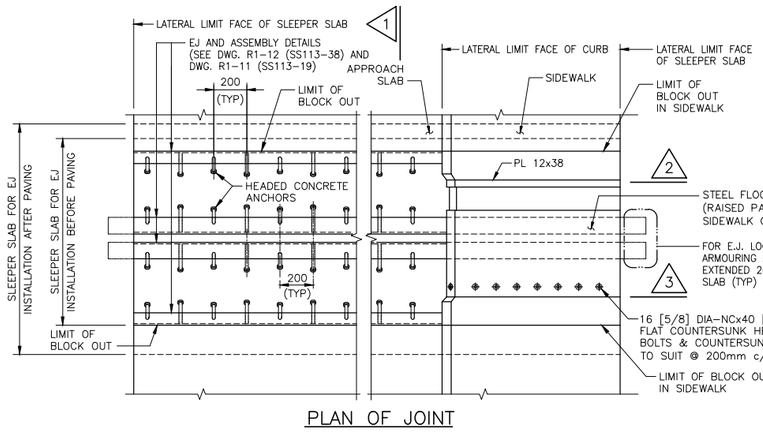
Niagara Region PUBLIC WORKS

Contract # ____-_-___
Phase 2
BRIDGE REHABILITATION
Martindale Road at Highway 406
Niagara Region
6000mm APPROACH SLAB

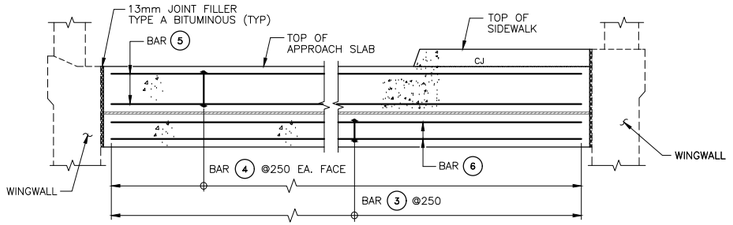
DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

SITE NO.	18–235/1
	METRIC
CONSULTANT FILE No.	TP113112
DATE	NOVEMBER 2018
SCALE	AS SHOWN
REF. No.	RN __–__
DWG No.	R1-9
REV.	

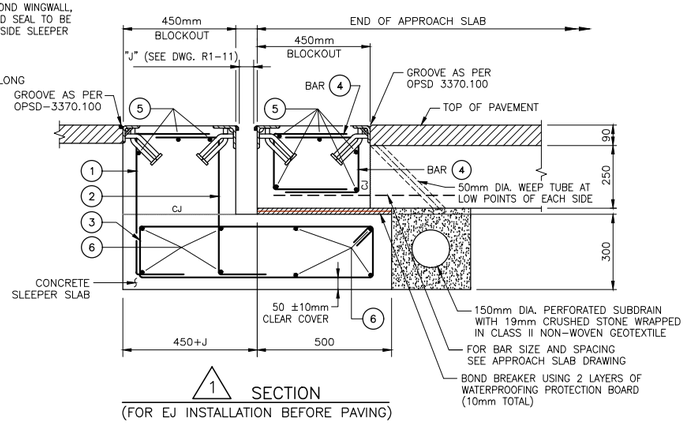
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PLAN OF JOINT



2 SECTION AT WINGWALL
(ARMOURING DETAIL NOT SHOWN FOR CLARITY)



1 SECTION
(FOR EJ INSTALLATION BEFORE PAVING)

BAR MARK	SIZE	SHAPE
(1)	S15M	310 / 530 / 180
(2)	S15M	300 / 530 / 180
(3)	15M	180
(4)	S15M	200 / 310
(5)	S15M	STRAIGHT
(6)	15M	STRAIGHT
(7)	S15M	260 / 440
(8)	S15M	310 / 490 / 180
(9)	S15M	300 / 490 / 180

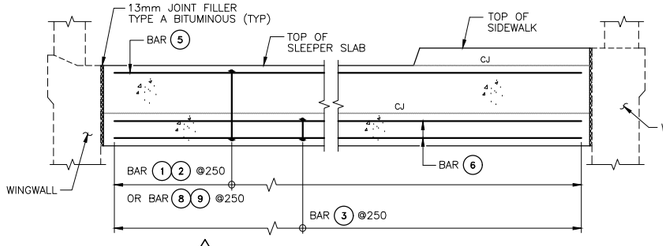
NOTES:

1. THIS DRAWING SHOWS EXPANSION JOINT AND SLEEPER SLAB AT THE END OF APPROACH SLAB OF INTEGRAL AND SEMI-INTEGRAL ABUTMENT BRIDGES WITH A MOVEMENT BETWEEN 10 AND 40mm.
2. CLASS OF CONCRETE 30 MPa.
3. REINFORCEMENT STEEL SHALL BE GRADE 400W. STAINLESS STEEL SHALL BE TYPE 316 LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500 MPa. BARS MARKED WITH PREFIX S DENOTE STAINLESS STEEL BARS.
4. COVER TO REINFORCING STEEL 70 ±20mm EXCEPT AS NOTED.
5. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING R1-11 (SS113-19).
6. EXPANSION JOINT TO BE SUPPLIED BY MANUFACTURES LISTED IN DSM 9.40.27 FOR THE SUPPLY OF TYPE 'C' STRIP SEAL EXPANSION JOINT.
7. EXPANSION JOINT ASSEMBLY CONSTRUCTION AND MATERIAL SHALL BE ACCORDING TO OPSS 920 AND OPSS 1210, AND AS SPECIFIED IN THE CONTRACT DOCUMENTS.
8. JOINT ASSEMBLY SHALL BE COMPLETELY SHOP ASSEMBLED (EXCEPT FOR SEALS) AND PRESET TO DIMENSION 'J' FOR 15°C AND ADJUSTED IN THE FIELD TO SUIT INSTALLATION TEMPERATURE.
9. JOINT ASSEMBLY INSTALLATION TEMPERATURE SHALL BE TAKEN AS MEAN SHADE AIR TEMPERATURE AT STRUCTURE PRIOR TO JOINT INSTALLATION AS FOLLOWS:
   - FOR CONCRETE STRUCTURES – 48 HOURS
   - FOR STEEL STRUCTURES – 24 HOURS
10. FIELD SPLICES IN JOINT ASSEMBLY ARE ONLY PERMITTED AT STAGED CONSTRUCTION, AND/OR AS SHOWN ON THE CONTRACT DRAWINGS.
11. IF THE JOINT ARMOURING FOR A SKEW STRUCTURE IS SPLICED AT A CROWN, THE SPLICE SHALL BE DETAILED PARALLEL TO THE CENTRELINE OF THE TRAFFIC LANE.
12. SETTING ANGLES SHALL BE FLAME CUT ACCORDING TO OPSS 920, BUT IN NO CASE PRIOR TO CONCRETE REACHING INITIAL SET.
13. AFTER CURING OF THE CONCRETE HAS BEEN COMPLETED, THE SETTING DEVICES MAY BE REMOVED. THE VOIDS UNDER THE ARMOURING ANGLE AND NOSING ANGLE SHALL THEN BE PRESSURE INJECTED.
14. PREFORMED SEALS SHALL HAVE MINIMUM THICKNESS OF 5mm OR AS PER DSM.
15. ALL STEEL RETAINER SURFACES COMING IN CONTACT WITH PREFORMED SEAL SHALL BE CLEANED PRIOR TO INSTALLATION OF THE SEAL.
16. PREFORMED SEALS SHALL BE INSTALLED AFTER JOINT ASSEMBLY HAS BEEN CAST, STYROFOAM OR FILLER BETWEEN APPROACH SLAB AND SLEEPER SLAB REMOVED, AND EXPANSION GAP CLEARED OF ANY DEBRIS.
17. HEADED CONCRETE ANCHORS IN NOSING ANGLES SHALL BE LOCATED WITHIN 75mm OF EITHER SIDE OF FIELD SPLICES.
18. PROTECT INJECTION HOSE AND FITTINGS ADJACENT TO FIELD SPLICE DURING WELDING AND REMOVE PROTECTION PRIOR TO PLACING OF CONCRETE IN BLOCKOUT.
19. FOR SKEWED STRUCTURE, WORKING DRAWING SHALL BE DETAILED TO SUIT GEOMETRY OF STRUCTURE.
20. ALL JOINT ANCHORAGES SHALL BE DETAILED ON WORKING DRAWINGS PERPENDICULAR TO THE EXPANSION JOINT ON BOTH THE APPROACH SLAB SIDE AND THE SLEEPER SLAB SIDE EXCEPT STRUCTURE SKEWED FROM OVER 15° AND UP TO 45° SHALL HAVE ANCHORAGES DETAILED 30° OFFSET FROM THE PERPENDICULAR TO THE EXPANSION JOINT ON THE APPROACH SLAB SIDE.
21. ALL CONSTRUCTIONS JOINTS (CJ) SURFACES SHALL BE INTENTIONALLY ROUGHENED BEFORE NEW CONCRETE IS PLACED AGAINST THEM.
22. SEQUENCE OF EXPANSION JOINT INSTALLATION SHALL BE AS PER DRAWING R1-12 (SS113-38).

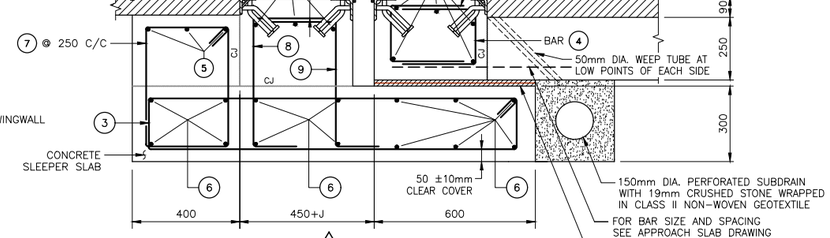
LEGEND:

[ ] DENOTES FASTENER SIZE IN INCHES
CJ DENOTES CONSTRUCTION JOINT
EJ DENOTES EXPENSION JOINT

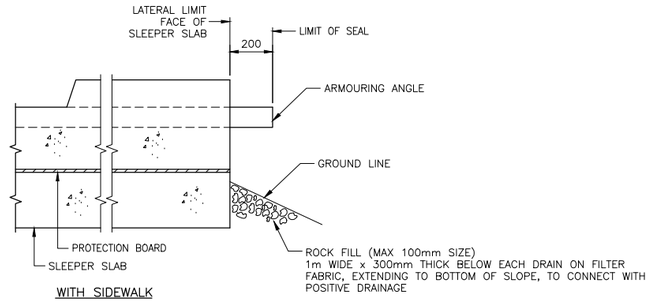
MODIFIED	
STANDARD DRAWING MAY 2017	SS113-37
EXPANSION JOINT AND SLEEPER SLAB (10mm< MOVEMENT ⩽40mm)	



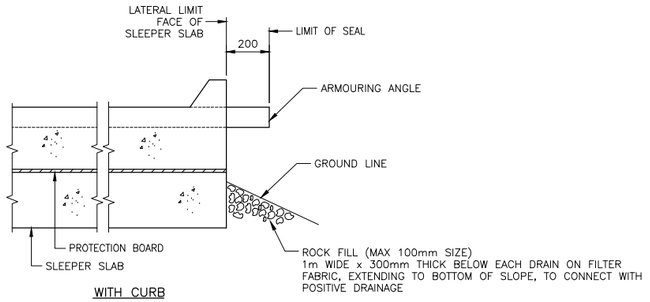
3 SECTION AT WINGWALL
(ARMOURING DETAIL NOT SHOWN FOR CLARITY)



1 SECTION
(FOR EJ INSTALLATION AFTER PAVING)



WITH SIDEWALK



WITH CURB

E.J. BEYOND WINGWALL

(FOR REINFORCING SEE 1 2 AND 3)

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

NO.	REVISION	DATE	INIT.
4	ISSUED FOR TENDER	2019-APR.	N.T.
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DRAFTING	C.B.
DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

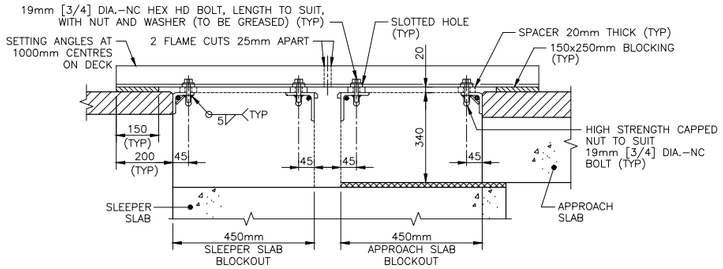
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Niagara Region PUBLIC WORKS

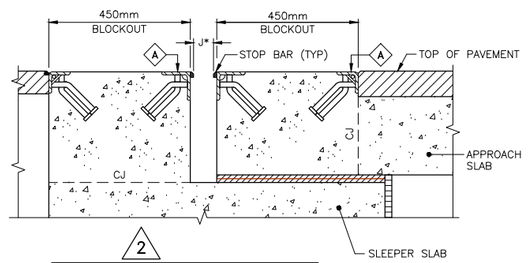
Contract # ____-__-____
Phase 2
BRIDGE REHABILITATION
Martindale Road at Highway 406
Niagara Region
EXPANSION JOINT AND SLEEPER SLAB

SITE NO.	18-235/1
	METRIC
CONSULTANT FILE No.	TP113112
DATE	NOVEMBER 2018
SCALE	AS SHOWN
REF. No.	RN __-__
DWG No.	R1-10
REV.	

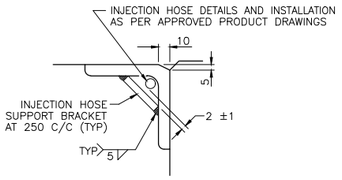
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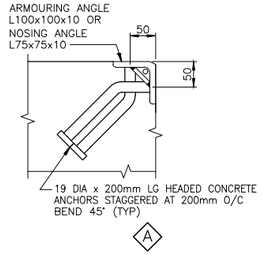
SETTING DEVICE AND BLOCKOUTS

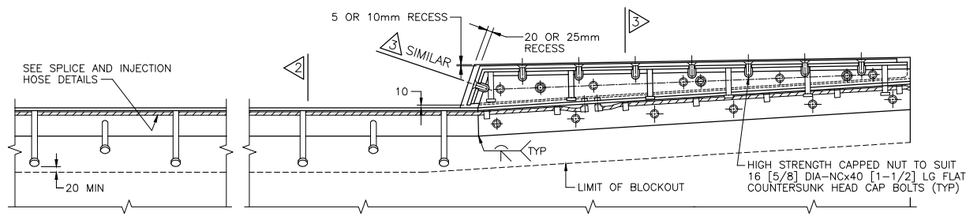


2
(EXPANSION JOINT SEAL NOT SHOWN)



INJECTION HOSE SUPPORT BRACKET DETAIL





SECTION AT EXPANSION JOINT

NOTE:

1. THIS DRAWING TO BE READ IN CONJUCTION WITH DWG. R1–10 (SS113–37).

LEGEND:

[ ] – DENOTED FASTENER SIZE IN INCHES
CJ – DENOTED CONSTRUCTION JOINT
EJ – DENOTED EXPANSION JOINT

ADDITIONAL NOTES FOR BOLTS:

1. 19 [3/4] DIAMETER BOLTS SHALL BE IN ACCORDANCE WITH WITH ASTM A325. ALL BOLTS USED IN 25 DIA. x 50 LONG SLOTTED HOLES SHALL BE INSTALLED WITH OVERSIZE WASHERS.
2. 16 [5/8] DIAMETER FLAT COUNTERSUNK HEAD CAP BOLTS SHALL BE IN ACCORDANCE WITH ASTM F835.
3. ALL BOLTS SHALL BE INSTALLED USING MOLY50 LUBRICANT.
4. ALL BOLTS SHALL BE TENSIONED USING THE TURN–OF–NUT TIGHTENING METHOD IN ACCORDANCE WITH CAN/CSA S6–14.

TABLE OF DESIGN REQUIREMENTS

EXP. JOINT LOCATION	MTO GAP ** RATING (mm)		DESIGN *** MOVEMENT	* "J" AT INSTALLATION TEMPERATURE (C) (mm)							
	MIN	MAX		–5°	0°	5°	10°	15°	20°	25°	30°
EAST ABUT.	40	100	37	58	56	54	52	50	48	46	44
WEST ABUT.	40	100	37	58	56	54	52	50	48	46	44

* DIMENSION 'J' MEASURED PERPENDICULAR TO CENTRELINE OF EXPANSION JOINT. WHERE MIN. AND MAX. FOR JOINT SUPPLIED DIFFER FROM THOSE SHOWN IN TABLE, 'J' DIMENSIONS SHALL BE REVISED BY CONTRACTOR AND SHOWN ON SHOP DRAWINGS. FOR STAGED CONSTRUCTION ON STRUCTURES OTHER THAN POST–TENSIONED, THE CONTRACTOR SHALL USE THE FIRST STAGE OBSERVED 'J' GAP TO INSTALL THE SECOND STAGE.

** MTO GAP, MEASURED BETWEEN PROJECTING FACES OF STEEL CLAMPING BAR, IS TAKEN FROM DSM 9.40.27, TYPE "C".

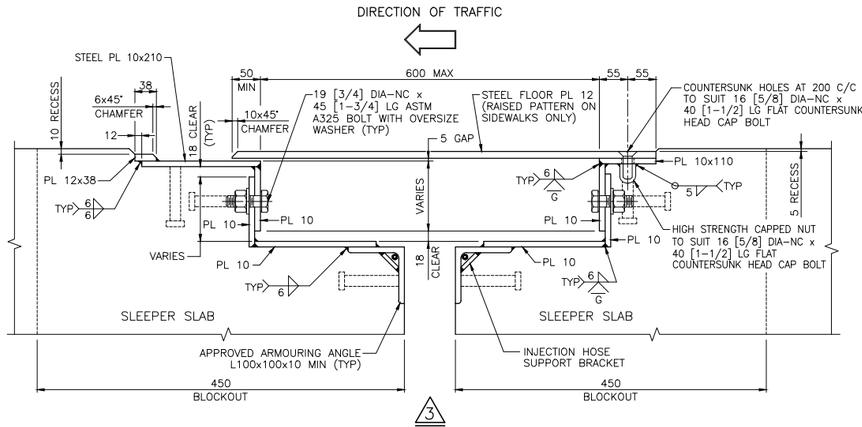
*** CALCULATED TOTAL MOVEMENT AT SLS OCCURRING AFTER TIME OF JOINT INSTALLATION. (MEASURED PARALLEL TO CENTRELINE OF STRUCTURE)

MODIFIED

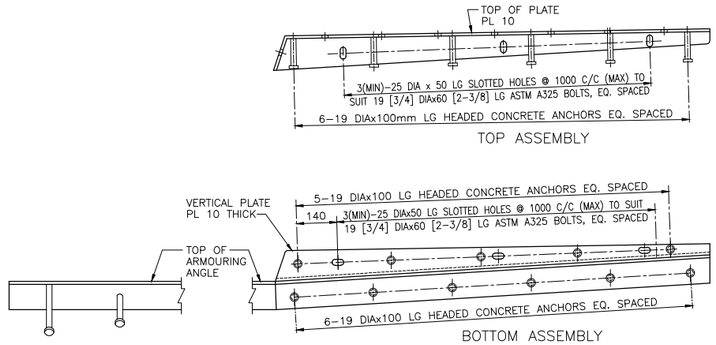
STANDARD DRAWING MAY 2018

SS113–19

STRIP SEAL EXPANSION JOINT FOR SLEEPER SLAB (10mm< MOVEMENT ≤40mm)



3
(STOP BARS AND RETAINER PLATES NOT SHOWN FOR CLARITY)

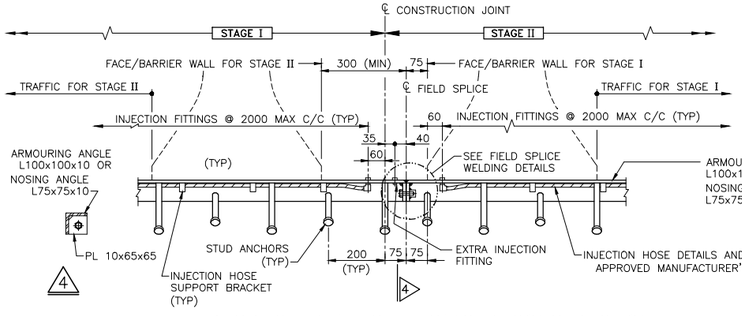


TOP ASSEMBLY

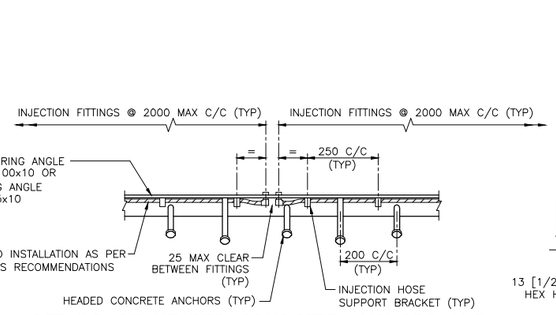
BOTTOM ASSEMBLY

DETAIL OF ARMOURING WITHOUT SIDEWALK

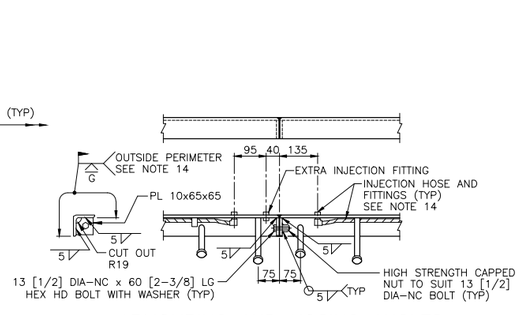
DETAIL OF ARMOURING AT SIDEWALK



FIELD SPLICE DETAILS AT STAGED CONSTRUCTION FOR ARMOURING AND NOSING ANGLES



DETAILS OF HEADED CONCRETE ANCHORS AND INJECTION HOSE FOR ARMOURING AND NOSING ANGLES



ARMOURING AND NOSING ANGLES FIELD SPLICE DETAIL

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

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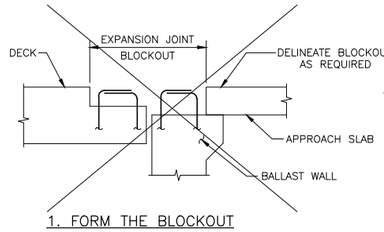
wood.

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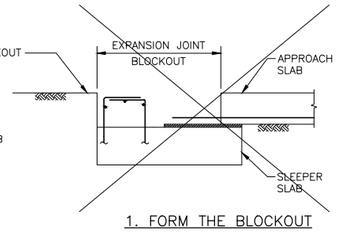
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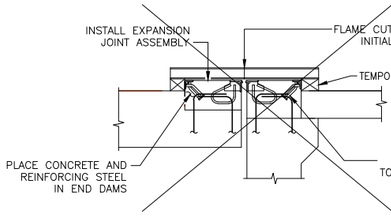
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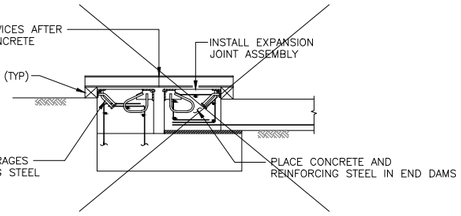
1. FORM THE BLOCKOUT



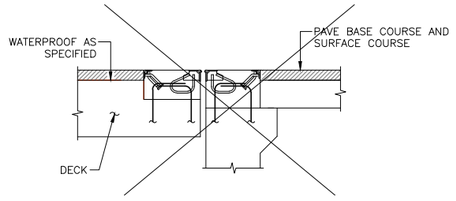
1. FORM THE BLOCKOUT



2. INSTALL THE EXPANSION JOINT

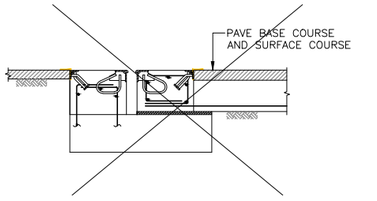


2. INSTALL THE EXPANSION JOINT



3. INSTALL THE WATERPROOFING AND PAVEMENT

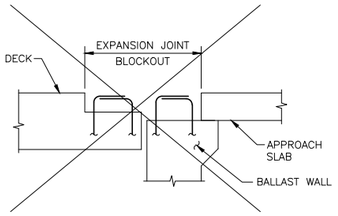
AT BRIDGE DECK



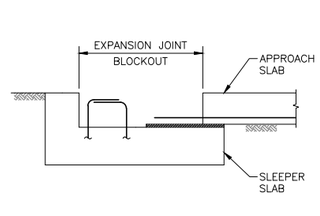
3. INSTALL THE WATERPROOFING AND PAVEMENT

AT SLEEPER SLAB

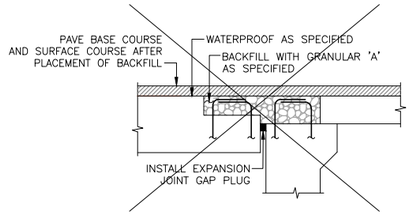
INSTALLATION BEFORE PAVING



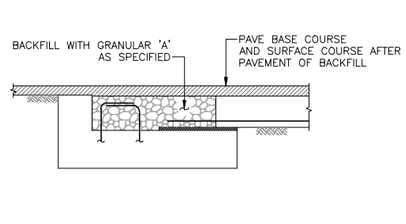
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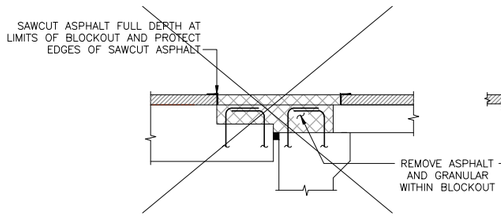
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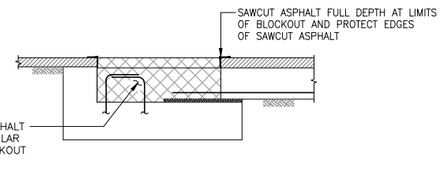
2. BACKFILL AND PAVE OVER BLOCKOUT



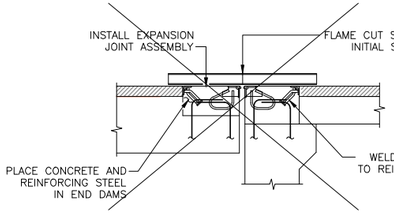
2. BACKFILL AND PAVE OVER BLOCKOUT



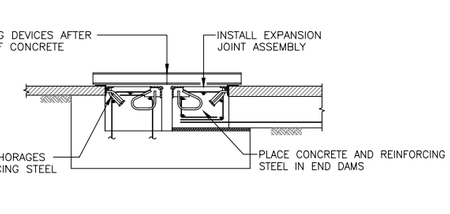
3. PREPARE BLOCKOUT FOR EXPANSION JOINT



3. PREPARE BLOCKOUT FOR EXPANSION JOINT



4. INSTALL THE EXPANSION JOINT



4. INSTALL THE EXPANSION JOINT

AT BRIDGE DECK

AT SLEEPER SLAB

INSTALLATION AFTER PAVING

NOTES:

1. THE PURPOSE OF THIS DRAWING IS TO SHOW SCHEMATICALLY THE EXPANSION JOINT CONSTRUCTION SEQUENCE.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE EXPANSION JOINT DRAWINGs (R1-10 & R1-11) AND SPECIFICATIONS.
3. REINFORCING STEEL AND JOINT HARDWARE SHOWN ARE SCHEMATIC ONLY AND ARE AS SPECIFIED ELSEWHERE.
4. CONTRACTOR SHALL ENSURE THAT ALL REINFORCEMENT IN THE BLOCKOUT IS NOT DAMAGED.

MODIFIED	
STANDARD DRAWING MAY 2017	SS113-38
SEQUENCE OF EXPANSION JOINT INSTALLATION	

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

NO.	REVISION	DATE	INIT.
4	ISSUED FOR TENDER	2019-APR.	N.T.
3	ISSUED FOR 90% MTO EXECUTIVE REVIEW	2019-02-05	N.T.
2	ISSUED FOR 90% MTO REVIEW	2018-DEC.	C.B.
1	ISSUED FOR 60% MTO REVIEW	2015-10-06	C.B.

NOTES/LEGEND
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DRAFTING	C.B.
DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

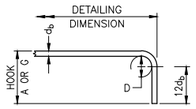
wood.

Niagara Region PUBLIC WORKS

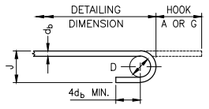
Contract # ____-_-____
Phase 2
BRIDGE REHABILITATION
Martindale Road at Highway 406
Niagara Region
SEQUENCE OF EXPANSION JOINT INSTALLATION

SITE NO.	18-235/1
	METRIC
CONSULTANT FILE No.	TP113112
DATE	NOVEMBER 2018
SCALE	AS SHOWN
REF. No.	RN __-__
DWG No.	R1-12
REV.	

AutoCAD drawing: P:\Work\TP113112\Str\Dwg\Contract\REHAB BRIDGE\TP113112-R12.dwg Mar 26/19 11:41am peter.butrus



STANDARD 90° HOOK



STANDARD 180° HOOK

MINIMUM BENDING PIN DIAMETER, D, mm

BAR SIZE	STEEL GRADE	
	400R (2)	400W
10M	70	60
15M	100	90
20M	120	100
25M	150	150
30M	250	200
35M	300	250
45M	450 (1)	400
55M	600 (1)	550

(1) Special fabrication is required for bends exceeding 90° for bars of these sizes and grade.

(2) For stainless steel, with Fy = 500, use the same D as for 400R.

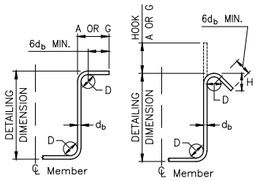
STANDARD HOOK DIMENSIONS

BAR SIZE	90° HOOKS		180° HOOKS			
	A OR G (mm)		A OR G (mm)		J (mm)	
	400R	400W	400R	400W	400R	400W
10M	180	180	140	130	90	80
15M	260	250	180	170	130	120
20M	310	300	220	200	160	140
25M	400	400	280	280	200	200
30M	510	490	400	350	310	260
35M	610	590	480	430	370	320
45M	790	770	680	630	540	490
55M	1030	1010	900	850	710	660

NOTE: All Hook Dimensions are according to the CHBDC–2000.

MINIMUM STIRRUP AND TIE HOOK DIMENSIONS

BAR SIZE	BAR DIAM. d_b(mm)	PIN DIAM. D(mm)	90° A OR G (mm)	135° A OR G (mm)	135° H (approx.) (mm)
10M	11.3	45	100	100	70
15M	16.0	65	140	140	100
20M	19.5	80	180	175	115
25M	25.2	100	230		

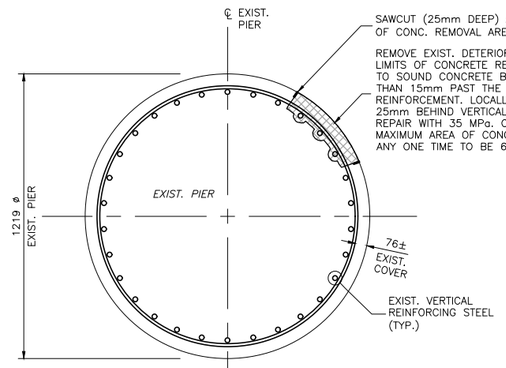


MIN. 90° HOOK MIN. 135° HOOK

HOOK DIMENSIONS FOR REINFORCING STEEL BARS

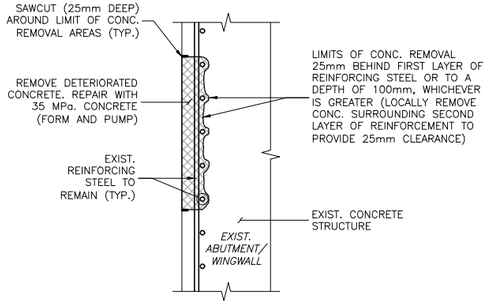
Date: OCT 2013 | Rev:

SS12–1



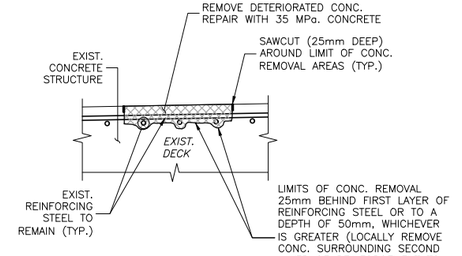
PIER REPAIR DETAIL

SCALE N.T.S.



