

CONTROL REPORT

D214386

New York State Thruway Authority
Design Phase I-IV, Replacement of 8 Syracuse Division Bridges
Mainline EB, WB Bridge over County Road 53 (BIN 5516072)
Mile Post 225.48 – 225.49 in the Syracuse Division
Herkimer County



February 2017


Prepared for:

New York State Thruway Authority
Syracuse Division

Prepared by:

Foit-Albert Associates
Architecture, Engineering and Surveying, PC
763 Main Street
Buffalo, New York 14203

I, Michael J. Pohl, PLS hereby certify that this survey was performed to the standards set forth in the "State of New York Department of Transportation Surveying and Procedure Manual".


Michael J. Pohl, PLS
NYS License No. 049978



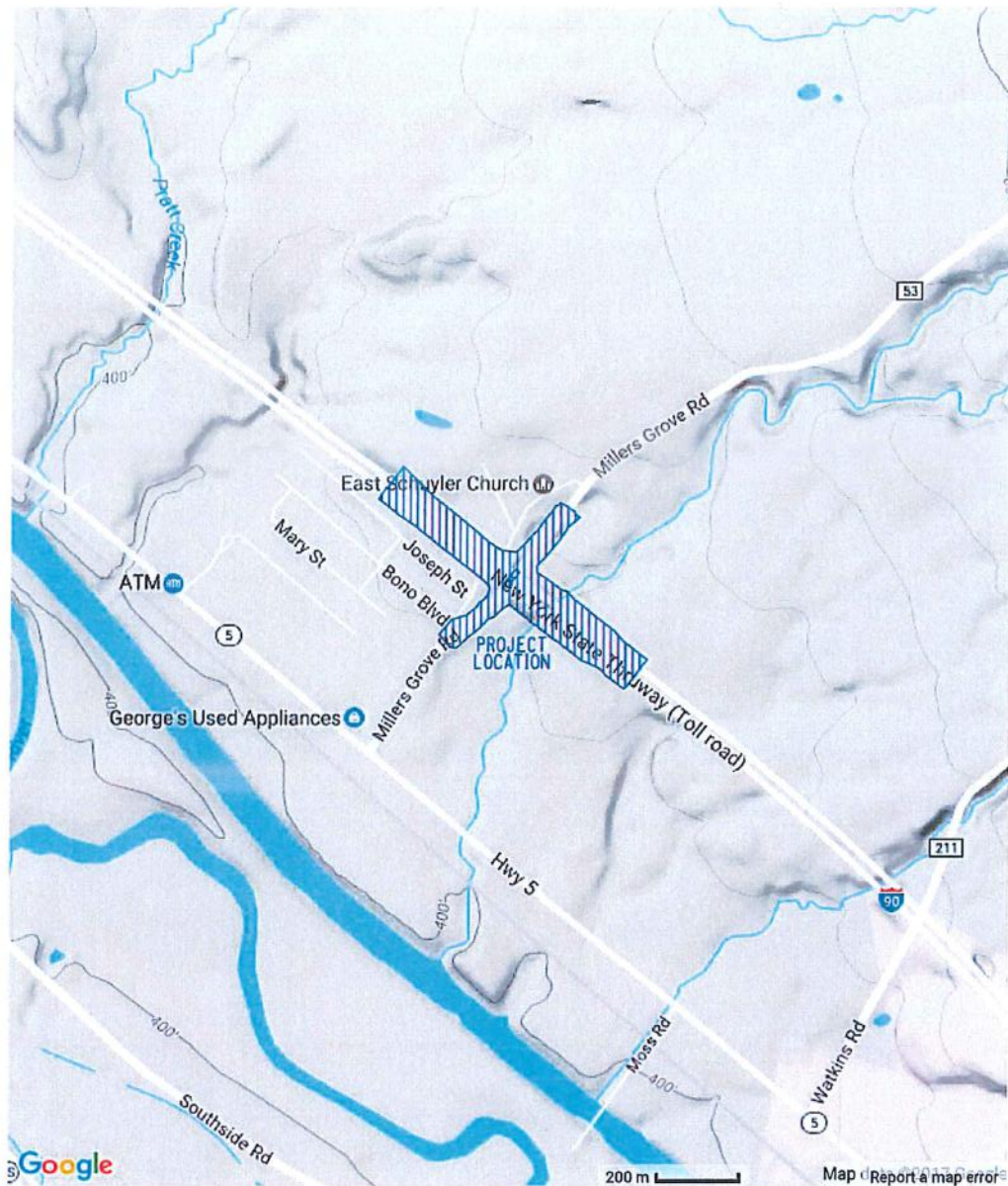
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INTRODUCTION

SITE LOCATION MAP



[Print this map](#)

Map provided by TopoZone.com

PROJECT NARRATIVE

D214386
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PROJECT NARRATIVE

This project involves providing preliminary design services to address corridor needs along and underneath Interstate 90, at MP 225.48 – 225.49 Millers Grove Road under Mainline, within the Syracuse Division.

Foit-Albert Associates has been retained by Stantec Consulting Services Inc. to establish primary and secondary horizontal and vertical project control and provide topographic survey and mapping.

The field work was performed from December 7, 2016 to January 12, 2017. The weather conditions during the project were varied with temperatures ranging from highs in the 50's to lows in the 20's. Conditions also varied from snow and sleet to rain and sunshine.

Field Crew Members:

Crew Chief – Jeremy Smith
Instrument Operators – Michael Matesic, Jay Maurer, Joshua Clarkson,
Joshua Kohut


Field Equipment:

Leica DNA2003 Digital Level
Trimble S6, 2" Digital Robotic Total Station with TSC-3 Data Collector with
Trimble Access Data Collection
Trimble R8 Model 3 GNSS GPS Rover and Base Receiver
Trimble R8 Model 3 GNSS GPS Rover
Trimble TSC-3 Data Collectors with Trimble Access Data Collection

Software:

Survey data was processed using Carlson software version 2016 with
AutoCAD version 2014.
The DTM, and field book files were processed and created using Bentley
Microstation with InRoads version 08.11.09.655 software.
The Base Map, Contour Map, Text Map and Points Map were created
using Microstation V8i.

I, Michael J. Pohl, PLS hereby certify that this survey was performed to the standards set forth in the "State of New York Department of Transportation Surveying and Procedure Manual".



Michael J. Pohl, PLS
NYS License No. 049978



HORIZONTAL CONTROL

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HORIZONTAL CONTROL NARRATIVE

The Primary horizontal control for the site was established by utilizing 3 GPS control pairs set along the NYS Thruway corridor by Foit-Albert Associates.

Primary GPS Control pairs CBP 1 – CBP 2, CBP 3 – CBP 4 and CBP 7 – CBP 8 were established using utilizing static GPS methods. The GPS static files were post-processed using OPUS user solutions. The three sets of Primary GPS control pairs were swing-tied and sketched.

Two secondary horizontal traverses were also run to obtain topographic information along, underneath and in the surrounding project along the New York State Thruway (I-90). The first traverse was a closed leg traverse that began by occupying the Primary GPS pair CBP 1 – CBP 2. The traverse then proceeded in an easterly direction and closing on the Primary GPS pair CBP 3 – CBP 4. Spur points CBS 2B and CBS 2B were also set at the site to obtain topographic information. Using the formula $4.5 \times \text{the square root of } N$ where 4.5 is seconds of arc and N is the number of traverse segments, the first traverse had an allowable angular misclosure of 4.5" and had an actual angular misclosure of 0.07".

The second traverse was also a closed leg traverse that began by occupying the Primary GPS pair CBP 1 – CBP 2, the traverse then proceeded in a southerly direction continuing through CBP 5 and CBP 6, then closing on the Primary GPS pair CBP 7 – CBP 8. Using the formula $4.5 \times \text{the square root of } N$ where 4.5 is seconds of arc and N is the number of traverse segments, the first traverse had an allowable angular misclosure of 7.79" and had an actual angular misclosure of 5.28".

The horizontal control traverse was run in accordance with the New York State Department of Transportation Surveying and Procedures Manual using a Trimble S6 electronic total station, serial number 93010506, having a direct reading of 2" and a least count accuracy of 0.1".

Prior to measuring angles and distances at each station, the field crew measured and recorded the temperature and atmospheric pressure and set the correction in the instrument. The vertical and horizontal index error was checked and set as

necessary. The correction for curvature was not set due to the small scale of the project site.

Two sets of direct and two sets of inverted angles were measured at each station. All angles were measured right and were rejected if the sum of a single set deviated from 360 degrees by more than 5 seconds.

Vertical angles and slope distances were measured from both ends of each control line. The slope distances were measured in U.S. Survey Feet at all pointings and reduced to horizontal distances. The slope distances were rejected if the forward and backward measurements differed by more than the EDM precision of +/- (2mm + 2ppm).

Control Recovered:

N/A

Control Not Recovered:

N/A

Horizontal Datum:

New York State Plane Coordinate System, Central Zone, NAD 83
Established by Relative and Static GPS techniques.

Combined Grid Scale Factor:

A combined scale factor of 0.99991067 was used.

Existing Control:

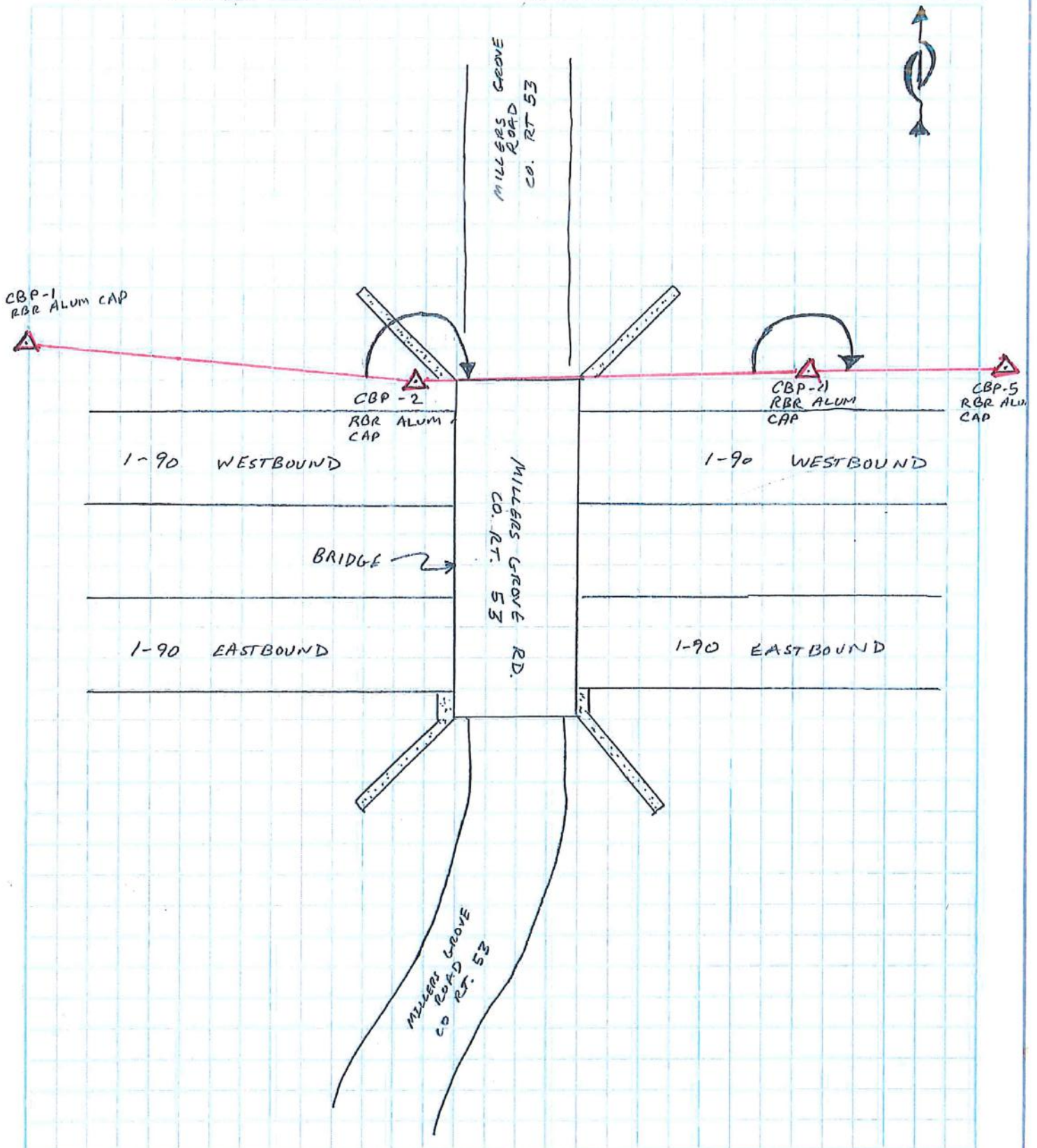
N/A

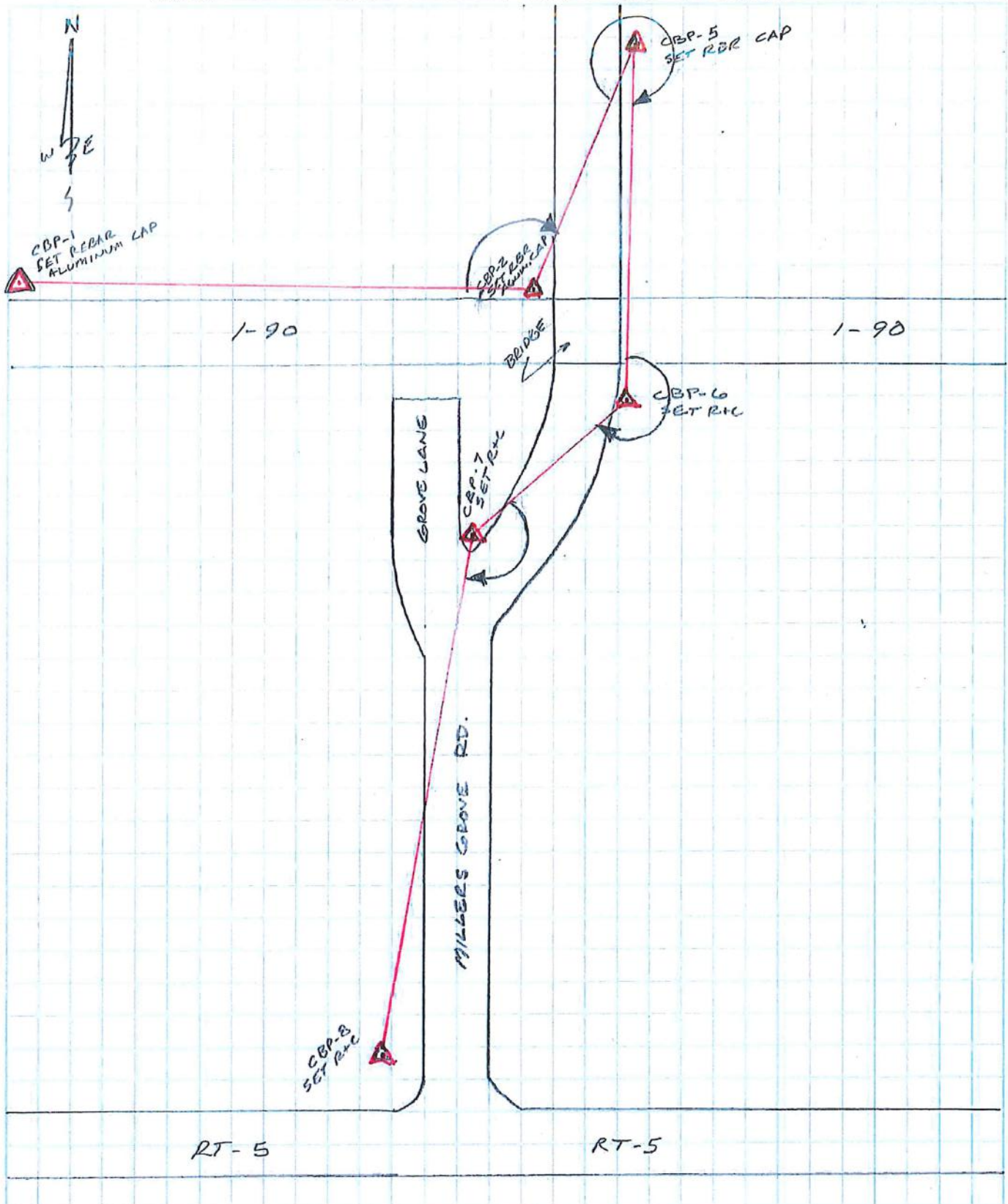
Traverse Closure and Adjustment:

The two closed leg traverses that were run for this project were adjusted by first balancing the angles to the GPS azimuth pairs, then by performing a Compass Rule Adjustment. Both traverses met the minimum traverse closure requirements in accordance with the New York State Department Of Transportation Land Surveying Standards and Procedures Manual.

	<u>Raw Closure</u>	<u>Closure After Angle Balance</u>
Traverse 1	1 in 29762	1 in 9999999
Traverse 2	1 in 18378	1 in 19870

TRAVERSE SKETCH





LIST OF BASELINE COORDINATES

Survey Fieldbook Coordinate List Report

Report Created: 2/21/2017
Time: 8:28am

Fieldbook: 1600130 Site 2-3

Slope Distance Scale Factor: 1.000000000000

Note: All units in this report are in feet unless specified otherwise.

Number	Northing	Easting	Elevation	Code	Description	STA
1GPS	1541911.0730	336684.0642	458.6375	CBP	REBAR ALUMINUM CAP	ML STA 10+00.00
2GPS	1541258.2306	337483.1790	453.3750	CBP	REBAR ALUMINUM CAP	ML STA 20+31.89
2B	1541441.8553	337752.0839	437.8035	CBS	REBAR AND CAP	
2C	1540959.9112	337639.9381	455.8134	CBS	REBAR AND CAP	
3GPS	1540983.9554	337862.1852	456.7545	CBP	REBAR ALUMINUM CAP	ML STA 24+99.72
4GPS	1540397.3026	338627.0768	465.2222	CBP	REBAR ALUMINUM CAP	ML STA 34+63.68
5	1541615.5455	337828.0435	456.5050	CBP	REBAR AND CAP	MG STA 32+04.68
5A	1541244.9569	337524.3612	438.4130	CBS	REBAR AND CAP	
5B	1541269.2698	337505.3445	437.6280	CBS	REBAR AND CAP	
6	1541020.5953	337336.0673	435.0783	CBP	REBAR AND CAP	MG STA 24+32.67
6A	1541155.8515	337386.3543	454.2855	CBS	REBAR AND CAP	
7GPS	1540711.6931	336901.1881	437.3450	CBP	REBAR AND CAP	MG STA 18+99.24
8GPS	1539975.3965	336384.9438	419.3014	CBP	REBAR AND CAP	MG STA 10+00.00

CONTROL POINT TIE SHEETS

FOIT-ALBERT ASSOCIATES CONTROL SURVEY DATA

PROJECT - 16001.30 SITE 2+3

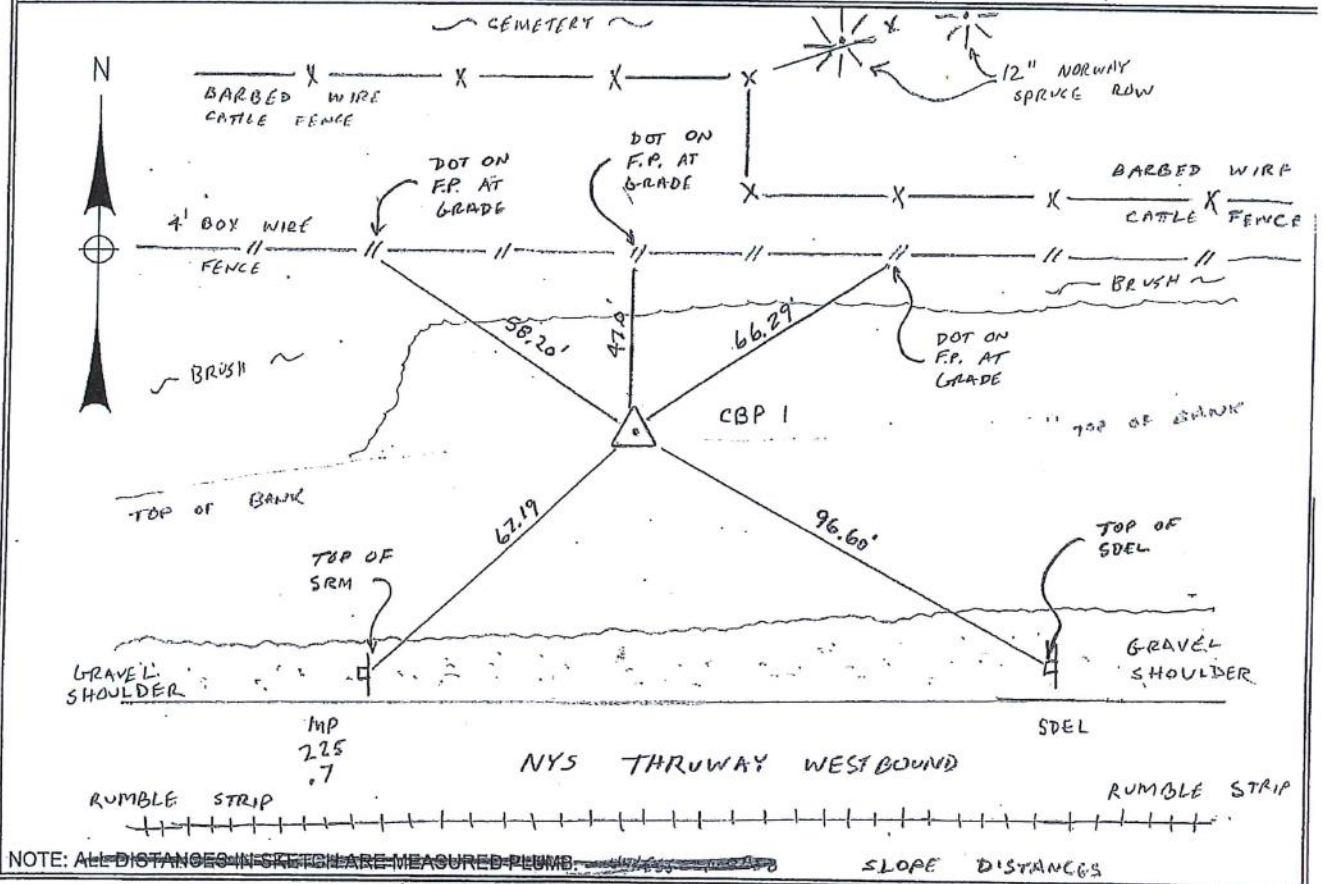
P.I.N. _____

PROJECTION NAD 83
CENTRAL ZONE, 3102

ORDER OF SURVEY: _____
STATE PLANE COORDINATE SYSTEM

CITY OR TOWN, COUNTY	NAME OF STATION	YEAR
FRANKFORT, HERRIMAN	CP No. CBP 1	2016
N(Y) = 1541911.0730 (GRID)	DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS OBSERVED AT STATION	
E(X) = 336684.0642 (GRID)	OBJECT	GRID DISTANCE (METER)
VERTICAL DATUM: NAVD 88		GRID BEARING
ELEVATION (METER): 458.6375		
COMBINED FACTOR 0.99991067		
ESTABLISHED BY: JS, YEAR 2016		
FOIT-ALBERT ASSOCIATES		

DESCRIPTION: CBP 1 IS A 30" REBAR WITH ALUMINUM CAP SET FLUSH. POINT IS ON NORTH SIDE OF NYS THRUWAY WESTBOUND LANE, +/- 30' NORTH OF E.O.P. POINT IS EAST OF REF. MARKER 225.7 +/- 30'. POINT IS ALSO SET AT THE TOP OF BANK.



CHECKED BY: _____ DATE: _____

FOIT-ALBERT ASSOCIATES CONTROL SURVEY DATA

PROJECT - 16001.30 SITE 2 + 3

P.I.N. _____

PROJECTION NAD 83

EAST

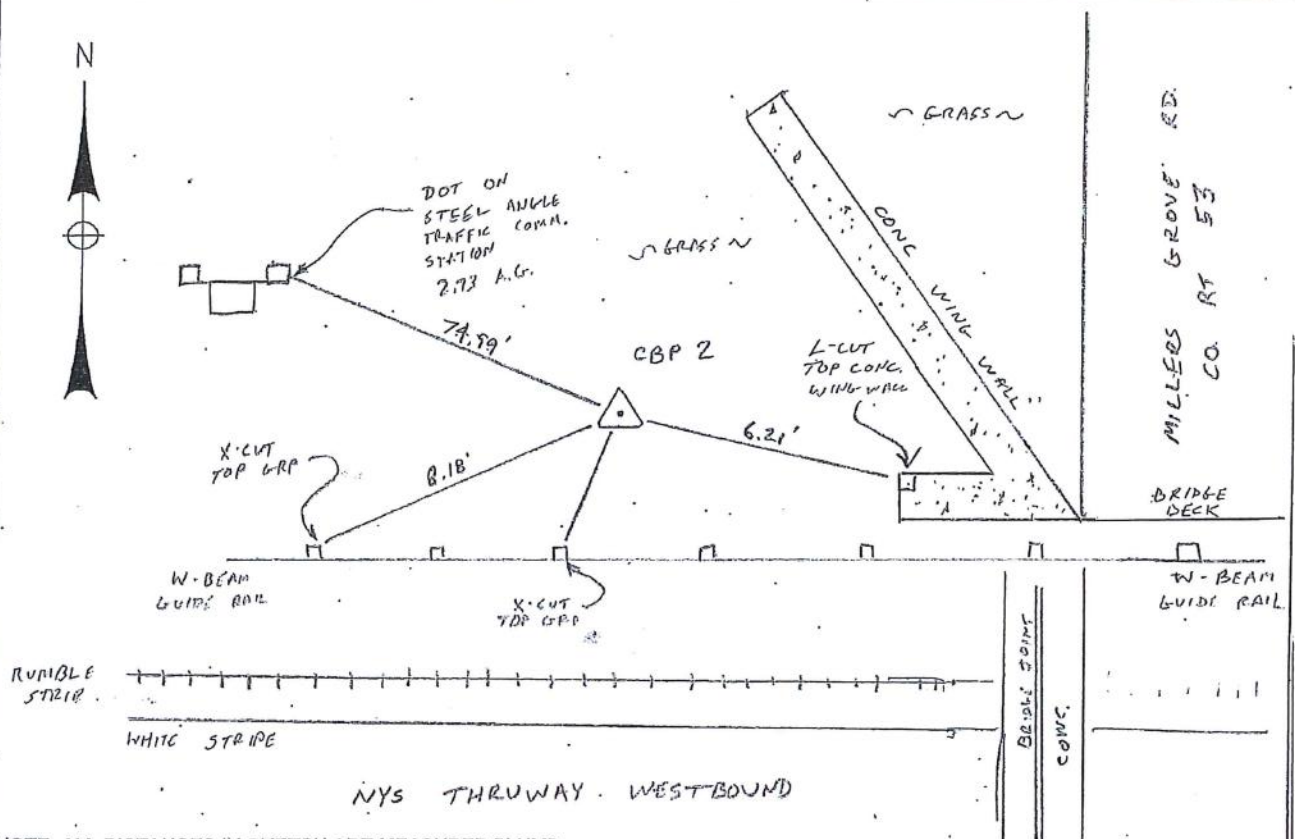
ZONE, 3103

ORDER OF SURVEY: _____

STATE PLANE COORDINATE SYSTEM

CITY OR TOWN, COUNTY	NAME OF STATION	YEAR
FRANKFORT, HERKIMER	CP No. CBP 2	2016
N(Y) = 1541258.2306 (GRID)	DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS OBSERVED AT STATION	
E(X) = 337483.1790 (GRID)	OBJECT	GRID DISTANCE (METER)
VERTICAL DATUM: NAVD 88		GRID BEARING
ELEVATION (MEET): 453.3750		
COMBINED FACTOR 0.99991067		
ESTABLISHED BY: JS YEAR 2016		
FOIT-ALBERT ASSOCIATES		

DESCRIPTION: SET 30" REBAR WITH ALUMINUM CAP SET FLUSH ON THE NORTH WEST CORNER OF A CONCRETE WING WALL. POINT IS 6.5' FROM THE NYS THRUWAY WB EDGE OF PAVEMENT. POINT IS 6.0' +/- PERPENDICULAR FROM THE CONCRETE WING WALL.



