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Sewall partners with clients to create practical, sustainable solutions.*

Ground Control Report

Ground Control Quality & Blind Check Points for the Coastal Northeast LiDAR project

State of Connecticut Project – Western Portion

USGS Task Order G10PD02143 and G10PD01027

Prepared for:
Photo Science, Inc.

2 March 2011



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Control Survey Report

**Western Connecticut Ground Control Quality & Blind Check Points
For the Northeast LiDAR Project
Task Order No.: G10PD02143 and G10PD01027
US Geological Survey
1400 Independence Road
Rolla, Missouri 65401**

James W. Sewall Company was contracted by Photo Science, Inc. to locate a total of 24 quality assurance check points for this project. These points were divided into the following point designations: 3 BDR's, 13 BP's, 5 DXR'S, and 3 HPN's. These points were located on relatively flat terrain on surfaces that generally consisted of grass, gravel or bare earth.

Field work was conducted by three staff surveyors from December 2010 to January 2011 with Topcon dual-frequency survey grade GPS receivers to locate the check points. Static sessions lasting a minimum of twenty minutes were conducted. A published control point was located during the course of the day to serve as a check. GPS session log sheets were filled out and photos taken of each point which accompany this report.

The data was submitted to NGS using the OPUS-RS utility. A sample of the data was post processed in Trimble Geomatics Office against the nearest Continuously Operating Reference Station (CORS) to check the OPUS-RS results.

The horizontal coordinates are Universal Transverse Mercator (UTM) coordinate system Zones 18; units are in meters, and the datum is the North American Datum of 1983 (NAD83). Vertical data is in the North American Vertical Datum of 1988 (NAVD88) Geoid09.



Ground Control Report Coastal Northeast LiDAR Project Connecticut

GPS Control Survey Results

- 1.0 Coordinate Summary and Overview Map Location
- 2.0 Field Data Sheets & OPUR RS Solution Reports
- 3.0 Published Control Locations



1.0 Coordinate Summary
 and Overview Map

Control Summary

Project Number: 75980S - Connecticut
 Project Name: Photo Science Inc - NE Lidar Project - BDR data
 Horizontal Datum: UTM NAD83 (Zone 18)
 Vertical Datum: NAVD 88 (GEOID09)
 Units: Meters
 Date: January 25, 2011

Station	Easting (X)	Northing (Y)	Elevation	Description
BDR8	639906.089	4558123.363	65.778	Control Point
BDR9	656603.532	4562319.264	11.656	Control Point
BDR10	648437.019	4571136.021	114.436	Control Point

Published Control Summary

Station	Easting (X)	Northing (Y)	Elevation	Name
CT02	660722.862	4577336.531	11.364	CT02
851 8091	611223.495	4535740.017	7.519	851 8091 A Tidal

- Notes:
- Coordinates and elevations were derived from our GPS observations using OPUS RS processing and also Topcon Tools.
 - Datum and unit conversions performed using Corpscon v.6.0.1 software.

Control Summary

Project Number: 75980S - Connecticut
 Project Name: Photo Science Inc - NE Lidar Project - BP data
 Horizontal Datum: UTM NAD83 (Zone 18)
 Vertical Datum: NAVD 88 (GEOID09)
 Units: Meters
 Date: January 25, 2011

Station	Easting (X)	Northing (Y)	Elevation	Description
BP1	610127.662	4550322.409	154.451	Control Point
BP2	615928.939	4543284.455	40.057	Control Point
BP3	629398.490	4546696.686	0.997	Control Point
BP4	640023.864	4553110.186	5.495	Control Point
BP5	630995.793	4566378.334	154.481	Control Point
BP6	633771.656	4578971.859	199.355	Control Point
BP7	645747.052	4577795.147	126.758	Control Point
BP8	642716.771	4570512.746	125.017	Control Point
BP9	648804.252	4560309.205	13.770	Control Point
BP10	654275.993	4570477.483	105.927	Control Point
BP18	650804.036	4571734.955	146.017	Control Point
BP19	626201.177	4555459.855	78.784	Control Point
BP20	641650.517	4562544.027	92.930	Control Point

Published Control Summary

Station	Easting (X)	Northing (Y)	Elevation	Name
CT02	660722.862	4577336.531	11.364	CT02
851 8091	611223.495	4535740.017	7.519	851 8091 A Tidal

- Notes:
- Coordinates and elevations were derived from our GPS observations using OPUS RS processing and also Topcon Tools.
 - Datum and unit conversions performed using Corpscon v.6.0.1 software.