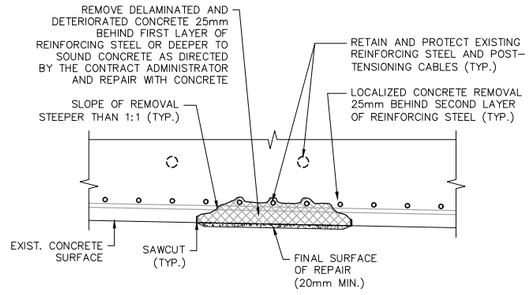
ABUTMENT / WINGWALL REPAIR DETAIL

SCALE N.T.S.



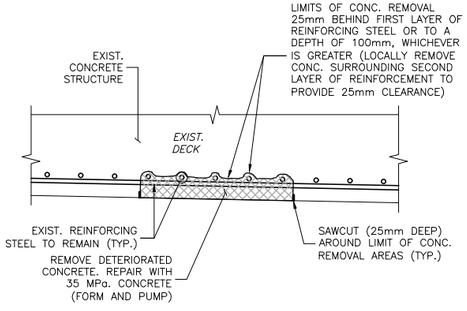
DECK TOP / BEARING SEAT REPAIR DETAIL

SCALE N.T.S.



REPAIRS AT AREAS WITH CONCRETE COVER < 50mm

SCALE N.T.S.



DECK SOFFIT REPAIR DETAIL

SCALE N.T.S.

DRAWING NOT TO BE SCALED

100 mm ON ORIGINAL DRAWING

no.	REVISION	DATE	INIT.
4	ISSUED FOR TENDER	2019–APR.	N.T.
3	ISSUED FOR 90% MTO EXECUTIVE REVIEW	2019–02–05	N.T.
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DRAFTING C.B.
DESIGN N.T.
CHECKED BY N.T.
APPROVED BY K.A.

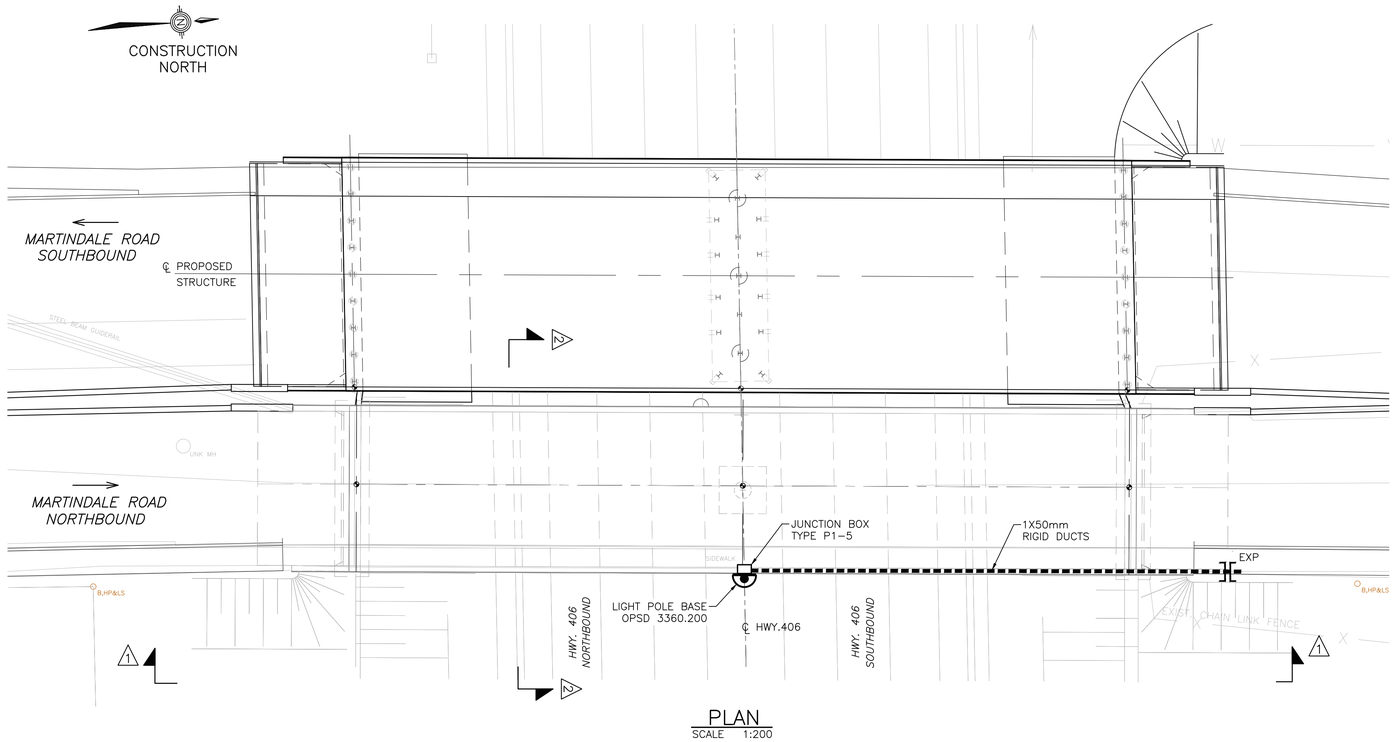
wood.

Niagara Region PUBLIC WORKS

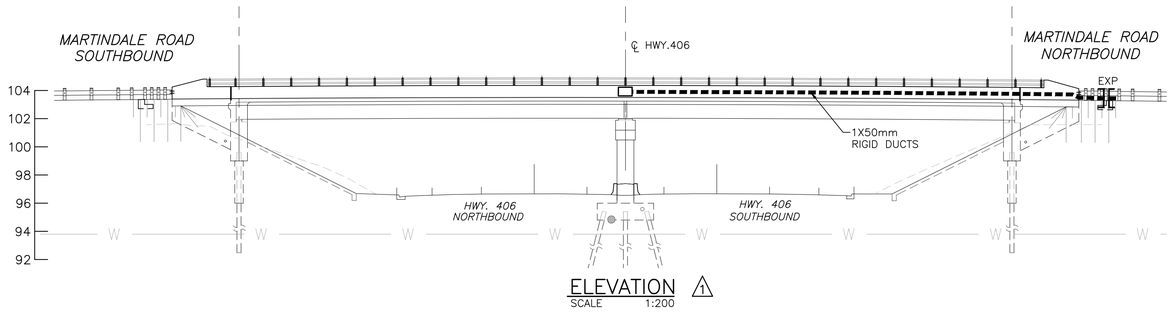
Contract # ____-_-____
Phase 2
BRIDGE REHABILITATION
Martindale Road at Highway 406
Niagara Region
MISCELLANEOUS REPAIR DETAILS

SITE NO. 18–235/1
METRIC
CONSULTANT FILE No. TP113112
DATE NOVEMBER 2018
SCALE AS SHOWN
REF. No. RN __-__
DWG No. R1-13
REV.

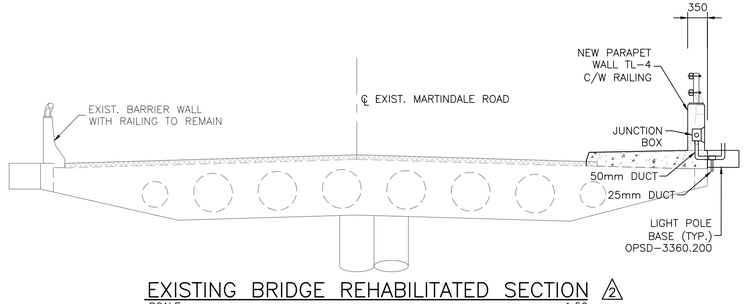
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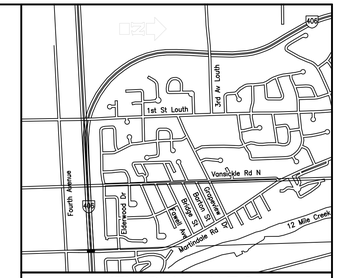
PLAN
SCALE 1:200



ELEVATION 1
SCALE 1:200



EXISTING BRIDGE REHABILITATED SECTION 2
SCALE 1:50



KEY PLAN - N.T.S.

LEGEND

- LIGHTING POLE BASE ON STRUCTURE
- EMBEDDED JUNCTION BOX
- EXP — EXPANSION JOINT
- 50mm PVC EMBEDDED DUCTS

APPLICABLE STANDARD DRAWINGS

OPSD-3360.200 – DECK, LIGHT POLE BASES, STRUCTURES WITH PARAPET WALLS
OPSD-2302.010 – EMBEDDED WORK DETAIL
OPSD-2302.020 – EXPANSION JOINT AND DEFLECTION FITTING ASSEMBLY FOR 50mm RIGID DUCTS
OPSD-2302.045 – EMBEDDED WORK IN STRUCTURES WITH PARAPET WALLS

U TECH ENGINEERS INC.
60 LEGENDARY CIRCLE
BRAMPTON, ON L6Y 0S1
TEL: 905-497-8414
WEB: www.utecheng.ca

No.	REVISION	DATE	INIT.
1	ISSUED FOR TENDER	2019/04/11	U.P.

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DRAFTING	S.S
DESIGN	U.P.
CHECKED BY	J.J
APPROVED BY	U.P.

LICENSED PROFESSIONAL ENGINEER
U. PADMANATH
100120747
PROVINCE OF ONTARIO
Apr. 11 / 2019

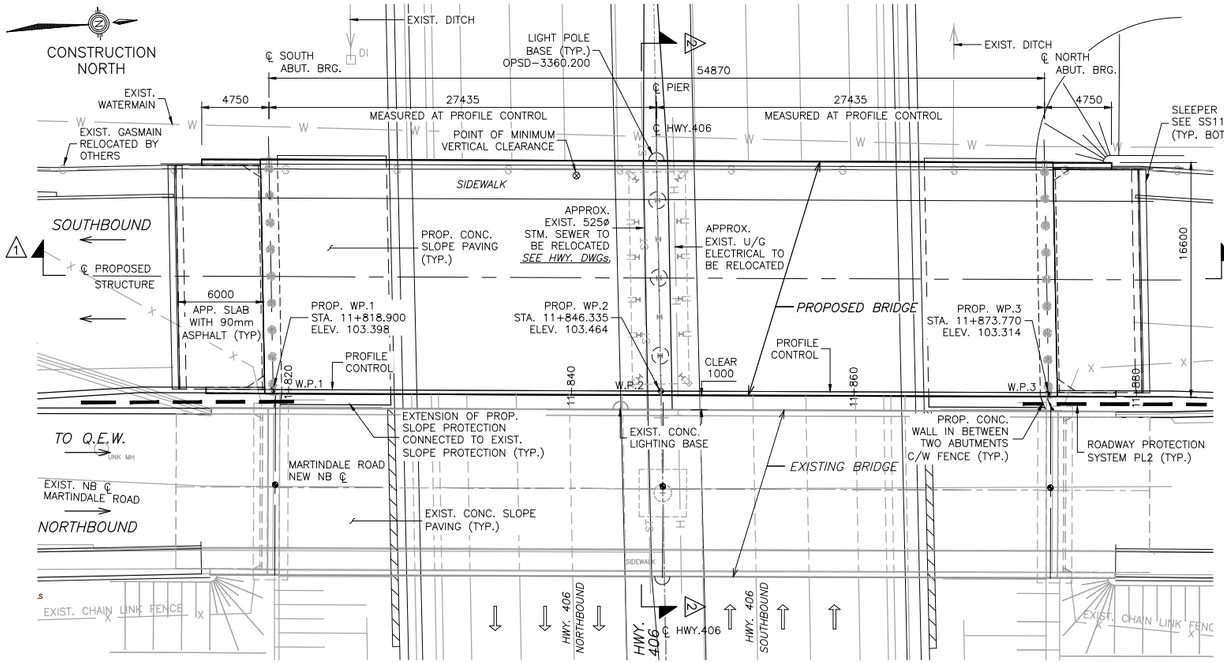
U TECH ENGINEERS INC.

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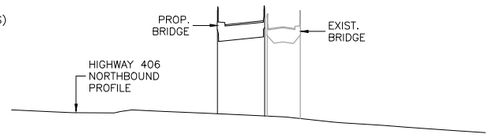
Niagara Region
PUBLIC WORKS

Contract # 2019-T-157
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
HWY 406 AT REGIONAL ROAD 38
City of St. Catharines
ELECTRICAL EMBEDDED WORK

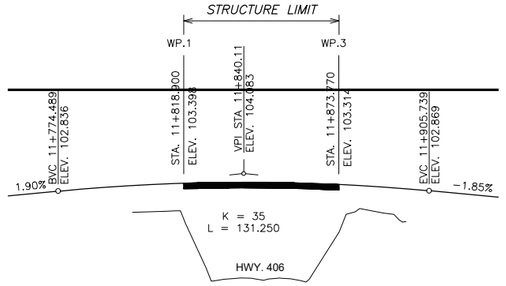
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DATE	2019-04-11
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DWG No.	R1-14
REV.	0



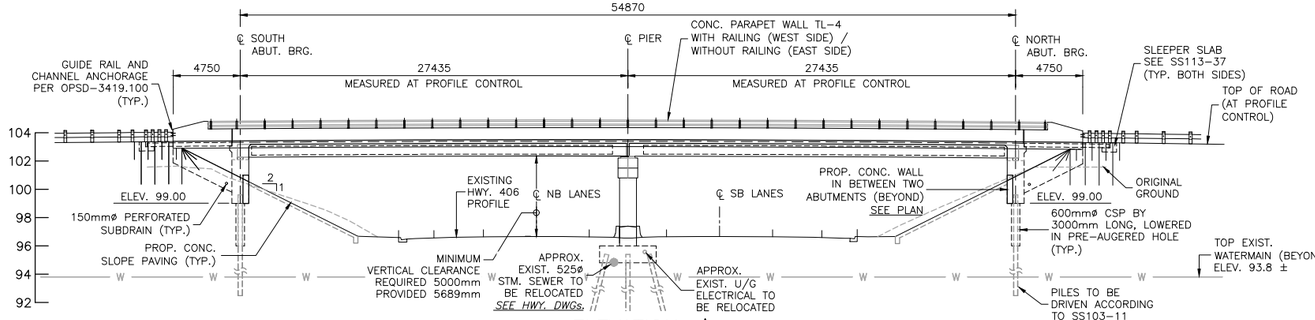
PLAN
SCALE 1:200



HIGHWAY 406 – NORTHBOUND PROFILE
SCALE N.T.S.
(WHERE MINIMUM VERTICAL CLEARANCE PROVIDED)



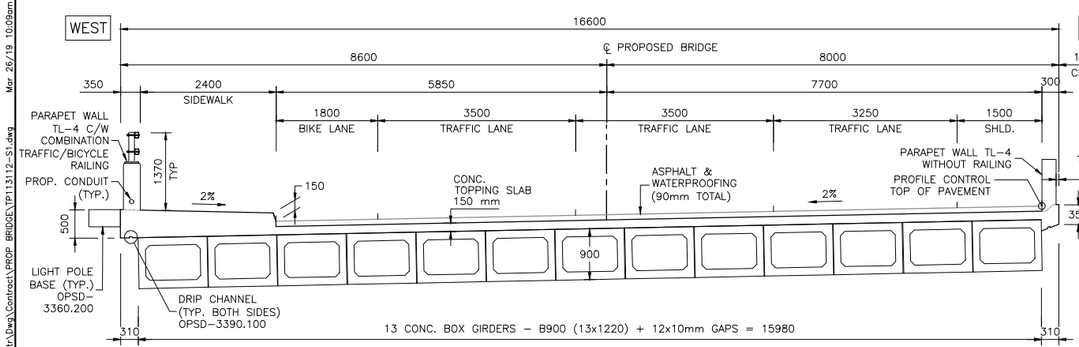
MARTINDALE ROAD – SOUTHBOUND PROFILE
SCALE N.T.S.



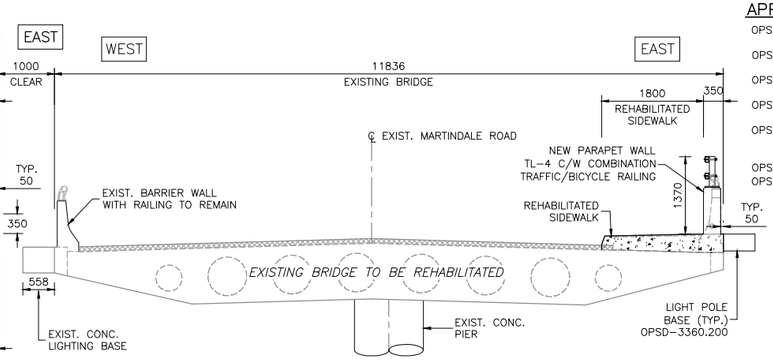
ELEVATION 1 (TAKEN AT PROPOSED BRIDGE ℄)
SCALE 1:200

WORKING POINT DATA				
W.P.	STATION	EASTING	NORTHING	ELEV.
1	11+818.900	641029.391	4779702.192	103.398
2	11+846.335	641028.293	4779729.604	103.464
3	11+873.770	641027.195	4779757.018	103.314

NOTES: a. ALL STATIONS ARE MEASURED ON MARTINDALE ROAD PROFILE CONTROL.
b. WORKING POINT ELEVATIONS ARE AT TOP OF ASPHALT ON PROFILE CONTROL.



PROPOSED BRIDGE SECTION 2
SCALE 1:50



EXISTING BRIDGE REHABILITATED SECTION 2
SCALE 1:50

GENERAL NOTES

CLASS OF CONCRETE

1. PRECAST GIRDERS	50 MPa
2. DECK	30 MPa
3. REMAINDER UNLESS OTHERWISE NOTED	30 MPa

CLEAR COVER TO REINFORCING STEEL

DECK : TOP	70 ±20
BOTTOM	40 ±10
REMAINDER UNLESS OTHERWISE NOTED	70 ±20

REINFORCING STEEL

1. REINFORCING STEEL SHALL BE GRADE 400W UNLESS OTHERWISE SPECIFIED.
2. BAR MARKS WITH PREFIX "S" DENOTES STAINLESS STEEL BAR.
3. STAINLESS REINFORCING STEEL SHALL BE TYPE 316LN OR DUPLEX 2205 AND HAVE A MINIMUM YIELD STRENGTH OF 500 MPa, UNLESS OTHERWISE SPECIFIED.
4. UNLESS SHOWN OTHERWISE, TENSION LAP SPLICES SHALL BE CLASS B.
5. BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS USING MINIMUM BEND DIAMETERS, WHILE STIRRUPS AND TIES SHALL HAVE MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL STANDARD DRAWING SS12-1, UNLESS INDICATED OTHERWISE.

GLASS FIBRE REINFORCED POLYMER (GFRP)

1. GLASS FIBRE REINFORCED POLYMER (GFRP) REINFORCING BARS SHALL BE GRADE III
2. THE MINIMUM DIAMETER, TENSILE MODULUS OF ELASTICITY AND GUARANTEED MINIMUM TENSILE STRENGTH SHALL BE AS SPECIFIED IN THE CONTRACT DOCUMENTS.
3. BAR MARKS WITH PREFIX "GIII" DENOTES GRADE III GFRP BAR.

CONSTRUCTION NOTES

1. THE CONTRACTOR SHALL ESTABLISH THE BEARING SEAT ELEVATIONS BY DEDUCTING THE ACTUAL BEARING THICKNESSES FROM THE TOP OF BEARING ELEVATIONS. IF THE ACTUAL BEARING THICKNESSES ARE DIFFERENT FROM THOSE GIVEN WITH THE BEARING DESIGN DATA, THE CONTRACTOR SHALL ADJUST THE REINFORCING STEEL TO SUIT.
2. NO BACKFILL SHALL BE PLACED UNTIL CONCRETE IN THE DECK HAS REACHED A STRENGTH OF 25 MPa.
3. BACKFILL SHALL BE PLACED SIMULTANEOUSLY BEHIND BOTH ABUTMENTS, KEEPING THE HEIGHT OF THE BACKFILL APPROXIMATELY THE SAME. AT NO TIME SHALL THE DIFFERENCE IN ELEVATION BE GREATER THAN 500mm.
4. CONTRACTOR SHALL ENSURE THE STABILITY OF ABUTMENTS AND PIERS DURING CONSTRUCTION.
5. CONTRACTOR TO PROVIDE ROADWAY PROTECTION DURING CONSTRUCTION STAGING. TEMPORARY ROADWAY PROTECTION SHALL BE DESIGNED TO PERFORMANCE LEVEL 2.
6. CONTRACTOR SHALL REHAB EXISTING PIER COLUMN, PIER CAP AND SOFFIT IN MEDIAN DURING FOUNDATION WORK FOR NEW STRUCTURE

LIST OF DRAWINGS

S1. GENERAL ARRANGEMENT
S2. BOREHOLES AND SOIL STRATA
S3. FOUNDATION DETAILS
S4. ABUTMENT DETAILS
S5. WINGWALL DETAILS
S6. PIER DETAILS
S7. PRESTRESSED BOX GIRDERS (SS107-13)
S8. PRESTRESSED BOX GIRDERS – DETAILS (SS107-15)
S9. DECK DETAILS I
S10. DECK DETAILS II
S11. PARAPET WALL FOR COMBINATION TRAFFIC/BICYCLE RAIL ON SIDEWALK, TL-4 (SS110-83 M)
S12. RAILING ON PARAPET FOR COMBINATION TRAFFIC/BICYCLE RAIL, TL-4 (SS110-85)
S13. PARAPET WALL WITHOUT RAILING, TL-4 (SS110-59 M)
S14. 6000mm APPROACH SLAB (SS116-1)
S15. EXPANSION JOINT AND SLEEPER SLAB (SS113-37)
S16. STRIP SEAL EXPANSION JOINT FOR SLEEPER SLAB (SS113-19)
S17. SEQUENCE OF EXPANSION JOINT INSTALLATION (SS113-38)
S18. DETAILS OF CONCRETE SLOPE PAVING (SSW116-10)
S19. STRUCTURAL STANDARD DETAILS
S20. ELECTRICAL EMBEDDED WORK

APPLICABLE STANDARD DRAWINGS

OPSD-912.430 – GUIDE RAIL SYSTEM, STEEL BEAM STRUCTURE CONNECTION
OPSD-3101.150 – WALLS ABUTMENT, BACKFILL MINIMUM GRANULAR REQUIREMENT
OPSD-3360.200 – DECK – LIGHT POLE BASES – STRUCTURES WITH PARAPET WALLS
OPSD-3370.100 – DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE WITH PROTECTION BOARD
OPSD-3370.101 – DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE AT ACTIVE CRACKS GREATER THAN 2mm WIDE AND CONSTRUCTION JOINTS.
OPSD-3390.100 – DECK – DRIP CHANNEL
OPSD-3419.100 – BARRIERS AND RAILINGS STEEL BEAM GUIDE RAIL AND CHANNEL ANCHORAGE

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

NO.	REVISION	DATE	INIT.
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3	ISSUED FOR 90% MTO EXECUTIVE REVIEW	2019-02-05	N.T.
2	ISSUED FOR 90% MTO REVIEW	2018-DEC.	C.B.
1	ISSUED FOR 60% MTO REVIEW	2015-10-06	C.B.

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DRAFTING	C.B.
DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

wood.

Niagara Region PUBLIC WORKS

Contract # ____-__-____
Phase 2
PROPOSED BRIDGE CONSTRUCTION
Martindale Road at Highway 406
Niagara Region
GENERAL ARRANGEMENT

SITE NO.	18-235/2
	METRIC
CONSULTANT FILE No.	TP113112
DATE	NOVEMBER 2018
SCALE	AS SHOWN
REF. No.	RN __-__
DWG No.	S1
REV.	

AutoCAD drawing: P:\Work\TP113112\Str\Dwg\Contract\PROP BRIDGE\TP113112-S1.dwg Mar 26/19 10:09am peter.butrus

METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

AGREEMENT NUMBER.
-

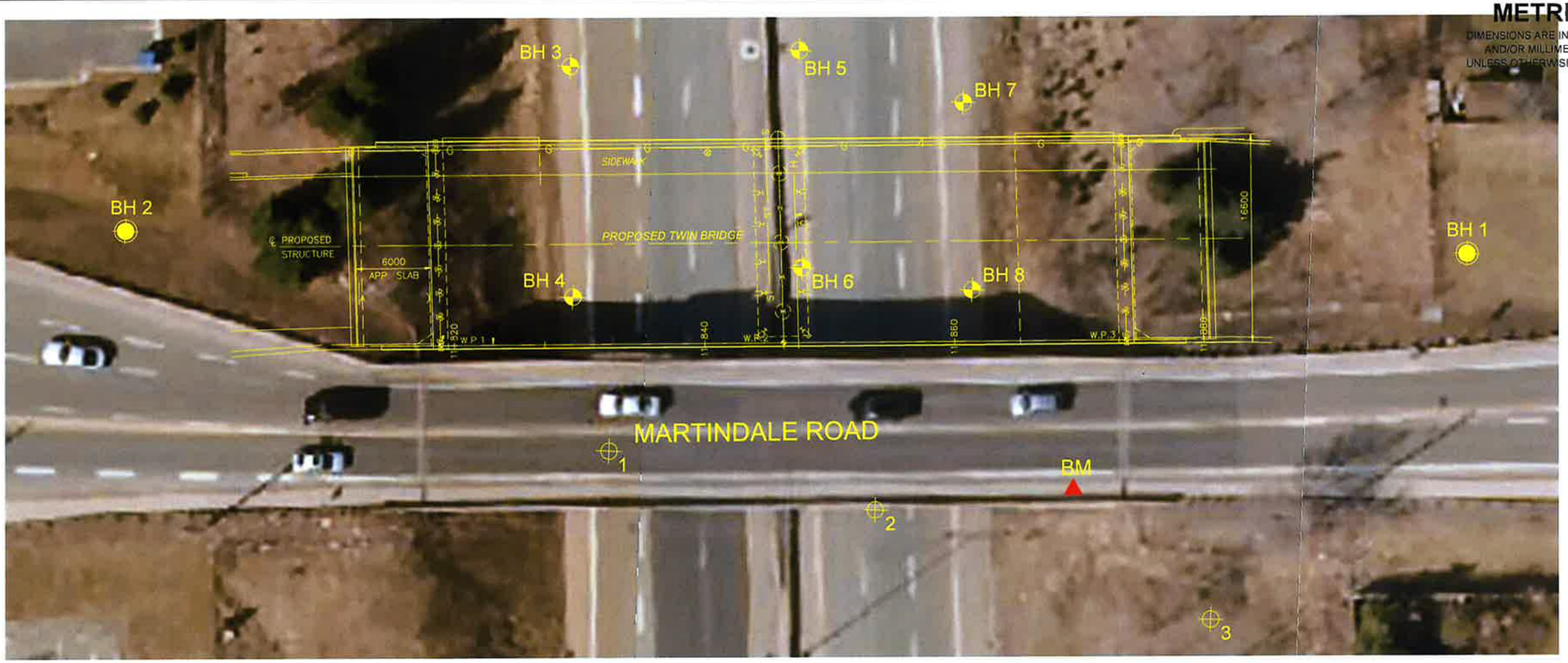
G.W.P. No.
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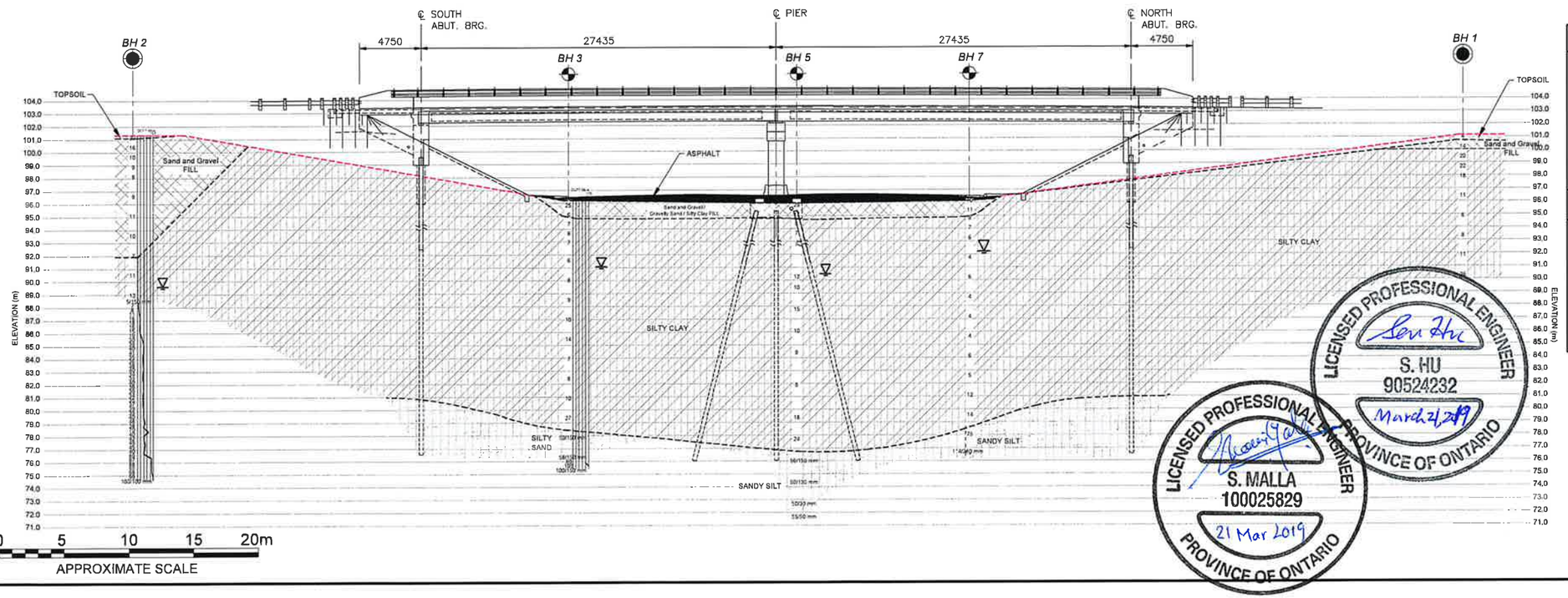
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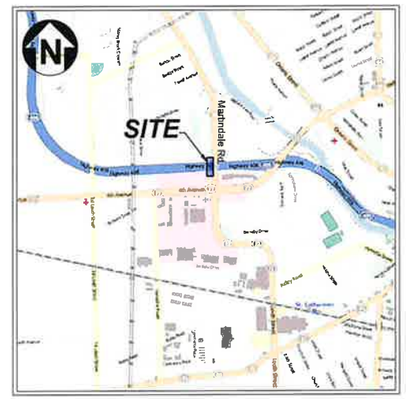
FOUNDATION INVESTIGATION AND DESIGN
TWINNING OF HIGHWAY 406 UNDERPASS
RECONSTRUCTION OF REGIONAL ROAD 38
(MARTINDALE ROAD), ST. CATHARINES, ONTARIO

BOREHOLE LOCATION & SOIL STRATA

wood.
Wood Environment & Infrastructure Solutions,
a Division of Wood Canada Limited
50 Vogell Road, Units 3 & 4 Richmond Hill, Ontario, L4B 3K6







KEY PLAN

500m 0 500 1000 1500 2000m

Approximate Scale

LEGEND

- BOREHOLE LOCATION (20m DEPTH)
- BOREHOLE LOCATION (10m DEPTH)
- BOREHOLE LOCATION (MTO - dated: April 24, 1975)
- GROUNDWATER LEVEL AT TIME OF INVESTIGATION
- BENCHMARK (MONUMENT 008880956)

DESCRIPTION	COORDINATES		ELEVATION
	LATITUDE	LONGITUDE	(m)
BH 1	43.15767	-79.26547	101.1
BH 2	43.15678	-79.26545	101.3
BH 3	43.15706	-79.26560	96.6
BH 4	43.15704	-79.26540	96.6
BH 5	43.15725	-79.26563	96.6
BH 6	43.15722	-79.26545	96.6
BH 7	43.15734	-79.26563	96.5
BH 8	43.15732	-79.26542	96.5
1	43.15704	-79.26526	100.9
2	43.15723	-79.26520	100.8
3	43.15748	-79.26510	100.4

NOTES:
1. The interpreted stratigraphy represents simplified subsurface conditions. The boundaries between soil strata have been defined at borehole locations only. Conditions between borehole locations could differ from illustrated conditions.
2. This drawing is for subsurface information only. Surface details and features are for conceptual illustration.
3. Base file provided by Wood Design Team, in 2018.