NOTE: ALL DISTANCES IN SKETCH ARE MEASURED PLUMB.

CHECKED BY: _____ DATE: _____

FOIT-ALBERT ASSOCIATES CONTROL SURVEY DATA

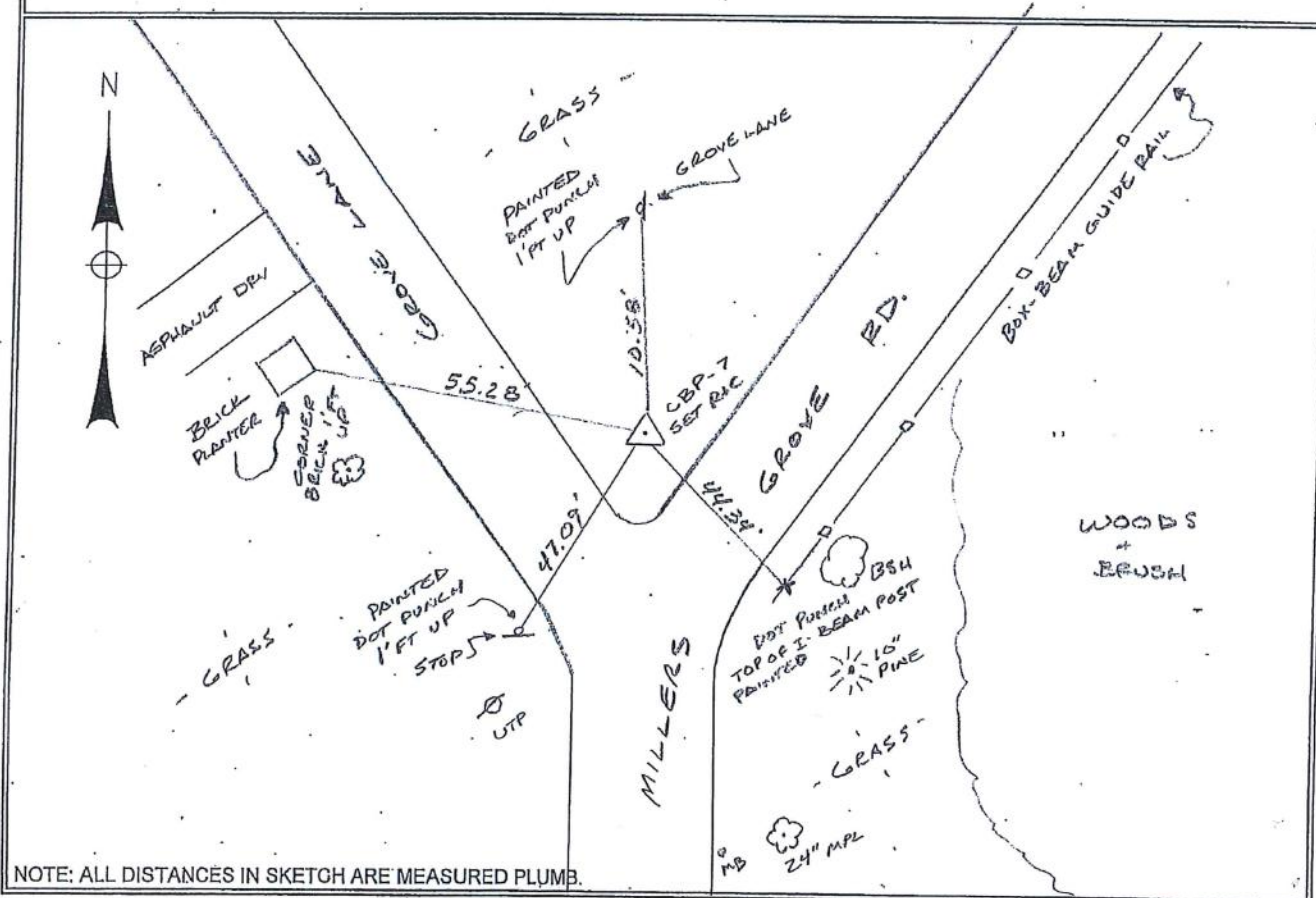
PROJECT - 16001.30
P.I.N. _____

PROJECTION NAD 83
EAST ZONE, 3103

ORDER OF SURVEY: _____
STATE PLANE COORDINATE SYSTEM

CITY OR TOWN, COUNTY	NAME OF STATION	YEAR
FRANKFORT, HERKIMER	CP No. <u>CBP-7</u>	<u>2016</u>
N(Y) = <u>1540711.6931</u> (GRID)	DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS OBSERVED AT STATION	
E(X) = <u>336901.1881</u> (GRID)	OBJECT	GRID DISTANCE (METER)
VERTICAL DATUM: <u>NAD 88</u>		GRID BEARING
ELEVATION (METER): <u>437.3450</u>		
COMBINED FACTOR <u>0.99991067</u>		
ESTABLISHED BY: <u>MM</u> YEAR <u>2016</u>		
FOIT-ALBERT ASSOCIATES		

DESCRIPTION: SET R/C ON WEST SIDE OF MILLERS GROVE RD 700' + 00' SOUTH OF I-90 BRIDGE. EAST SIDE OF GROVE LANE SPLIT FROM MILLERS GROVE RD IN GRASS AREA



NOTE: ALL DISTANCES IN SKETCH ARE MEASURED PLUMB.

CHECKED BY: _____ DATE: _____

FOIT-ALBERT ASSOCIATES CONTROL SURVEY DATA

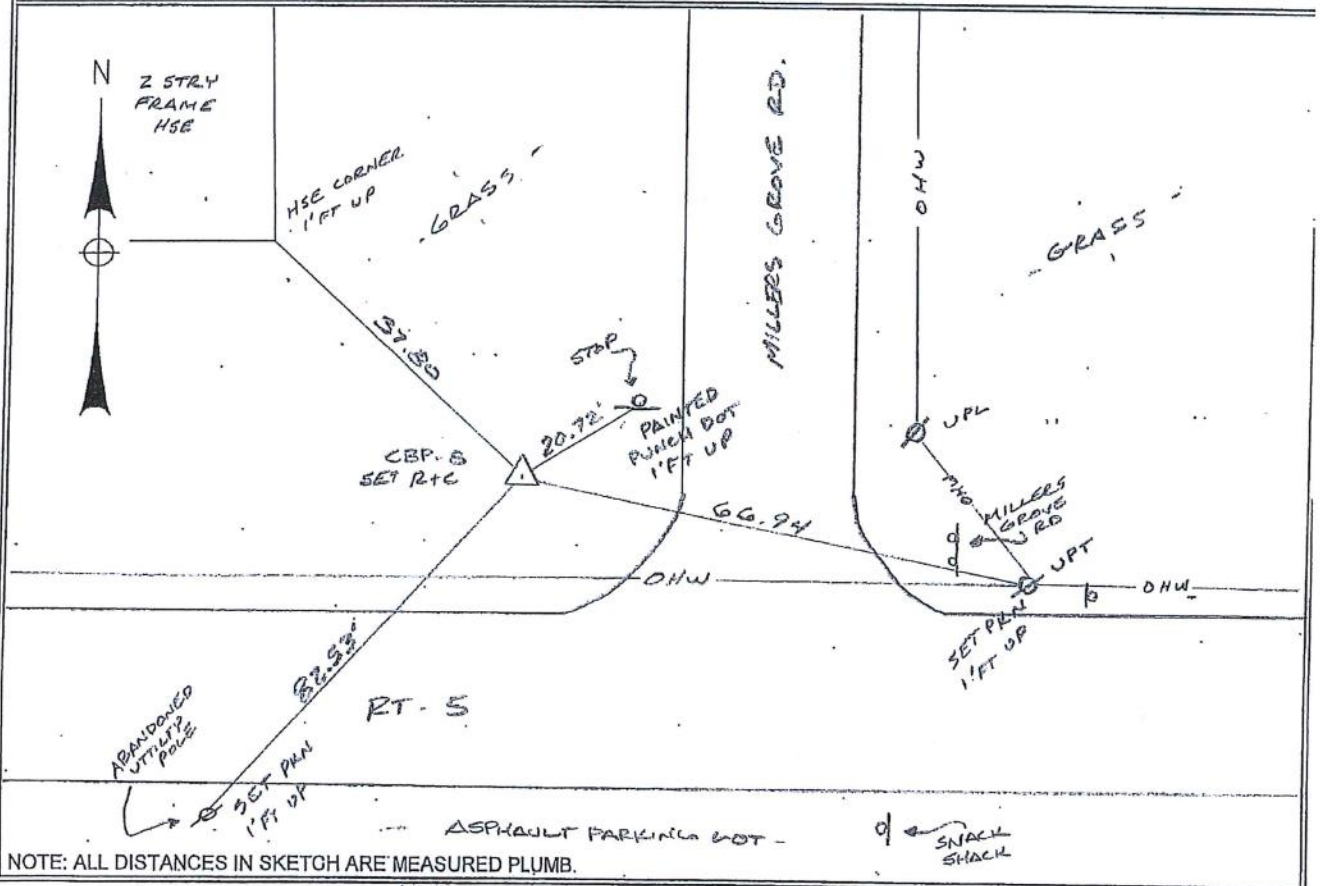
PROJECT - 110001.300
P.I.N. _____

PROJECTION NAD 83
EAST ZONE, 3103

ORDER OF SURVEY: _____
STATE PLANE COORDINATE SYSTEM

CITY OR TOWN, COUNTY	NAME OF STATION	YEAR
FRANKFORT, HERKIMER	CP No. CPB 8	2016
N(Y) = 1539975.3965 (GRID)	DISTANCES AND DIRECTIONS TO REFERENCE MARKS AND PROMINENT OBJECTS OBSERVED AT STATION	
E(X) = 336384.9438 (GRID)	OBJECT	GRID DISTANCE (METER)
VERTICAL DATUM: NAVD 88		GRID BEARING
ELEVATION (METER): 419.3014		
COMBINED FACTOR		
ESTABLISHED BY: MM, YEAR 2016		
FOIT-ALBERT ASSOCIATES		

DESCRIPTION: SET RTC IN GRASS ON NORTH SIDE OF RT-5 AND WEST SIDE OF MILLERS GROVE RD. 1500' ± OR - SOUTH OF 1-90 BRIDGE



NOTE: ALL DISTANCES IN SKETCH ARE MEASURED PLUMB.