Control Summary

Project Number: 75980S - Connecticut
 Project Name: Photo Science Inc - NE Lidar Project - DXR data
 Horizontal Datum: UTM NAD83 (Zone 18)
 Vertical Datum: NAVD 88 (GEOID09)
 Units: Meters
 Date: January 25, 2011

Station	Easting (X)	Northing (Y)	Elevation	Description
DXR11	648842.393	4576560.123	182.225	Control Point
DXR12	632482.961	4579541.188	117.854	Control Point
DXR13	628495.261	4564626.863	163.717	Control Point
DXR14	640769.968	4567527.132	69.553	Control Point
DXR15	637820.675	4573665.009	214.862	Control Point

Published Control Summary

Station	Easting (X)	Northing (Y)	Elevation	Name
CT02	660722.862	4577336.531	11.364	CT02
851 8091	611223.495	4535740.017	7.519	851 8091 A Tidal

- Notes:
- Coordinates and elevations were derived from our GPS observations using OPUS RS processing and also Topcon Tools.
 - Datum and unit conversions performed using Corpscon v.6.0.1 software.

Control Summary

Project Number: 75980S - Connecticut
 Project Name: Photo Science Inc - NE Lidar Project - HPN data
 Horizontal Datum: UTM NAD83 (Zone 18)
 Vertical Datum: NAVD 88 (GEOID09)
 Units: Meters
 Date: January 25, 2011

Station	Easting (X)	Northing (Y)	Elevation	Description
HPN5	612030.818	4546576.602	83.100	Control Point
HPN6	617689.471	4556085.282	107.359	Control Point
HPN7	634612.881	4551653.624	17.410	Control Point

Published Control Summary

Station	Easting (X)	Northing (Y)	Elevation	Name
CT02	660722.862	4577336.531	11.364	CT02
851 8091	611223.495	4535740.017	7.519	851 8091 A Tidal

- Notes:
- Coordinates and elevations were derived from our GPS observations using OPUS RS processing and also Topcon Tools.
 - Datum and unit conversions performed using Corpscon v.6.0.1 software.





2.0 Field Data Sheets,
OPUS RS Solution Reports &
TGO Processing

Offices nationwide
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136 Center Street
P.O. Box 433
Old Town, Maine 04468

207 827 4456
fax: 207 827 3647
800 648 4202

JOB REFERENCE
NE Lidar

POINT ID: HPN 5
Proj. No.: 75980S

STATE CT

COUNTY Fairfield

LOCATION: Greenwich

OPERATOR P Messier

GENERAL GPS CONTROL POINT LOCATION

RECEIVER MODEL TOPCON HIPER GD

LATITUDE N 41-03-45.8

RECEIVER S/N 272-0788

LONGITUDE W 073-39-59.98

HGT. MTS 83.10

ANTENNA INFO

RADIUS (M)

SESSION

C

DATE: 01/20/11

Antenna Serial #

DAY OF YEAR 020

Antenna Type

START TIME 09:34

U.T.C.

END TIME 09:55

X LOCAL

ANTENNA HEIGHT (SLANT)

Collection Rate

5 SECONDS

MTRS/FT

MEASURED **FIXED HGT.**

ANTENNA HEIGHT (ARP)

TOP OF MONUMENT IS: X FLUSH

MTRS/FT 1.5 Meters

MTRS/FEET ABOVE GROUND

MEASURED X **FIXED HGT**

MTRS/FEET BELOW GROUND

DESCRIPTION

Point marked by flagging

AERIAL TARGET

PHOTO I.D.