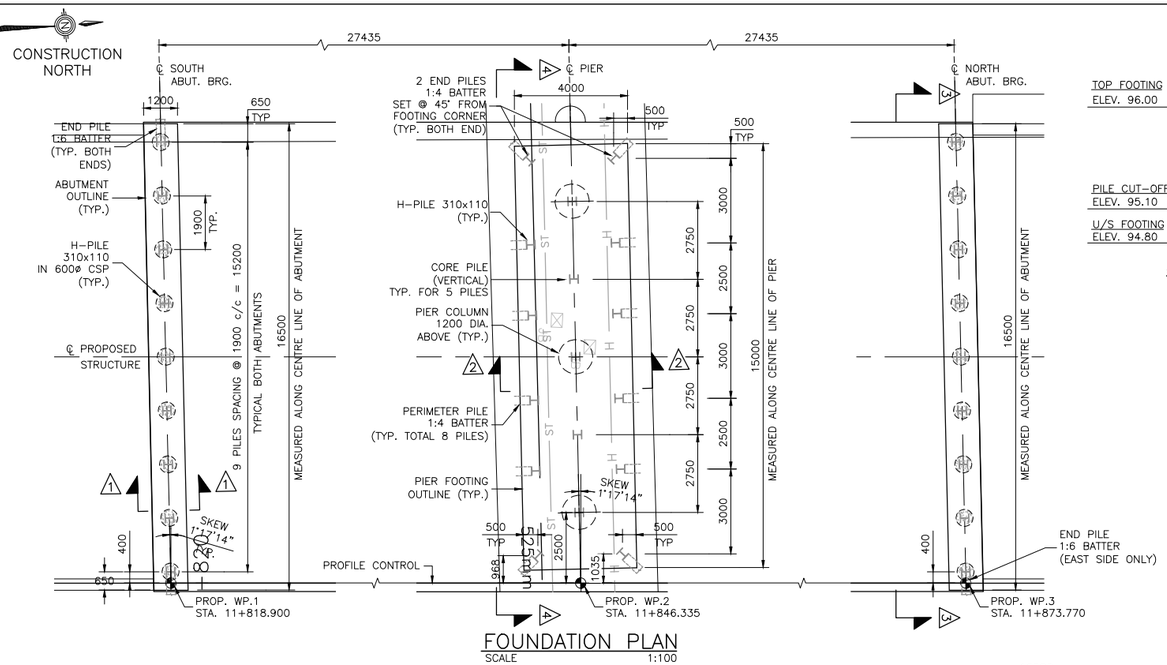
LICENSED PROFESSIONAL ENGINEER
S. HU
90524232
March 21, 2019
PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER
S. MALLA
100025829
21 Mar 2019
PROVINCE OF ONTARIO

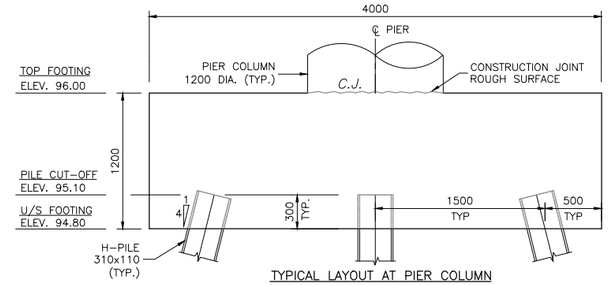
REVISIONS			

DESIGN	CHK	CODE CHBDC-06	CL 625-ONT	DATE MAR. 2019	
DRAWN KW	CHK SM	SITE MARTINDALE		DWG S2	

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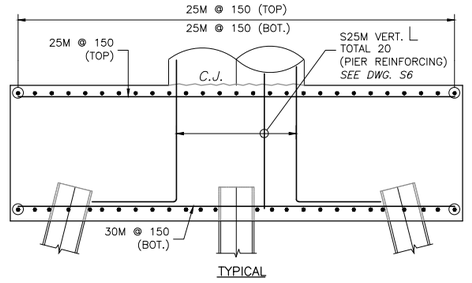


FOUNDATION PLAN
SCALE 1:100



TYPICAL LAYOUT AT PIER COLUMN

PIER FOOTING SECTION
SCALE 1:25



TYPICAL

PIER FOOTING REINFORCING SECTION
SCALE 1:25

NOTES

1. PILES ARE HP 310x110. STEEL H-PILES ARE EQUIPED WITH DRIVING SHOES
2. ORIENTATION OF PILES SHALL BE AS SHOWN ON PLAN.
3. PILE SPACING IS MEASURED AT THE UNDERSIDE OF ABUTMENTS/ PIER FOOTING.
4. 600 DIA. CSPs. DENOTE GALVANIZED, CORRUGATED STEEL PIPES WITH SQUARE ENDS, 3.0mm WALL THICKNESS.
5. THIS DRAWING TO BE READ IN CONJUNCTION WITH GENERAL ARRANGEMENT DRAWING.

H-PILES

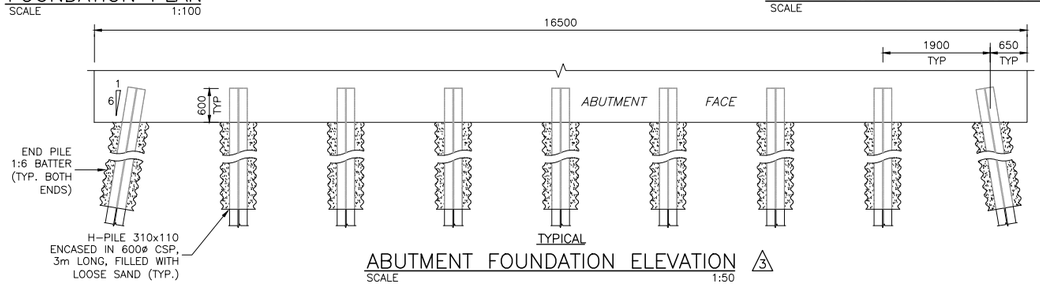
1. MAXIMUM COMBINED FACTORED LOADING
   - SLS FACTORED AXIAL LOAD ..... 989 kN/PILE
   - ULS FACTORED AXIAL LOAD ..... 1340 kN/PILE
2. USE PILE DRIVING ANALYZER (PDA) IN ACCORDANCE WITH ASTM D4945-08 TO DETERMINE SET CRITERIA AND TO CONFIRM THAT THE PILE ULTIMATE AXIAL GEOTECHNICAL RESISTANCE IS AT LEAST TWICE THE ULS LOADS.

APPLICABLE STANDARD DRAWINGS

OPSD-3000.100 – FOUNDATION PILES STEEL H-PILE DRIVING SHOE
OPSD-3000.150 – FOUNDATION PILES STEEL H-PILE SPLICE

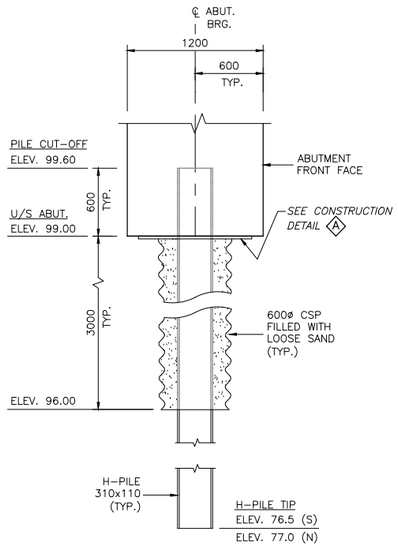
H-PILE DATA					
LOCATION	TOTAL REQ'D	TYPE	BATTER	LENGTH (m)	TIP ELEVATION (m)
SOUTH ABUTMENT	9	H-PILE 310x110	7-VERTICAL 2 – 1:6	23.1 23.4	76.5
PIER	17	H-PILE 310x110	5-VERTICAL 12 – 1:4	19.0 19.6	76.1
NORTH ABUTMENT	9	H-PILE 310x110	8-VERTICAL 1 – 1:6	22.6 22.9	77.0

NOTE : PILE LENGTHS ARE APPROXIMATE ONLY.
LENGTHS MAY VARY DEPENDING ON ROCK ELEVATIONS.



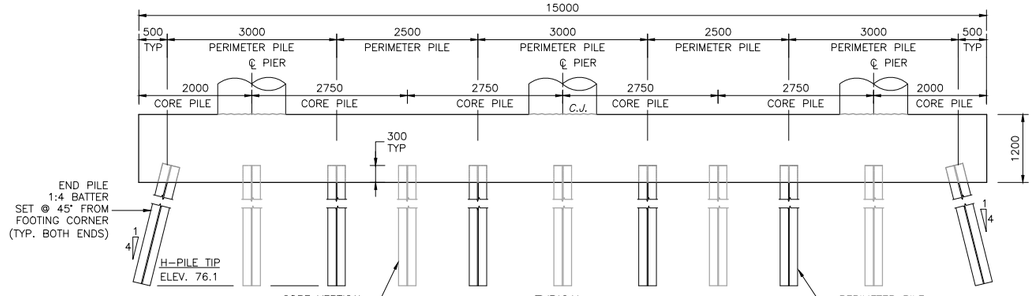
TYPICAL

ABUTMENT FOUNDATION ELEVATION
SCALE 1:50



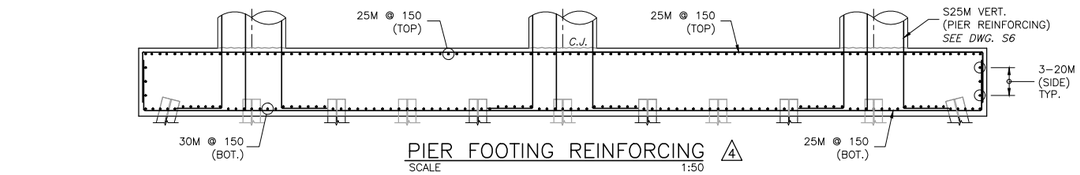
TYPICAL

ABUTMENT PILE SECTION
SCALE 1:25

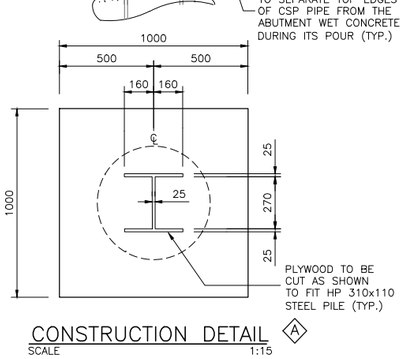


TYPICAL

PIER FOOTING ELEVATION
SCALE 1:50



PIER FOOTING REINFORCING
SCALE 1:50



CONSTRUCTION DETAIL
SCALE 1:15

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

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DRAFTING C.B.
DESIGN N.T.
CHECKED BY N.T.
APPROVED BY K.A.

wood.

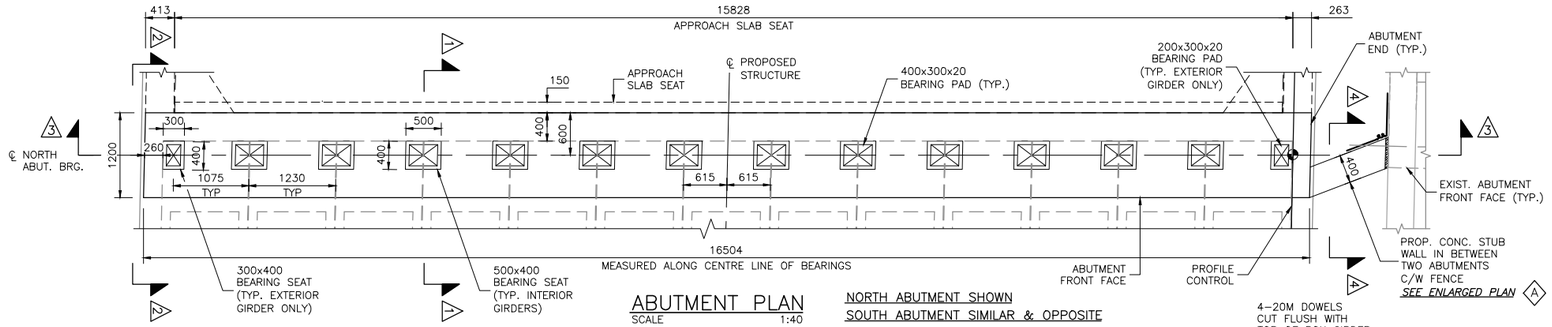
Niagara Region PUBLIC WORKS

Contract # ____-__-___
Phase 2
PROPOSED BRIDGE CONSTRUCTION
Martindale Road at Highway 406
Niagara Region
FOUNDATION DETAILS

SITE NO. 18-235/2
METRIC
CONSULTANT FILE No. TP113112
DATE NOVEMBER 2018
SCALE AS SHOWN
REF. No. RN __-__
DWG No. S3
REV.

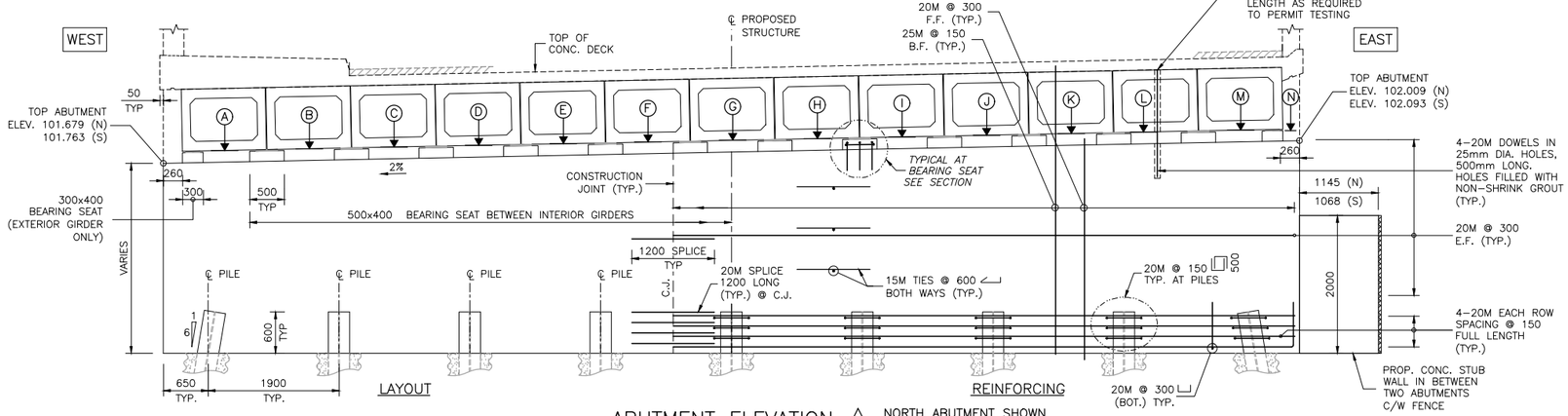
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CONSTRUCTION NORTH



ABUTMENT PLAN
SCALE 1:40

NORTH ABUTMENT SHOWN
SOUTH ABUTMENT SIMILAR & OPPOSITE



ABUTMENT ELEVATION 3
SCALE 1:40

NORTH ABUTMENT SHOWN
SOUTH ABUTMENT SIMILAR & OPPOSITE

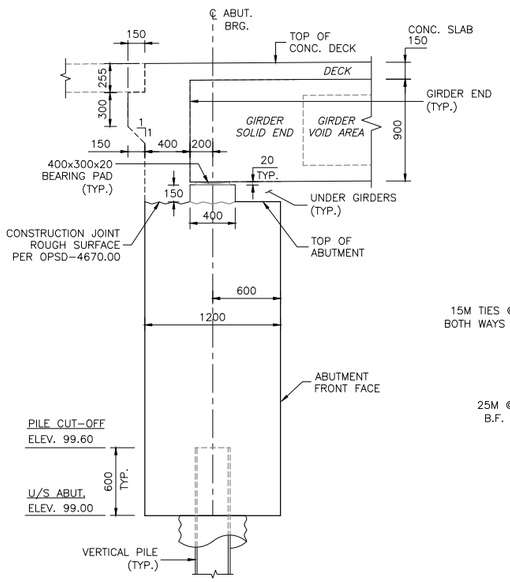
NOTE

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH GENERAL ARRANGEMENT AND DETAILS DRAWINGS.

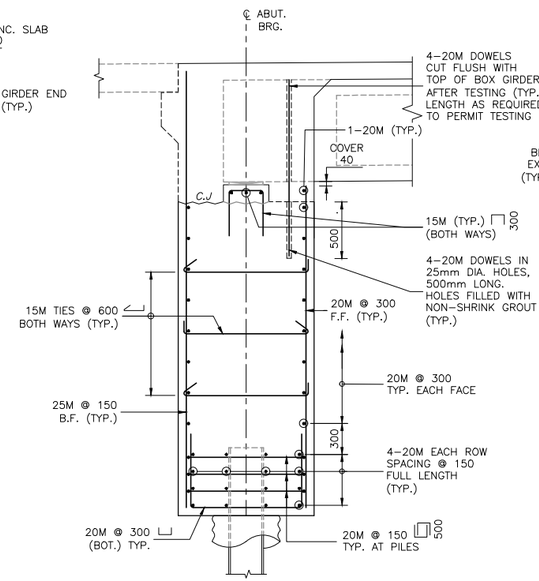
LEGEND

B.F. DENOTES BACK FACE
E.F. DENOTES EACH FACE
F.F. DENOTES FRONT FACE

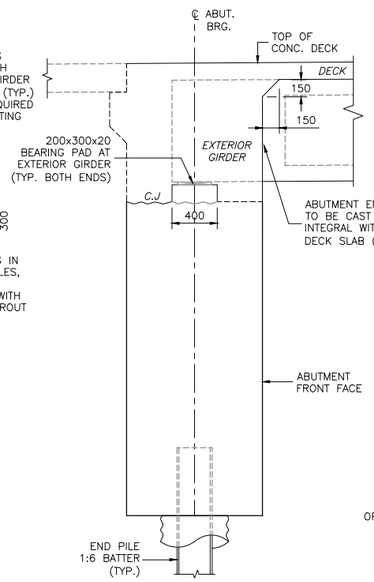
TOP OF BEARING ELEVATIONS		
LOCATION	SOUTH ABUTMENT	NORTH ABUTMENT
	BEARING ELEVATIONS (m) AT BEARING CENTRE LINE	
Ⓐ	101.942	101.858
Ⓑ	101.964	101.880
Ⓒ	101.988	101.904
Ⓓ	102.013	101.929
Ⓔ	102.037	101.953
Ⓕ	102.062	101.978
Ⓖ	102.086	102.002
Ⓗ	102.111	102.027
Ⓘ	102.135	102.051
Ⓙ	102.160	102.076
Ⓚ	102.184	102.100
Ⓛ	102.209	102.125
Ⓜ	102.233	102.150
Ⓝ	102.255	102.171



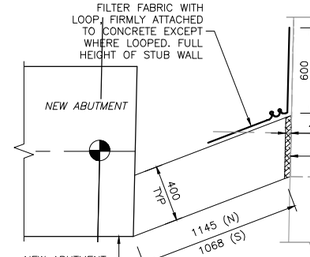
LAYOUT SECTION 1
SCALE 1:25



REINFORCING SECTION
SCALE 1:25

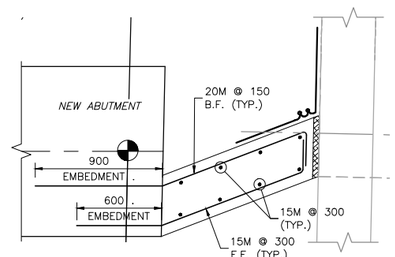


END ELEVATION 2
SCALE 1:25

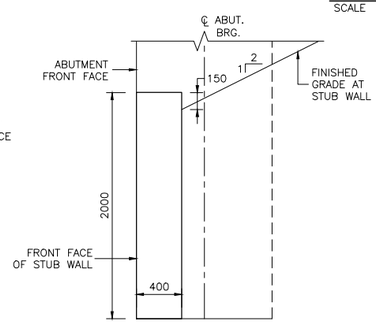


LAYOUT

ENLARGED PARTIAL PLAN A
SCALE 1:20



REINFORCING



SECTION 4
SCALE 1:25

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

NO.	REVISION	DATE	INIT.
4	ISSUED FOR TENDER	2019–APR.	N.T.
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DRAFTING	C.B.
DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

wood.

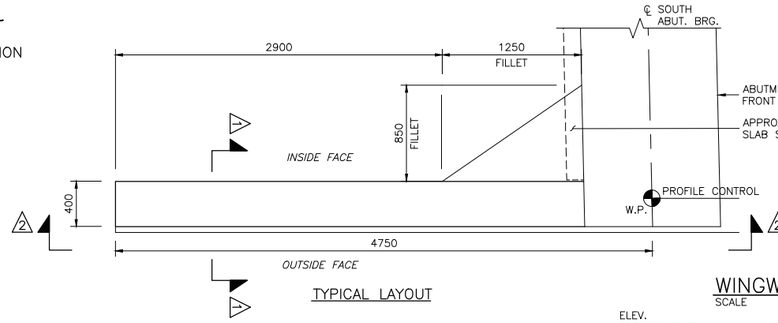
Niagara Region PUBLIC WORKS

Contract # ____-_-____
Phase 2
PROPOSED BRIDGE CONSTRUCTION
Martindale Road at Highway 406
Niagara Region
ABUTMENT DETAILS

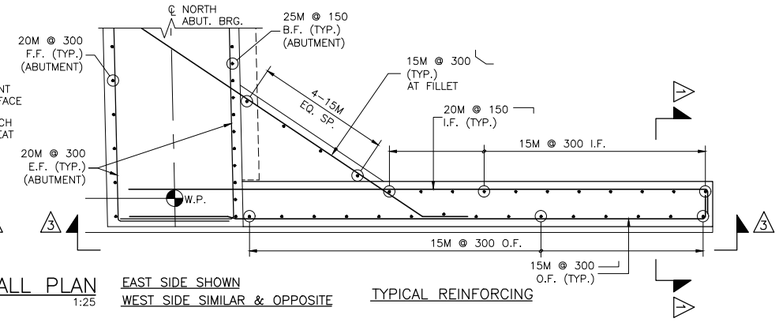
SITE NO.	18–235/2
	METRIC
CONSULTANT FILE No.	TP113112
DATE	NOVEMBER 2018
SCALE	AS SHOWN
REF. No.	RN __-__
DWG No.	S4
REV.	

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CONSTRUCTION NORTH



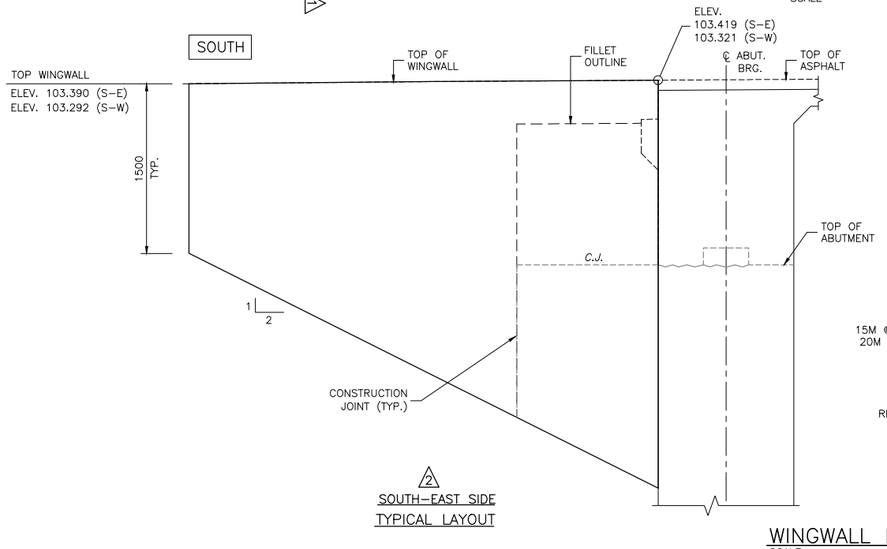
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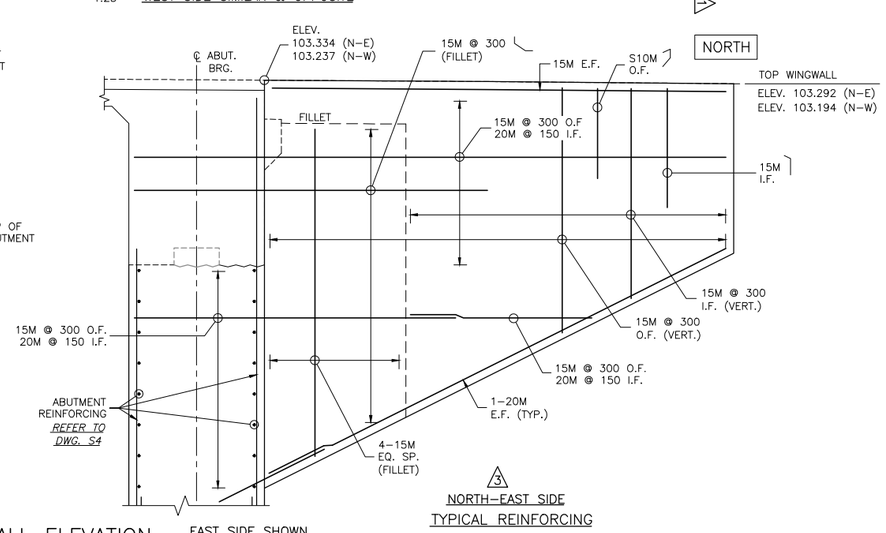
WINGWALL PLAN
SCALE 1:25

EAST SIDE SHOWN
WEST SIDE SIMILAR & OPPOSITE

TYPICAL REINFORCING



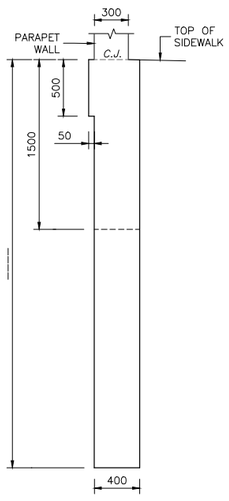
2 SOUTH–EAST SIDE
TYPICAL LAYOUT



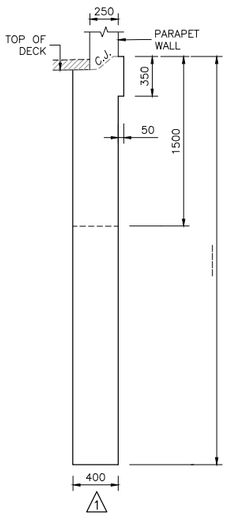
3 NORTH–EAST SIDE
TYPICAL REINFORCING

WINGWALL ELEVATION
SCALE 1:25

EAST SIDE SHOWN
WEST SIDE SIMILAR & OPPOSITE

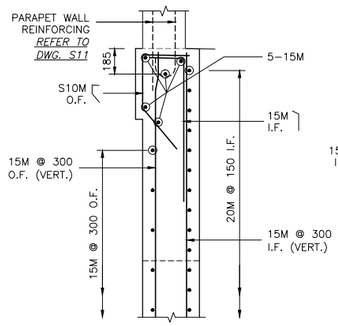


WEST SIDE

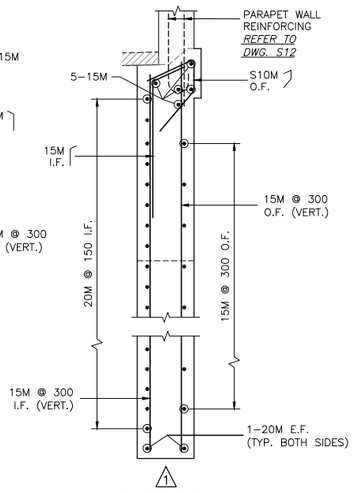


1 EAST SIDE

TYPICAL
LAYOUT SECTION
SCALE 1:25



PARTIAL
WEST SIDE SECTION



1 EAST SIDE SECTION

TYPICAL
REINFORCING SECTION
SCALE 1:20

NOTES:

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH GENERAL ARRANGEMENT, ABUTMENT AND PARAPET WALL DRAWINGS.
2. TOP OF CLEAT TO BE CAST 35mm BELOW APPROACH SLAB LEDGE.
3. REINFORCING STEEL SHALL BE GRADE 400W UNLESS OTHERWISE SPECIFIED.
4. STAINLESS STEEL SHALL BE TYPE 316 LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500MPA. BARS MARKED WITH PREFIX 'S' DENOTE STAINLESS STEEL.

LEGEND

B.F.	DENOTES BACK FACE
F.F.	DENOTES FRONT FACE
E.F.	DENOTES EACH FACE
I.F.	DENOTES INSIDE FACE
O.F.	DENOTES OUTSIDE FACE
EQ. SP.	DENOTES EQUAL SPACE

APPLICABLE STANDARD DRAWINGS

OPSD 3102.100	WALLS ABUTMENT BACKFILL DRAIN
OPSD 3950.100	JOINTS CONCRETE EXPANSION AND CONSTRUCTION ON STRUCTURE

STANDARD DRAWING JAN 2013	SS105–2
WINGWALL DETAILS FOR BRIDGES	

NO.	REVISION	DATE	INIT.
4	ISSUED FOR TENDER	2019–APR.	N.T.
3	ISSUED FOR 90% MTO EXECUTIVE REVIEW	2019–02–05	N.T.
2	ISSUED FOR 90% MTO REVIEW	2018–DEC.	C.B.
1	ISSUED FOR 60% MTO REVIEW	2015–10–06	C.B.

NOTES/LEGEND
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DRAFTING	C.B.
DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

wood.

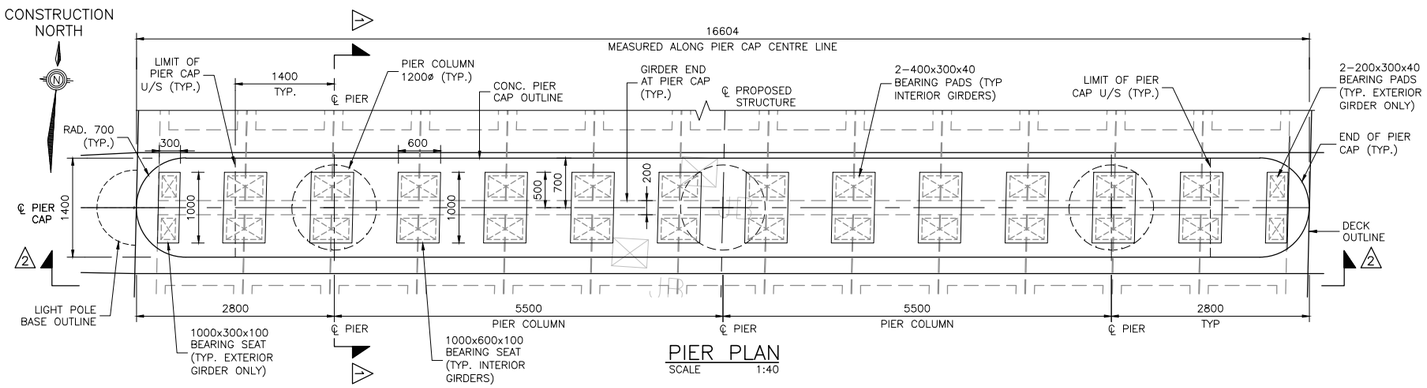
Niagara Region PUBLIC WORKS

Contract # ____-_-____
Phase 2
PROPOSED BRIDGE CONSTRUCTION
Martindale Road at Highway 406
Niagara Region
WINGWALL DETAILS

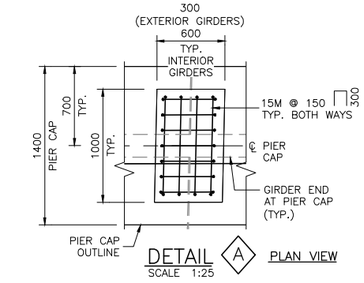
DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

SITE NO.	18–235/2
	METRIC
DATE	NOVEMBER 2018
SCALE	AS SHOWN
REF. No.	RN __-__
DWG No.	S5
REV.	