CHECKED BY: _____ DATE: _____

TRAVERSE COMPUTATIONS

TRAVERSE 1

File: I:\2016\16001.00 Engineering Survey\16001.30 NYSTA - Four Bridges\Drawings\Surv\Reports\Site 2 & 3\Nc
, adjust Trav 1.txt 2/28/2017, 3:53:09 PM

Process No Adjust Results

Thu Jan 12 08:31:46 2017

Raw File: I:\2016\16001.00 Engineering Survey\16001.30 NYSTA - Four Bridges\Drawings\Surv\Field Files\Site
2 & 3\1600130SITE2-3RD (Trav1).rw5

Coordinate File: I:\2016\16001.00 Engineering Survey\16001.30 NYSTA - Four Bridges\Drawings\Surv\CRD -
Point Database\16001.30 Site 2+3 COMPS.crd

Scale Factor: 0.99991067

Correct for Earth Curvature: OFF

Closure Results

Starting Point 2GPS: N 1541258.2306 E 337483.1790 Z 453.3735

Closing Reference Point 3GPS: N 1540983.9554 E 337862.1852 Z 456.7545

Ending Point 3GPS: N 1540983.9711 E 337862.1854 Z 456.7410

Azimuth Of Error: 00°40'40"

North Error : 0.01572

East Error : 0.00019

Vertical Error : -0.01346

Hz Dist Error : 0.01572

Sl Dist Error : 0.02070

Traverse Lines : 1

SideShots : 2

Store Points : 4

Horiz Dist Traversed: 467.8291

Slope Dist Traversed: 467.8382

Closure Precision: 1 in 29761.6

Starting Point 2GPS: N 1541258.2306 E 337483.1790 Z 453.3735

Backsight Point 1GPS: N 1541911.0730 E 336684.0642 Z 458.6375

Point No.	Horizontal Angle	Zenith Angle	Slope Dist	Inst HT	Rod HT	Northing	Easting	Elev
3GPS	AR176.3836	89.3836	467.8780	5.405	4.950	1540983.971	337862.1854	456.7410
CBP ,RBR ALUM CAP								

Check Points

	Point No.	Northing	Easting	Elevation	Description
Reference 3GPS	1540983.955	337862.1852	456.7545	CPB ,RBR ALUM CAP	
Measure 3GPS	1540983.971	337862.1854	456.7410	CBP ,RBR ALUM CAP	
Delta	0.0157	0.0002	-0.0135		

Horizontal Distance: 0.0157

LN:127,OC:2GPS,SD:467.878,HA:176.3836,ZA:89.3836,HI:5.405,HR:4.950

Reference 4GPS	1540397.316	338627.1246	465.2222	CPB ,RBR ALUM CAP
Measure 4GPS	1540397.292	338627.0931	465.2443	CBP ,RBR ALUM CAP
Delta	-0.0239	-0.0315	0.0221	

Horizontal Distance: 0.0395

LN:186,OC:3GPS,SD:964.104,HA:181.3542,ZA:89.2942,HI:5.100,HR:5.110

Process Angle Balance Results

Thu Jan 12 08:41:40 2017

Raw File: I:\2016\16001.00 Engineering Survey\16001.30 NYSTA - Four Bridges\Drawings\Surv\Field Files\Site 2 & 3\1600130SITE2-3RD (Trav1).rw5

Coordinate File: I:\2016\16001.00 Engineering Survey\16001.30 NYSTA - Four Bridges\Drawings\Surv\CRD - Point Database\16001.30 Site 2+3 COMPS.crd

Scale Factor: 0.99991067

Correct for Earth Curvature: OFF

Closure Results (Before Angle Balance)

Starting Point 2GPS: N 1541258.2306 E 337483.1790 Z 453.3735

Closing Reference Point 3GPS: N 1540983.9554 E 337862.1852 Z 456.7545

Ending Point 3GPS: N 1540983.9554 E 337862.1852 Z 456.7545

Azimuth Of Error: 90°00'00"

North Error : 0.00000

East Error : 0.00000

Vertical Error : 0.00000

Hz Dist Error : 0.00000

Sl Dist Error : 0.00000

Traverse Lines : 1

SideShots : 2

Store Points : 4

Horiz Dist Traversed: 467.8291

Slope Dist Traversed: 467.8382

Closure Precision: 1 in 9999999

Starting Point 2GPS: N 1541258.2306 E 337483.1790 Z 453.3735

Backsight Point 1GPS: N 1541911.0730 E 336684.0642 Z 458.6375

Point No.	Horizontal Angle	Zenith Angle	Slope Dist	Inst HT	Rod HT	Northing	Easting	Elev
-----------	------------------	--------------	------------	---------	--------	----------	---------	------

3GPS	AR176.3836	89.3836	467.8780	5.405	4.950	1540983.971	337862.1854	456.7410
CBP ,RBR ALUM CAP								

Check Points

	Point No.	Northing	Easting	Elevation	Description
Reference	4GPS	1540397.302	338627.0768	465.2222	CPB ,RBR ALUM CAP
Measure	4GPS	1540397.292	338627.0931	465.2443	CBP ,RBR ALUM CAP
Delta		-0.0103	0.0163	0.0221	

Horizontal Distance: 0.0192

LN:186,OC:3GPS,SD:964.104,HA:181.3542,ZA:89.2942,HI:5.100,HR:5.110

Angle Balance

Angular Error: -0°00'00.07" for 2 traverse sides

Adjusting Each Angle: -0°00'00.04"

Closure Results (After Angle Balance)

Starting Coordinates : N 1541258.2306 E 337483.1790 Z 453.3735

Closing Reference Point 3GPS: N 1540983.9554 E 337862.1852 Z 456.7545

Ending Coordinates : N 1540983.9554 E 337862.1852 Z 456.7545

Azimuth Of Error: 90°00'00"

North Error : 0.00000

East Error : 0.00000

Vertical Error : 0.00000

Hz Dist Error : 0.00000

Sl Dist Error : 0.00000

Traverse Lines : 1

SideShots

Total Hz Dist Traversed: 467.82914

Total Sl Dist Traversed: 467.83821

Closure Precision: 1 in 9999999

Point No.	Horizontal Angle	Zenith Angle	Slope Dist	Inst HT	Rod HT	Northing	Easting	Elev
3GPS	AR176.3836	89.3836	467.8780	5.405	4.950	1540983.971	337862.1853	456.7410
CBP ,RBR ALUM CAP								

Check Points

	Point No.	Northing	Easting	Elevation	Description
Reference	4GPS	1540397.302	338627.0768	465.2222	CPB ,RBR ALUM CAP
Measure	4GPS	1540397.292	338627.0930	465.2443	CBP ,RBR ALUM CAP
Delta		-0.0104	0.0162	0.0221	

Horizontal Distance: 0.0192

LN:186,OC:3GPS,SD:964.104,HA:181.3542,ZA:89.2942,HI:5.100,HR:5.110

File: I:\2016\16001.00 Engineering Survey\16001.30 NYSTA - Four Bridges\Drawings\Surv\Reports\Site 2 & 3\Compass Trav 1.txt 2/28/2017, 3:53:09 PM

Process Compass Results

Thu Jan 12 08:42:08 2017

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Coordinate File: I:\2016\16001.00 Engineering Survey\16001.30 NYSTA - Four Bridges\Drawings\Surv\CRD - Point Database\16001.30 Site 2+3 COMPS.crd

Scale Factor: 0.99991067

Correct for Earth Curvature: OFF

Backsight Point 1GPS: N 1541911.0730 E 336684.0642 Z 458.6375

Check Points

	Point No.	Northing	Easting	Elevation	Description
Reference	4GPS	1540397.302	338627.0768	465.2222	CPB ,RBR ALUM CAP
Measure	4GPS	1540397.292	338627.0931	465.2443	CBP ,RBR ALUM CAP
Delta		-0.0103	0.0163	0.0221	

Horizontal Distance: 0.0192

LN:186,OC:3GPS,SD:964.104,HA:181.3542,ZA:89.2942,HI:5.100,HR:5.110

Adjusted Elevation Comparison

Point#	Original Z	Adjusted Z	Delta Z
3GPS	456.755	456.755	0.000

Compass Closure

Adjusted Point Comparison

Point#	Original Northing	Easting	Adjusted Northing	Easting	Dist	Bearing
--------	----------------------	---------	----------------------	---------	------	---------

Error: only 1 traverse sides found.

TRAVERSE 2

File: I:\2016\16001.00 Engineering Survey\16001.30 NYSTA - Four Bridges\Drawings\Surv\Reports\Site 2 & 3\No
, adjust Trav 2.txt 2/28/2017, 3:53:10 PM

Process No Adjust Results

Tue Feb 28 12:50:40 2017

Raw File: I:\2016\16001.00 Engineering Survey\16001.30 NYSTA - Four Bridges\Drawings\Surv\Field Files\Site
2 & 3\1600130SITE2-3RE (Trav 2)_edited.rw5

Coordinate File: I:\2016\16001.00 Engineering Survey\16001.30 NYSTA - Four Bridges\Drawings\Surv\CRD -
Point Database\16001.30 Site 2+3 COMPS.crd

Scale Factor: 0.99991067

Correct for Earth Curvature: OFF

Closure Results

Starting Point 5: N 1541615.5291 E 337828.0205 Z 456.4835

Closing Reference Point 7GPS: N 1540711.6931 E 336901.1881 Z 437.3450

Ending Point 7GPS: N 1540711.7588 E 336901.2150 Z 437.3575

Azimuth Of Error: 22°13'59"

North Error : 0.06575

East Error : 0.02687

Vertical Error : 0.01251

Hz Dist Error : 0.07103

Sl Dist Error : 0.07212

Traverse Lines : 2

SideShots : 4

Store Points : 4

Horiz Dist Traversed: 1305.3506

Slope Dist Traversed: 1305.6499

Closure Precision: 1 in 18378.4

Starting Point 5: N 1541615.5291 E 337828.0205 Z 456.4835

Backsight Point 2GPS: N 1541258.2306 E 337483.1790 Z 453.3735

Point No.	Horizontal Angle	Zenith Angle	Slope Dist	Inst HT	Rod HT	Northing	Easting	Elev
6	AR355.3614	91.3444	772.3510	5.350	5.475	1541020.595	337336.0673	435.0783
CBP ,R&C								
7GPS	AR195.0147	89.4332	533.4170	5.325	5.600	1540711.758	336901.2150	437.3575
CPB ,R&C								

Check Points

	Point No.	Northing	Easting	Elevation	Description
Reference	7GPS	1540711.693	336901.1881	437.3450	CBP ,RBR ALUM CAP
Measure	7GPS	1540711.758	336901.2150	437.3575	CPB ,R&C
Delta		0.0657	0.0269	0.0125	
Horizontal Distance:		0.0710			
LN:277,OC:6,SD:533.417,HA:195.0147,ZA:89.4332,HI:5.325,HR:5.600					

Reference	8GPS	1539975.396	336384.9438	419.3014	CBP ,RBR ALUM CAP
Measure	8GPS	1539975.314	336384.9390	419.3172	CBP ,R&C
Delta		-0.0823	-0.0048	0.0158	
Horizontal Distance:		0.0824			
LN:336,OC:7GPS,SD:899.576,HA:160.2511,ZA:91.0916,HI:5.485,HR:5.390					

Process Angle Balance Results

Tue Feb 28 12:53:06 2017

Raw File: I:\2016\16001.00 Engineering Survey\16001.30 NYSTA - Four Bridges\Drawings\Surv\Field Files\Site 2 & 3\1600130SITE2-3RE (Trav 2)_edited.rw5

Coordinate File: I:\2016\16001.00 Engineering Survey\16001.30 NYSTA - Four Bridges\Drawings\Surv\CRD - Point Database\16001.30 Site 2+3 COMPS.crd

Scale Factor: 0.99991067

Correct for Earth Curvature: OFF

Closure Results (Before Angle Balance)

Starting Point 5: N 1541615.5291 E 337828.0205 Z 456.4835

Closing Reference Point 7GPS: N 1540711.6931 E 336901.1881 Z 437.3450

Ending Point 7GPS: N 1540711.7588 E 336901.2150 Z 437.3575

Azimuth Of Error: 22°13'59"

North Error : 0.06575

East Error : 0.02687

Vertical Error : 0.01251

Hz Dist Error : 0.07103

Sl Dist Error : 0.07212

Traverse Lines : 2

SideShots : 4

Store Points : 4

Horiz Dist Traversed: 1305.3506

Slope Dist Traversed: 1305.6499

Closure Precision: 1 in 18378.4

Starting Point 5: N 1541615.5291 E 337828.0205 Z 456.4835

Backsight Point 2GPS: N 1541258.2306 E 337483.1790 Z 453.3735

Point No.	Horizontal Angle	Zenith Angle	Slope Dist	Inst HT	Rod HT	Northing	Easting	Elev
6	AR355.3614	91.3444	772.3510	5.350	5.475	1541020.595	337336.0673	435.0783
CBP ,R&C								
7GPS	AR195.0147	89.4332	533.4170	5.325	5.600	1540711.758	336901.2150	437.3575
CPB ,R&C								

Check Points

	Point No.	Northing	Easting	Elevation	Description
Reference	8GPS	1539975.396	336384.9438	419.3014	CBP ,RBR ALUM CAP
Measure	8GPS	1539975.416	336384.9133	419.3297	CBP ,R&C
Delta		0.0203	-0.0305	0.0283	

Horizontal Distance: 0.0366

LN:336,OC:7GPS,SD:899.576,HA:160.2511,ZA:91.0916,HI:5.485,HR:5.390

Angle Balance

Angular Error: 0°00'05.28" for 3 traverse sides

Adjusting Each Angle: 0°00'01.76"

Closure Results (After Angle Balance)

Starting Coordinates : N 1541615.5291 E 337828.0205 Z 456.4835

Closing Reference Point 7GPS: N 1540711.6931 E 336901.1881 Z 437.3450

Ending Coordinates : N 1540711.7472 E 336901.2253 Z 437.3575

Azimuth Of Error: 34°30'10"

North Error : 0.05414

East Error : 0.03721

Vertical Error : 0.01251

Hz Dist Error : 0.06569

Sl Dist Error : 0.06687

Traverse Lines : 2

SideShots

Total Hz Dist Traversed: 1305.35055

Total Sl Dist Traversed: 1305.64991

Closure Precision: 1 in 19870.3

Point No.	Horizontal Angle	Zenith Angle	Slope Dist	Inst HT	Rod HT	Northing	Easting	Elev
6	AR355.3612	91.3444	772.3510	5.350	5.475	1541020.591	337336.0724	435.0783
CBP ,R&C								
7GPS	AR195.0145	89.4332	533.4170	5.325	5.600	1540711.747	336901.2253	437.3575
CPB ,R&C								