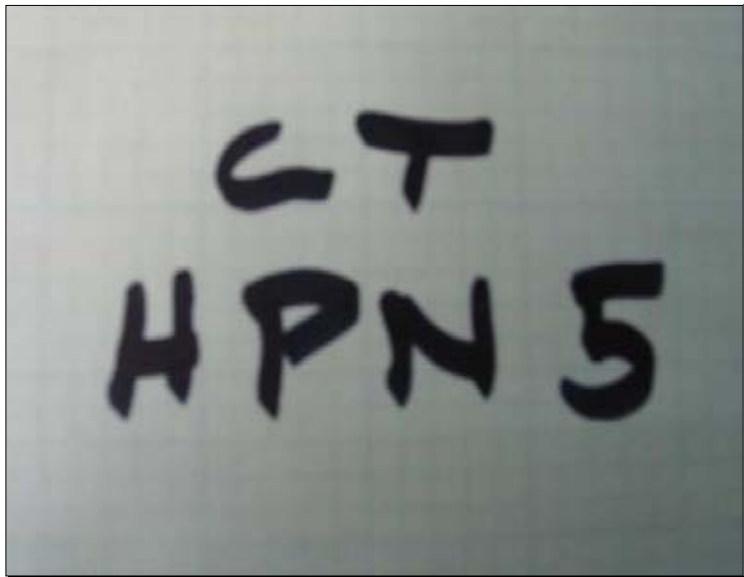
PUB. BENCH MARK

X **NEW CONTROL**

PUB. CONTROL

NATURAL

PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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JOB REFERENCE
NE Lidar

POINT ID: HPN 6
Proj. No.: 75980S

STATE CT

COUNTY Fairfield

LOCATION: Stamford

OPERATOR P Messier

GENERAL GPS CONTROL POINT LOCATION

RECEIVER MODEL TOPCON HIPER GD

LATITUDE N 41-08-51.2

RECEIVER S/N 272-0788

LONGITUDE W 073-35-51.0

ANTENNA INFO

SESSION
E

DATE: 01/20/11
DAY OF YEAR 020

RADIUS (M)
Antenna Serial #
Antenna Type

START TIME 11:35
END TIME 12:00

U.T.C.
 LOCAL

ANTENNA HEIGHT (SLANT)

Collection Rate
5 SECONDS

MTRS/FT
 MEASURED FIXED HGT.

ANTENNA HEIGHT (ARP)

TOP OF MONUMENT IS: FLUSH
MTRS/FEET ABOVE GROUND
MTRS/FEET BELOW GROUND

MTRS/FT 1.5 Meters
 MEASURED X FIXED HGT

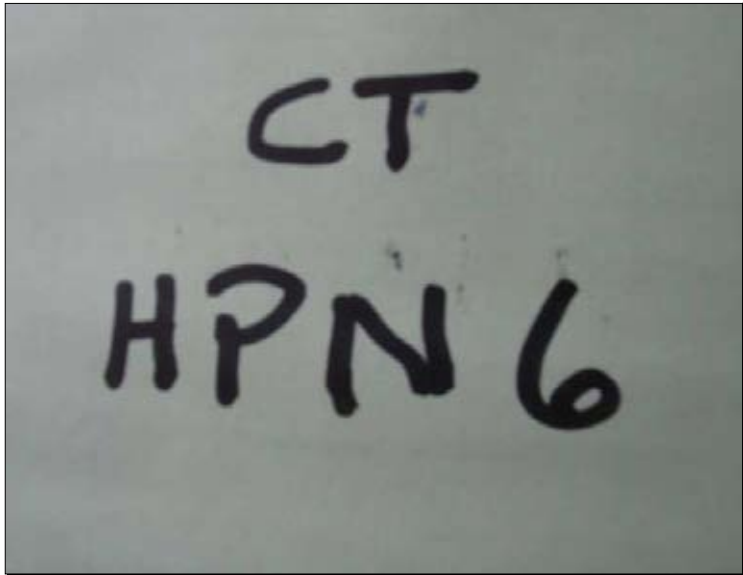
DESCRIPTION

Point marked with flagging

AERIAL TARGET
PUB. BENCH MARK
PUB. CONTROL

PHOTO I.D.
 NEW CONTROL
NATURAL

PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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JOB REFERENCE
NE Lidar