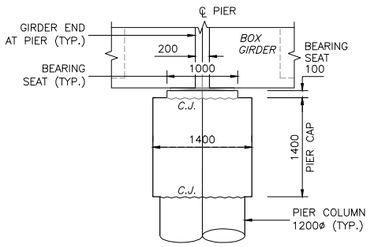
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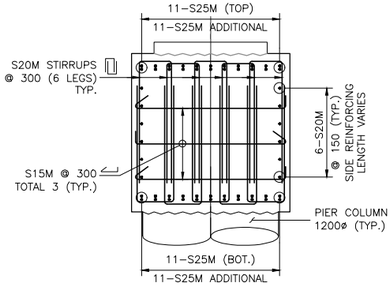
PIER PLAN
SCALE 1:40



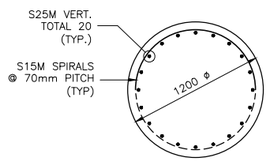
DETAIL A PLAN VIEW
SCALE 1:25



PIER CAP LAYOUT 1
SCALE 1:40



PIER CAP REINFORCING 3
SCALE 1:25



TYPICAL

PIER REINFORCING 4
SCALE 1:25

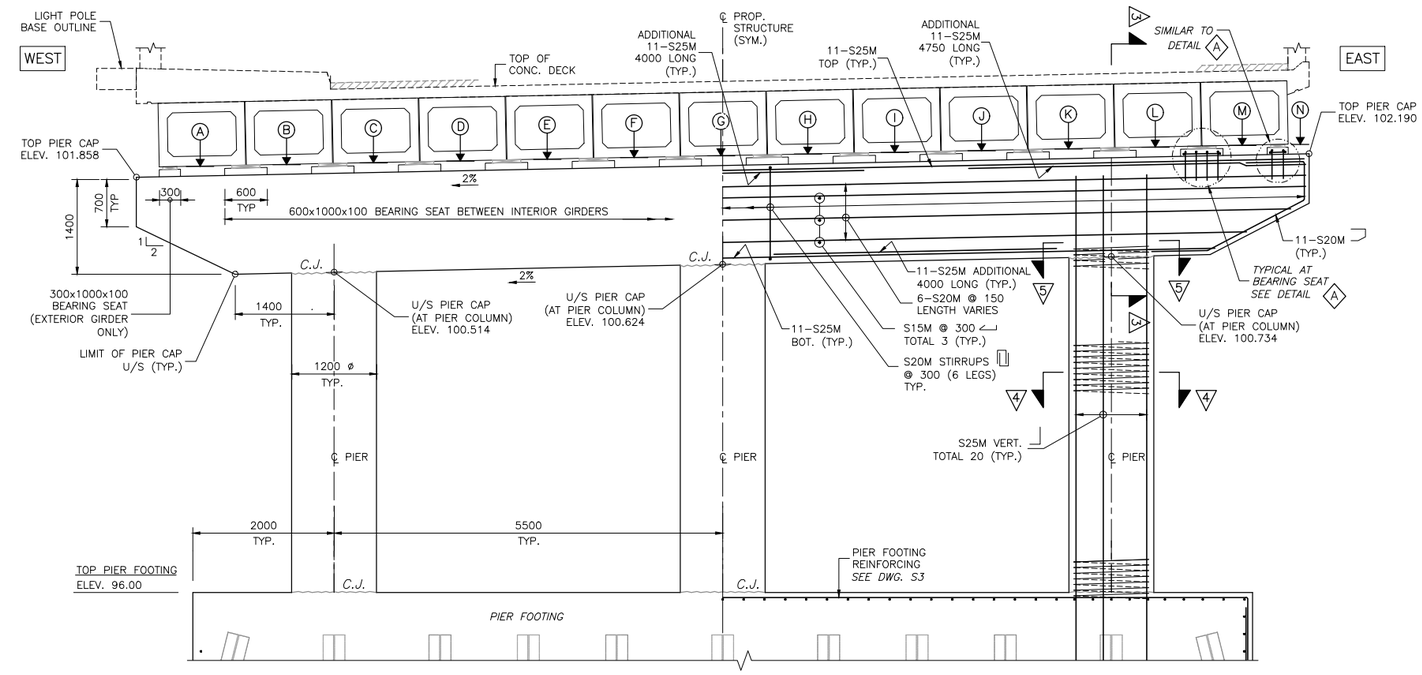
NOTES

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH GENERAL ARRANGEMENT AND DETAILS DRAWINGS.
2. ROUGH SURFACE FOR ALL CONSTRUCTION JOINTS.

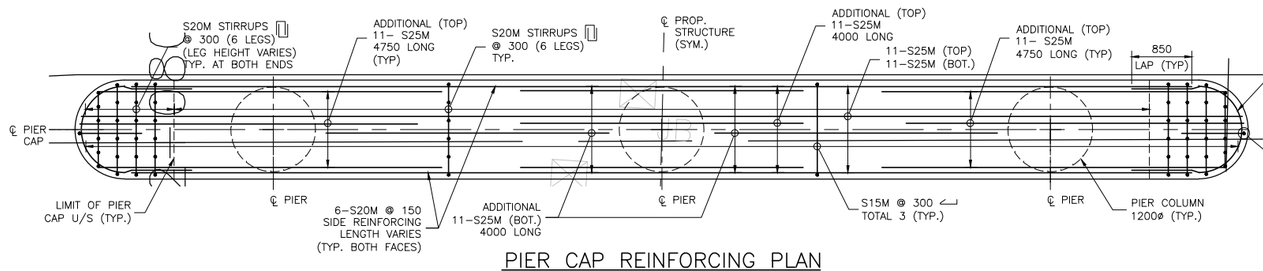
LEGEND

B.F. DENOTES BACK FACE
E.F. DENOTES EACH FACE
F.F. DENOTES FRONT FACE
U/S DENOTES UNDERSIDE
C.J. DENOTES CONSTRUCTION JOINT

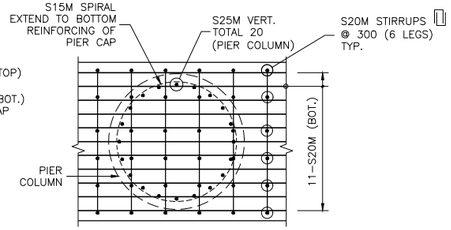
TOP OF BEARING ELEVATIONS	
LOCATION	BEARING ELEVATIONS (m) AT BEARING CENTRE LINE
Ⓐ	102.010
Ⓑ	102.028
Ⓒ	102.053
Ⓓ	102.078
Ⓔ	102.102
Ⓕ	102.127
Ⓖ	102.151
Ⓗ	102.176
Ⓘ	102.201
Ⓙ	102.225
Ⓚ	102.250
Ⓛ	102.274
Ⓜ	102.299
Ⓝ	102.317



ELEVATION 2
SCALE 1:40



PIER CAP REINFORCING PLAN
SCALE 1:40



TYPICAL AT PIER COLUMN

REINFORCING SECTION 5
SCALE 1:25

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

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DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

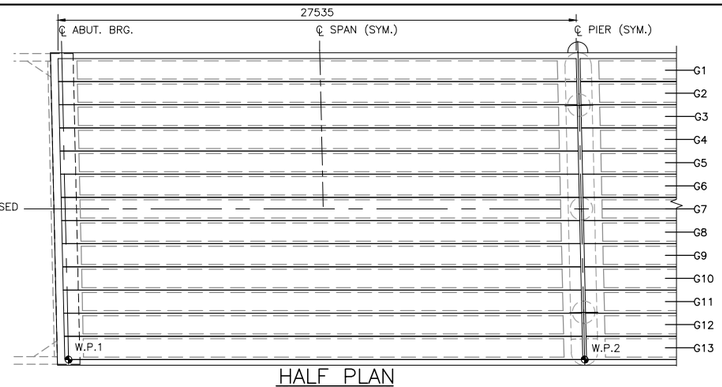
wood.

Niagara Region PUBLIC WORKS

Contract # ____-_-____
Phase 2
PROPOSED BRIDGE CONSTRUCTION
Martindale Road at Highway 406
Niagara Region
PIER DETAILS

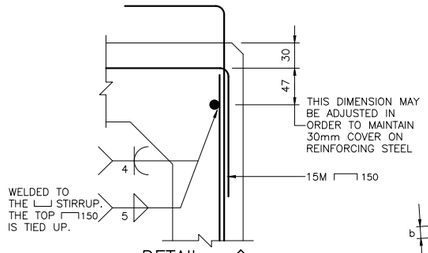
SITE NO. 18–235/2	
METRIC	
CONSULTANT FILE No. TP113112	
DATE NOVEMBER 2018	
SCALE AS SHOWN	
REF. No. RN __-__	
DWG No. S6	REV.

AutoCAD drawing: P:\Work\TP113112\Str\Dwg\Contract\PROP BRIDGE\TP113112–S6.dwg Mar 26/19 10:37am peter.butrus



HALF PLAN

SCALE 1:150



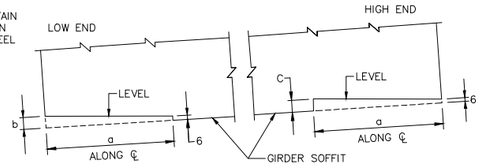
DETAIL B

STRUCTURAL WELD

(WELDED CAGES ONLY)

METRIC

DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN



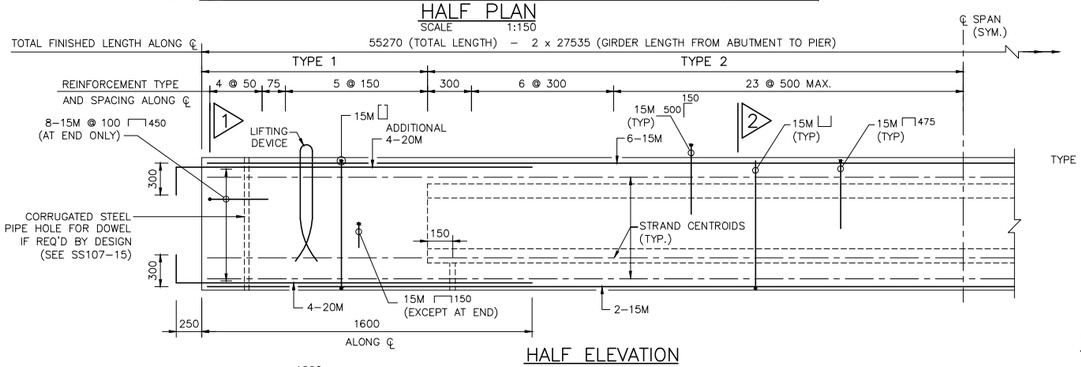
GIRDER SOFFIT DETAIL AT BEARINGS

NOTE: DIMENSIONS b AND c = 9, 12, 15 OR 18mm, AS REQUIRED BY THE DESIGN

UNDERCUT CALCULATIONS			
LOCATION	a	b	c
S. ABUTMENT	0.4	0.006	0.008
PIER	0.4	0.007	0.006
PIER	0.4	0.006	0.010
N. ABUTMENT	0.4	0.005	0.006

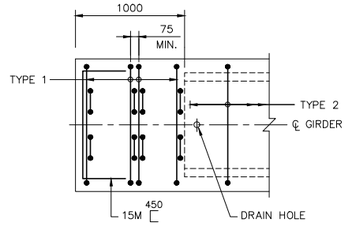
NOTES:

1. PRESTRESSING STEEL SHALL BE LOW-RELAXATION SEVEN WIRE STRANDS, SIZE DESIGNATION 15, GRADE 1860.
2. MINIMUM BREAKING STRENGTH OF STRAND 260.5 kN.
3. JACKING FORCE PER STRAND 203 kN.
4. FORCE PER STRAND AFTER ALL LOSSES 157 kN.
5. THE ELAPSED TIME INTERVAL BETWEEN JACKING OF STRANDS AND TRANSFER SHALL NOT BE LESS THAN 15 HOURS.
6. THE VERTICAL SPACING OF PRESTRESSING STRANDS IN THE WEB BETWEEN LOCATIONS OF HOLD-DOWN POINTS SHOWN ON THIS DRAWING MAY BE INCREASED TO SUIT THE FABRICATOR'S HARDWARE CAPABILITIES TO A MAXIMUM OF 50mm. IF THE SPECIFIED STRAND SPACING IS CHANGED, THE FABRICATOR SHALL BE RESPONSIBLE FOR ADJUSTING THE NUMBER OF STRANDS TO ENSURE THAT THE SAME FORCE EFFECT IS PRODUCED AS REQUIRED BY THE DESIGN.
7. CLASS OF CONCRETE:
   PRECAST GIRDER 50 MPa.
8. CONCRETE STRENGTH AT TRANSFER 38 MPa.
9. REINFORCING STEEL SHALL BE GRADE 400W.
   STAINLESS STEEL BARS SHALL BE TYPE 316 LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500 MPA.
10. CLEAR COVER TO REINFORCING STEEL:
    SOFFIT OF BOTTOM SLAB (EXCEPT UNDERCUT) ... 48 +15mm/-5mm
    UNDERCUT AND ELSEWHERE ..... 30 +15mm/-5mm
11. ALL STIRRUPS, AND BURSTING/SPLITTING REINFORCEMENT WITHIN 1000mm FROM THE GIRDER END WITH EXPANSION JOINT SHALL BE STAINLESS.
12. FOR BRIDGES ON GRADES EXCEEDING 3%, THE ENDS OF GIRDERS SHALL BE CAST SO THAT THEY ARE VERTICAL WHEN ERECTED.
13. THE TOP OF PRECAST BEAM SHALL BE GIVEN ROUGH FINISH OF ABOUT 5mm AMPLITUDE ACROSS THE WIDTH.
14. DRAWING TO BE READ IN CONJUNCTION WITH SS107-15.
15. NO WELDING SHALL BE PERMITTED EXCEPT AS SPECIFIED OR APPROVED BY THE OWNER.



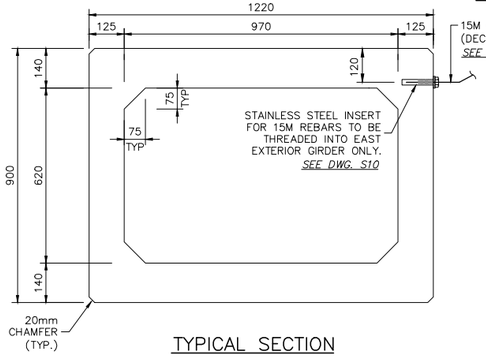
HALF ELEVATION

N.T.S.

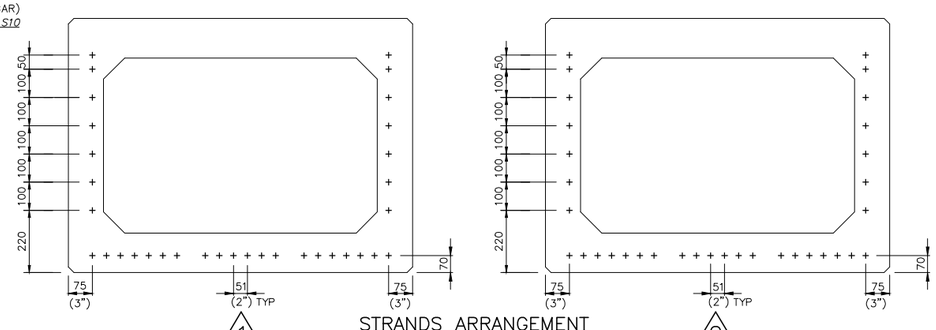


SQUARE END

TYPICAL END REINFORCING



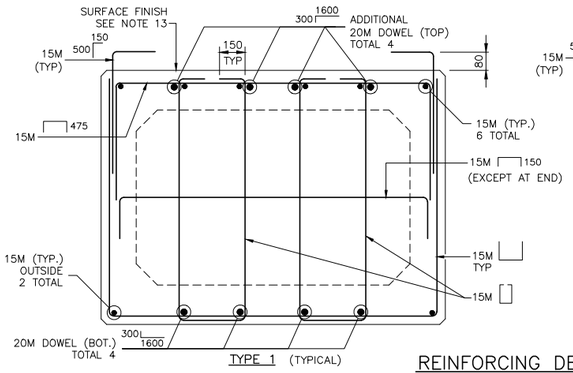
TYPICAL SECTION

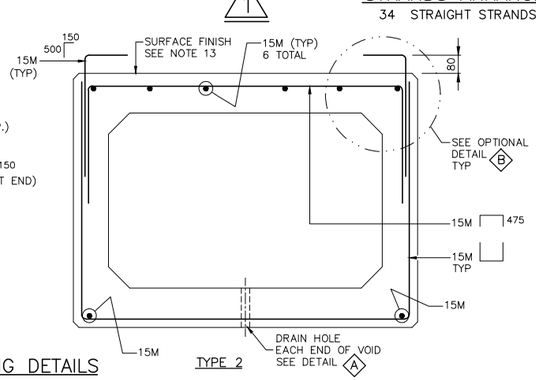


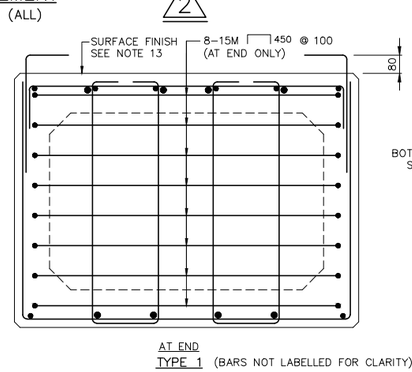
BEARING DATA					
LOCATION		ABUTMENTS		PIERS	
TYPE		PLAIN ELASTOMERIC		LAMINATED ELASTOMERIC	
SIZE (mm)		400x300x20	200x300x20	400x300x40	200x300x40
NUMBER REQUIRED		24	4	24	4
SERVICEABILITY LIMIT STATES	DEAD LOAD (kN)	304	152	461	232
	TOTAL LOAD (kN)	405	203	550	275
	MOVEMENT (mm)	+/- ___	+/- ___	+/- ___	+/- ___
	ROTATION (radian)	___	___	0.00185	0.00185
	MAXIMUM SHEAR RATE @ 20° C (kN/mm)	___	___	3.14	1.39
ULTIMATE LIMIT STATES	DEAD LOAD (kN)	___	___	537	269
	TOTAL LOAD (kN)	___	___	612	306

B900

STANDARD DRAWING SEPTEMBER 2016	SS107-13
PRESTRESSED BOX GIRDERS AND BEARINGS (B900)	



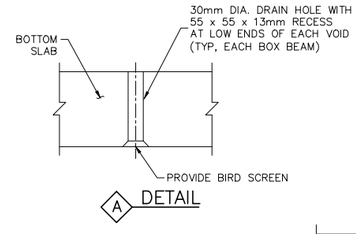




AT END

TYPE 1 (BARS NOT LABELLED FOR CLARITY)

REINFORCING DETAILS



A DETAIL

DRAWING NOT TO BE SCALED

100 mm ON ORIGINAL DRAWING

LEGEND

G1 DENOTES NUMBERED GIRDER

no.	REVISION	DATE	INIT.
4	ISSUED FOR TENDER	2019-APR.	N.T.
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DRAFTING	C.B.
DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

wood.

Niagara Region PUBLIC WORKS

Contract # ____-__-___
Phase 2
PROPOSED BRIDGE CONSTRUCTION
Martindale Road at Highway 406
Niagara Region
PRESTRESSED BOX GIRDERS

SITE NO.	18-235/2
	METRIC
CONSULTANT FILE No.	TP113112
DATE	NOVEMBER 2018
SCALE	AS SHOWN
REF. No.	RN __-__
DWG No.	S7
REV.	

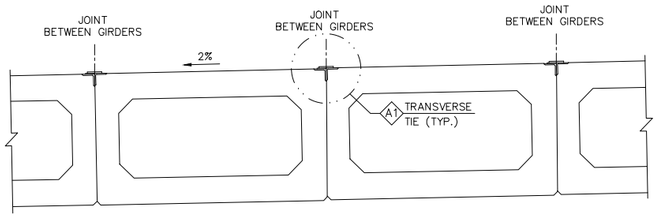
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METRIC

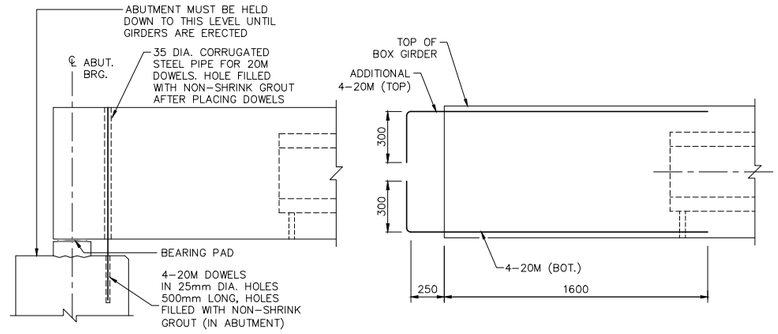
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

NOTES:

1. THIS DRAWING SHOWS TYPICAL DETAILS FOR PRECAST CONCRETE BOX GIRDERS AND IS TO BE READ IN CONJUNCTION WITH DRAWING SS107–13.
2. STEEL PLATES AND ANGLES SHALL BE ACCORDING TO CSA/CSA G40.20–13/G40.21–13, GRADE 300W
3. STEEL PLATES AND ANGLES SHALL BE HOT–DIP GALVANIZED AFTER FABRICATION.
4. IF ANCHORED EMBEDDED STEEL BEARING PLATES ARE REQUIRED AT GIRDER ENDS, THEY SHALL HAVE A THICKNESS OF 20mm. THEY SHALL BE HOT–DIP GALVANIZED AFTER FABRICATION. ALL DAMAGED GALVANIZED SURFACES SHALL BE COATED WITH TWO COATS OF ZINC–RICH PAINT.
5. AT ENDS OF GIRDERS WHICH ARE NOT TO BE ENCASED IN CONCRETE, STRAND ENDS SHALL BE RECESSED AND GROUTED, AND GIRDER END FACE SHALL BE PAINTED WITH TWO COATS OF ASPHALTIC PAINT.
6. STEEL FILLER PLATES SHALL BE PROVIDED WHENEVER THE TOP OF BOX ELEVATIONS, AT THE TRANSVERSE TIE LOCATIONS, DIFFER MORE THAN 2mm.
7. IF THE THICKNESS OF THE REQUIRED STEEL FILLER PLATE, t^f, IS LESS THAN OR EQUAL TO 5mm, THE FILLER PLATE SIZE SHALL BE 120x60xt^f. THE SIZE OF THE WELD CONNECTING THE COMBINATION OF PLATES TO THE ANGLE SHALL BE INCREASED BY THE THICKNESS OF THE FILLER PLATE.
8. IF THE THICKNESS OF THE REQUIRED STEEL FILLER PLATE, t^f, IS GREATER THAN 5mm, THE FILLER PLATE SIZE SHALL BE 150x75xt^f, AND SHALL BE WELDED TO THE ANGLE WITH A WELD SIZE OF 2mm LESS THAN THE THICKNESS OF THE PLATE BUT NOT LESS THAN 6mm. THE 120x120x12mm PLATE SHALL BE WELDED ALL AROUND WITH AN 8mm WELD AS SHOWN.
9. IF ANCHORD EMBEDDED STEEL BEARING PLATES ARE REQUIRED THE REINFORCING MAY BE ADJUSTED SLIGHTLY TO ACCOMMODATE THE SHEAR CONNECTORS.
10. NON–METALLIC GROUT TUBES AND DOWEL TUBES TO BE LOCATED SO THEY AVOID REINFORCING AND PRESTRESSING STEEL.



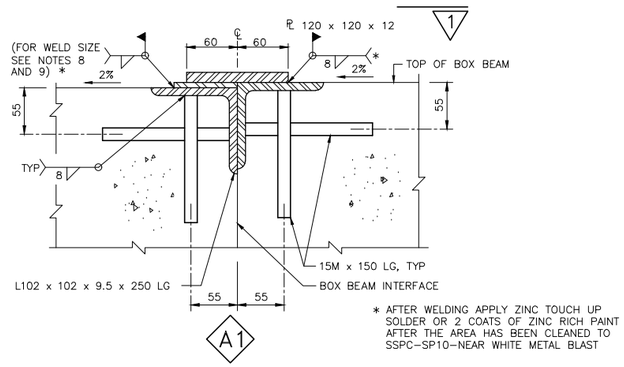
JOINT BETWEEN GIRDERS



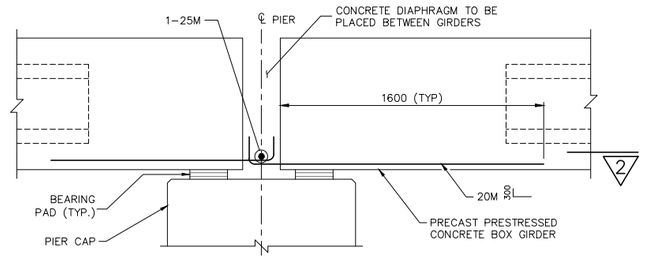
PINNED END

FOR INTEGRAL ABUTMENT

BEAM TO ABUTMENT

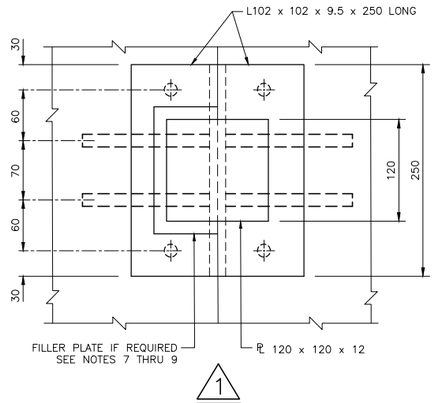


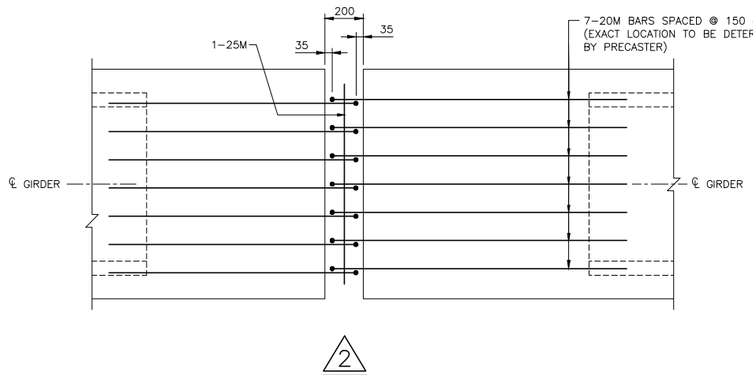
* AFTER WELDING APPLY ZINC TOUCH UP SOLDER OR 2 COATS OF ZINC RICH PAINT AFTER THE AREA HAS BEEN CLEANED TO SSPC–SP10–NEAR WHITE METAL BLAST



ELEVATION

POSITIVE MOMENT CONNECTION AT PIERS





MODIFIED	
STANDARD DRAWING SEPTEMBER 2016	SS107–15
PRESTRESSED BOX GIRDERS DETAILS	

DRAWING NOT TO BE SCALED

100 mm ON ORIGINAL DRAWING

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DRAFTING	C.B.
DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

wood.

Niagara Region PUBLIC WORKS

Contract # ____–_–___

Phase 2

PROPOSED BRIDGE CONSTRUCTION

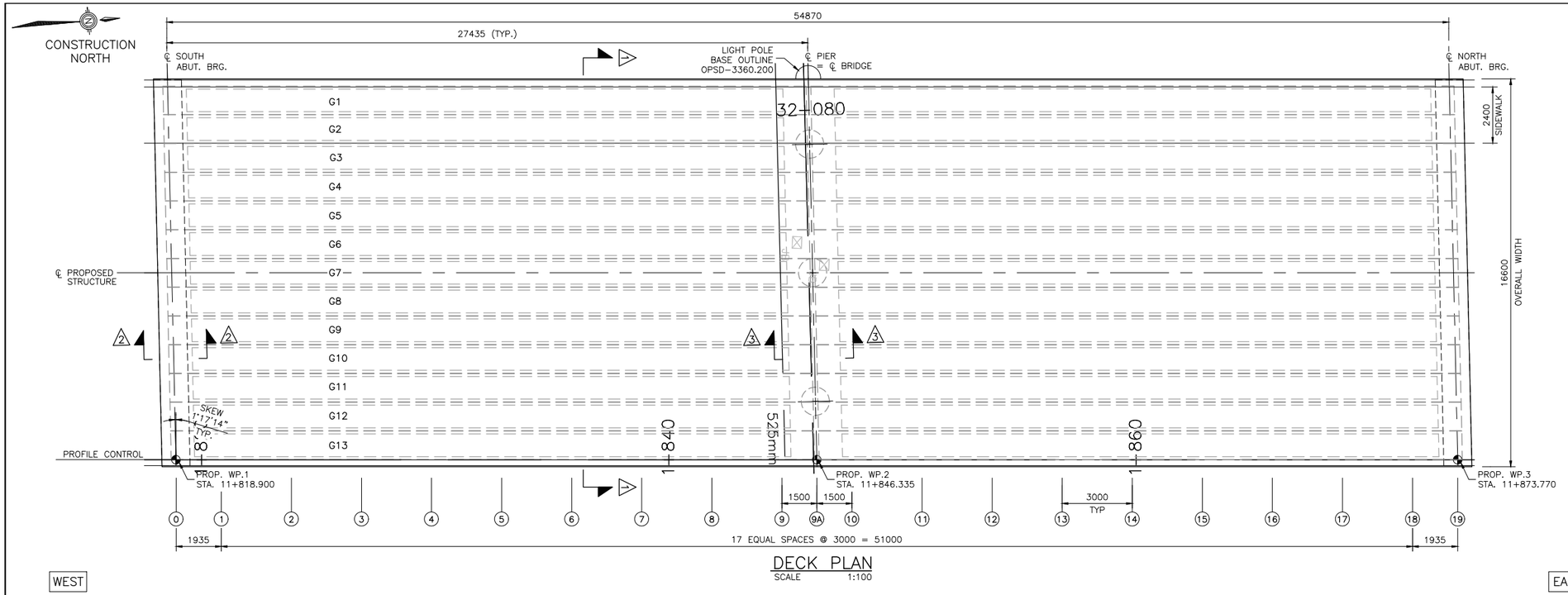
Martindale Road at Highway 406

Niagara Region

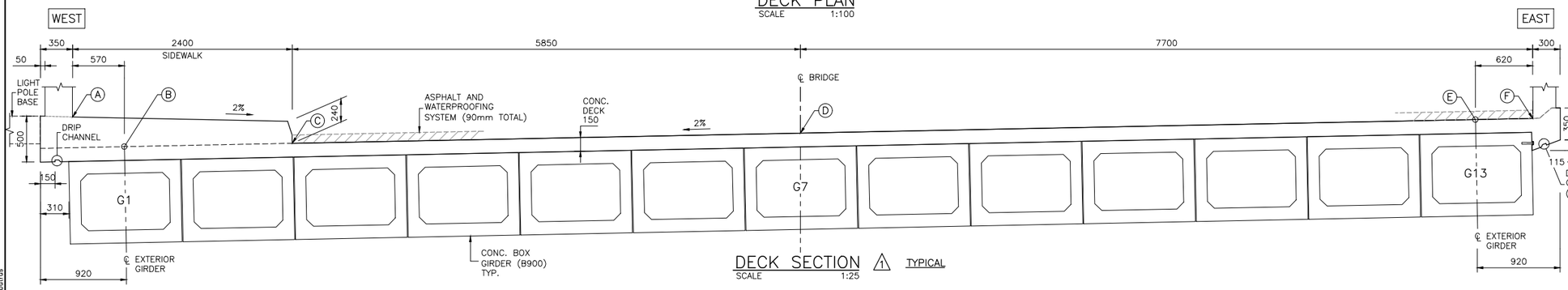
PRESTRESSED BOX GIRDERS - DETAILS

SITE NO.	18–235/2
	METRIC
CONSULTANT FILE No.	TP113112
DATE	NOVEMBER 2018
SCALE	AS SHOWN
REF. No.	RN __–__
DWG No.	S8
REV.	

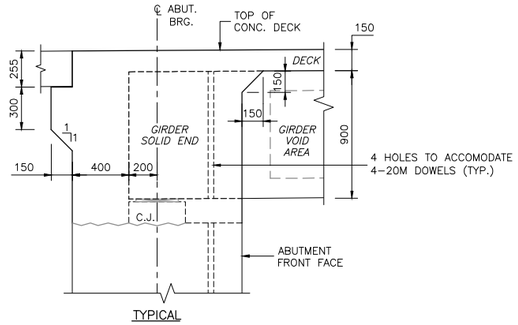
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DECK PLAN
SCALE 1:100

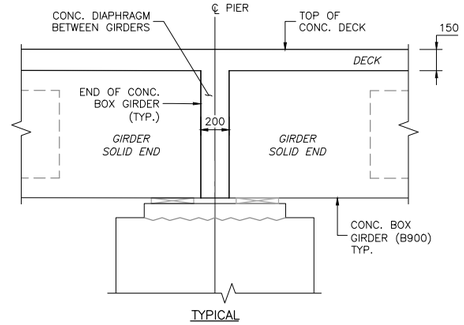


DECK SECTION 1 TYPICAL
SCALE 1:25



TYPICAL

DECK END SECTION 2
SCALE 1:20



TYPICAL

PIER DIAPHGRAM SECTION 3
SCALE 1:20

NOTE

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH GENERAL ARRANGEMENT AND DETAILS DRAWINGS.