Check Points

	Point No.	Northing	Easting	Elevation	Description
Reference	8GPS	1539975.396	336384.9438	419.3014	CBP ,RBR ALUM CAP
Measure	8GPS	1539975.392	336384.9425	419.3297	CBP ,R&C
Delta		-0.0045	-0.0013	0.0283	
Horizontal Distance: 0.0047					
LN:336,OC:7GPS,SD:899.576,HA:160.2509,ZA:91.0916,HI:5.485,HR:5.390					

File: I:\2016\16001.00 Engineering Survey\16001.30 NYSTA - Four Bridges\Drawings\Surv\Reports\Site 2 & 3\Ccompass Trav 2.txt 2/28/2017, 3:53:11 PM

Process Compass Results

Tue Feb 28 12:53:39 2017

Raw File: I:\2016\16001.00 Engineering Survey\16001.30 NYSTA - Four Bridges\Drawings\Surv\Field Files\Site 2 & 3\1600130SITE2-3RE (Trav 2)_edited.rw5
Coordinate File: I:\2016\16001.00 Engineering Survey\16001.30 NYSTA - Four Bridges\Drawings\Surv\CRD - Point Database\16001.30 Site 2+3 COMPS.crd
Scale Factor: 0.99991067
Correct for Earth Curvature: OFF
Backsight Point 2GPS: N 1541258.2306 E 337483.1790 Z 453.3735

Check Points

	Point No.	Northing	Easting	Elevation	Description
Reference	8GPS	1539975.396	336384.9438	419.3014	CBP ,RBR ALUM CAP
Measure	8GPS	1539975.416	336384.9133	419.3297	CBP ,R&C
Delta		0.0203	-0.0305	0.0283	
Horizontal Distance: 0.0366					
LN:336,OC:7GPS,SD:899.576,HA:160.2511,ZA:91.0916,HI:5.485,HR:5.390					

Adjusted Elevation Comparison

Point#	Original Z	Adjusted Z	Delta Z
6	435.078	435.071	-0.007
7GPS	437.358	437.345	-0.013

Compass Closure

Adjusted Point Comparison

Point#	Original Northing	Original Easting	Adjusted Northing	Adjusted Easting	Dist	Bearing
6	1541020.595	337336.067	1541020.556	337336.051	0.042	S 22°13'59" W
7GPS	1540711.759	336901.215	1540711.693	336901.188	0.071	S 22°13'59" W

Max adjustment: 0.071

Point No.	Horizontal Angle	Zenith Angle	Slope Dist	Inst HT	Rod HT	Northing	Easting	Elev
6	AR355.3611	91.3444	772.3207	5.350	5.475	1541020.556	337336.0514	435.0709
CBP ,R&C								
7GPS	AR195.0145	89.4332	533.3940	5.325	5.600	1540711.693	336901.1881	437.3450
CPB ,R&C								

Check Points

	Point No.	Northing	Easting	Elevation	Description
Reference	8GPS	1539975.396	336384.9438	419.3014	CBP ,RBR ALUM CAP
Measure	8GPS	1539975.336	336384.9079	419.3172	CBP ,R&C
Delta		-0.0605	-0.0359	0.0158	
Horizontal Distance: 0.0704					
LN:336,OC:7GPS,SD:899.576,HA:160.2511,ZA:91.0916,HI:5.485,HR:5.390					

FIELD NOTES FOR TRAVERSE

FOIT-ALBERT ASSOCIATES

PROJECT 16001-30

P.C. MM

WEATHER: 25°

P.I.N.

CREW: INST. SD

DATE

12-14-16

ROD

SHEET:

OF

12-14-16
COLLIMINATION
DONE ✓

RAW DATA FILE: 1600130 SITE 2-3RD

CONTROL FILE: _____

START POINT: _____

POINT NO.	COMMENT
T: 23°F P: 30.08"	T.O. GPS 1 BS- (2) (HI: 5.715 BS: 5.25)
	HI = 0.000 V = 0.015 FS- 2A
T: 23°F P: 30.09"	T.O. 2A BS- GPS 1 (HI = 5.408 BS = 5.546)
	HI = 0.010 V = 0.110 FS- 5 HI = 5.13 FS- 3 HI = 4.95
T: 23°F P: 30.09"	T.O. 3 BS- (2A) (HI = 5.15 BS = 5.06)
	HI = 0.002 V = 0.028 FS- 4 HI = 5.11

FOIT-ALBERT ASSOCIATES

PROJECT 16001.30

P.C. MM

WEATHER: 12° SNOW

P.I.N. _____

CREW: INST. JD

DATE 12-15-16

ROD _____

SHEET: _____ OF _____

12-16-16

-7° SNOW 1' + DR-

RAW DATA FILE: 1600130 SITE 2-3 RE

CONTROL FILE: ROBOT

START POINT: _____

POINT NO.	COMMENT
T: 12°F	BS- (2A) (HI= 5.35 BS= 4.98)
P: 30.07"	HI= -0.013 VE= -0.001 FS- CBP-6 HI= 5.475
	FS- CBS 3A S. 74 FS- CBS 3B HI= 4.92
T: 12°F	BS- (5) (HI= 5.35 BS= 5.12)
P: 29.95"	FS- CBS-3C S. 39
T: 12°F	BS- (5) (HI= 5.325 BS= 5.22)
P: 29.94"	FS- CBP-7 = 5.60
T: 12°F	BS- (6) (HI= 5.485 BS= 5.15)
P: 29.94"	FS- CBP-8 = 5.39

VERTICAL CONTROL

D214386
New York State Thruway Authority
Design Phase I-IV, Replacement of 8 Syracuse Division Bridges
Mainline EB, WB Bridge over County Road 53 (BIN 5516072)
Mile Post 225.48 – 225.49 in the Syracuse Division
Herkimer County

VERTICAL CONTROL NARRATIVE

The primary vertical control for the project was established by static GPS methods and distributed throughout project by differential leveling methods. An elevation of 458.6375' on CBP 1 was used and applied to control points and benchmarks set around the project area. Benchmarks CPBM1 through CPBM6 were all set and leveled through using differential leveling methods.

Control Recovered:

N/A

Control Not Recovered:

N/A

Vertical Datum:

North American Vertical Datum 1988.

Closure and Adjustment:

The first level loop began at CBP 1, a set rebar and aluminum cap, and ran through CBP 2, set rebar and aluminum cap and CPBM 2, a set L-cut on the northwest corner of a concrete wing wall, continuing through CPBM 3, L-cut on the southwest corner of a concrete wing wall then closing on CBP 1.

The total length of the first level run was 0.448 miles with a misclosure of -0.004 ft. Using the formula $0.03 \times \text{the square root of } K$, the allowable error was ± 0.020 ft. The misclosure was within tolerance and the level run was then adjusted by distributing the error equally to all the turning points.

The second level loop began at CBP 2, a set rebar and aluminum cap, and ran through CPBM 1, an X-cut on top of a box beam guide rail post, the loop continued through CPBM 4, a set X-cut on top of a box beam guide rail post then closing back on CBP 2.

The total length of the second level run was 0.287 miles with a misclosure of 0.000 ft. Using the formula $0.03 \times \text{the square root of } K$, the allowable error was ± 0.016 ft. The misclosure was within tolerance and the level run did not require any further adjustment.

The third level loop began at CBP 2, a set rebar and aluminum cap, then ran through CBP 3, a set rebar and aluminum cap, then continuing to close back on CBP 2.

The total length of the third level run was 0.178 miles with a misclosure of 0.000 ft. Using the formula $0.03 \times \text{the square root of } K$, the allowable error was ± 0.013 ft. The misclosure was within tolerance and the level run did not require any further adjustment.

The fourth level loop began at CBP 1, a set rebar and aluminum cap, then ran through CBPM 5, a set chiseled box cut in the southeast corner of a concrete drainage structure pad, the level continued to close back on CBP 1.

The total length of the fourth level run was 0.144 miles with a misclosure of -0.001 ft. Using the formula $0.03 \times \text{the square root of } K$, the allowable error was ± 0.011 ft. The misclosure was within tolerance and the level run was then adjusted by distributing the error equally to all the turning points.

The fifth level loop began at CPBM 1, a set X-cut on top of a box beam guide rail post, then the level continued through CBP 5, a set rebar and cap, then continued to close back on CPBM 1.

The total length of the fifth level run was 0.085 miles with a misclosure of -0.000 ft. Using the formula $0.03 \times \text{the square root of } K$, the allowable error was ± 0.009 ft. The misclosure was within tolerance and the level run did not require any further adjustment.

The sixth level loop began at CPBM 4, a set X-cut on top of a box beam guide rail post, the level continued through CBP 7, a set rebar and cap, then continued to close back on CPBM 4.

The total length of the fourth level run was 0.179 miles with a misclosure of 0.000 ft. Using the formula $0.03 \times \text{the square root of } K$, the allowable error was ± 0.013 ft. The misclosure was within tolerance and the level run did not require any further adjustment.

The seventh and final level loop began at CBP 3, a set rebar and aluminum cap, then continued through CPBM 6, a set X-cut on top of the southwest bolt of the south double post service area sign, continuing to close back on CBP 3.

The total length of the seventh level run was 0.044 miles with a misclosure of -0.001 ft. Using the formula $0.03 \times \text{the square root of } K$, the allowable error was ± 0.006 ft. The misclosure was within tolerance and the level run was then adjusted by distributing the error equally to all the turning points.

BENCHMARK LIST

Survey Fieldbook Benchmark List Report

Report Created: 2/21/2017

Time: 8:28am

Fieldbook: 1600130 Site 2-3

Slope Distance Scale Factor: 1.000000000000

Note: All units in this report are in feet unless specified otherwise.

Name	Northing	Easting	Elevation	Description	STA O/S
CPBM1	1541467.1333	337661.3754	447.0700	X-CUT TOP GUIDE RAIL POST	MG STA 34+27.21, OS 16.86 R
CPBM2	1541252.1586	337484.4517	455.6585	L-CUT TOP CONC WING WALL	ML STA 20+36.48, OS 4.17 R
CPBM3	1541144.7742	337403.9421	455.6835	L-CUT TOP CONC WING WALL	MG STA 25+71.62, OS 26.83 L
CPBM4	1540973.9238	337293.6442	436.2350	X-CUT TOP GUIDE RAIL POST	MG STA 23+71.05, OS 13.48 R
CPBM5	1541664.2374	336969.4078	448.0160	BOX-CUT TOP CONC DS PAD	ML STA 13+77.14, OS 10.63 R
CPBM6	1540915.6159	337957.7156	458.7440	X-CUT SW BOLT OF S SIGN POST	ML STA 26+17.12, OS 3.91 L

HORIZONTAL CONTROL POINT ELEVATION LIST

Survey Fieldbook Coordinate List Report

Report Created: 2/21/2017
Time: 8:28am

Fieldbook: 1600130 Site 2-3

Slope Distance Scale Factor: 1.000000000000

Note: All units in this report are in feet unless specified otherwise.

Number	Northing	Easting	Elevation	Code	Description	STA
1GPS	1541911.0730	336684.0642	458.6375	CBP	REBAR ALUMINUM CAP	ML STA 10+00.00
2GPS	1541258.2306	337483.1790	453.3750	CBP	REBAR ALUMINUM CAP	ML STA 20+31.89
2B	1541441.8553	337752.0839	437.8035	CBS	REBAR AND CAP	
2C	1540959.9112	337639.9381	455.8134	CBS	REBAR AND CAP	
3GPS	1540983.9554	337862.1852	456.7545	CBP	REBAR ALUMINUM CAP	ML STA 24+99.72
4GPS	1540397.3026	338627.0768	465.2222	CBP	REBAR ALUMINUM CAP	ML STA 34+63.68
5	1541615.5455	337828.0435	456.5050	CBP	REBAR AND CAP	MG STA 32+04.68
5A	1541244.9569	337524.3612	438.4130	CBS	REBAR AND CAP	
5B	1541269.2698	337505.3445	437.6280	CBS	REBAR AND CAP	
6	1541020.5953	337336.0673	435.0783	CBP	REBAR AND CAP	MG STA 24+32.67
6A	1541155.8515	337386.3543	454.2855	CBS	REBAR AND CAP	
7GPS	1540711.6931	336901.1881	437.3450	CBP	REBAR AND CAP	MG STA 18+99.24
8GPS	1539975.3965	336384.9438	419.3014	CBP	REBAR AND CAP	MG STA 10+00.00

LEVEL LOOP NO. 1

FOIT-ALBERT ASSOCIATES

LOOP 1

PROJECT	16001.30	5176	DATUM	UNITS	INSTRUMENT: LEICA 20403	DATE	WEATHER	P.C.	INST.	ROD	SHEET
P.L.N.	2-3	1447088	FT	SERIAL NO: 333205	12-6-16	30's	cloudy	JS	MM	5D	1 OF 2
TURN	3 WIRE BS	BS (+)	HI	3 WIRE FS	FS (-)	ELEV.	ADJ. ELEV.	DESCRIPTION		DISTANCE + -	
	4.305					458.6375		CBP 1 - RBL ALUM CAP		166.5	
	3.480	3.480	462.1175								
	2.640			12.050							
TP 1				11.150	11.150	450.9675	450.9680				179.5
	8.220			10.255							
	7.130	7.106	458.0735							225.0	
	5.970										
				3.660							
				2.500	2.500	455.5735	455.5745				234.0
TP 2	5.745			1.320							
	5.225	5.225	460.7985							103.0	
	4.710										
TP 3				8.110				CBP 2 - RBL ALUM CAP			
				7.425	7.425	453.3735	453.3750				137.0
				6.740							
SS				5.850				CPBM 2 - L-CUT ON TOP			
				5.440	5.140	455.6585	455.6585	BRIDGE WIND WALL NW CORNER			142.0
	6.630			4.430							
	6.270	6.270	459.6435					CBP 2 - RBL ALUM CAP		71.0	
	5.920										
				5.710							
TP 4				5.360	5.360	454.2835	454.2835	CBS 6A - RBL ALUM CAP			70.0
				5.010							
				4.310							
SS				3.960	3.960	455.6835		CPBM 3 - L-CUT ON TOP			
				3.640				BRIDGE WIND WALL SW CORNER			70.0
	5.470										
	5.130	5.130	459.4135							69.0	
	4.780										
				6.400	6.040	453.3735	453.3760	CBP 2 - RBL ALUM CAP			72.0
TP 5				5.680							

FOIT-ALBERT ASSOCIATES

PROJECT	16001.30 SITE 2-3	DATUM	NAVD 83	INSTRUMENT:	LEICA DNA03	DATE	12-6-16	WEATHER	30's CLOUDY	P.C.	55	INST.	MM	ROD	JD	SHEET	2 OF 2
TURN	3 WIRE BS	BS (+)	HI	3 WIRE FS	FS (-)	ELEV.	ADJ. ELEV.	DESCRIPTION	DISTANCE	+	-						
TP6	7.820	7.050	460.4235														
	7.050																
	6.270																
	3.910	2.870	458.2435														
	2.870																
	1.820																
TP7	7.210																
	5.050																
	4.120																
	3.035																
	7.930	9.320	461.4435														
	9.320																
	8.700																
TP8	3.700																
	2.810																
	1.910																
		ACTUAL MISCLOSE															
		ALLOWABLE MISCLOSE															

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LEVEL LOOP NO. 2

LOOP 2.