POINT ID: HPN 7
Proj. No.: 75980S

STATE CT

COUNTY Fairfield

LOCATION: Norwalk

OPERATOR P Messier

GENERAL GPS CONTROL POINT LOCATION

RECEIVER MODEL TOPCON HIPER GD

LATITUDE N 41-06-18.1

RECEIVER S/N 272-0788

LONGITUDE W 073-23-48.8

HGT. MTS 17.41

ANTENNA INFO

RADIUS (M)

Antenna Serial #

Antenna Type

SESSION
H

DATE: 01/20/11
DAY OF YEAR 020

START TIME 14:15
END TIME 14:35

U.T.C.
 LOCAL

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED **FIXED HGT.**

Collection Rate
5 SECONDS

ANTENNA HEIGHT (ARP)

MTRS/FT 1.5 Meters

MEASURED **FIXED HGT**

TOP OF MONUMENT IS: **FLUSH**

MTRS/FEET **ABOVE GROUND**

MTRS/FEET **BELOW GROUND**

DESCRIPTION

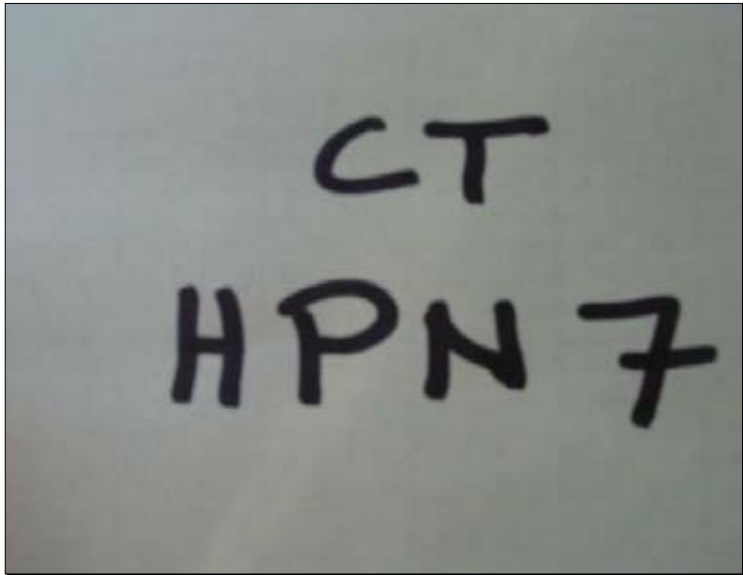
Point marked by flagging

AERIAL TARGET **PHOTO I.D.**

PUB. BENCH MARK **NEW CONTROL**

PUB. CONTROL **NATURAL**

PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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JOB REFERENCE
NE Lidar

POINT ID: BDR 8
Proj. No.: 75980S

STATE CT

COUNTY Fairfield

LOCATION: Westport

OPERATOR E Jellison

GENERAL GPS CONTROL POINT LOCATION

RECEIVER MODEL TOPCON HIPER GD

LATITUDE N 41-09-44.6

RECEIVER S/N 272-0515

LONGITUDE W 073-19-56.6

ANTENNA INFO

SESSION

DATE: 01/21/11

RADIUS (M)

B

DAY OF YEAR 021

Antenna Serial #

Antenna Type

START TIME 08:27

U.T.C.