SCREED ELEVATIONS

SCREED LINE	A	B	C	D	E	F
0 (S. ABUT.)	103.325	103.000	103.037	103.154	103.296	103.308
1	103.346	103.021	103.058	103.175	103.316	103.329
2	103.374	103.049	103.086	103.203	103.344	103.357
3	103.398	103.074	103.110	103.227	103.369	103.381
4	103.412	103.087	103.124	103.241	103.383	103.395
5	103.422	103.098	103.134	103.251	103.393	103.405
6	103.426	103.101	103.138	103.255	103.397	103.409
7	103.426	103.101	103.138	103.255	103.397	103.409
8	103.416	103.091	103.128	103.245	103.386	103.399
9	103.402	103.077	103.114	103.231	103.372	103.385
9A (℄ BRIDGE)	103.391	103.066	103.103	103.220	103.361	103.374
10	103.397	103.072	103.109	103.226	103.368	103.380
11	103.402	103.077	103.114	103.231	103.373	103.385
12	103.403	103.079	103.115	103.232	103.374	103.386
13	103.394	103.069	103.106	103.223	103.364	103.377
14	103.381	103.056	103.093	103.210	103.352	103.364
15	103.362	103.037	103.074	103.191	103.332	103.345
16	103.339	103.014	103.051	103.168	103.309	103.322
17	103.305	102.980	103.017	103.134	103.276	103.288
18	103.264	102.939	102.976	103.093	103.234	103.247
19 (N. ABUT.)	103.241	102.917	102.953	103.070	103.212	103.224

LEGEND

G1 DENOTES NUMBERED GIRDER

NOTES:

1. SCREED ELEVATIONS ARE TO TOP OF CONCRETE DECK.
2. SCREED ELEVATIONS SHOWN IN TABLE INCLUDE AN ALLOWANCE FOR VERTICAL CURVE, WEIGHT OF DECK SLAB AND SUPERIMPOSED DEAD LOAD.
3. CONCRETE IN DECK SLABS AND DIAPHRAGMS SHALL BE RETARDED USING A TYPE B OR D ADMIXTURE TO ENSURE THAT THE CONCRETE REMAINS PLASTIC FOR THE DURATION OF EACH PLACEMENT.
4. CONCRETE BARRIER WALLS OR SIDEWALK SHALL NOT BE PLACED UNTIL ALL CONCRETE IN DECK SLAB HAS REACHED A STRENGTH OF 20 MPa.
5. ALL DIAPHRAGMS SHALL BE CAST INTEGRAL WITH DECK SLAB AND CONCRETE IN DIAPHRAGMS SHALL BE VIBRATED THOROUGHLY.

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

NO.	REVISION	DATE	INIT.
4	ISSUED FOR TENDER	2019-APR.	N.T.
3	ISSUED FOR 90% MTO EXECUTIVE REVIEW	2019-02-05	N.T.
2	ISSUED FOR 90% MTO REVIEW	2018-DEC.	C.B.
1	ISSUED FOR 60% MTO REVIEW	2015-10-06	C.B.

NOTES/LEGEND
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2 PROPERTY LINES WERE PLOTTED USING REGISTERED PLANS AND BARS LOCATED IN THE FIELD. TO VERIFY THE ACCURACY OF THESE PROPERTY LINES, A LEGAL SURVEY SHOULD BE PERFORMED PRIOR TO CONSTRUCTION.

DRAFTING	C.B.
DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

wood.

Niagara Region PUBLIC WORKS

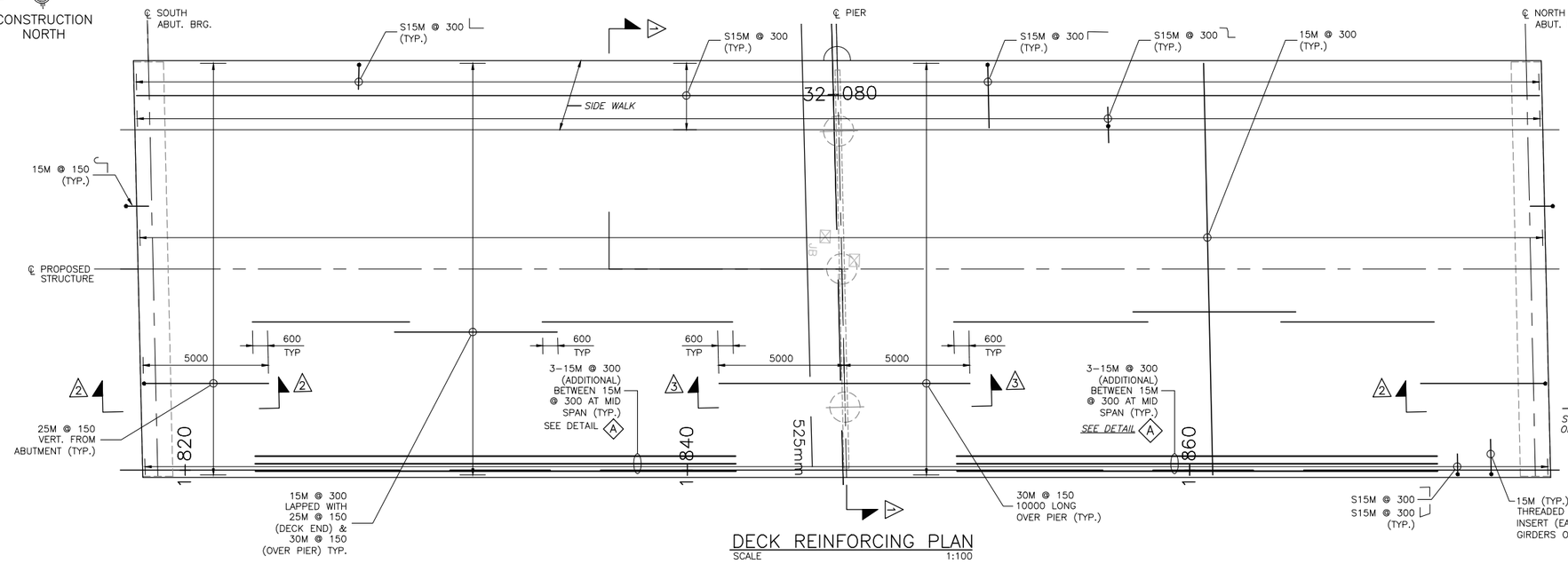
Contract # ____-__-___
Phase 2
PROPOSED BRIDGE CONSTRUCTION
Martindale Road at Highway 406
Niagara Region

DECK DETAILS I

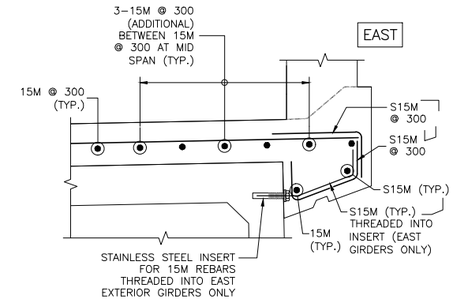
SITE NO.	18-235/2
	METRIC
CONSULTANT FILE No.	TP113112
DATE	NOVEMBER 2018
SCALE	AS SHOWN
REF. No.	RN __-__
DWG No.	S9
REV.	

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CONSTRUCTION NORTH

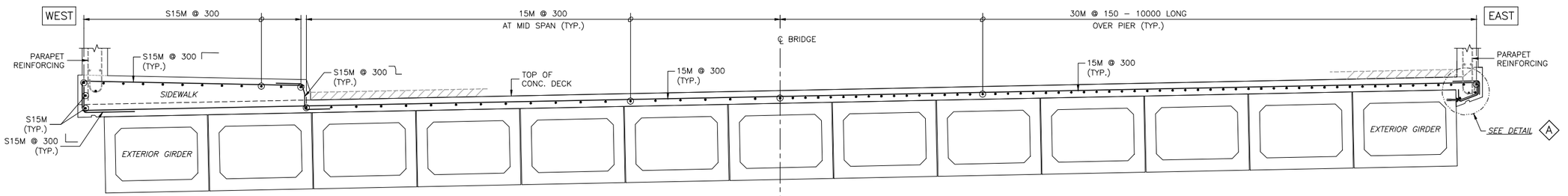


DECK REINFORCING PLAN
SCALE 1:100

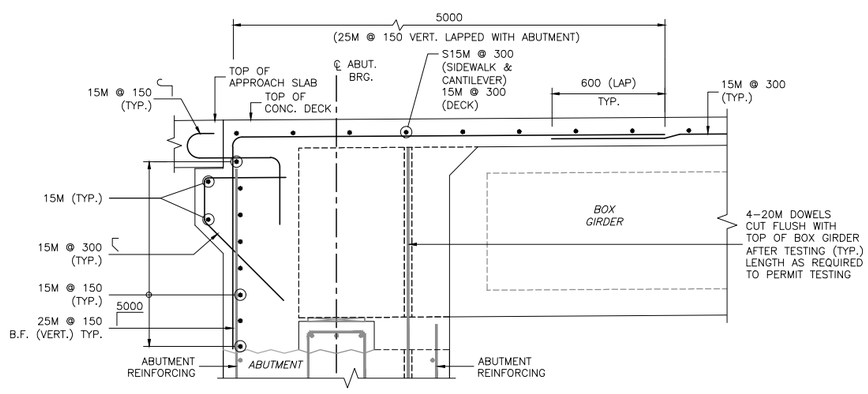


DETAIL A
SCALE 1:10

NOTE
1. THIS DRAWING TO BE READ IN CONJUNCTION WITH GENERAL ARRANGEMENT AND DETAILS DRAWINGS.

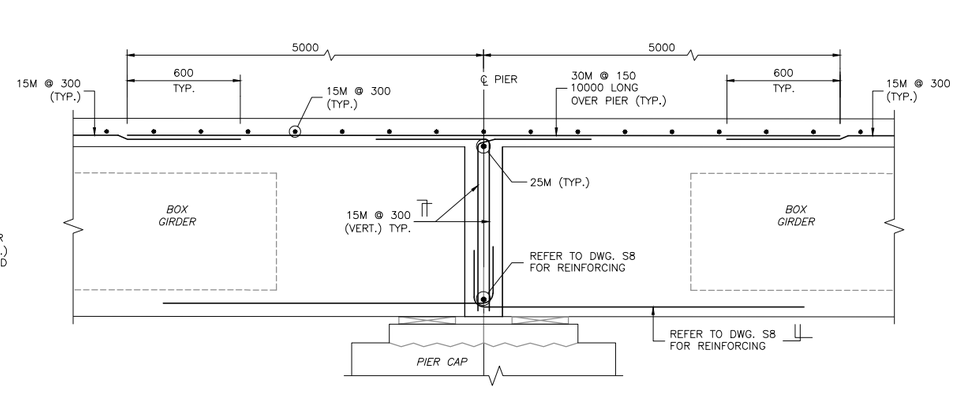


DECK REINFORCING SECTION 1 TYPICAL
SCALE 1:25



TYPICAL

DECK END REINFORCING 2
SCALE 1:15



TYPICAL

PIER DIAPHGRAM REINFORCING 3
SCALE 1:15

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

NO.	REVISION	DATE	INIT.
4	ISSUED FOR TENDER	2019-APR.	N.T.
3	ISSUED FOR 90% MTO EXECUTIVE REVIEW	2019-02-05	N.T.
2	ISSUED FOR 90% MTO REVIEW	2018-DEC.	C.B.
1	ISSUED FOR 60% MTO REVIEW	2015-10-06	C.B.

NOTES/LEGEND
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DRAFTING	C.B.
DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

wood.

Niagara Region PUBLIC WORKS

Contract # ___-__-___
Phase 2
PROPOSED BRIDGE CONSTRUCTION
Martindale Road at Highway 406
Niagara Region
DECK DETAILS II

SITE NO.	18-235/2
	METRIC
CONSULTANT FILE No.	TP113112
DATE	NOVEMBER 2018
SCALE	AS SHOWN
REF. No.	RN __-__
DWG No.	S10
REV.	

AutoCAD drawing: P:\Work\TP113112\Str\Dwg\Contract\PROP BRIDGE\TP113112-S10.dwg Mar 26/19 10:52am peter.butrus

METRIC

DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

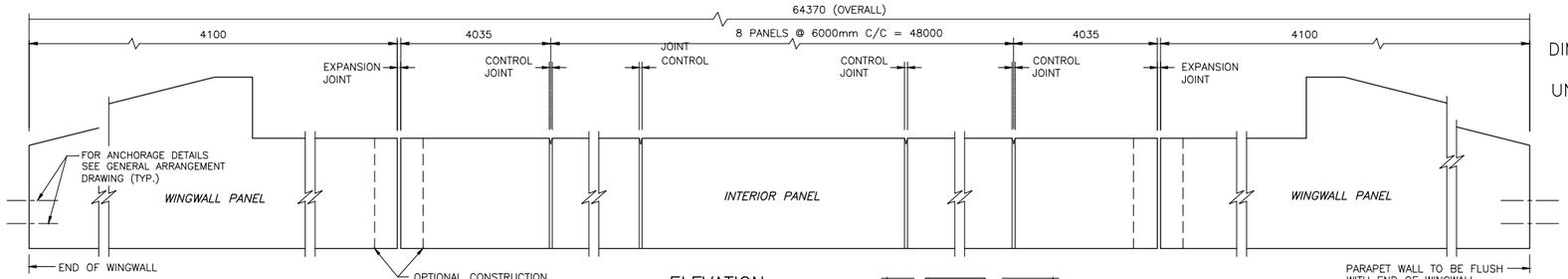
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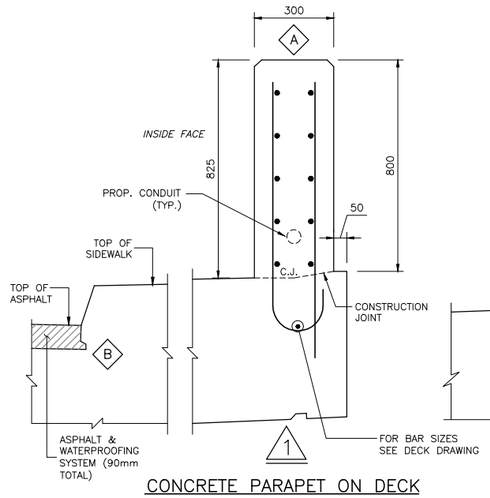
1. SYSTEM CONFIGURATION MEETS THE REQUIREMENTS OF NCHRP 350.
2. CONCRETE COVER TO REINFORCING 60±10mm EXCEPT AS NOTED.
3. REINFORCING SHALL BE GLASS FIBRE REINFORCED POLYMER (GFRP) GRADE III. SIZE IN THE BAR SCHEDULE INDICATES GFRP GRADE AND DESIGNATED BAR DIAMETER AND SHALL HAVE A CROSS SECTIONAL AREA ACCORDING TO CAN/CSA S-807.
4. BAR LAP SPLICE FOR HORIZONTAL REINFORCEMENT MUST NOT LAP THROUGH CONTROL JOINT.
5. MINIMUM BAR LAP SPLICE TO BE 550mm, UNLESS OTHERWISE SHOWN.
6. LENGTH OF HORIZONTAL BAR TO SUIT CONTRACTOR'S OPERATIONS. BAR LENGTHS NEED NOT MATCH DISTANCE BETWEEN CONTROL JOINTS.
7. CONTROL JOINT TO BE FORMED.
8. SAWCUTS NOT PERMITTED.
9. CONTROL JOINT FORM HARDWARE NOT TO BE LEFT IN PLACE.
10. OPTIONAL CONSTRUCTION JOINTS TO BE LOCATED WITHIN LIMITS OF CONCRETE DAMS ON DECK OR BALLAST WALL.
11. CHASE REQUIRED ON HIGH AND LOW SIDE OF CROSSFALL.
12. THIS STANDARD DRAWING MAY BE SUBSTITUTED WITH STANDARD DRAWING SS110-84.
13. THE CONTRACT ADMINISTRATOR SHALL SELECT FIVE (5) SAMPLES AT RANDOM, FROM EACH GFRP BAR MARK IDENTIFIED WITH AN (*), FOR QUALITY ASSURANCE TESTING. THE CONTRACTOR NEEDS TO ALLOW FOR THIS WHEN CALCULATING THE NUMBER OF BARS TO BE DELIVERED TO THE SITE.
14. LEGEND:
    - EF – DENOTES EACH FACE
    - IF – DENOTES INSIDE FACE
    - OF – DENOTES OUTSIDE FACE
    - CJ – DENOTES CONSTRUCTION JOINT

BAR MARK	SIZE	SHAPE
① *	GIII-20M	80, 190, 945
② *	GIII-15M	STRAIGHT
③	GIII-15M	230, 2190, 530
④ *	GIII-20M	80, 190, VARIES
⑤ *	GIII-15M	STRAIGHT
⑥	GIII-15M	STRAIGHT LENGTH VARIES
⑦	GIII-15M	STRAIGHT
⑧	GIII-20M	80, 190, 1490
⑨	GIII-15M	STRAIGHT

(*) SEE NOTE 13.

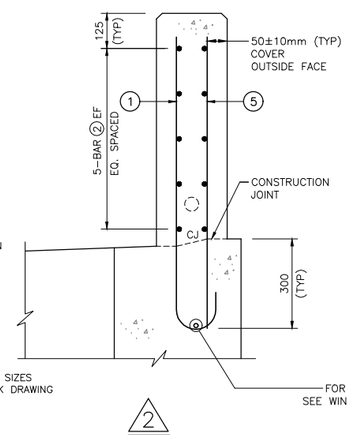
ELEVATION

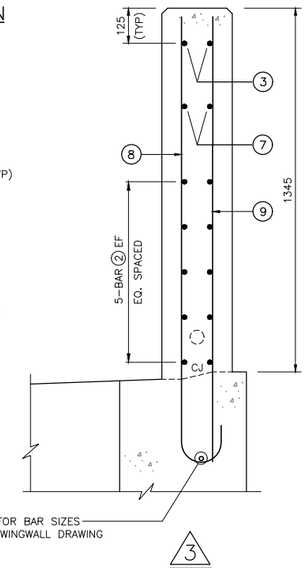




CONCRETE PARAPET ON DECK

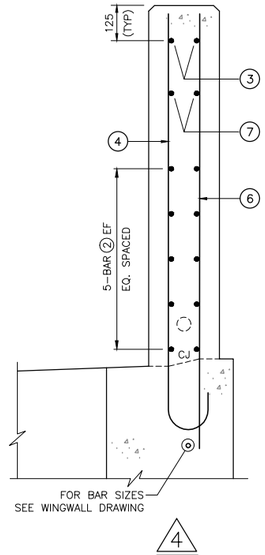
TYPICAL DIMENSIONS (FOR BAR NUMBERS SEE 2)

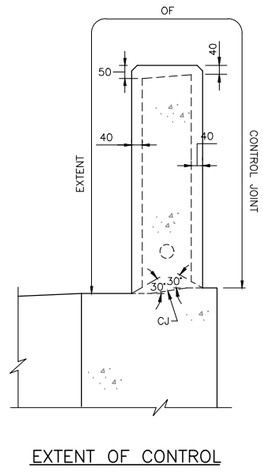




CONCRETE PARAPET ON WINGWALL

TYPICAL REINFORCEMENT

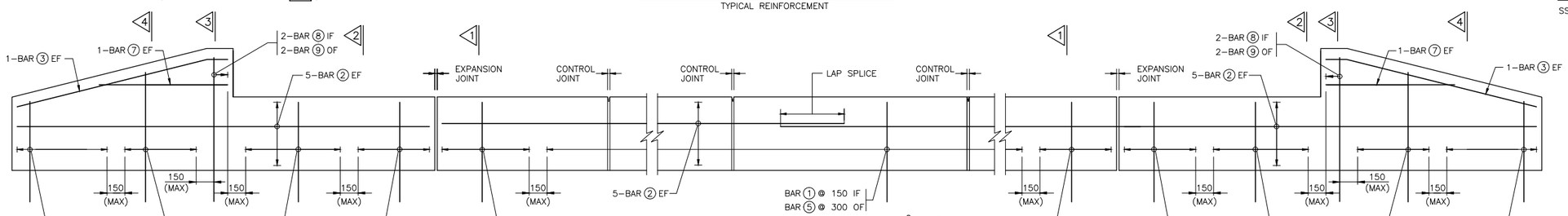




EXTENT OF CONTROL JOINT IN PARAPET WALL

APPLICABLE STANDARD DRAWING:

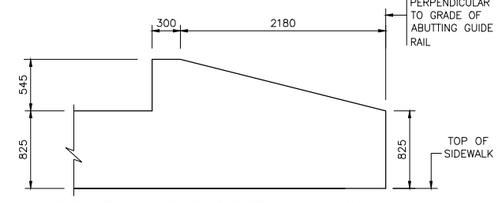
SS110-85 RAILING ON PARAPET/BARRIER FOR COMBINATION TRAFFIC/BICYCLE RAIL, TL-4



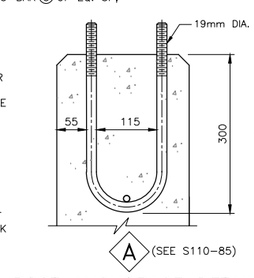
TYPICAL REINFORCING ARRANGEMENT

MODIFIED	
STANDARD DRAWING MAY 2018	SS110-83
PARAPET WALL FOR COMBINATION TRAFFIC/ BICYCLE RAIL, TL-4 (GFRP GRADE III REBAR)	

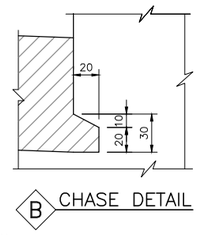
DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING



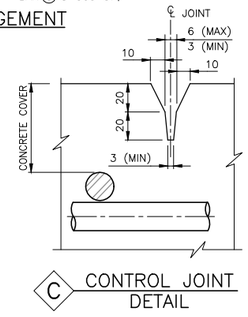
ELEVATION OF PARAPET ON WINGWALL



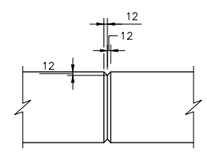
POST ANCHORAGE DETAIL



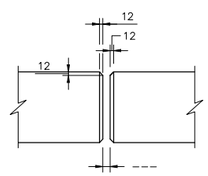
CHASE DETAIL



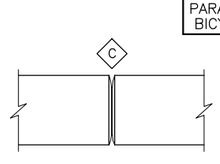
CONTROL JOINT DETAIL



TYPICAL OPTIONAL CONSTRUCTION JOINT



TYPICAL EXPANSION JOINT



TYPICAL CONTROL JOINT

NO.	REVISION	DATE	INIT.
4	ISSUED FOR TENDER	2019-APR.	N.T.
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1	ISSUED FOR 60% MTO REVIEW	2015-10-06	C.B.

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DRAFTING	C.B.
DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

wood.

Niagara Region PUBLIC WORKS

Contract # ____-_-___

Phase 2

PROPOSED BRIDGE CONSTRUCTION

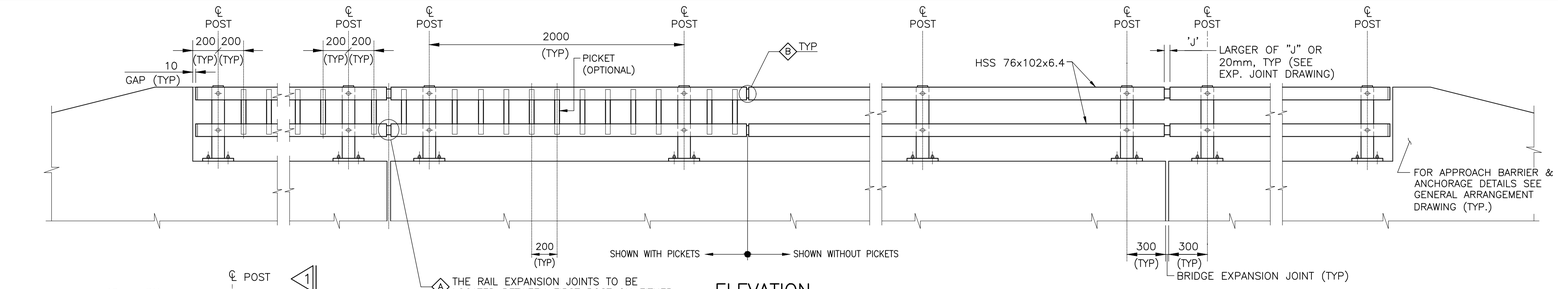
Martindale Road at Highway 406

Niagara Region

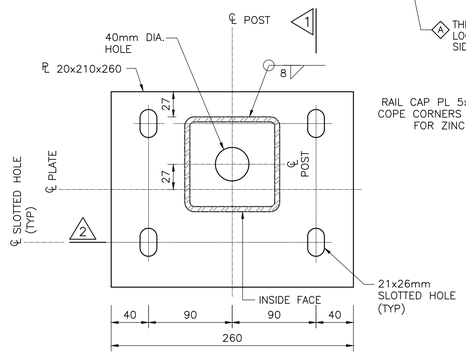
PARAPET WALL FOR COMBINATION TRAFFIC / BICYCLE RAIL ON SIDEWALK, TL-4

SITE NO.	18-235/2
	METRIC
CONSULTANT FILE No.	TP113112
DATE	NOVEMBER 2018
SCALE	AS SHOWN
REF. No.	RN __-__
DWG No.	S11
REV.	

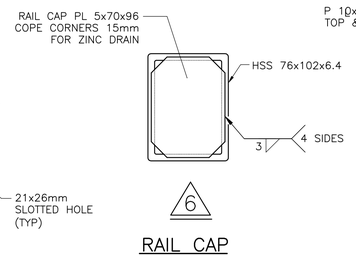
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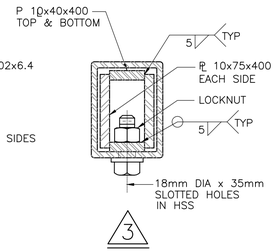
ELEVATION
(INSIDE FACE SHOWN)

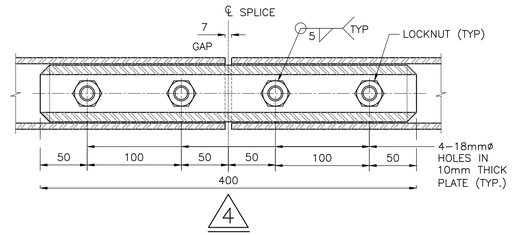


BASE PLATE

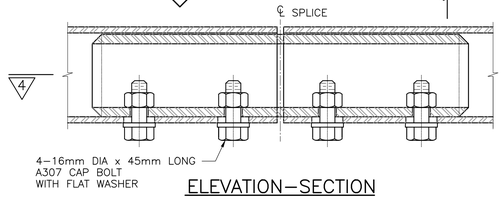


RAIL CAP

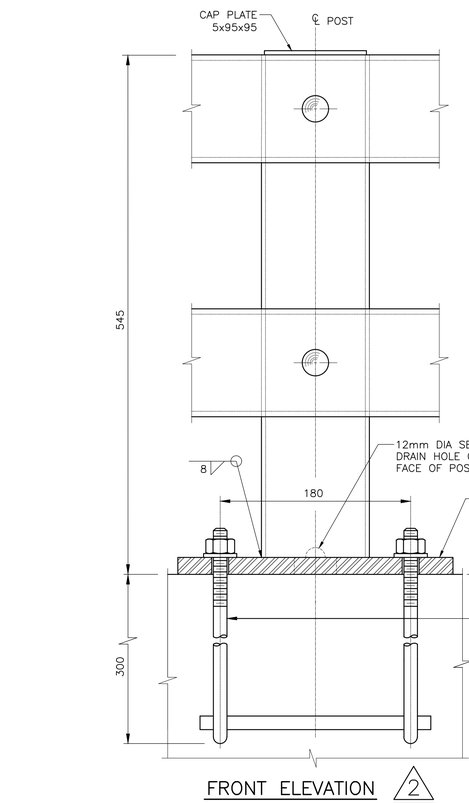




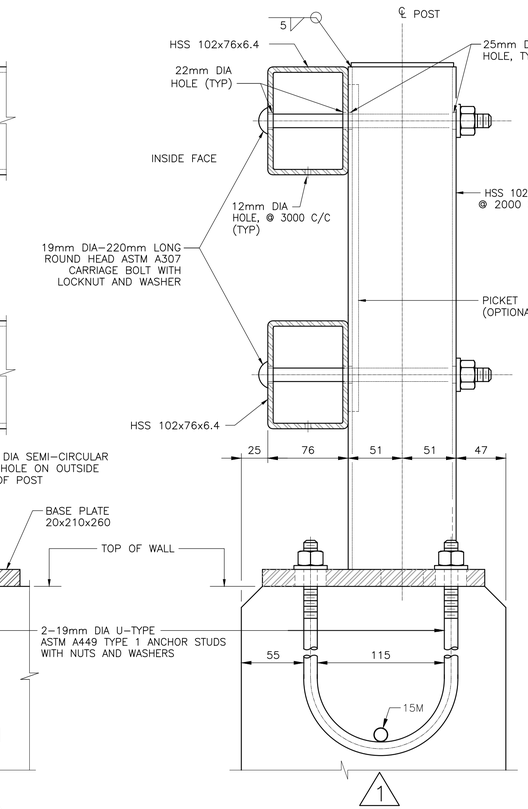
B RAIL SPLICE DETAIL



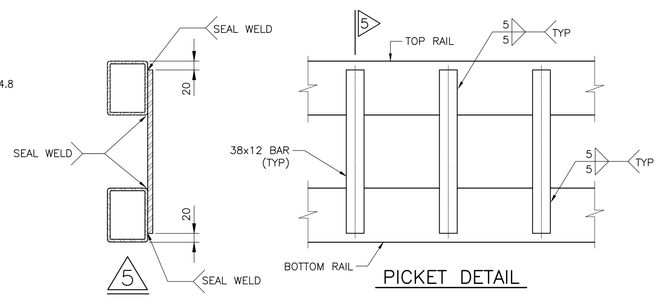
ELEVATION–SECTION



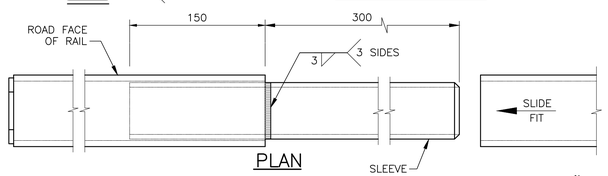
FRONT ELEVATION 2



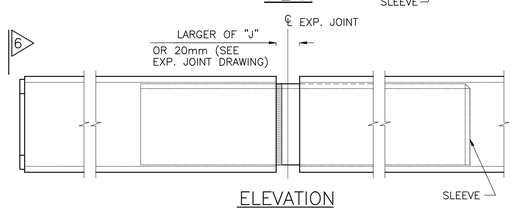
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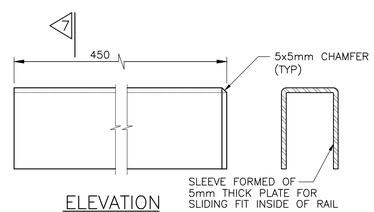
PICKET DETAIL



PLAN



A EXPANSION JOINT ASSEMBLY



ELEVATION
EXPANSION JOINT SLEEVE 7

METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

NOTES:

1. THIS STANDARD TO BE READ IN CONJUNCTION WITH SS110–83.
2. RAIL ELEMENTS AND POSTS SHALL BE HOLLOW STRUCTURAL SECTIONS GRADE 350W, CLASS C.
3. STEEL PLATES SHALL BE GRADE 350W.
4. ANCHOR STUDS, WASHERS AND NUTS SHALL BE ACCORDING TO ASTM A449.
5. BOLTS, WASHERS AND NUTS FOR FASTENING GUIDE RAILS TO POST SHALL CONFORM TO ASTM A307.
6. RAIL SHALL BE SUPPLIED IN LENGTHS TO BE ATTACHED TO A MINIMUM OF THREE (3) POSTS EXCEPT WHEN THE WINGWALL LENGTH OF A BRIDGE WITH EXPANSION JOINTS DOES NOT PERMIT THIS. IN THIS CASE, THE RAIL LENGTH SHALL BE ATTACHED TO TWO (2) POSTS ON THE WINGWALL.
7. GALVANIZING ON MATING SURFACES OF RAILS TO HAVE UNIFORM THICKNESS NOT EXCEEDING 0.15 mm TO ENSURE SLIDING FIT.
8. RAIL, POSTS AND RAIL SPLICES SHALL BE HOT DIP GALVANIZED. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION.
9. BOLTS, ANCHOR STUDS, PLATES, WASHERS AND NUTS SHALL BE HOT DIP GALVANIZED. LOCKNUTS SHALL BE ZINC PLATED ACCORDING TO ASTM–B695.
10. RAILS SHALL BE PREBENT TO FOLLOW ROAD CURVATURE WHERE RADIUS IS LESS THAN 150 METRES.
11. RAIL POSTS SHALL BE SET PERPENDICULAR TO GRADE.
12. RAIL MAY BE CUT AS REQUIRED IN FIELD. CUT TO BE SURFACE TREATED WITH A ZINC TOUCH–UP SOLDER, GALVAGUARD OR APPROVED EQUIVALENT.
13. WHEN CONNECTING TO EXISTING RAILING, RAIL MUST BE MADE CONTINUOUS AND POST SPACING DETERMINED WITH REFERENCE TO EXISTING POSTS.
14. GROUT SHALL NOT BE USED UNDER BASE PLATES. THIN PAD OF OF EPOXY GROUT MAY BE USED WHEN REQUIRED FOR FILLING THE VOIDS UNDER THE BASE PLATE.
15. BOLTS IN RAIL SPLICES SHALL BE TIGHTENED TO A CONDITION THAT WILL ALLOW RAIL MOVEMENT.
16. HOLES FOR HSS RAILING SHALL BE DRILLED IN FIELD
17. POST ANCHORING NUTS SHALL BE TIGHTENED TO A SNUG FIT CONDITION AND GIVEN AN ADDITIONAL 1/3 OF A TURN

ADDITIONAL NOTES FOR PICKET:

1. PICKET SHALL BE 38x12 STEEL BAR GRADE 300W.
2. HOT DIP GALVANIZING OF RAILING SHALL BE AFTER ADDITION OF PICKETS.

MODIFIED	
STANDARD DRAWING SEPTEMBER 2016	SS110–85
RAILING ON PARAPET FOR COMBINATION TRAFFIC/BICYCLE RAIL, TL–4	

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

NO.	REVISION	DATE	INIT.
4	ISSUED FOR TENDER	2019–APR.	N.T.
3	ISSUED FOR 90% MTO EXECUTIVE REVIEW	2019–02–05	N.T.
2	ISSUED FOR 90% MTO REVIEW	2018–DEC.	C.B.
1	ISSUED FOR 60% MTO REVIEW	2015–10–06	C.B.