FOIT-ALBERT ASSOCIATES

PROJECT	16001.30 SITE		DATUM	144088		UNITS	FT		INSTRUMENT:	LEICA DINA03		DATE	12-7-16		WEATHER	30's CLOUDY		P.C.	53		INST.	MM		ROD	50		SHEET	1 OF 2		
TURN	3 WIRE BS	BS (+)	HI	3 WIRE FS	FS (-)	ELEV.	ADJ. ELEV.	DESCRIPTION	DISTANCE																					
	2.980	2.801	456.1850		15.270	453.3750		CBP 2 - RBR RETURN CAMP	35.8																					
	2.800																													
	2.622																													
TP 1	5.685	5.070	445.9850		3.090	443.2350			113.0																					
	5.070																													
	4.505																													
TP 2	7.085	6.065	450.1000		2.750	443.2350																								
	6.865																													
	6.645																													
TP 3	1.540	1.150	448.2200		3.030	447.0700		CPBM 1 - X-CUT ON TOP BOX-BEAM GRP	44.0																					
	1.150																													
	0.760																													
TP 4	1.956	1.115	442.1200		7.265	440.9550			78.0																					
	1.115																													
	0.370																													
TP 5	4.950	4.545	439.7350		6.930	435.1900			158.0																					
	4.545																													
	4.190																													
TP 6					3.500	436.2350		CPBM 4 - X-CUT ON TOP BOX-BEAM GRP	81.0																					

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FOIT-ALBERT ASSOCIATES

PROJECT	1600130	SITE	517E	DATUM	NAVD88	UNITS	FT	INSTRUMENT:	LEICA DMS03	DATE	12-7-16	WEATHER	70's CLOUDY	P.C.	55	INST.	M114	ROD	TP	SHEET	2 OF 2
TURN	3 WIRE BS	BS (+)	HI	3 WIRE FS	FS (-)	ELEV.	ADJ. ELEV.	DESCRIPTION	DISTANCE	+	-										
	5.650																				
	4.550	4.550	440.785						220.0												
	3.450																				
				3.470	2.470	438.3150					201.0										
TP 7	18.350																				
	17.870	17.870	456.1850						95.0												
	17.400																				
				3.010																	
TP 8				3.820	2.810	453.3750		CAP 2 - RBL ALUM													
				8.620		-453.3750		CAP			38.0										

LEVEL LOOP NO. 3

LOOP 3

FOIT-ALBERT ASSOCIATES

PROJECT 1600130 SIVS 2-T3			DATUM		UNITS		INSTRUMENT: LEICA DIST 03		DATE		WEATHER		P.C.	INST.	ROD	SHEET
P.L.N.			MAY 28		FT		SERIAL NO.: 333205		12-14-16		25° WINDY		MM	MM	52	1 OF 1
TURN	3 WIRE BS	BS (+)	HI	3 WIRE FS	FS (-)	ELEV.	ADJ. ELEV.	DESCRIPTION		DISTANCE						
	8.282							CBP 2 - RGR ALUM CAP		139.9						
	7.583	7.583	460.9565			453.3735										
	6.883															
				2.464	1.720	459.2365								149.4		
	3.369			4.720												
	2.980			8.970												
	2.589	2.980	462.2165					CBP 3 - RGR ALUM CAP		78.0						
				5.972												
				3.462	5.462	456.7545										
				4.950						102.3						
	5.821															
	5.310	5.310	462.0645													
	4.798									102.3						
				3.212												
				2.823	2.823	459.2415										
				2.435						149.7						
	2.762															
	2.012	2.012	461.2535													
	1.265							CBP 2 - RGR ALUM CAP				140.0				
				3.580												
				7.080	7.080	453.3735										
				7.180						469.9		469.3				
		ACTUAL MISCLOSURE			=	-453.3735										
						0.0										
										939.2		FT				
		ALLOWABLE MISCLOSURE			=	$0.03 \sqrt{0.1779}$				0.1779		MI				
					=	0.0127	>	6.0 ✓								

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LEVEL LOOP NO. 4

FOIT-ALBERT ASSOCIATES

Loop 4

PROJECT / 6001.30 2015 2016		DATUM	UNITS	INSTRUMENT: LEICA DINA03		DATE	WEATHER	P.C.	INST.	ROD	SHEET
P.L.N.		11/01/83	FT	SERIAL NO.: 333205		12-14-16	25° WINDY	mm	SD	57	1 OF 1
TURN	3 WIRE BS	BS (+)	HI	3 WIRE FS	FS (-)	ELEV.	ADJ. ELEV.	DESCRIPTION		DISTANCE +	-
	6.204	5.062	461.2995					CBP 1. RBR WITH ALUM CAP		108.50	
	5.662					458.6375					
	5.119										
TP-1	2.164 1.782 1.402	1.782	457.3765				455.5945 455.5941				107.10
TP-2	9.895	9.450	457.4655					CBP 1. "D" CALIBRATED SURT IN SOUTH EAST CORNER OF CONCRETE PAD		76.20	
	9.450					448.0155					
	9.019										
TP-3	9.668 9.135 8.602	9.135	460.4405							87.60	
						455.2655					
TP-4		ACTUAL MISCLOSURE						CBP 1 - RBR WITH ALUM CAP		108.50	
						458.6365					
		ACTUAL MISCLOSURE						0.001 / 4 = ±0.00025 TURN		378.9	379.2
		ACTUAL MISCLOSURE								758.1	FT
		ACTUAL MISCLOSURE						=		0.1436	MI

LEVEL LOOP NO. 5

100% 5

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LEVEL LOOP NO. 6

FOIT-ALBERT ASSOCIATES

[illegible]

LEVEL LOOP NO. 7

1000 7

[illegible]

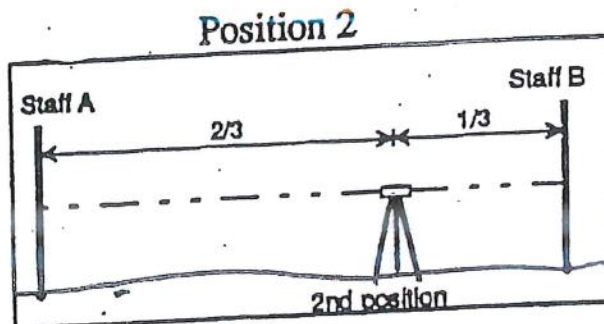
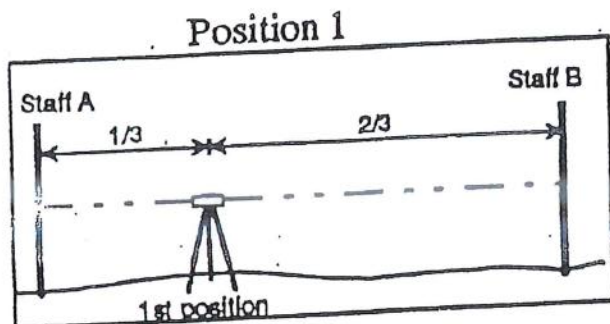
PEG TESTS



Foit-Albert Associates
Architecture, Engineering and Surveying, P.C.

OB 1600130 SITE 243
SHEET NO. _____ OF _____

CALCULATED BY JS DATE 12-6-16
CHECKED BY _____ DATE _____
SCALE _____



1ST SET-UP

A 4.600

B 5.190

Δ ELEV -0.590 ($A' - B'$)

DIFF 0.005' ✓

Δ COLLIMATION _____
ABSOLUTE COLLIMATION _____

CALCULATED ROD READING FOR CHECK @ A2 _____

ACTUAL ROD READING @ A2 (AFTER ELECTRONIC CALIBRATION) _____

2ND SET-UP

B 4.575

A 3.990

Δ ELEV 0.585 ($B^2 - A^2$)

DATE: 12-6-16

INST.: LEICA DNA-03

P.C.: JS

PROJECT: 16001.30 SITE 243

PER. NO.: _____

π : mm

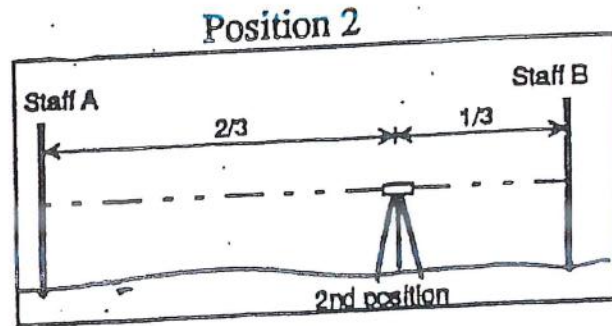
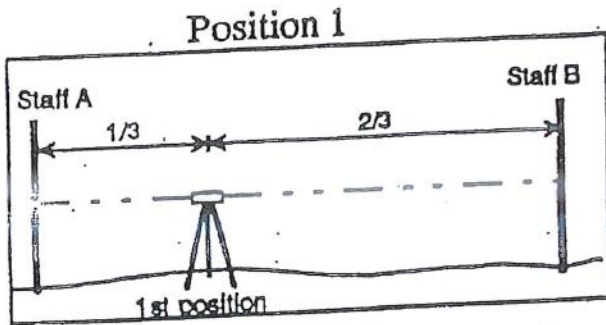
1 SD



Foit-Albert Associates
Architecture, Engineering and Surveying, P.C.

OB 16001.30 SITE 2+3
HEET NO. 1 OF 1

CALCULATED BY JS DATE 12-7-16
CHECKED BY _____ DATE _____
SCALE _____



1ST SET-UP

A 4.325

B 4.910

Δ ELEV 0.585 ($A' - B'$)

DIFF 0.005 ✓

A COLLIMATION _____
ABSOLUTE COLLIMATION _____

CALCULATED ROD READING FOR CHECK @ A2 _____

ACTUAL ROD READING @ A2 (AFTER ELECTRONIC CALIBRATION) _____

2ND SET-UP

B 4.315

A 3.725

Δ ELEV 0.590 ($B^2 - A^2$)

DATE: 12-7-16

INST.: LEICA DNA03

P.L.: JS

PROJECT: 16001.30 SITE 2+3 PER. NO.: _____

π : MM

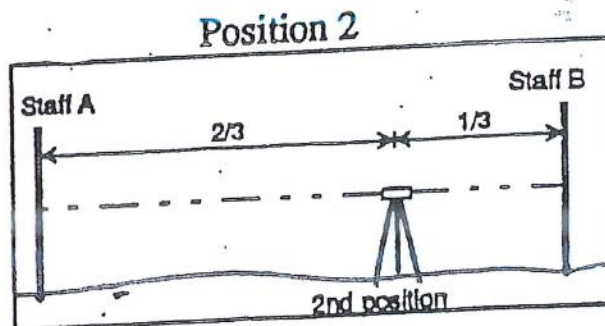
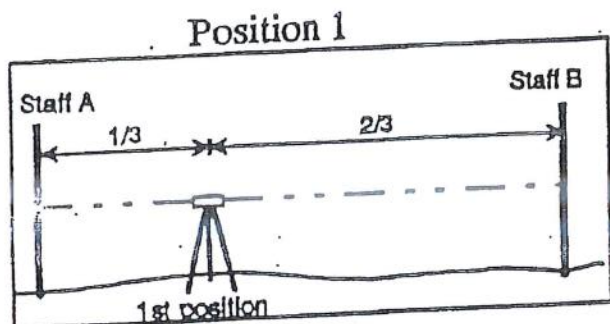
λ : SD



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Architecture, Engineering and Surveying, P.C.