END TIME 08:47

X LOCAL

ANTENNA HEIGHT (SLANT)

MTRS/FT

Collection Rate

MEASURED **FIXED HGT.**

5 SECONDS

ANTENNA HEIGHT (ARP)

MTRS/FT 2.0 Meters

MEASURED **X** **FIXED HGT**

TOP OF MONUMENT IS: X FLUSH

MTRS/FEET ABOVE GROUND

MTRS/FEET BELOW GROUND

DESCRIPTION

Point in baseball field

AERIAL TARGET

PHOTO I.D.

PUB. BENCH MARK

X NEW CONTROL

PUB. CONTROL

NATURAL

PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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JOB REFERENCE
NE Lidar

POINT ID: BDR 9
Proj. No.: 75980S

STATE CT

COUNTY Fairfield

LOCATION: Stratford

OPERATOR E Jellison

GENERAL GPS CONTROL POINT LOCATION

RECEIVER MODEL TOPCON HIPER GD

LATITUDE N 41-11-49.6

RECEIVER S/N 272-0515

LONGITUDE W 073-07-56.6

ANTENNA INFO

RADIUS (M)

Antenna Serial #

Antenna Type

SESSION

I

DATE: 01/20/11
DAY OF YEAR 020

START TIME 15:34
END TIME 15:55

U.T.C.
 LOCAL

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED **FIXED HGT.**

Collection Rate

5 **SECONDS**

ANTENNA HEIGHT (ARP)

MTRS/FT 2.0 Meters

MEASURED **FIXED HGT**

TOP OF MONUMENT IS: **FLUSH**

MTRS/FEET **ABOVE GROUND**

MTRS/FEET **BELOW GROUND**

DESCRIPTION

Point in lawn

AERIAL TARGET

PUB. BENCH MARK

PUB. CONTROL

PHOTO I.D.

NEW CONTROL

NATURAL

PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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JOB REFERENCE
NE Lidar

POINT ID: BDR 10
Proj. No.: 75980S

STATE CT

COUNTY Fairfield

LOCATION: Trumbull

OPERATOR E Jellison

GENERAL GPS CONTROL POINT LOCATION

RECEIVER MODEL TOPCON HIPER GD

LATITUDE N 41-16-40.9

RECEIVER S/N 272-0515

LONGITUDE W 073-13-39.3

HGT. MTS 114.44

ANTENNA INFO

SESSION
H

DATE: 01/20/11
DAY OF YEAR 020

RADIUS (M)
Antenna Serial #
Antenna Type

START TIME 14:41
END TIME 15:07

U.T.C.
 LOCAL

ANTENNA HEIGHT (SLANT)

Collection Rate
5 SECONDS

MTRS/FT
 MEASURED FIXED HGT.

ANTENNA HEIGHT (ARP)