NOTES/LEGEND
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2 PROPERTY LINES WERE PLOTTED USING REGISTERED PLANS AND BARS LOCATED IN THE FIELD. TO VERIFY THE ACCURACY OF THESE PROPERTY LINES, A LEGAL SURVEY SHOULD BE PERFORMED PRIOR TO CONSTRUCTION.

DRAFTING	C.B.
DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

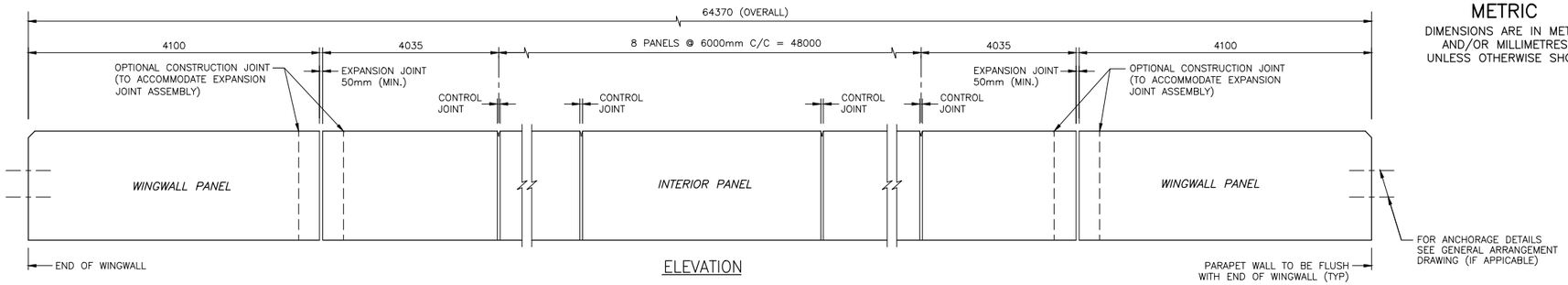
wood.

Niagara Region PUBLIC WORKS

Contract # ____-_-___
Phase 2
PROPOSED BRIDGE CONSTRUCTION
Martindale Road at Highway 406
Niagara Region
RAILING ON PARAPET FOR COMBINATION TRAFFIC / BICYCLE RAIL, TL4

SITE NO. 18–235/2	
METRIC	
CONSULTANT FILE No. TP113112	
DATE	NOVEMBER 2018
SCALE	AS SHOWN
REF. No.	RN __-__
DWG No.	S12
REV.	

AutoCAD drawings: P:\Work\TP113112\Sta\Dwg\Contract\PROP BRIDGE\TP113112–S12.dwg Mar 26/19 11:00am peter.butrus



ELEVATION

METRIC

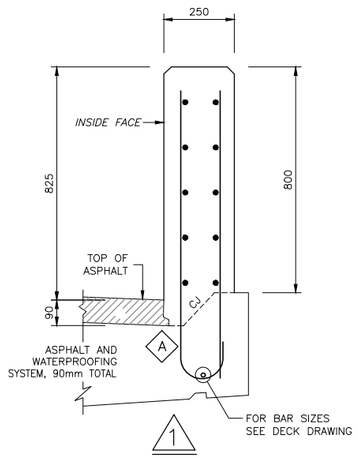
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

NOTES:

1. SYSTEM CONFIGURATION MEETS THE REQUIREMENTS OF NCHRP 350.
2. CONCRETE COVER TO REINFORCING BAR 60±10mm EXCEPT AS NOTED.
3. REINFORCING SHALL BE GLASS FIBRE REINFORCED POLYMER (GFRP) GRADE III. SIZE IN THE BAR SCHEDULE INDICATES GFRP GRADE AND DESIGNATED BAR DIAMETER AND SHALL HAVE A NOMINAL CROSS SECTIONAL AREA ACCORDING TO CAN/CSA S-807.
4. BAR LAP SPLICE FOR HORIZONTAL REINFORCEMENT MUST NOT LAP THROUGH CONTROL JOINT.
5. MINIMUM BAR LAP SPLICE TO BE 550mm, UNLESS OTHERWISE SHOWN.
6. LENGTH OF HORIZONTAL BAR TO SUIT CONTRACTOR'S OPERATIONS. BAR LENGTHS NEED NOT MATCH DISTANCE BETWEEN CONTROL JOINTS.
7. CONTROL JOINT TO BE FORMED.
8. SAWCUTS NOT PERMITTED.
9. CONTROL JOINT FORM HARDWARE NOT TO BE LEFT IN PLACE.
10. OPTIONAL CONSTRUCTION JOINTS TO BE LOCATED WITHIN LIMITS OF CONCRETE DAMS ON DECK OR BALLAST WALL.
11. THIS STANDARD DRAWING MAY BE SUBSTITUTED WITH STANDARD DRAWING SS110-90.
12. CHASE REQUIRED ON HIGH AND LOW SIDE OF CROSSFALL.
13. THE CONTRACT ADMINISTRATOR SHALL SELECT FIVE (5) SAMPLES AT RANDOM, FROM EACH GFRP BAR MARK IDENTIFIED WITH AN (*), FOR QUALITY ASSURANCE TESTING. THE CONTRACTOR NEEDS TO ALLOW FOR THIS WHEN CALCULATING THE NUMBER OF BARS TO BE DELIVERED TO THE SITE.
14. LEGEND: EF – DENOTES EACH FACE
    IF – DENOTES INSIDE FACE
    OF – DENOTES OUTSIDE FACE
    CJ – CONSTRUCTION JOINT

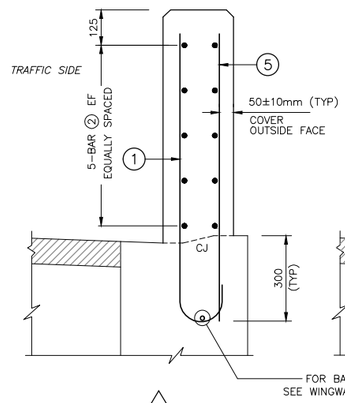
BAR MARK	SIZE	SHAPE
1 *	G III–20M	80, 190, 950
2 *	G III–15M	STRAIGHT
3	G III–15M	250, 885, 240
4	G III–20M	80, 190, 950
5 *	G III–15M	STRAIGHT
6	G III–15M	STRAIGHT
7 *	G III–20M	80, 190, 950
8	G III–15M	STRAIGHT

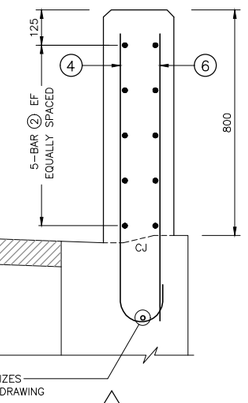
(*) SEE NOTE 13.



CONCRETE PARAPET ON DECK

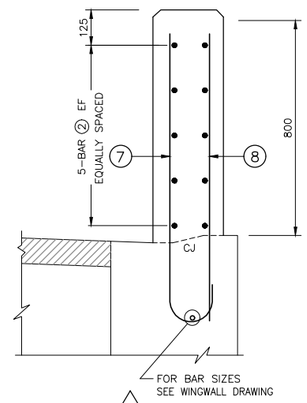
TYPICAL DIMENSIONS (FOR BAR NUMBERS SEE 2)

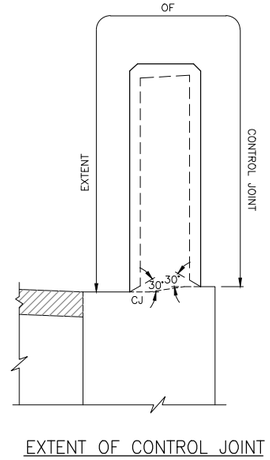




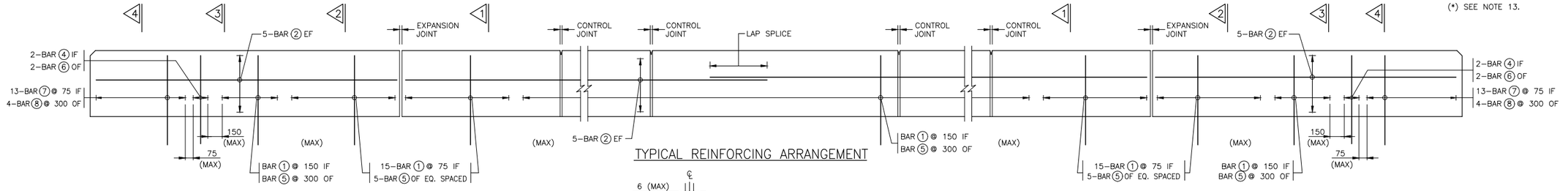
CONCRETE PARAPET ON WINGWALL

TYPICAL REINFORCING

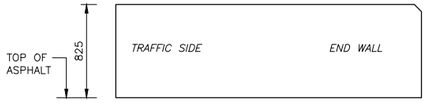




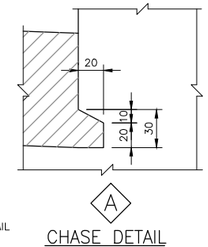
EXTENT OF CONTROL JOINT IN PARAPET WALL



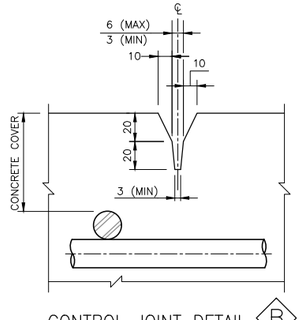
TYPICAL REINFORCING ARRANGEMENT



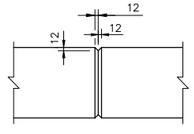
ELEVATION OF PARAPET ON WINGWALL



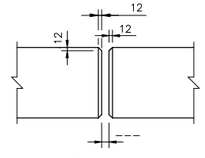
CHASE DETAIL



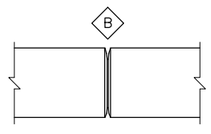
CONTROL JOINT DETAIL



TYPICAL OPTIONAL CONSTRUCTION JOINT



TYPICAL EXPANSION JOINT



TYPICAL CONTROL JOINT

MODIFIED	
STANDARD DRAWING MAY 2018	SS110-59
PARAPET WALL WITHOUT RAILING, TL-4 (GFRP GRADE III REBAR)	

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

NO.	REVISION	DATE	INIT.
4	ISSUED FOR TENDER	2019-APR.	N.T.
3	ISSUED FOR 90% MTO EXECUTIVE REVIEW	2019-02-05	N.T.
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DRAFTING	C.B.
DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

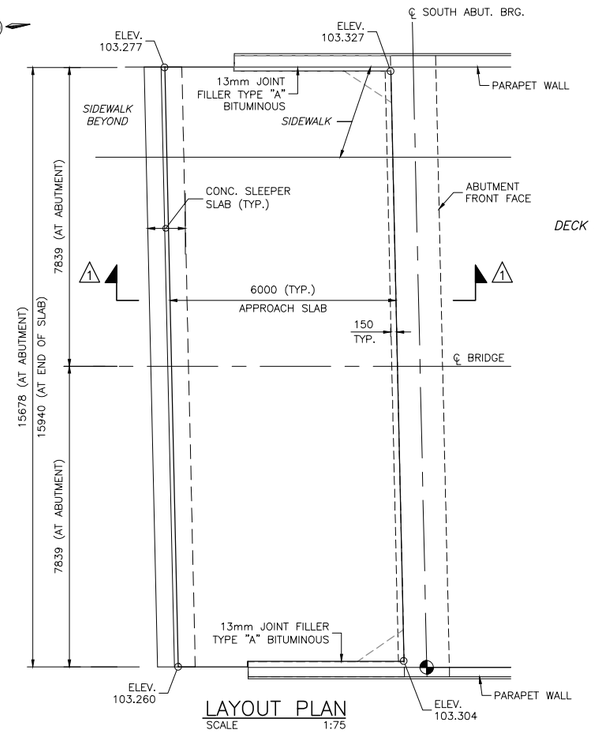
wood.

Niagara Region PUBLIC WORKS

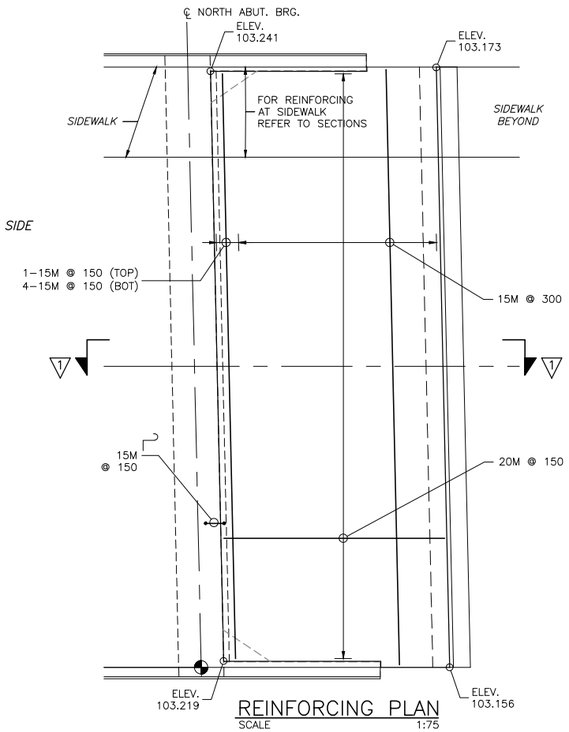
Contract # ____-_-___
Phase 2
PROPOSED BRIDGE CONSTRUCTION
Martindale Road at Highway 406
Niagara Region
PARAPET WALL WITHOUT RAILING, TL-4

SITE NO.	18-235/2
	METRIC
CONSULTANT FILE No.	TP113112
DATE	NOVEMBER 2018
SCALE	AS SHOWN
REF. No.	RN __-__
DWG No.	S13
REV.	

AutoCAD drawings: P:\Work\TP113112\Str\Dwg\Contract\PROP BRIDGE\TP113112-S13.dwg Mar 26/19 11:01am peter.butrus



LAYOUT PLAN
SCALE 1:75



REINFORCING PLAN
SCALE 1:75

NOTES:

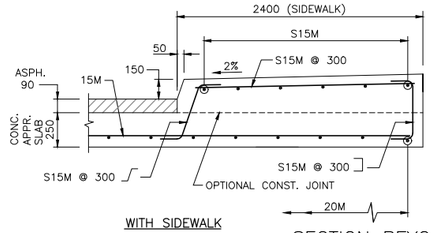
1. CLEAR COVER TO REINFORCING STEEL 70 ± 20 mm EXCEPT AS NOTED.
2. LAYOUT OF REINFORCING STEEL WILL BE SIMILAR FOR LEFT HAND AND ZERO DEGREE SKEW.
3. STAINLESS STEEL BARS SHALL BE TYPE 316 LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500 MPA. REINFORCING STEEL SHALL BE GRADE 400W.
4. WATERPROOFING AT JOINT BETWEEN BRIDGE AND APPROACH SLAB TO BE IN ACCORDANCE WITH OPSD–3370.100
5. WATERPROOFING FOR BRIDGES WITHOUT EXPANSION JOINTS (RIGID FRAMES AND INTEGRAL ABUTMENTS) TO BE IN ACCORDANCE WITH OPSD–3370.101
6. BARS MARK WITH PREFIX "S" DENOTE STAINLESS STEEL BARS.
7. THIS DRAWING TO BE READ IN CONJUNCTION WITH GENERAL ARRANGEMENT AND DETAILS DRAWINGS.

APPLICABLE STANDARD DRAWINGS

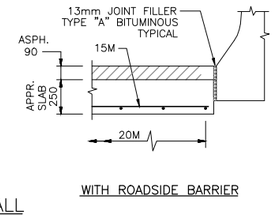
OPSD–3370.100 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE WITH PROTECTION BOARD

OPSD–3370.101 DECK, WATERPROOFING HOT APPLIED ASPHALT MEMBRANE AT ACTIVE CRACKS GREATER THAN 2mm WIDE AND CONSTRUCTION JOINTS

MODIFIED	
STANDARD DRAWING MARCH 2016	SS116–1
6000mm APPROACH SLAB	

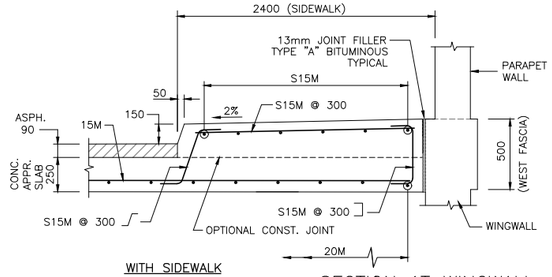


WITH SIDEWALK

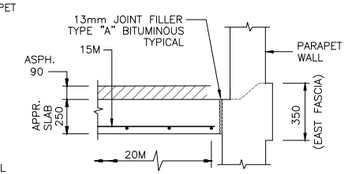


WITH ROADSIDE BARRIER

SECTION BEYOND WINGWALL

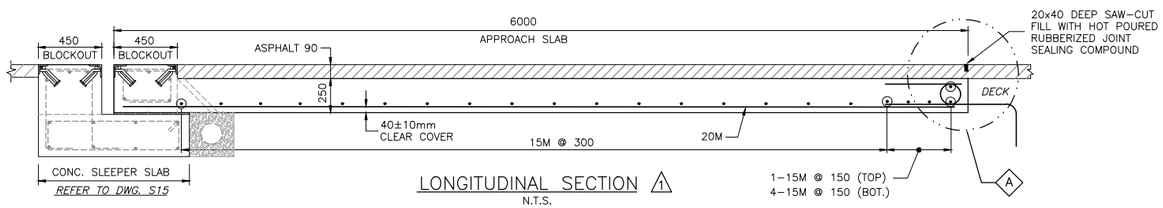


WITH SIDEWALK

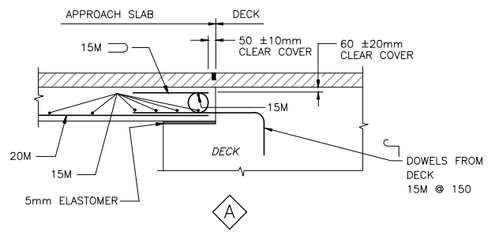


WITHOUT SIDEWALK

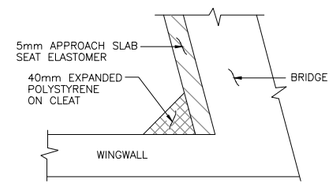
SECTION AT WINGWALL



LONGITUDINAL SECTION 1
N.T.S.



FOR BRIDGES WITHOUT EXPANSION JOINTS



DETAIL AT CLEAT

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

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4	ISSUED FOR TENDER	2019–APR.	N.T.
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DRAFTING	C.B.
DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

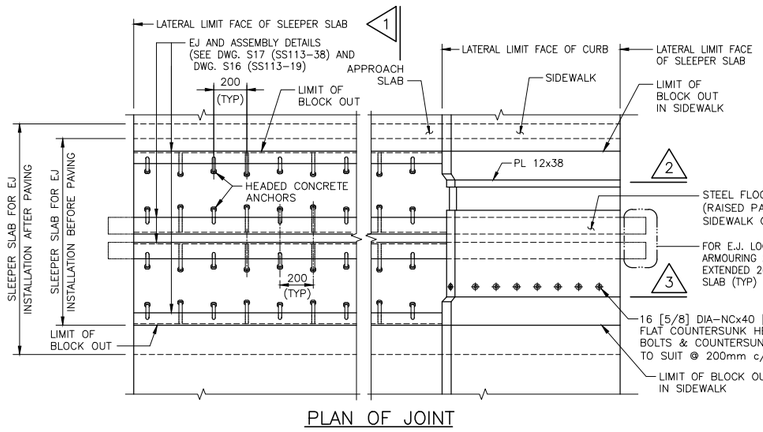
wood.

Niagara Region PUBLIC WORKS

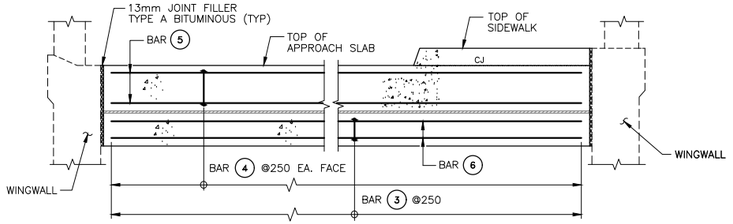
Contract # ____-_-___
Phase 2
PROPOSED BRIDGE CONSTRUCTION
Martindale Road at Highway 406
Niagara Region
6000mm APPROACH SLAB

SITE NO.	18–235/2
	METRIC
CONSULTANT FILE No.	TP113112
DATE	NOVEMBER 2018
SCALE	AS SHOWN
REF. No.	RN __-__
DWG No.	S14
REV.	

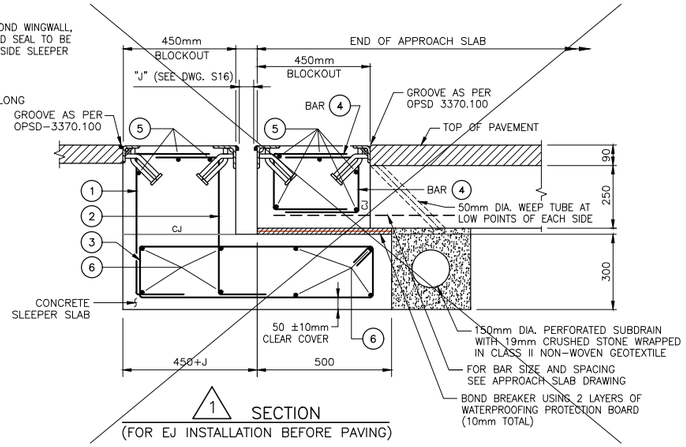
*AutoCAD drawing: P:\Work\TP113112\Str\Dwg\Contract\PROP BRIDGE\TP113112–S14.dwg Mar. 26/19 11:01am peter.bufrus



PLAN OF JOINT



2 SECTION AT WINGWALL
(ARMOURING DETAIL NOT SHOWN FOR CLARITY)



1 SECTION
(FOR EJ INSTALLATION BEFORE PAVING)

BAR MARK	SIZE	SHAPE
(1)	S15M	310 / 530 / 180
(2)	S15M	300 / 530 / 180
(3)	15M	180
(4)	S15M	200 / 310
(5)	S15M	STRAIGHT
(6)	15M	STRAIGHT
(7)	S15M	260 / 440
(8)	S15M	310 / 490 / 180
(9)	S15M	300 / 490 / 180

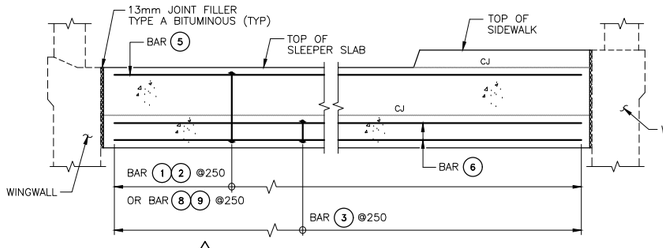
NOTES:

1. THIS DRAWING SHOWS EXPANSION JOINT AND SLEEPER SLAB AT THE END OF APPROACH SLAB OF INTEGRAL AND SEMI-INTEGRAL ABUTMENT BRIDGES WITH A MOVEMENT BETWEEN 10 AND 40mm.
2. CLASS OF CONCRETE 30 MPa.
3. REINFORCEMENT STEEL SHALL BE GRADE 400W. STAINLESS STEEL SHALL BE TYPE 316 LN OR DUPLEX 2205 WITH A MINIMUM YIELD STRENGTH OF 500 MPa. BARS MARKED WITH PREFIX S DENOTE STAINLESS STEEL BARS.
4. COVER TO REINFORCING STEEL 70 ±20mm EXCEPT AS NOTED.
5. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING S16 (SS113-19).
6. EXPANSION JOINT TO BE SUPPLIED BY MANUFACTURES LISTED IN DSM 9.40.27 FOR THE SUPPLY OF TYPE 'C' STRIP SEAL EXPANSION JOINT.
7. EXPANSION JOINT ASSEMBLY CONSTRUCTION AND MATERIAL SHALL BE ACCORDING TO OPSS 920 AND OPSS 1210, AND AS SPECIFIED IN THE CONTRACT DOCUMENTS.
8. JOINT ASSEMBLY SHALL BE COMPLETELY SHOP ASSEMBLED (EXCEPT FOR SEALS) AND PRESET TO DIMENSION 'J' FOR 15°C AND ADJUSTED IN THE FIELD TO SUIT INSTALLATION TEMPERATURE.
9. JOINT ASSEMBLY INSTALLATION TEMPERATURE SHALL BE TAKEN AS MEAN SHADE AIR TEMPERATURE AT STRUCTURE PRIOR TO JOINT INSTALLATION AS FOLLOWS:
   - FOR CONCRETE STRUCTURES – 48 HOURS
   - FOR STEEL STRUCTURES – 24 HOURS
10. FIELD SPLICES IN JOINT ASSEMBLY ARE ONLY PERMITTED AT STAGED CONSTRUCTION, AND/OR AS SHOWN ON THE CONTRACT DRAWINGS.
11. IF THE JOINT ARMOURING FOR A SKEW STRUCTURE IS SPLICED AT A CROWN, THE SPLICE SHALL BE DETAILED PARALLEL TO THE CENTRELINE OF THE TRAFFIC LANE.
12. SETTING ANGLES SHALL BE FLAME CUT ACCORDING TO OPSS 920, BUT IN NO CASE PRIOR TO CONCRETE REACHING INITIAL SET.
13. AFTER CURING OF THE CONCRETE HAS BEEN COMPLETED, THE SETTING DEVICES MAY BE REMOVED. THE VOIDS UNDER THE ARMOURING ANGLE AND NOSING ANGLE SHALL THEN BE PRESSURE INJECTED.
14. PREFORMED SEALS SHALL HAVE MINIMUM THICKNESS OF 5mm OR AS PER DSM.
15. ALL STEEL RETAINER SURFACES COMING IN CONTACT WITH PREFORMED SEAL SHALL BE CLEANED PRIOR TO INSTALLATION OF THE SEAL.
16. PREFORMED SEALS SHALL BE INSTALLED AFTER JOINT ASSEMBLY HAS BEEN CAST, STYROFOAM OR FILLER BETWEEN APPROACH SLAB AND SLEEPER SLAB REMOVED, AND EXPANSION GAP CLEARED OF ANY DEBRIS.
17. HEADED CONCRETE ANCHORS IN NOSING ANGLES SHALL BE LOCATED WITHIN 75mm OF EITHER SIDE OF FIELD SPLICES.
18. PROTECT INJECTION HOSE AND FITTINGS ADJACENT TO FIELD SPLICE DURING WELDING AND REMOVE PROTECTION PRIOR TO PLACING OF CONCRETE IN BLOCKOUT.
19. FOR SKEWED STRUCTURE, WORKING DRAWING SHALL BE DETAILED TO SUIT GEOMETRY OF STRUCTURE.
20. ALL JOINT ANCHORAGES SHALL BE DETAILED ON WORKING DRAWINGS PERPENDICULAR TO THE EXPANSION JOINT ON BOTH THE APPROACH SLAB SIDE AND THE SLEEPER SLAB SIDE EXCEPT STRUCTURE SKEWED FROM OVER 15° AND UP TO 45° SHALL HAVE ANCHORAGES DETAILED 30° OFFSET FROM THE PERPENDICULAR TO THE EXPANSION JOINT ON THE APPROACH SLAB SIDE.
21. ALL CONSTRUCTIONS JOINTS (CJ) SURFACES SHALL BE INTENTIONALLY ROUGHENED BEFORE NEW CONCRETE IS PLACED AGAINST THEM.
22. SEQUENCE OF EXPANSION JOINT INSTALLATION SHALL BE AS PER DRAWING S17 (SS113-38).

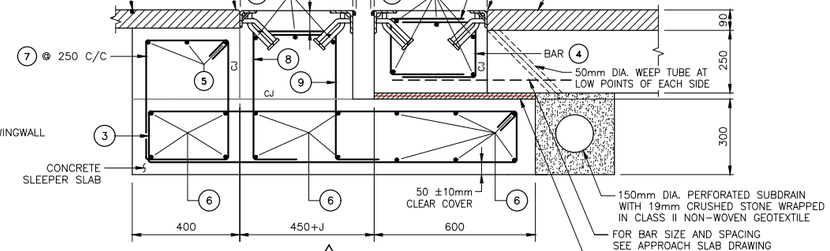
LEGEND:

[ ] DENOTES FASTENER SIZE IN INCHES
CJ DENOTES CONSTRUCTION JOINT
EJ DENOTES EXPENSION JOINT

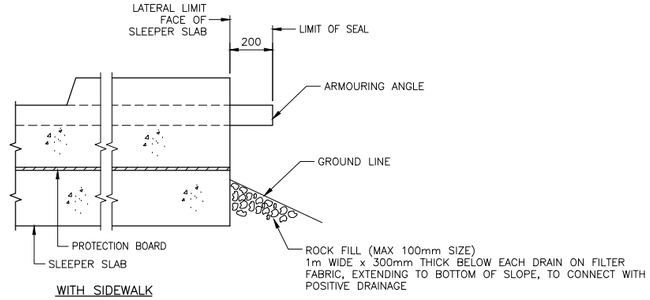
MODIFIED	
STANDARD DRAWING MAY 2017	SS113-37
EXPANSION JOINT AND SLEEPER SLAB (10mm< MOVEMENT ⩽40mm)	



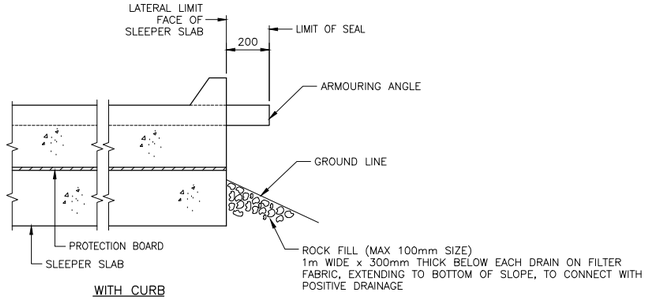
3 SECTION AT WINGWALL
(ARMOURING DETAIL NOT SHOWN FOR CLARITY)



1 SECTION
(FOR EJ INSTALLATION AFTER PAVING)



WITH SIDEWALK



WITH CURB

E.J. BEYOND WINGWALL

(FOR REINFORCING SEE 1 2 AND 3)

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

NO.	REVISION	DATE	INIT.
4	ISSUED FOR TENDER	2019-APR.	N.T.
3	ISSUED FOR 90% MTO EXECUTIVE REVIEW	2019-02-05	N.T.
2	ISSUED FOR 90% MTO REVIEW	2018-DEC.	C.B.
1	ISSUED FOR 60% MTO REVIEW	2015-10-06	C.B.