OB 16001.30 SITE 2+3
HEET NO. _____ OF _____

CALCULATED BY MM DATE 12-14-16
CHECKED BY _____ DATE _____
SCALE _____



1ST SET-UP

A 3.648

B 5.045

Δ ELEV -1.397 ($A' - B'$)

DIFF -0.005 ✓

Δ COLLIMATION _____
ABSOLUTE COLLIMATION _____

CALCULATED ROD READINGS FOR CHECK @ A2 _____

ACTUAL ROD READINGS @ A2 (AFTER ELECTRONIC CALIBRATION) _____

CPBM 5

DATE: 12-14-16

INST.: LEICA DNA 03

P.L.: ID

PROJECT: 16001.30 SITE 2+3

PER. NO.: _____

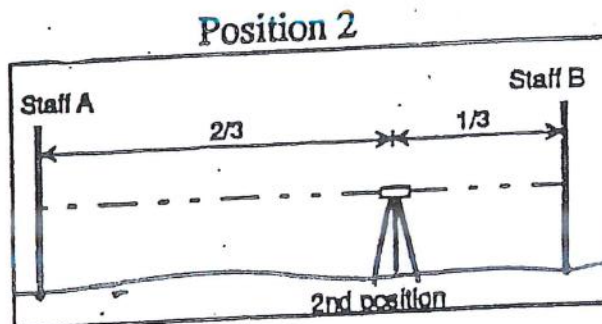
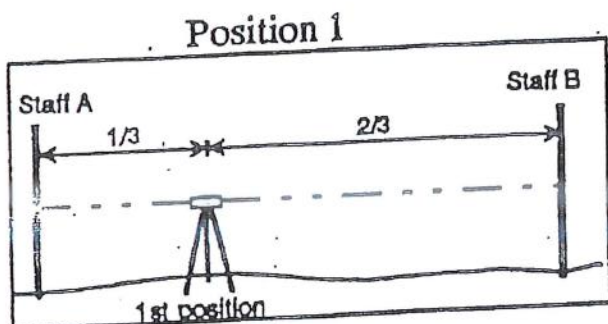
π : ARM



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OB 16001.30
SHEET NO. _____ OF _____

CALCULATED BY MM, JIC DATE 12-15-16
CHECKED BY 10° SNOW DATE _____
SCALE _____



1ST SET-UP

A 1.452
4.430

B 6.188

Δ ELEV -4.736 ($A' - B'$)

DIFF 0.000

Δ COLLIMATION _____
ABSOLUTE COLLIMATION _____

CALCULATED ROD READING FOR CHECK @ A2 _____

ACTUAL ROD READING @ A2 (AFTER ELECTRONIC CALIBRATION) _____

2ND SET-UP

B 5.041

A 0.305

Δ ELEV 4.736 ($B^2 - A^2$)

DATE: 12-15-16

INST.: LEICA DNA03

P.I.: MM

PROJECT: 16001.30

Per. No.: _____

π : JD

EQUIPMENT DATA SHEETS

TRIMBLE S6 TOTAL STATION

KEY FEATURES

Now available with Trimble VISION technology for video robotic control and scene documentation

Powerful and flexible, ready for anything

Trimble DR Plus technology for long range and superior accuracy

Unmatched fast and smooth performance with MagDrive servo technology

Trimble SurePoint accuracy assurance automatically corrects instrument pointing

POWERFUL AND FLEXIBLE

The Trimble® S6 Total Station provides the power and flexibility required by today's Surveying Professionals. With the industry's most advanced technology and available feature set, the Trimble S6 Total Station will meet the changing needs of your business, allowing your investment to go further.

TRIMBLE VISION TECHNOLOGY

Now available with optional Trimble VISION™ technology, the Trimble S6 gives you the power to see everything the instrument sees without a trip back to the tripod. Direct your survey with live video images on the controller. Now you are free to capture measurements, to prism or reflectorless surfaces, remotely, and with point-and-click efficiency.

The on-board camera integrates surveyed data with the live scene images, so you can verify the work that you've done before leaving the job site. Calibrated photo documentation provides customers with deliverables they know they can trust.

TRIMBLE DR PLUS TECHNOLOGY

Trimble DR Plus™ range measurement technology provides extended range of Direct Reflex measurement without a prism to exceptionally long range distances. Hard-to-reach or unsafe targets are no obstacle to the Trimble S6. Trimble DR Plus, combined with MagDrive™, creates unmatched capability for quick and safe measurements, without compromising on accuracy.

MAGDRIVE SERVO TECHNOLOGY

The Trimble S6 Total Station redefines surveying instrument performance with unsurpassed integration of servos, angle sensors and measurement technology. The instrument's advanced error compensation provides fast, accurate measurement every time. With smooth, silent MagDrive servo motors, the Trimble S6 offers exceptional speed.

TRIMBLE SUREPOINT ACCURACY ASSURANCE

The Trimble S6 Total Station aims and stays on target through windy weather, vibrations, handling, and sinkage. Trimble SurePoint™ technology enables the Trimble S6 to actively correct for unwanted movement ensuring accurate pointing and measurement every time. Reduce aiming error, avoid costly re-measurement and be confident in your results with Trimble SurePoint.

With its exclusive MultiTrack™ technology and Target ID capabilities, surveyors can choose the type of target, passive or active, that best suits the jobsite conditions and be confident that they will find and lock to the correct target.

ELIMINATE SEARCH TIME WITH GPS SEARCH

With GPS Search the Trimble S6 locks onto a prism in just seconds. Using a consumer grade GPS card with Bluetooth receiver or your survey grade GNSS in a Trimble I.S. rover configuration, GPS Search uses GPS positioning at the robotic rod to locate or reacquire targets rapidly. With GPS Search, waiting for target search becomes a thing of the past.

INTEGRATED SURVEYING

Put the equipment in your truck or van to the best possible use by combining your GNSS with your robotic rod into a Trimble I.S. Rover™. In clear sky, enjoy the high productivity of GNSS measurements. In obstructed areas, Trimble Access seamlessly switches to optical measurements. Or collect both GNSS and optical data simultaneously for redundant results. With the Trimble I.S. Rover, you have the freedom to use the best tool for the jobsite conditions, optimizing your productivity.



TRIMBLE S6 DR PLUS

PERFORMANCE

Angle measurement	Absolute encoder with diametrical reading
Sensor type	
Accuracy (Standard deviation based on DIN 18723)	.2" (0.6 mgon) 3" (1.0 mgon), or 5" (1.5 mgon)
Angle Display (least count)	0.1" (0.01 mgon)
Automatic level compensator	
Type	Centered dual-axis
Accuracy	0.5" (0.15 mgon)
Range	± 5.4' (±100 mgon)
Distance measurement	
Accuracy (RMSE)	
Prism mode	
Standard	2 mm + 2 ppm (0.0065 ft + 2 ppm)
Standard deviation according to ISO17123-4	1 mm + 2 ppm (0.003 ft + 2 ppm)
Tracking	4 mm + 2 ppm (0.013 ft + 2 ppm)
DR mode	
Standard	2 mm + 2 ppm (0.0065 ft + 2 ppm)
Tracking	4 mm + 2 ppm (0.013 ft + 2 ppm)
Measuring time	
Prism mode	
Standard	1.2 sec
Tracking	0.4 sec
DR mode	
Standard	1–5 sec
Tracking	0.4 sec
Range	
Prism mode (under standard clear conditions ^{1,2})	
1 prism	2500 m (8202 ft)
1 prism Long Range mode	5500 m (18,044 ft) (max. range)
Shortest range	0.2 m (0.65 ft)

DR mode

	Good (Good visibility, low ambient light)	Normal (Normal visibility, moderate sunlight, some heat shimmer)	Difficult (Haze, object in direct sunlight, turbulence)
White card (90% reflective) ³	1,300 m (4,265 ft)	1,300 m (4,265 ft)	1,200 m (3,937 ft)
Gray card (18% reflective) ³	600 m (1,969 ft)	600 m (1,969 ft)	550 m (1,804 ft)

Shortest range	1 m (3.28 ft)
DR Ranges (typically)	
Concrete	600 m–800 m (1968–2624 ft)
Wood construction	400 m–800 m (1312–2624 ft)
Metal construction	400 m–500 m (1312–1640 ft)
Light rock	400 m–600 m (1312–1968 ft)
Dark rock	300 m–400 m (984–1312 ft)
Reflective foil 20 mm	1000 m (3280 ft)
DR Extended Range Mode	
White Card (90% reflective) ³	2000 m–2200 m
Gray Card (18% reflective) ³	900 m–1000 m
Accuracy	10 mm + 2 ppm (0.033 ft + 2 ppm)
Camera	
Chip	Color Digital Image Sensor
Resolution	2048 x 1536 pixels
Focal length	23 mm (0.07 ft)
Depth of field	3 m to infinity (9.84 ft to infinity)
Field of view	16.5° x 12.3° (18.3 gon x 13.7 gon)
Digital zoom	4-step (1x, 2x, 4x, 8x)
Exposure	Automatic
Brightness	User-definable
Contrast	User-definable
Image storage	Up to 2048 x 1536 pixels
File format	JPEG

GENERAL SPECIFICATIONS

EDM SPECIFICATIONS

Light source	Pulsed laserdiode 905 nm, Laser class 1
Laser pointer coaxial (standard)	Laser class 2
Beam divergence	
Horizontal	4 cm/100 m (0.13 ft/328 ft)
Vertical	8 cm/100 m (0.26 ft/328 ft)
Atmospheric correction	~130 ppm to 160 ppm continuously

Leveling	
Circular level in tribrach	8'/2 mm (8'/0.007 ft)
Servo system	MagDrive servo technology, integrated servo/angle sensor electromagnetic direct drive
Rotation speed	115 degrees/sec (128 gon/sec)
Rotation time Face 1 to Face 2	2.6 sec
Positioning time 180 degrees (200 gon)	2.6 sec
Clamps and slow motions	Servo-driven, endless fine adjustment
Centering	
Centering system	Trimble 3-pin
Optical plummet	Built-in optical plummet
Magnification/shortest focusing distance	2.3x/0.5 m-infinity (1.6 ft-infinity)
Telescope	
Magnification	30x
Aperture	40 mm (1.57 in)
Field of view at 100 m (328 ft)	2.6 m at 100 m (8.5 ft at 328 ft)
Shortest focusing distance	1.5 m (4.92 ft)-infinity
Illuminated crosshair	Variable (10 steps)
Tracklight built in	Not available in all models
Operating temperature	-20 °C to +50 °C (-4 °F to +122 °F)
Dust and water proofing	IP55
Humidity	100% condensing
Power supply	
Internal battery	Rechargeable Li-Ion battery 11.1 V, 5.0 Ah
Operating time ⁴	
One internal battery	Approx. 6.5 hours
Three internal batteries in multi-battery adapter	Approx. 20 hours
Robotic holder with one internal battery	13.5 hours
Operating time for video robotic ⁴	
One battery	5.5 hours
Three batteries in multi-battery adapter	17 hours
Weight	
Instrument (servo/Autolock)	5.15 kg (11.35 lb)
Instrument (Robotic)	5.25 kg (11.57 lb)
Trimble CU controller	0.4 kg (0.88 lb)
Tribrach	0.7 kg (1.54 lb)
Internal battery	0.35 kg (0.77 lb)
Trunnion axis height	196 mm (7.71 in)
Communication	USB, Serial, Bluetooth ^{®5}
Security	Dual-layer password protection; available on some models

TRIMBLE S6 TOTAL STATION

ROBOTIC SURVEYING

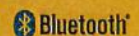
Autolock and Robotic Range ²	
Passive prisms	500 m–700 m (1,640–2,297 ft)
Trimble MultiTrack Target	800 m (2,625 ft)
Autolock pointing precision at 200 m (656 ft) (Standard deviation) ²	
Passive prisms	<2 mm (0.007 ft)
Trimble MultiTrack Target	<2 mm (0.007 ft)
Shortest search distance	0.2 m (0.65 ft)
Type of radio internal/external	2.4 GHz frequency-hopping, spread-spectrum radios
Search time (typical) ⁶	2–10 sec

GPS SEARCH/GEOLOCK WITH THE TRIMBLE MULTITRACK TARGET

GPS Search/GeoLock	360 degrees (400 gon) or defined horizontal and vertical search window
Solution acquisition time ⁷	15–30 sec
Target re-acquisition time	<3 sec
Range	Autolock & Robotic range limits

- 1 Standard clear: No haze. Overcast or moderate sunlight with very light heat shimmer.
- 2 Range and accuracy depend on atmospheric conditions, size of prisms and background radiation.
- 3 Kodak Gray Card, Catalog number E1527795.
- 4 The capacity in –20 °C (–5 °F) is 75% of the capacity at +20 °C (68 °F).
- 5 Bluetooth type approvals are country specific. Contact your local Trimble Authorized Distribution Partner for more information.
- 6 Dependent on selected size of search window.
- 7 Solution acquisition time is dependent upon solution geometry and GPS position quality.

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Specifications subject to change without notice

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TRIMBLE AUTHORIZED DISTRIBUTION PARTNER



DATASHEET

TRIMBLE R8 GNSS RECEIVER

KEY FEATURES

Advanced Trimble R-Track technology

Unmatched GNSS tracking performance

Includes Trimble Maxwell 6 chip with 220 channels

Remote configuration and access

Base and rover communications options to suit any application



The Trimble® R8 GNSS Receiver sets the new standard for full-featured GNSS (Global Navigation Satellite System) receiver technology. This integrated system delivers unmatched power, accuracy and performance in a rugged, compact unit.