TOP OF MONUMENT IS: FLUSH
 ABOVE GROUND
 BELOW GROUND

MTRS/FT 2.0 Meters
 MEASURED X FIXED HGT

DESCRIPTION

Point in lawn

AERIAL TARGET
 PUB. BENCH MARK
 PUB. CONTROL

PHOTO I.D.
 NEW CONTROL
 NATURAL

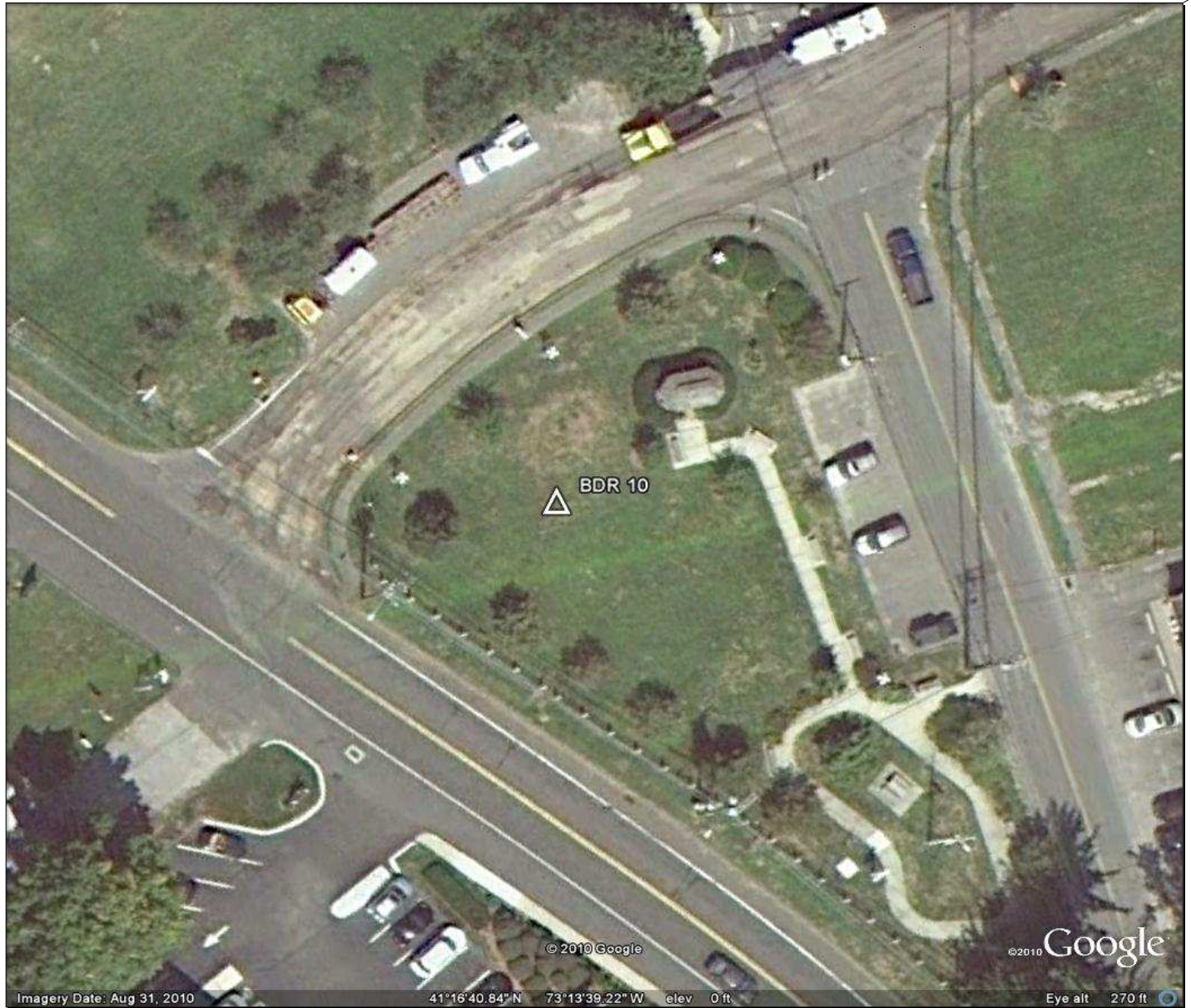
PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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JOB REFERENCE
NE Lidar

POINT ID: DXR 11
Proj. No.: 75980S

STATE: CT **COUNTY:** Fairfield **LOCATION:** Monroe Town

OPERATOR: E Jellison

GENERAL GPS CONTROL POINT LOCATION

RECEIVER MODEL: TOPCON HIPER GD
RECEIVER S/N: 272-0515

LATITUDE	N 41-19-36.4	HGT. MTS	
LONGITUDE	W 073-13-17.1		182.20

ANTENNA INFO

RADIUS (M)

Antenna Serial #

Antenna Type

SESSION
D

DATE: 01/20/11
DAY OF YEAR: 020

START TIME: 11:13
END TIME: 11:36

U.T.C.
 LOCAL

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED **FIXED HGT.**

Collection Rate
5 SECONDS

ANTENNA HEIGHT (ARP)

MTRS/FT 2.0 Meters

MEASURED **FIXED HGT**

TOP OF MONUMENT IS: **FLUSH**

MTRS/FEET **ABOVE GROUND**

MTRS/FEET **BELOW GROUND**

DESCRIPTION

Point in lawn in front of church

AERIAL TARGET

PUB. BENCH MARK

PUB. CONTROL

PHOTO I.D.