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2 PROPERTY LINES WERE PLOTTED USING REGISTERED PLANS AND BARS LOCATED IN THE FIELD. TO VERIFY THE ACCURACY OF THESE PROPERTY LINES, A LEGAL SURVEY SHOULD BE PERFORMED PRIOR TO CONSTRUCTION.

DRAFTING	C.B.
DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

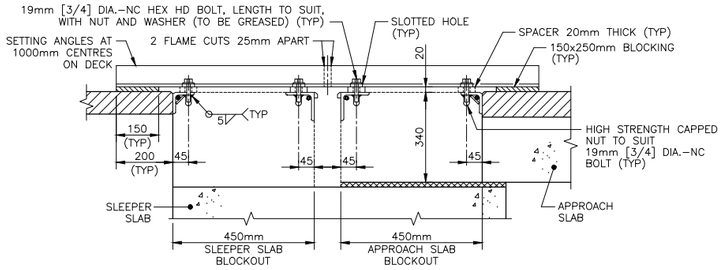
wood.

Niagara Region PUBLIC WORKS

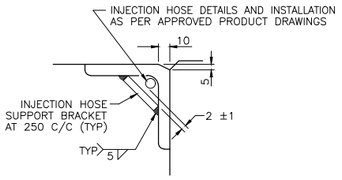
Contract # ____-__-____
Phase 2
PROPOSED BRIDGE CONSTRUCTION
Martindale Road at Highway 406
Niagara Region
EXPANSION JOINT AND SLEEPER SLAB

SITE NO.	18-235/2
	METRIC
CONSULTANT FILE No.	TP113112
DATE	NOVEMBER 2018
SCALE	AS SHOWN
REF. No.	RN __-__
DWG No.	S15
REV.	

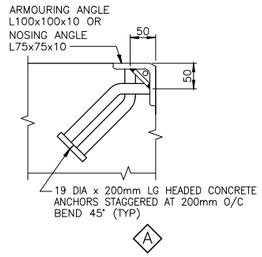
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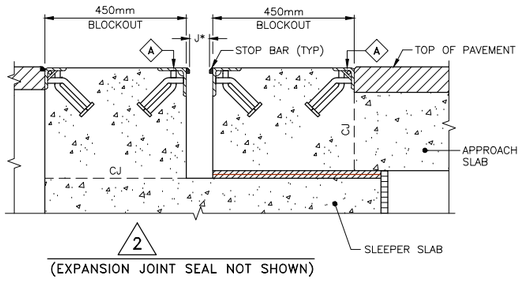


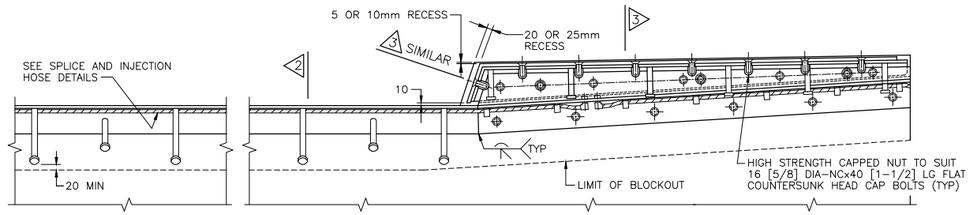
SETTING DEVICE AND BLOCKOUTS



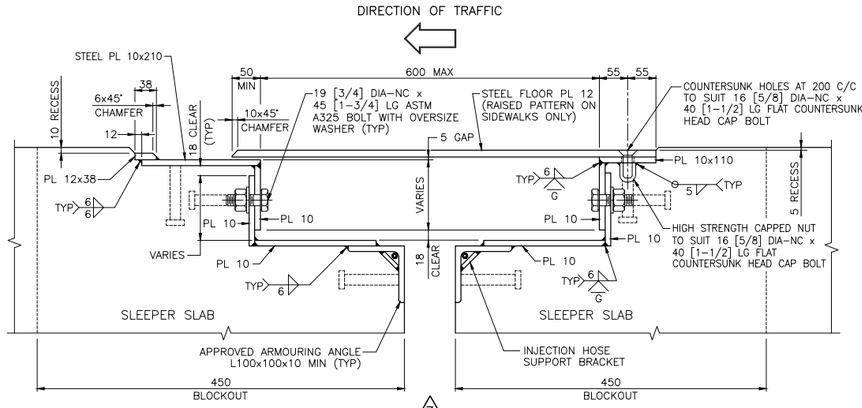
INJECTION HOSE SUPPORT BRACKET DETAIL

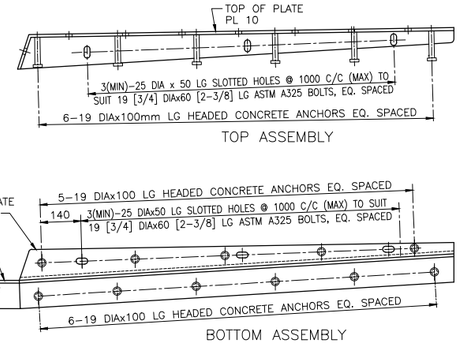






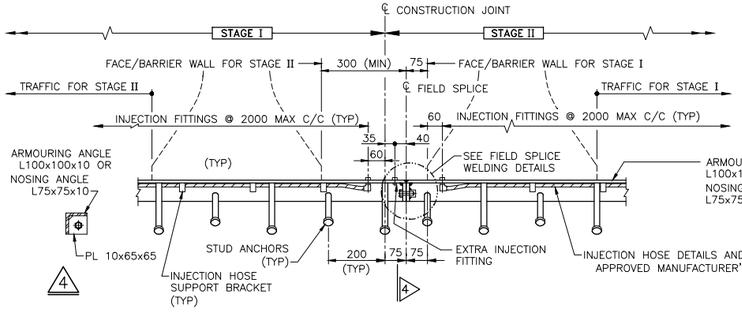
SECTION AT EXPANSION JOINT



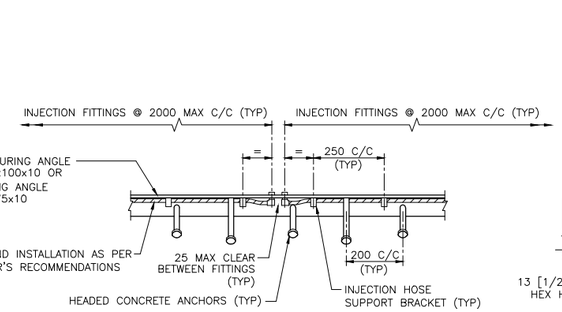


DETAIL OF ARMOURING WITHOUT SIDEWALK

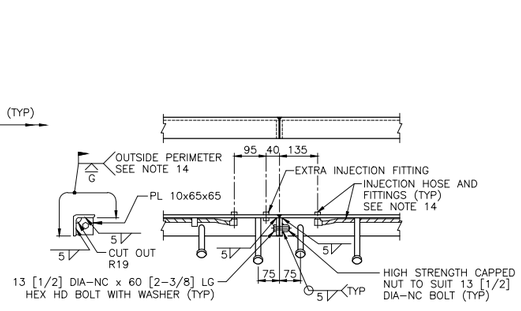
DETAIL OF ARMOURING AT SIDEWALK



FIELD SPLICE DETAILS AT STAGED CONSTRUCTION FOR ARMOURING AND NOSING ANGLES



DETAILS OF HEADED CONCRETE ANCHORS AND INJECTION HOSE FOR ARMOURING AND NOSING ANGLES



ARMOURING AND NOSING ANGLES FIELD SPLICE DETAIL

NOTE:

1. THIS DRAWING TO BE READ IN CONJUCTION WITH DWG. S15 (SS113–37).

LEGEND:

[ ] – DENOTED FASTENER SIZE IN INCHES
CJ – DENOTED CONSTRUCTION JOINT
EJ – DENOTED EXPANSION JOINT

ADDITIONAL NOTES FOR BOLTS:

1. 19 [3/4] DIAMETER BOLTS SHALL BE IN ACCORDANCE WITH WITH ASTM A325. ALL BOLTS USED IN 25 DIA. x 50 LONG SLOTTED HOLES SHALL BE INSTALLED WITH OVERSIZE WASHERS.
2. 16 [5/8] DIAMETER FLAT COUNTERSUNK HEAD CAP BOLTS SHALL BE IN ACCORDANCE WITH ASTM F835.
3. ALL BOLTS SHALL BE INSTALLED USING MOLY50 LUBRICANT.
4. ALL BOLTS SHALL BE TENSIONED USING THE TURN–OF–NUT TIGHTENING METHOD IN ACCORDANCE WITH CAN/CSA S6–14.

TABLE OF DESIGN REQUIREMENTS

EXP. JOINT LOCATION	MTO GAP ** RATING (mm)		DESIGN *** MOVEMENT	* "J" AT INSTALLATION TEMPERATURE (C) (mm)							
	MIN	MAX		–5°	0°	5°	10°	15°	20°	25°	30°
EAST ABUT.	40	100	37	58	56	54	52	50	48	46	44
WEST ABUT.	40	100	37	58	56	54	52	50	48	46	44

* DIMENSION 'J' MEASURED PERPENDICULAR TO CENTRELINE OF EXPANSION JOINT. WHERE MIN. AND MAX. FOR JOINT SUPPLIED DIFFER FROM THOSE SHOWN IN TABLE, 'J' DIMENSIONS SHALL BE REVISED BY CONTRACTOR AND SHOWN ON SHOP DRAWINGS. FOR STAGED CONSTRUCTION ON STRUCTURES OTHER THAN POST–TENSIONED, THE CONTRACTOR SHALL USE THE FIRST STAGE OBSERVED 'J' GAP TO INSTALL THE SECOND STAGE.

** MTO GAP, MEASURED BETWEEN PROJECTING FACES OF STEEL CLAMPING BAR, IS TAKEN FROM DSM 9.40.27, TYPE "C".

*** CALCULATED TOTAL MOVEMENT AT SLS OCCURRING AFTER TIME OF JOINT INSTALLATION. (MEASURED PARALLEL TO CENTRELINE OF STRUCTURE)

MODIFIED

STANDARD DRAWING MAY 2018

SS113–19

STRIP SEAL EXPANSION JOINT FOR SLEEPER SLAB (10mm< MOVEMENT ≤40mm)

NO.	REVISION	DATE	INIT.
4	ISSUED FOR TENDER	2019–APR.	N.T.
3	ISSUED FOR 90% MTO EXECUTIVE REVIEW	2019–02–05	N.T.
2	ISSUED FOR 90% MTO REVIEW	2018–DEC.	C.B.
1	ISSUED FOR 60% MTO REVIEW	2015–10–06	C.B.

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DRAFTING	C.B.
DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

wood.

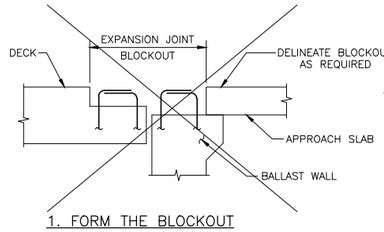
Niagara Region PUBLIC WORKS

Contract # ____-__-___
Phase 2
PROPOSED BRIDGE CONSTRUCTION
Martindale Road at Highway 406
Niagara Region
STRIP SEAL EXPANSION JOINT FOR SLEEPER SLAB

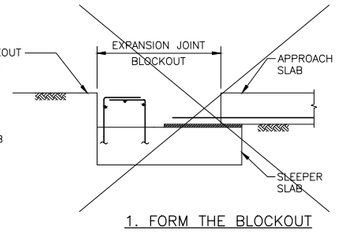
DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

SITE NO.	18–235/2
	METRIC
CONSULTANT FILE No.	TP113112
DATE	NOVEMBER 2018
SCALE	AS SHOWN
REF. No.	RN __–__
DWG No.	S16
REV.	

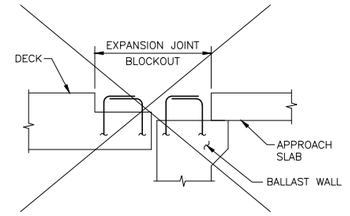
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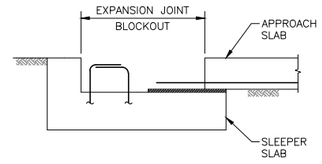
1. FORM THE BLOCKOUT



1. FORM THE BLOCKOUT



1. FORM THE BLOCKOUT

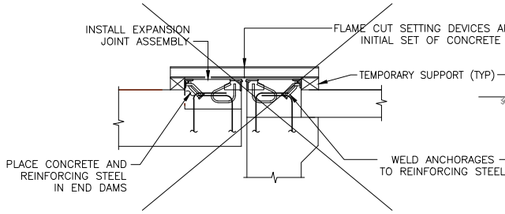


1. FORM THE BLOCKOUT

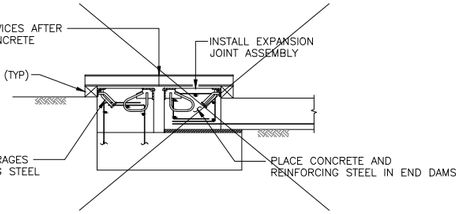
NOTES:

1. THE PURPOSE OF THIS DRAWING IS TO SHOW SCHEMATICALLY THE EXPANSION JOINT CONSTRUCTION SEQUENCE.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE EXPANSION JOINT DRAWINGs (S13 & S14) AND SPECIFICATIONS.
3. REINFORCING STEEL AND JOINT HARDWARE SHOWN ARE SCHEMATIC ONLY AND ARE AS SPECIFIED ELSEWHERE.
4. CONTRACTOR SHALL ENSURE THAT ALL REINFORCEMENT IN THE BLOCKOUT IS NOT DAMAGED.

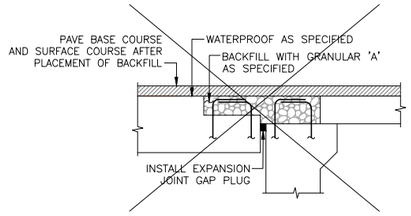
MODIFIED	
STANDARD DRAWING MAY 2017	SS113–38
SEQUENCE OF EXPANSION JOINT INSTALLATION	



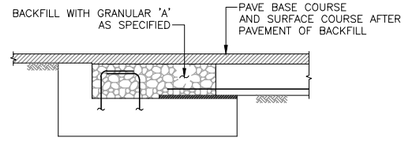
2. INSTALL THE EXPANSION JOINT



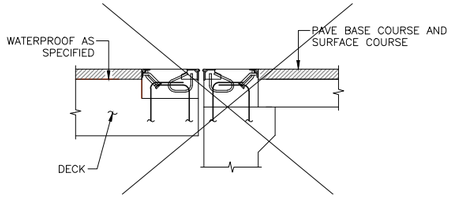
2. INSTALL THE EXPANSION JOINT



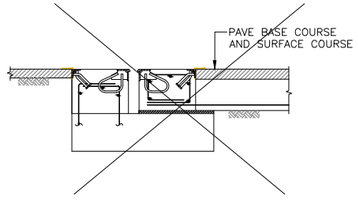
2. BACKFILL AND PAVE OVER BLOCKOUT



2. BACKFILL AND PAVE OVER BLOCKOUT



3. INSTALL THE WATERPROOFING AND PAVEMENT

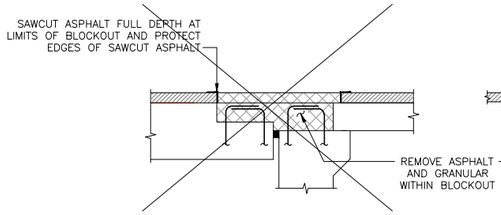


3. INSTALL THE WATERPROOFING AND PAVEMENT

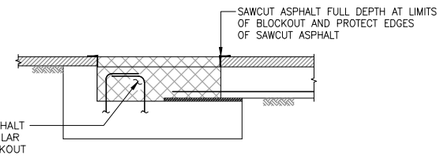
AT BRIDGE DECK

AT SLEEPER SLAB

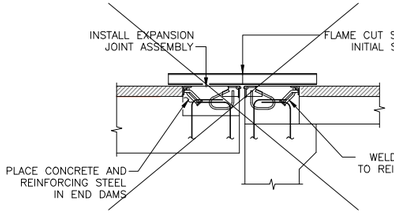
INSTALLATION BEFORE PAVING



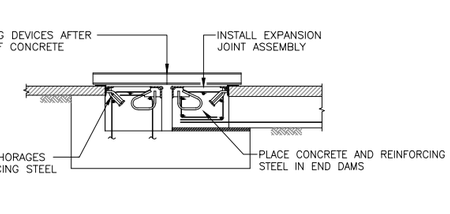
3. PREPARE BLOCKOUT FOR EXPANSION JOINT



3. PREPARE BLOCKOUT FOR EXPANSION JOINT



4. INSTALL THE EXPANSION JOINT



4. INSTALL THE EXPANSION JOINT

AT BRIDGE DECK

AT SLEEPER SLAB

INSTALLATION AFTER PAVING

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

no.	REVISION	DATE	INIT.
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DRAFTING	C.B.
DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

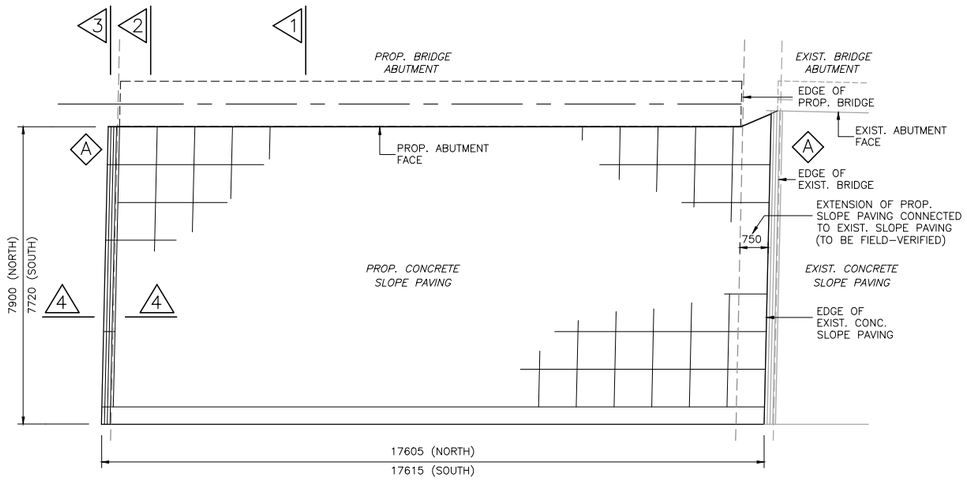
wood.

Niagara Region PUBLIC WORKS

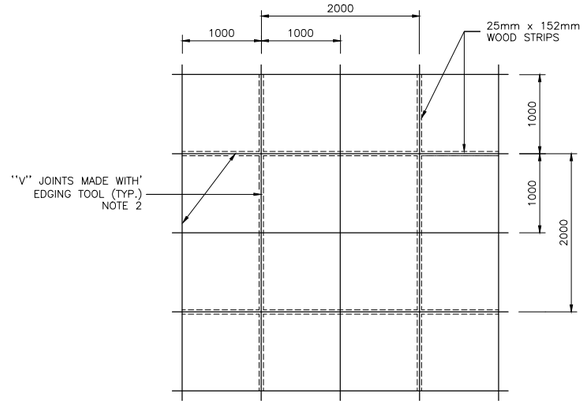
Contract # ____-_-____
Phase 2
PROPOSED BRIDGE CONSTRUCTION
Martindale Road at Highway 406
Niagara Region
SEQUENCE OF EXPANSION JOINT INSTALLATION

SITE NO. 18-235/2	
METRIC	
CONSULTANT FILE No. TP113112	
DATE NOVEMBER 2018	
SCALE AS SHOWN	
REF. No. RN __-__	
DWG No. S17	REV.

AutoCAD drawing: P:\Work\TP113112\Str\Dwg\Contract\PROP BRIDGE\TP113112-S17.dwg Mar 26/19 11:07am peter.bultse



SLOPE PAVING LAYOUT (NORTH SLOPE PAVING SHOWN)
SCALE 1:75 (SOUTH SLOPE PAVING SIMILAR & OPPOSITE)

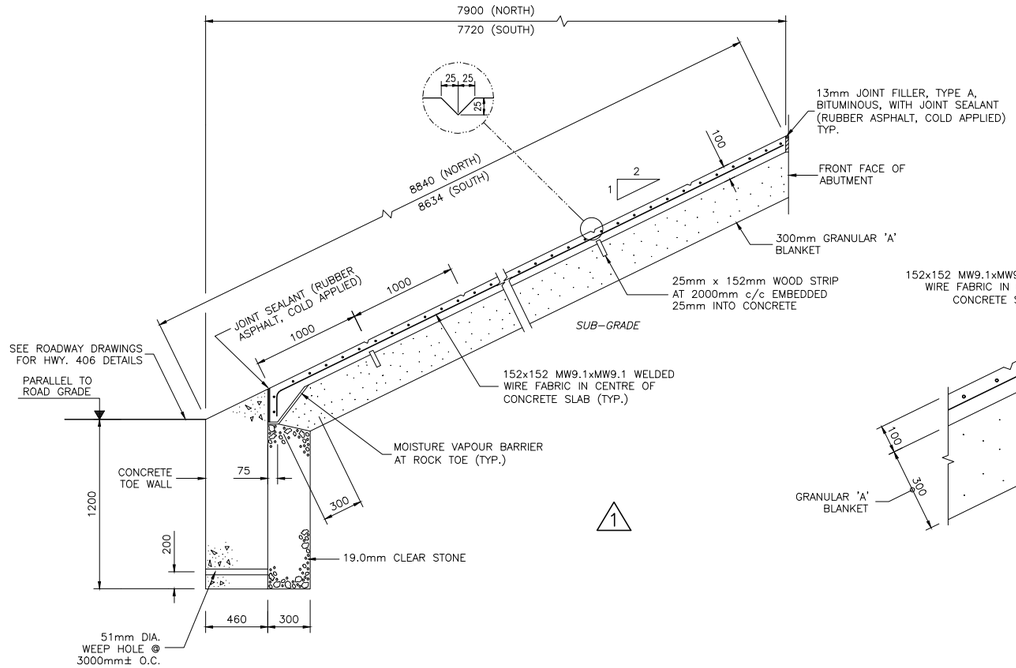


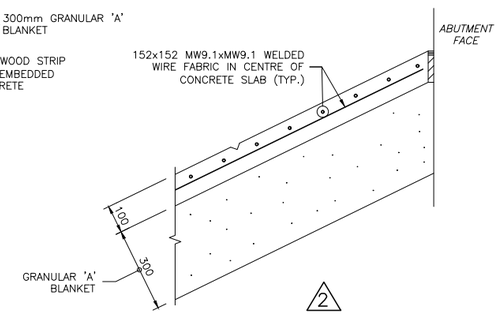
WOOD FRAME AND "V" JOINT LAYOUT

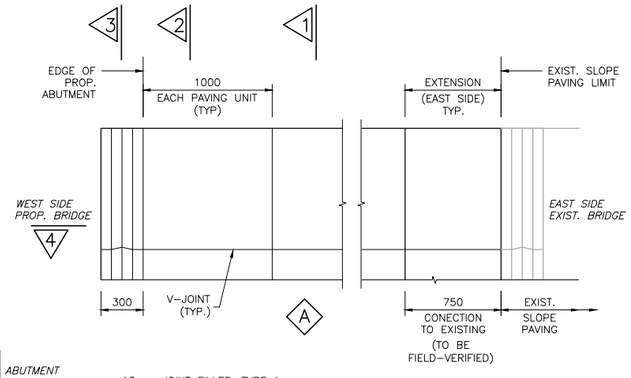
NOTES:

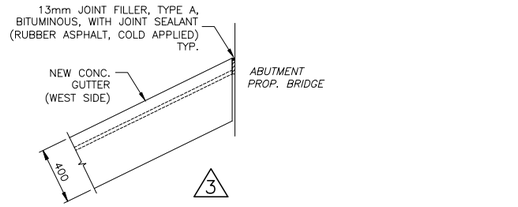
1. SECTIONS AND DETAILS TYPICAL FOR ALL LAYOUTS.
2. FOR BRIDGES WITH SKEW EXCEEDING 45°, ''V'' GROOVES SHALL BE PROVIDED AT 2000mm O.C. OVER WOOD FRAME STRIPS ONLY.
3. ELEVATIONS, COORDINATES, CURVE AND ALIGNMENT DATA ARE IN METRES.
4. THIS DIMENSION VARIES TO MAINTAIN SLOPE OF ROADWAY APPROACH CUT THROUGH THE WIDTH OF THE BRIDGE.
5. THIS DRAWING TO BE READ IN CONJUNCTION WITH GENERAL ARRANGEMENT AND DETAILS DRAWINGS.

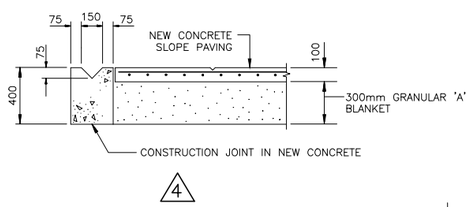
MODIFIED	
STANDARD DRAWING DECEMBER 2003	SS116–10
DETAILS OF CONCRETE SLOPE PAVING	











DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

no.	REVISION	DATE	INIT.
4	ISSUED FOR TENDER	2019–APR.	N.T.
3	ISSUED FOR 90% MTO EXECUTIVE REVIEW	2019–02–05	N.T.
2	ISSUED FOR 90% MTO REVIEW	2018–DEC.	C.B.
1	ISSUED FOR 60% MTO REVIEW	2015–10–06	C.B.

NOTES/LEGEND
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DRAFTING	C.B.
DESIGN	N.T.
CHECKED BY	N.T.
APPROVED BY	K.A.

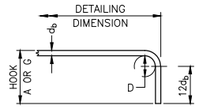
wood.

Niagara Region PUBLIC WORKS

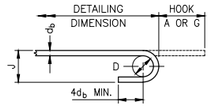
Contract # ____-_-___
Phase 2
PROPOSED BRIDGE CONSTRUCTION
Martindale Road at Highway 406
Niagara Region
DETAILS OF CONCRETE SLOPE PAVING

SITE NO.	18–235/2
	METRIC
CONSULTANT FILE No.	TP113112
DATE	NOVEMBER 2018
SCALE	AS SHOWN
REF. No.	RN __-__
DWG No.	S18
REV.	

AutoCAD drawing: P:\Work\TP113112\Str\Dwg\Contract\PROP BRIDGE\TP113112–S18.dwg Mar 26/19 11:08am peter.butrus



STANDARD 90° HOOK



STANDARD 180° HOOK

MINIMUM BENDING PIN DIAMETER, D, mm

BAR SIZE	STEEL GRADE	
	400R (2)	400W
10M	70	60
15M	100	90
20M	120	100
25M	150	150
30M	250	200
35M	300	250
45M	450 (1)	400
55M	600 (1)	550

(1) Special fabrication is required for bends exceeding 90° for bars of these sizes and grade.

(2) For stainless steel, with Fy = 500, use the same D as for 400R.

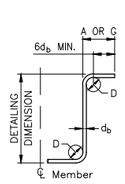
STANDARD HOOK DIMENSIONS

BAR SIZE	90° HOOKS		180° HOOKS			
	A OR G (mm)		A OR G (mm)		J (mm)	
	400R	400W	400R	400W	400R	400W
10M	180	180	140	130	90	80
15M	260	250	180	170	130	120
20M	310	300	220	200	160	140
25M	400	400	280	280	200	200
30M	510	490	400	350	310	260
35M	610	590	480	430	370	320
45M	790	770	680	630	540	490
55M	1030	1010	900	850	710	660

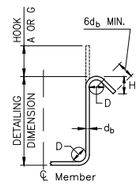
NOTE: All Hook Dimensions are according to the CHBDC–2000.

MINIMUM STIRRUP AND TIE HOOK DIMENSIONS

BAR SIZE	BAR DIAM. d_b(mm)	PIN DIAM. D(mm)	90° A OR G (mm)	135° A OR G (mm)	135° H (approx.) (mm)
10M	11.3	45	100	100	70
15M	16.0	65	140	140	100
20M	19.5	80	180	175	115
25M	25.2	100	230		



MIN. 90° HOOK



MIN. 135° HOOK

HOOK DIMENSIONS FOR REINFORCING STEEL BARS

Date: OCT 2013 | Rev:

SS12–1

NO.	REVISION	DATE	INIT.
4	ISSUED FOR TENDER	2019–APR.	N.T.
3	ISSUED FOR 90% MTO EXECUTIVE REVIEW	2019–02–05	N.T.
2	ISSUED FOR 90% MTO REVIEW	2018–DEC.	C.B.
1	ISSUED FOR 60% MTO REVIEW	2015–10–06	C.B.

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DRAFTING C.B.
DESIGN N.T.
CHECKED BY N.T.
APPROVED BY K.A.

wood.

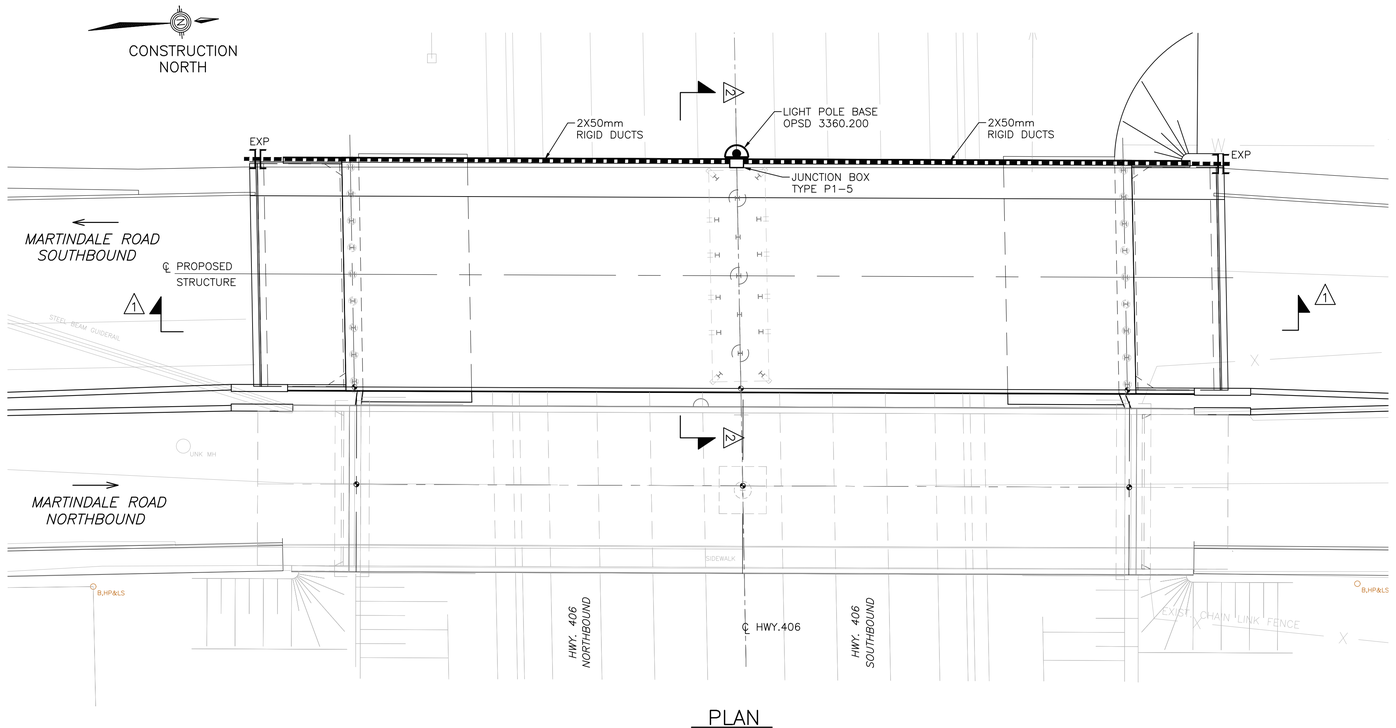
Niagara Region PUBLIC WORKS

Contract # ____-_-___
Phase 2
PROPOSED BRIDGE CONSTRUCTION
Martindale Road at Highway 406
Niagara Region
STRUCTURAL STANDARD DETAILS

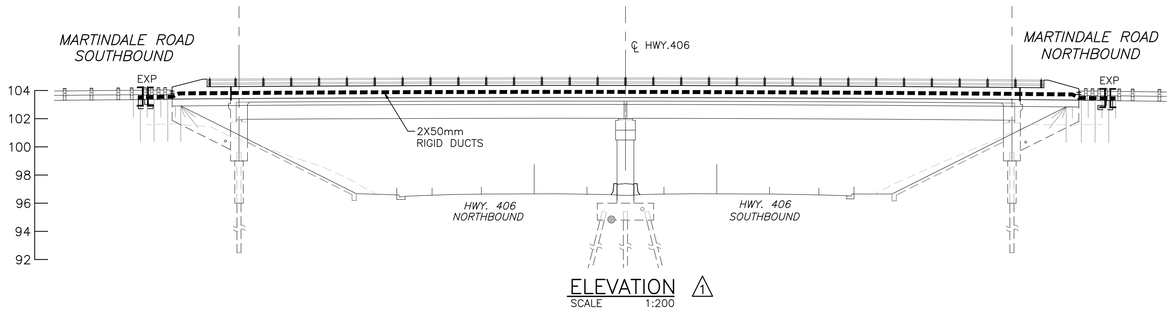
DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

SITE NO. 18–235/2
METRIC
CONSULTANT FILE No. TP113112
DATE NOVEMBER 2018
SCALE AS SHOWN
REF. No. RN __-__
DWG No. S19
REV.