ADVANCED TRIMBLE R-TRACK TECHNOLOGY

The Trimble R8 GNSS delivers the latest advancements in R-Track™ technology, designed to deliver reliable, precise positioning performance. In challenging areas for GNSS surveying, such as tree cover or limited sky view, Trimble R-Track provides unmatched tracking performance of GNSS satellite signals.

Trimble R-Track with Signal Prediction™ compensates for intermittent or marginal RTK correction signals, enabling extended precision operation after an RTK signal is interrupted.

The new CMRx communications protocol provides unprecedented correction compression for optimized bandwidth and full utilization all of the satellites in view, giving you the most reliable positioning performance.

Featuring the Trimble Maxwell™ 6 chip, the Trimble R8 GNSS advances the industry with more memory and more GNSS channels. Trimble delivers business confidence with a sound GNSS investment for today and into the future.

Broad GNSS Support

The Trimble R8 GNSS supports a wide range of satellite signals, including GPS L2C and L5 and GLONASS L1/L2 signals. In addition, Trimble is committed to the next generation of modernized GNSS configurations by providing Galileo-compatible products available for customers well in advance of Galileo system availability^{1,2}. In support of this plan, the new Trimble R8 GNSS is capable of tracking the experimental GIOVE-A and GIOVE-B test satellites for signal evaluation and test purposes.

FLEXIBLE SYSTEM DESIGN

The Trimble R8 GNSS receiver combines the most comprehensive feature set into an integrated and flexible system for demanding surveying applications. The Trimble R8 GNSS includes a built-in transmit/receive UHF radio,

enabling ultimate flexibility for rover or base operation. As a base station, the internal NTRIP caster provides you with customized access³ to base station corrections via the internet.

Trimble's exclusive, Web UI™ eliminates travel requirements for routine monitoring of base station receivers. Now you can assess the health and status of base receivers and perform remote configurations from the office. Likewise, you can download post-processing data through Web UI and save additional trips out to the field.

ENABLING THE CONNECTED SITE

Pair the speed and accuracy of the Trimble R8 GNSS receiver with flexibility and collaboration tools of Trimble Access™ software. Trimble Access brings field and office teams closer by enabling data sharing and collaboration in a secure, web-based environment. With optional streamlined workflows, Trimble Access further empowers surveyors and survey teams for success. Now it is easier than ever to realize the potential of the Trimble Connected Site. Connecting the right tools, techniques, services and relationships enables surveying businesses to achieve more every day.

¹ Galileo Commercial Authorization Receiver technology having Galileo capability to operate in the Galileo frequency bands and using information from the Galileo system for future operational satellites is restricted in the publicly available Galileo Open Service Signal-In-Space Interface Control Document (GAL OS SIS ICD) and is not currently authorized for commercial use.

Receiver technology that tracks the GIOVE-A and GIOVE-B test satellites uses information that is unrestricted in the public domain in the GIOVE A + B Navigation Signal-In-Space Interface Control Document. Receiver technology having developmental GIOVE-A and B capability is intended for signal evaluation and test purposes.

² For more information about Trimble and GNSS modernization, please visit http://www.trimble.com/srv_new_era.shtml.

³ Cellular modem required.



TRIMBLE R8 GNSS RECEIVER

PERFORMANCE SPECIFICATIONS

Measurements

- Trimble R-Track technology
- Advanced Trimble Maxwell 6 Custom Survey GNSS chip with 220 channels
- High precision multiple correlator for GNSS pseudorange measurements
- Unfiltered, unsmoothed pseudorange measurements data for low noise, low multipath error, low time domain correlation and high dynamic response
- Very low noise GNSS carrier phase measurements with <1 mm precision in a 1 Hz bandwidth
- Signal-to-Noise ratios reported in dB-Hz
- Proven Trimble low elevation tracking technology
- Satellite signals tracked simultaneously:
 - GPS: L1C/A, L2C, L2E (Trimble method for tracking L2P), L5
 - GLONASS: L1C/A, L1P, L2C/A (GLONASS M only), L2P
 - SBAS: L1C/A, L5
 - Galileo GIOVE-A and GIOVE-B

Code differential GNSS positioning¹

Horizontal..... 0.25 m + 1 ppm RMS
 Vertical..... 0.50 m + 1 ppm RMS
 WAAS differential positioning accuracy²..... typically <5 m 3DRMS

Static and FastStatic GNSS surveying¹

Horizontal..... 3 mm + 0.1 ppm RMS
 Vertical..... 3.5 mm + 0.4 ppm RMS

Kinematic surveying¹

Horizontal..... 10 mm + 1 ppm RMS
 Vertical..... 20 mm + 1 ppm RMS
 Initialization time³..... typically <10 seconds
 Initialization reliability⁴..... typically >99.9%

HARDWARE

Physical

Dimensions (WxH)..... 19 cm x 11.2 cm (7.5 in x 4.4 in), including connectors
 Weight..... 1.34 kg (2.95 lb) with internal battery, internal radio, standard UHF antenna.
 3.70 kg (8.16 lb) entire RTK rover including batteries, range pole, controller and bracket

Temperature⁵

Operating..... -40 °C to +65 °C (-40 °F to +149 °F)

Storage..... -40 °C to +75 °C (-40 °F to +167 °F)

Humidity..... 100%, condensing

Water/dustproof..... IP67 dustproof, protected from temporary immersion to depth of 1 m (3.28 ft)

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Shock and vibration..... Tested and meets the following environmental standards:

Shock..... Non-operating: Designed to survive a 2 m (6.6 ft) pole drop onto concrete. Operating: to 40 G, 10 msec, sawtooth
 Vibration..... MIL-STD-810F, FIG.514.5C-1

Electrical

- Power 11 to 28 V DC external power input with over-voltage protection on Port 1 (7-pin Lemo)
- Rechargeable, removable 7.4 V, 2.4 Ah Lithium-Ion battery in internal battery compartment. Power consumption is 3.2 W, in RTK rover mode with internal radio. Operating times on internal battery:
 - 450 MHz receive only option..... 5.8 hours⁷
 - 450 MHz receive/transmit option..... 3.7 hours⁸
 - GSM/GPRS..... 4.1 hours⁷
- Certification Class B Part 15, 22, 24 FCC certification, 850/1900 MHz. Class 10 GSM/GPRS module. CE Mark approval, and C-tick approval

Communications and Data Storage

- 3-wire serial (7-pin Lemo) on Port 1. Full RS-232 serial on Port 2 (Dsub 9 pin)
- Fully integrated, fully sealed internal 450 MHz receiver/transmitter option:
 - Transmit power: 0.5 W
 - Range⁶: 3–5 km typical / 10 km optimal
- Fully integrated, fully sealed internal GSM/GPRS option⁷
- Fully integrated, fully sealed 2.4 GHz communications port (Bluetooth®)⁹
- External cellphone support for GSM/GPRS/CDPD modems for RTK and VRS operations
- Data storage on 57 MB internal memory: 40.7 days of raw observables (approx. 1.4 MB / Day), based on recording every 15 seconds from an average of 14 satellites
- 1 Hz, 2 Hz, 5 Hz, 10 Hz, and 20 Hz positioning
- CMR+, CMRx, RTCM 2.1, RTCM 2.3, RTCM 3.0, RTCM 3.1 Input and Output
- 16 NMEA outputs, GSO, RT17 and RT27 outputs. Supports BINEX and smoothed carrier

1 Accuracy and reliability may be subject to anomalies due to multipath, obstructions, satellite geometry, and atmospheric conditions. Always follow recommended survey practices.

2 Depends on WAAS/EGNOS system performance.

3 May be affected by atmospheric conditions, signal multipath, obstructions and satellite geometry.

4 May be affected by atmospheric conditions, signal multipath, and satellite geometry. Initialization reliability is continuously monitored to ensure highest quality.

5 Receiver will operate normally to -40 °C. Internal batteries are rated to -20 °C.

6 Varies with terrain and operating conditions.

7 Varies with temperature.

8 Varies with temperature and wireless data rate.

9 Bluetooth type approvals are country specific. Contact your local Trimble Authorized Distribution Partner for more information.

Specifications subject to change without notice.



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www.trimble.com

LEICA digital levels at a glance

Technical data	LEICA DNA03	LEICA DNA10
Area of use	<ul style="list-style-type: none"> – Quick measurements of heights, height differences and stake outs – I. and II. order levelling – Precision measurements 	<ul style="list-style-type: none"> – Quick measurements of heights, height differences and stake outs – Cadastral levelling – Technical levelling
Accuracy	Standard deviation height measurement per 1km double-run (ISO 17123-2)	
Electronic measurements: with Invar staffs	0.3mm	0.9mm
with standard staffs	1.0mm	1.5mm
Optical measurements	2.0mm	2.0mm
Standard deviation distance measurement (electr.)	1cm/20m (500ppm)	
Range		
Electronic measurement	1.8m – 110m	
Optical measurement	from 0.6m	
Electronic measurement		
Resolution height measurement	0.01mm, 0.0001ft, 0.0005inch	0.1mm, 0.001ft
Time for single measurement	typically 3 seconds	
Measurement modes	Single, average, median, repeated single measurements	
Measurement programs	Measure & Record, staff height/distance BF, aBF, BFFB, aBFFB	
Coding	Remark, Free code, Quick code	
Data storage		
Internal memory	6000 measurements or 1650 station	
Backup	PCMCIA card (ATA-Flash/SRAM) SRAM compatible with Omnidrive MCR4	
Online operations	GSI format via RS232	
Data exchange internal memory	GSI8/GSI16/XML/flexible formats	
Telescope magnification	24x	
Compensator		
Type	Pendulum compensator with magnetic damping	
Slope range	±10'	
Compensator setting accuracy	0.3"	0.8"
Display	LCD, 8 lines at 24 characters	
Battery operated		
GEB111	12h operation	
GEB121	24h operation	
Battery adapter GAD39	Alkaline battery, 6x LR6/AA/AM3, 1.5V	
Weight	2.8kg (incl. battery GEB111)	
Environmental conditions		
Working temperature	–20°C to +50°C	
Storage temperature	–40°C to +70°C	
Dust/water (IEC60529)	IP53	
Humidity	95%, non condensing	



Total Quality Management
is our commitment to total
customer satisfaction.

For more information about
our TQM program, ask
your local Leica Geosystems
agent.

Leica
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729342en – X.02 – RDV

Certificate Of Calibration

Calibration Date: 3/4/2016

Instrument Model: Trimble S6

Serial Number: 93010506

Technician: George Scott

Next Due Date: 3/4/2017

**KEYSTONE
PRECISION
INSTRUMENTS**

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1-800-833-9250

WWW.KEYPRE.COM

Before:

X/H: 0.0019g

Y/V: -77.6066g

H: -0.0008g

V: -77.6139g

Vial: ✓

EDM: ✓

Radio: ✓

After:

X/H: 0.0018g

Y/V: -77.6081g

H: -0.0004g

V: -77.6104g

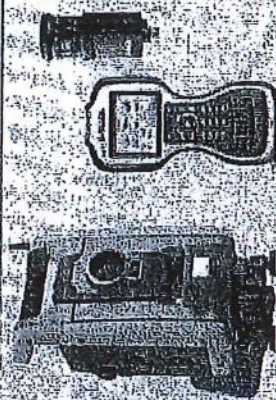
Angles / Axis:

Autolock:

O.P: ✓

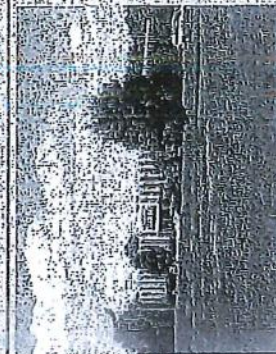
This certificate confirms that the above instrument has been inspected, calibrated and is working within the manufacturer's specifications by

The calibration of this instrument is guaranteed to be within product specifications when the unit leaves Keystone Precision Instruments. Neither Keystone Precision Instruments or representative will assume liability incurred during use of this unit should unit lose calibration.



Trimble

Preferred Service Provider



COMPUTER FILES

D214386
New York State Thruway Authority
Design Phase I-IV, Replacement of 8 Syracuse Division Bridges
Mainline EB, WB Bridge over County Road 53 (BIN 5516072)
Mile Post 225.48 – 225.49 in the Syracuse Division
Herkimer County

List of Computer Files

D214386_map_surv_base_site 2-3_3D.dgn
D214386_map_surv_points_site 2-3_3D.dgn
D214386_map_surv_dtm_site 2-3_3D.dgn
D214386_map_surv_text_site 2-3_2D.dgn
D214386_map_surv_control_site 2-3_3D.dgn
D214386_map_surv_bridge deck_site 2-3.dtm
D214386_map_surv_existing ground_site 2-3.dtm
D214386_dat_surv_site 2-3.fwd

List of Field Files

1600130SITE2-3.csv
1600130SITE2-3A.csv
1600130SITE2-3B.csv
1600130SITE2-3C.csv
1600130SITE2-3D.csv
1600130SITE2-3E.csv
1600130SITE2-3F.csv
1600130SITE2-3G.csv
1600130SITE2-3H.csv
1600130SITE2-3RA.rw5
1600130SITE2-3RB.rw5
1600130SITE2-3RC.rw5
1600130SITE2-3RD.rw5
1600130SITE2-3RE.rw5
1600130SITE2-3RF.rw5
1600130SITE2-3RG.rw5