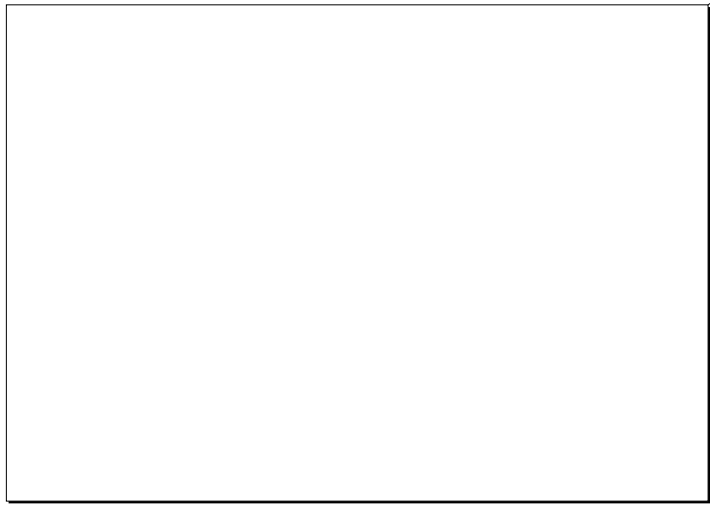
NEW CONTROL

NATURAL

PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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JOB REFERENCE
NE Lidar