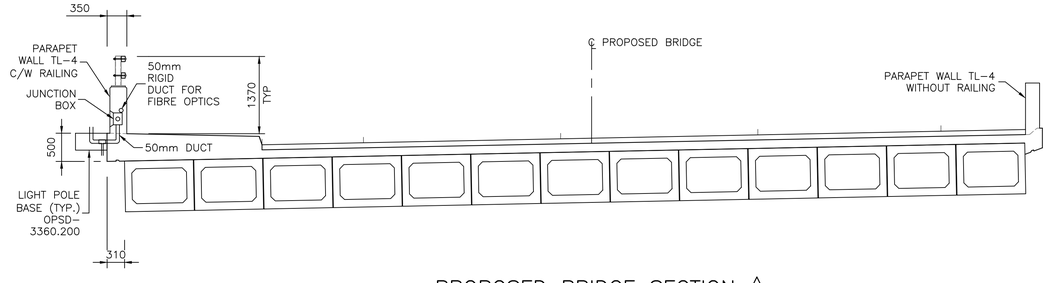
*AutoCAD drawing: P:\Work\TP113112\Str\Dwg\Contract\PROP BRIDGE\TP113112–S19.dwg Mar 26/19 11:08am peter.butrus



PLAN
SCALE 1:200



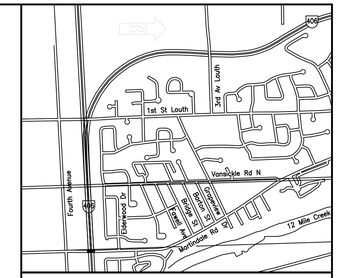
ELEVATION 1
SCALE 1:200



PROPOSED BRIDGE SECTION 2
SCALE 1:50

LEGEND

- LIGHTING POLE BASE ON STRUCTURE
- EMBEDDED JUNCTION BOX
- EXP][EXPANSION JOINT
- 50mm PVC EMBEDDED DUCTS



KEY PLAN - N.T.S.

APPLICABLE STANDARD DRAWINGS

OPSD-3360.200 – DECK, LIGHT POLE BASES, STRUCTURES WITH PARAPET WALLS
OPSD-2302.010 – EMBEDDED WORK DETAIL
OPSD-2302.020 – EXPANSION JOINT AND DEFLECTION FITTING ASSEMBLY FOR 50mm RIGID DUCTS
OPSD-2302.045 – EMBEDDED WORK IN STRUCTURES WITH PARAPET WALLS

U TECH ENGINEERS INC.
60 LEGENDARY CIRCLE
BRAMPTON, ON L6Y 0S1
TEL: 905-497-8414
WEB: www.utecheng.ca

No.	REVISION	DATE	INIT.
1	ISSUED FOR TENDER	2019/04/11	U.P.

NOTES:
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DRAFTING	S.S
DESIGN	U.P.
CHECKED BY	J.J
APPROVED BY	U.P.

LICENSED PROFESSIONAL ENGINEER · U. PADMANATH · 100120747 · PROVINCE OF ONTARIO · for: 11/2019

U TECH ENGINEERS INC.

wood.

Niagara Region PUBLIC WORKS

Contract # 2019-T-157
Road Reconstruction - Phase 2
REGIONAL ROAD 38 (Martindale Road)
HWY 406 AT REGIONAL ROAD 38
City of St. Catharines
ELECTRICAL EMBEDDED WORK

CONSULTANT FILE No.	TP113112
DATE	2019-04-11
SCALE	1 : 200
REF. No.	RN19-57
DWG No.	S20
REV.	0

POLE & ELECTRICAL STRUCTURES

LOCATION (QUADRANT)	POLE OR STRUCT. No.	POLE HEIGHT	POLE BASE TYPE	COMMENTS	LUMINAIRE ARM LENGTH	LUMINAIRE WATTAGE	FAWS DIAL SETTING	BLACK POWDER COATED POLE W DECORATIVE BASE
EAST SIDE	TS1	6.30m	6	SIGNAL HEAD, PED HEAD, PUSH BUTTON AND PRE-EMPTION				
SW	TS2	10.50m	6	SIGNAL HEAD, PED HEAD, PUSH BUTTON, RADAR AND LUMINAIRE				
SW	TS3	4.00m	1	PED HEAD AND PUSH BUTTON				
NW	TS4	10.50m	6	PED HEAD, PUSH BUTTON, RADAR AND LUMINAIRE				
NW	TS5	10.50m	6	SIGNAL HEAD, PED HEAD, PUSH BUTTON AND LUMINAIRE				
EAST SIDE	TS6	6.30m	6	SIGNAL HEAD, PED HEAD, PUSH BUTTON AND RADAR				
EAST SIDE	TS7	6.30m	6	SIGNAL HEAD				
EAST SIDE	TS8	6.30m	6	SIGNAL HEAD				
EAST SIDE	PS1	7.00m	DIRECT BURIED	POWER SUPPLY AND METER				

ELECTRICAL MAINTENANCE HOLES & MANHOLES

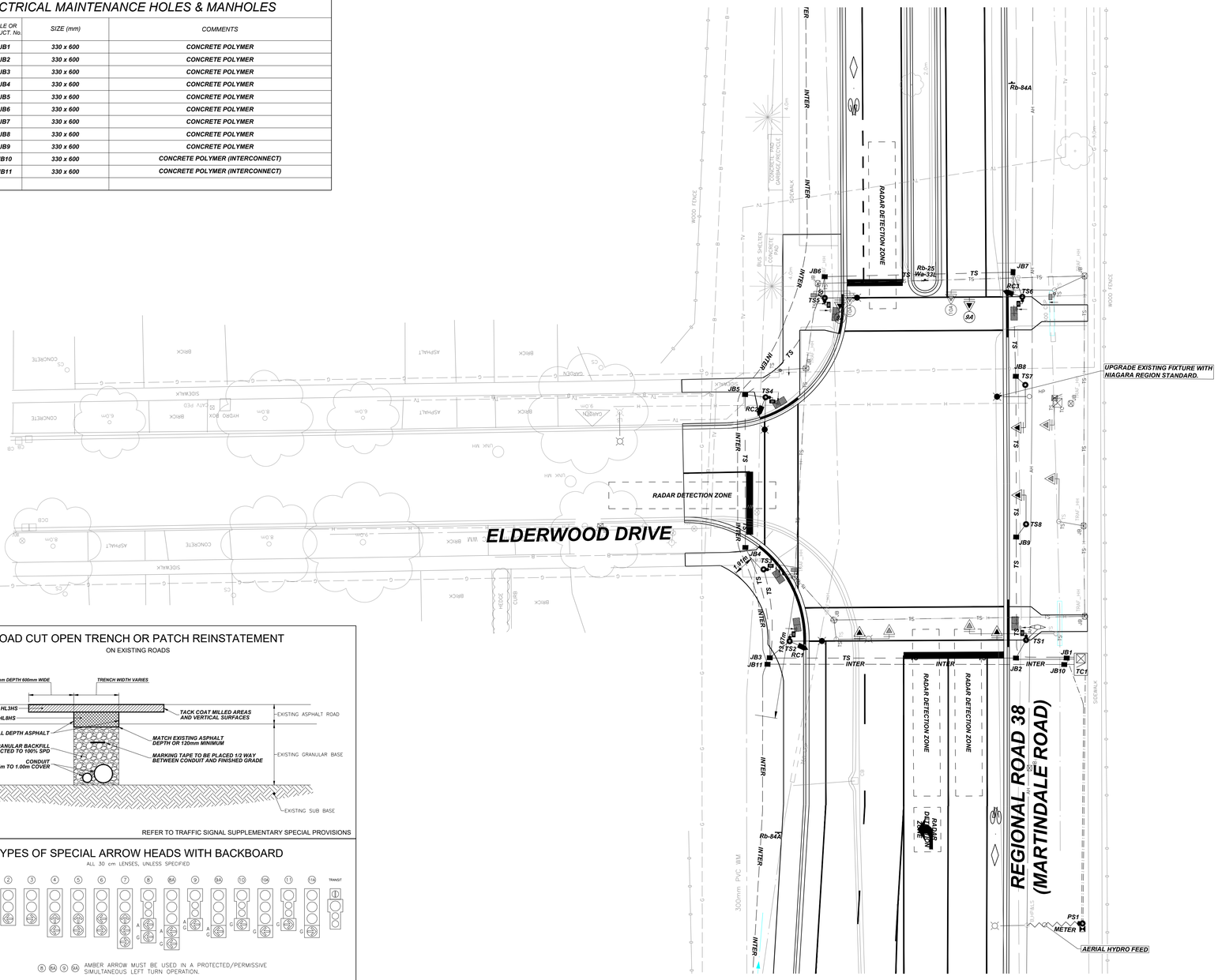
LOCATION (QUADRANT)	POLE OR STRUCT. No.	SIZE (mm)	COMMENTS
EAST SIDE	JB1	330 x 600	CONCRETE POLYMER
EAST SIDE	JB2	330 x 600	CONCRETE POLYMER
SW	JB3	330 x 600	CONCRETE POLYMER
SW	JB4	330 x 600	CONCRETE POLYMER
NW	JB5	330 x 600	CONCRETE POLYMER
NW	JB6	330 x 600	CONCRETE POLYMER
EAST SIDE	JB7	330 x 600	CONCRETE POLYMER
EAST SIDE	JB8	330 x 600	CONCRETE POLYMER
EAST SIDE	JB9	330 x 600	CONCRETE POLYMER
EAST SIDE	JB10	330 x 600	CONCRETE POLYMER (INTERCONNECT)
SW	JB11	330 x 600	CONCRETE POLYMER (INTERCONNECT)

TYPE AND LOCATION OF TRAFFIC SIGNAL HEADS

LOCATION	TYPE	BACKBOARD	SIGNAL MOUNTING HEIGHT	COMMENTS
NB PRIMARY	9A	YES	5.00m	
NB SECONDARY	9A	YES	5.00m	
SB PRIMARY	HWY	YES	5.00m	
SB SECONDARY	HWY	YES	5.00m	
EB PRIMARY	HWY	YES	5.00m	
EB SECONDARY	HWY	YES	5.00m	

TYPE AND LOCATION OF DETECTION

LOCATION	No.	TYPE	COMMENTS
RR38 (MARTINDALE ROAD)		RADAR	
ELDERWOOD DRIVE		RADAR	



ROAD CUT OPEN TRENCH OR PATCH REINSTATEMENT

ON EXISTING ROADS

REFER TO TRAFFIC SIGNAL SUPPLEMENTARY SPECIAL PROVISIONS

TYPES OF SPECIAL ARROW HEADS WITH BACKBOARD

ALL 30 cm LENSES, UNLESS SPECIFIED

⑧ ⑧A ⑨ ⑨A AMBER ARROW MUST BE USED IN A PROTECTED/PERMISSIVE SIMULTANEOUS LEFT TURN OPERATION.

LEGEND

TRAFFIC SIGNAL BLOCKS

- HIGHWAY SIGNAL HEAD (30 cm. Red) WITH BACKBOARD AND MAST ARM
- HIGHWAY SIGNAL HEAD (30 cm. Red) WITH BACKBOARD AND OVERHEAD CABLE
- HIGHWAY SIGNAL HEAD WITH BACKBOARD AND MAST ARM (ALL 30 cm. LENSES)
- SPECIAL HEAD WITH ARROW INDICATION AND BACKBOARD (Example shows Type (2) Head)
- HIGHWAY SIGNAL HEAD WITH BACKBOARD AND MAST ARM (ALL 30 cm. LENSES) (Example shows Type (2) Head)
- SPECIAL HEAD WITH BACKBOARD AND ONE OR MORE PROGRAMMABLE LENSES (Example shows Type (2) Head)
- STANDARD SIGNAL HEAD WITH BACKBOARD AND MAST ARM (ALL 20 cm. LENSES)
- STANDARD SIGNAL HEAD WITH MAST ARM, WITHOUT BACKBOARD
- PEDESTRIAN SIGNAL HEAD
- COUNTDOWN PEDESTRIAN SIGNAL HEAD
- PEDESTRIAN PUSH BUTTON
- AUDIBLE PEDESTRIAN PUSH BUTTON
- VEHICLE PASSAGE LOOP DETECTOR
- VEHICLE LOOP / VIDEO DETECTION AREA
- DUPLEX LOOP DETECTOR
- DIAMOND LOOP DETECTOR
- EMERGENCY VEHICLE PRE-EMPTION DETECTOR
- MICRO-WAVE DETECTOR
- MAGNETIC VEHICLE DETECTOR
- TRAFFIC CONTROLLER
- Rb-25 TRAFFIC SIGN (Example shows Rb-25 Sign)
- TRAFFIC SIGN WITH FLASHING BEACON
- ILLUMINATED TRAFFIC SIGN
- VIDEO DETECTION CAMERA
- RADAR DETECTION CAMERA
- TILT/PAN/ZOOM VIDEO CAMERA
- MULTI-LEG DETECTION CAMERA
- LUMINAIRE
- POWER DISTRIBUTION CABINET / DISCONNECT
- RADIO INTERCONNECT
- HYDRO METER
- TACTILE WARNING SURFACE

TRAFFIC SIGNAL LINETYPES

- TRAFFIC SIGNAL CONDUITS (1-100mm AND 1-50mm) — TS —
- TRAFFIC SIGNAL CONDUIT (1-50mm)
- TRAFFIC SIGNAL AERIAL WIRE
- TRAFFIC LOOP DETECTION CABLE

ISSUED FOR TENDER

ISSUED : 2019-04-09

PROJECT : MARTINDALE ROAD PHASE 2

INTERSECTION HARDWARE CHECKLIST

CHECK ☑ ALL THAT APPLY

CONTROL

☑ FULLY ACTUATED ☐ SEMI ACTUATED ☐ FIXED TIME

PEDESTRIANS

	N. LEG S. LEG E. LEG W. LEG
AUDIBLE PEDESTRIAN HEADS	☑ ☑ ☐ ☑
COUNTDOWN HEADS	☑ ☑ ☐ ☑

DETECTION

	NB	SB	EB	WB
VIDEO	☐	☐	☐	☐
RADAR	☑	☑	☑	☐
LOOPS	☐	☐	☐	☐
LONG DISTANCE LOOPS	☐	☐	☐	☐
OTHER: _____	☐	☐	☐	☐

COMMUNICATION

RADIO ☐ FIBRE ☑ COPPER ☐ NONE ☐

PHASING

TWO PHASE ☐

	NB	SB	EB	WB
PROTECTED/PERMISSIVE LT	☑	☐	☐	☐
FULLY PROTECTED LT	☐	☐	☐	☐
SPLIT PHASE	☐	☐	☐	☐
OTHER: _____				

BACKUP POWER SUPPLY

YES ☑ NO ☐

PRE-EMPTION

NONE ☐ RAIL ☐ BRIDGE ☐

EMERGENCY VEHICLE ☑

RETURN DATE

SIGNATURE

ADAM SEMARK NICK ROSATI

038ELD

NO.	REVISION	DATE	INIT.
3	ISSUED FOR TENDER	2019-04-10	TC
2	ISSUED FOR 90% DESIGN REVIEW	2019-04-09	TC
1	ISSUED FOR 60% DESIGN REVIEW	2019-02-27	TC

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3. THE CONTRACTOR SHALL CONTACT THE REGION'S TRAFFIC OPERATIONS MANAGER FOLLOWING THE TRAFFIC SIGNAL PLANT LAYOUT. PROPERTY AND UTILITY LOCATIONS MUST ALSO BE IDENTIFIED. THE FINAL LOCATIONS FOR ALL TRAFFIC SIGNAL PLANT INCLUDING BUT NOT LIMITED TO DUCTS, POLE BASES, JUNCTION BOXES, CONTROLLER BASE AND LOOPS WILL BE VERIFIED IN THE FIELD BY THE NIAGARA REGION TRAFFIC SIGNAL SUPERVISOR OR DESIGNATE PRIOR TO INSTALLATION. A TRAFFIC SIGNAL INSPECTOR FROM THE REGION MUST BE ON SITE AT ALL TIMES (OR WHERE DETERMINED BY THE REGION'S TRAFFIC OPERATIONS MANAGER AS NECESSARY) WHEN TRAFFIC SIGNAL WORK IS BEING UNDERTAKEN.
4. ALL MATERIALS SHALL BE AS PER NIAGARA REGION TRAFFIC SIGNAL STANDARDS MANUAL (CONTRACTORS SHALL VERIFY ALL MATERIALS WITH REGION'S SIGNAL SUPERVISOR PRIOR TO COMMENCING CONSTRUCTION).
5. ALL CONDUIT FROM JUNCTION BOXES TO JUNCTION BOXES AND FROM JUNCTION BOXES TO TRAFFIC SIGNAL POLES SHALL INCLUDE 1-100mm DUCT AND 1-50mm DUCT UNLESS OTHERWISE SPECIFIED.
6. WHERE APPROVED FINAL POLE BASE LOCATION DIFFER FROM THIS PLAN, INSTALL SIGNAL MAST ARM OF APPROPRIATE LENGTH TO MAINTAIN POSITION OF SIGNAL HEAD AT DESIGNED LOCATION.
7. ALL TRAFFIC SIGNAL ELECTRICAL CONNECTIONS, BOTH TEMPORARY AND FINAL ARE TO BE COORDINATED WITH AND PERFORMED BY NIAGARA REGION FORCES.

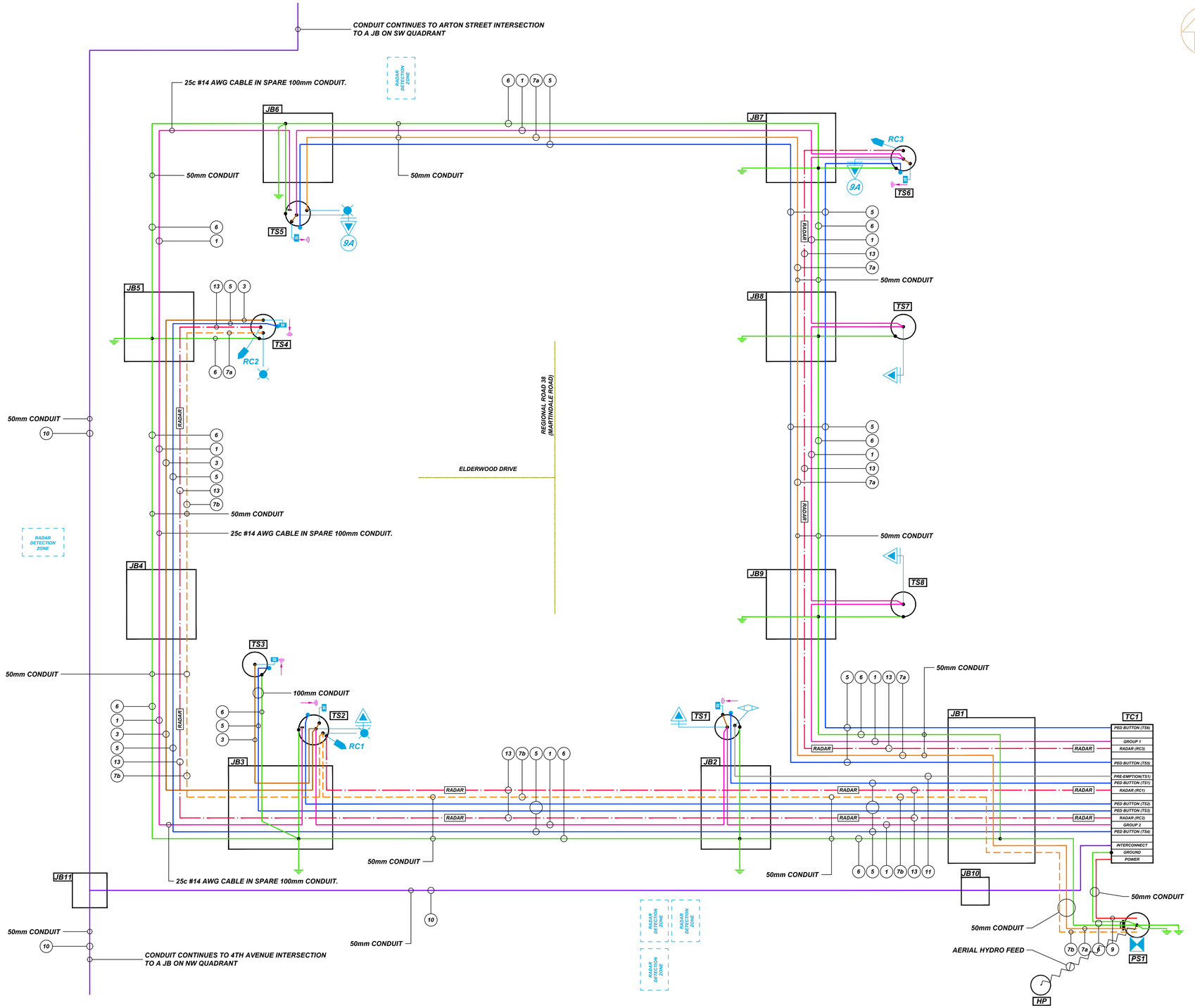
DRAFTING	TC
DESIGN	TC
CHECKED BY	TC
APPROVED BY	NR, AS

Niagara Region PUBLIC WORKS

MARTINDALE RD RECONSTRUCTION
From Fourth Ave to Barton St
REGIONAL ROAD 38 (Martindale Road)
at Elderwood Drive
CITY OF ST CATHARINES
TRAFFIC SIGNAL DESIGN

CONSULTANT FILE No.	-
DATE	2019-02-27
SCALE	Hor : 1:200 m
REF. No.	RN ___-___
DWG No.	TS01
REV.	3

DRAWING FILE: L:\Engineering\Regional Road 38 (St. Catharines)\E9847 Reconstruction from Fourth Avenue to Barton Street - Phase 2\Drawings\Elderwood_Traffic Signal Design\dwg\038ELD_DESIGN.dwg PLOTTED: Apr 10, 2019 - 3:54pm PLOTTED BY: leen



NORTH

LEGEND

- (1) TRAFFIC SIGNAL CABLE – 25c #14 AWG.
- (2) TRAFFIC SIGNAL CABLE – 7c #14 AWG.
- (3) TRAFFIC SIGNAL CABLE – 4c #14 AWG.
- (4) LOOP CABLE – 2c – (BLACK/WHITE) GENERAL CABLE OR EQUIVALENT. SHIELDED COMMUNICATION AND CONTROL CABLE, 1 TWISTED PAIR, BELDFOIL(R) SHIELD, 600w RATING
- (5) PUSH BUTTON CABLE – 2c – (BLACK/RED) GENERAL CABLE OR EQUIVALENT. SHIELDED COMMUNICATION AND CONTROL CABLE, 1 TWISTED PAIR, BELDFOIL(R) SHIELD, 600w RATING
- (6) INSULATED BOND WIRE – 1c – #6 AWG. (GREEN) CU RWU-90 XLPE
- (7a) ROADWAY LIGHTING WIRE (UNDERGROUND) – 2c – #6 AWG. (BLACK/WHITE) CU RWU-90 XLPE
- (7b) ROADWAY LIGHTING WIRE (UNDERGROUND) – 2c – #6 AWG. (RED/WHITE) CU RWU-90 XLPE
- (7c) RECEPTACLE WIRE – 2c – #4 AWG. (BLACK/WHITE) CU RWU-90 XLPE
- (8) ROADWAY LIGHTING WIRE (RISER) – #12/2 (BLACK & WHITE) CU NMWU-90
- (9) TRAFFIC CONTROLLER POWER – 2c – #8 (BLACK/WHITE) CU RWU-90 XLPE & 1c – #6 (GREEN) CU RWU-90 XLPE
- (10) COMMUNICATIONS (INTERCONNECT) – FIBRE OPTIC & 1c – #12 (WHITE) TRACER WIRE
- (11) VEHICLE PRE-EMPTION DETECTOR – COAXIAL
- (12) TRACER — RWU90 CSA 12AWG (TRACER CABLE)
- (13) RADAR — RADAR DETECTOR CABLE
- (14) CAT 5 RADIO COMMUNICATION ANTENNA CABLE

- SUPPLY A – 120/240v
- GROUND ROD
- CONNECTION POINT
- LUMINAIRE
- TRAFFIC SIGNAL HEAD
- PEDESTRIAN PUSH BUTTON
- PEDESTRIAN SIGNAL HEAD
- VEHICLE DETECTION LOOP (D4, D5)
- HYDRO METER
- VEHICLE PRE-EMPTION DETECTOR

GENERAL NOTES

A. ALL CABLES TO BE PLACED IN 1–100mm RIGID PVC UNLESS OTHERWISE SPECIFIED.

B. ALL TRAFFIC SIGNAL HEAD RISER CABLE SHALL BE AS PER THE FOLLOWING:
- – 3 SECTION HEADS – (3) 4 CONDUCTOR #14 AWG. TRAFFIC SIGNAL CABLE (SUPPLIED BY REGION)
- – 4 SECTION HEADS – (2) 7 CONDUCTOR #14 AWG. TRAFFIC SIGNAL CABLE (SUPPLIED BY REGION)

C. ALL ROADWAY LIGHTING RISER WIRE SHALL BE (8) #12/2 CU NMWU-90

D. ALL PEDESTRIAN SIGNAL RISER CABLE TO BE (3) 4 CONDUCTOR #14 AWG. TRAFFIC SIGNAL CABLE (SUPPLIED BY REGION)

E. ALL 'END OF RUN' CONDUCTOR TO BE TERMINATED WITH INSULATING MARRETT CONNECTORS, TAPED, AND BEND UPWARDS.

F. A SUFFICIENT AMOUNT OF CABLE IS TO BE SPOOLED AT CONNECTION POINTS TO MAKE ALL CONNECTIONS AND PROVIDE DRIP LOOPS

G. THE ENDS OF EACH CABLE SHALL BE UNIQUELY IDENTIFIED WITH COLORED ELECTRICAL TAPE. REFER TO NRS 2710 FOR CABLE COLOR ID CHART.

SUPPLY CONTROL CABINET ASSEMBLY — PP1

120/240v, 1 PHASE, 3 WIRE

NRS 2441 TYPE 3s 60A

CIRCUIT NO.	DESCRIPTION	LOCATION	BREAKER AMPS	WATTAGE	QUANT.	CIRCUIT LOAD (w)
1	TRAFFIC SIGNALS	24hr LOAD	40	520w	1ea	520
2a	LED LUMINAIRES	INTERSECTION	15	169w	2ea	338
2b	LED LUMINAIRES	INTERSECTION	15	169w	1ea	169
				TOTAL WATTS		1027

038ELD

NO.	REVISION	DATE	INIT.
2	ISSUED FOR TENDER	2019-04-10	N.R.L
1	ISSUED FOR 90% DESIGN REVIEW	2019-03-27	N.R.L

NOTES:
1. THE POSITION OF POLE LINES, CONDUIT, WATERMAINS, SEWER AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.
2. PROPERTY LINES WERE PLOTTED USING REGISTERED PLANS AND BARS LOCATED IN THE FIELD. TO VERIFY THE ACCURACY OF THESE PROPERTY LINES, A LEGAL SURVEY SHOULD BE PERFORMED PRIOR TO CONSTRUCTION.
3. THE CONTRACTOR SHALL CONTACT THE REGION'S TRAFFIC OPERATIONS MANAGER FOLLOWING THE TRAFFIC SIGNAL PLANT LAYOUT. PROPERTY AND UTILITY LOCATIONS MUST ALSO BE IDENTIFIED. THE FINAL LOCATIONS FOR ALL TRAFFIC SIGNAL PLANT INCLUDING BUT NOT LIMITED TO CONDUIT, POLE BASES, JUNCTION BOXES, CONTROLLER BASE AND LOOPS WILL BE VERIFIED IN THE FIELD BY THE NIAGARA REGION TRAFFIC SIGNAL SUPERVISOR OR DESIGNATE PRIOR TO INSTALLATION. A TRAFFIC SIGNAL INSPECTOR FROM THE REGION MUST BE ON SITE AT ALL TIMES (OR WHERE DETERMINED BY THE REGION'S TRAFFIC OPERATIONS MANAGER AS NECESSARY) WHEN TRAFFIC SIGNAL WORK IS BEING UNDERTAKEN.
4. ALL MATERIALS SHALL BE AS PER NIAGARA REGION TRAFFIC SIGNAL STANDARDS MANUAL (CONTRACTORS SHALL VERIFY ALL MATERIALS WITH REGION'S SIGNAL SUPERVISOR PRIOR TO COMMENCING CONSTRUCTION).
5. ALL CONDUIT FROM JUNCTION BOXES TO JUNCTION BOXES AND FROM JUNCTION BOXES TO TRAFFIC SIGNAL POLES SHALL INCLUDE 1–100mm CONDUIT AND 1–50mm CONDUIT UNLESS OTHERWISE SPECIFIED.
6. WHERE APPROVED FINAL POLE BASE LOCATION DIFFER FROM THIS PLAN, INSTALL SIGNAL MAST ARM OF APPROPRIATE LENGTH TO MAINTAIN POSITION OF SIGNAL HEAD AT DESIGNED LOCATION.
7. ALL TRAFFIC SIGNAL ELECTRICAL CONNECTIONS, BOTH TEMPORARY AND FINAL ARE TO BE COORDINATED WITH AND PERFORMED BY NIAGARA REGION FORCES.

DRAFTING	N.R.L
DESIGN	N.R.L
CHECKED BY	TC
APPROVED BY	AS

Niagara Region PUBLIC WORKS

MARTINDALE RD RECONSTRUCTION
From Fourth Ave to Barton St
REGIONAL ROAD 38 (Martindale Road)
at Elderwood Drive
CITY OF ST CATHARINES
WIRING SCHEMATIC

CONSULTANT FILE No.	–
DATE	2019-02-28
SCALE	N.T.S
REF. No.	RN ___-___
DWG No.	TS02
REV.	2

DRAWING FILE: L:\Engineering\Regional Road 38 (St. Catharines)\E9847 Reconstruction from Fourth Avenue to Barton Street – Phase 2\Drawings\Elderwood_Traffic Signal Design\dwg\038ELD_DESIGN.dwg PLOTTED: Apr 10, 2019 – 3:55pm PLOTTED BY: leen