POINT ID: DXR 12
Proj. No.: 75980S

STATE CT

COUNTY Fairfield

LOCATION: Bethel

OPERATOR E Jellison

GENERAL GPS CONTROL POINT LOCATION

RECEIVER MODEL TOPCON HIPER GD

LATITUDE N 41-21-23.3

RECEIVER S/N 272-0515

LONGITUDE W 073-24-58.3

ANTENNA INFO

SESSION
A

DATE: 01/20/11
DAY OF YEAR 020

RADIUS (M)
Antenna Serial #
Antenna Type

START TIME 07:26
END TIME 07:55

U.T.C.
 LOCAL

ANTENNA HEIGHT (SLANT)
MTRS/FT
MEASURED **FIXED HGT.**

Collection Rate
5 **SECONDS**

ANTENNA HEIGHT (ARP)
MTRS/FT 2.0 Meters
MEASURED **FIXED HGT**

TOP OF MONUMENT IS: **FLUSH**
MTRS/FEET **ABOVE GROUND**
MTRS/FEET **BELOW GROUND**

DESCRIPTION

Point at Bethel cemetery

AERIAL TARGET
PUB. BENCH MARK
PUB. CONTROL

PHOTO I.D.
 NEW CONTROL
NATURAL

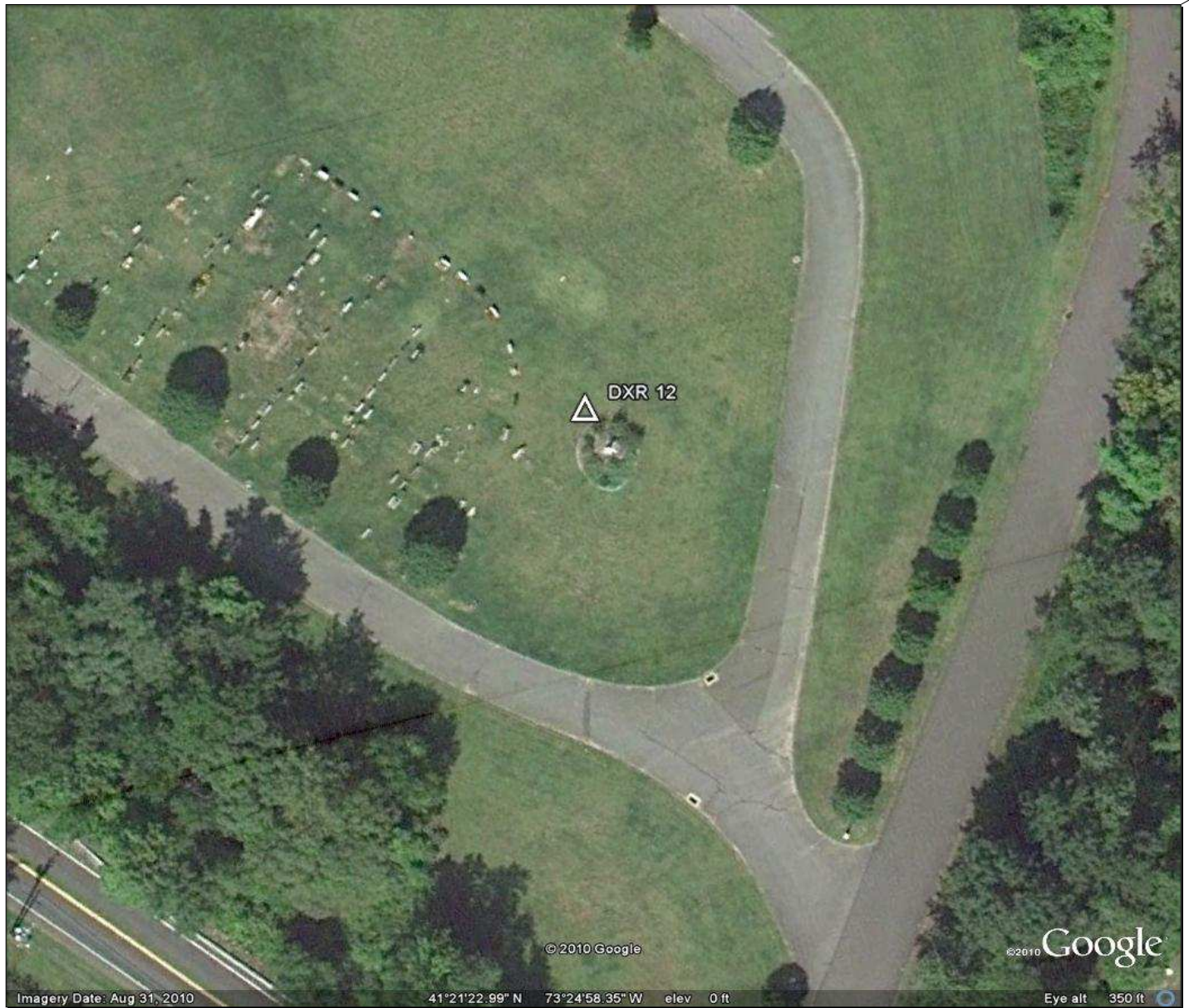
PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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JOB REFERENCE
NE Lidar

POINT ID: DXR 13
Proj. No.: 75980S

STATE CT

COUNTY Fairfield

LOCATION: Wilton

OPERATOR P Messier

GENERAL GPS CONTROL POINT LOCATION

RECEIVER MODEL TOPCON HIPER GD

LATITUDE N 41-13-22.2

LONGITUDE W 073-28-01.2

HGT. MTS

163.72

RECEIVER S/N 272-0788

ANTENNA INFO

RADIUS (M)

Antenna Serial #

Antenna Type

SESSION

J

DATE: 01/20/11

DAY OF YEAR 020

START TIME 15:51

END TIME 16:12

U.T.C.

LOCAL X

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED **FIXED HGT.**

Collection Rate

5 SECONDS

ANTENNA HEIGHT (ARP)

MTRS/FT 1.5 Meters

MEASURED X **FIXED HGT**

TOP OF MONUMENT IS: X FLUSH

MTRS/FEET ABOVE GROUND

MTRS/FEET BELOW GROUND

DESCRIPTION

Point marked by flagging

AERIAL TARGET

PUB. BENCH MARK

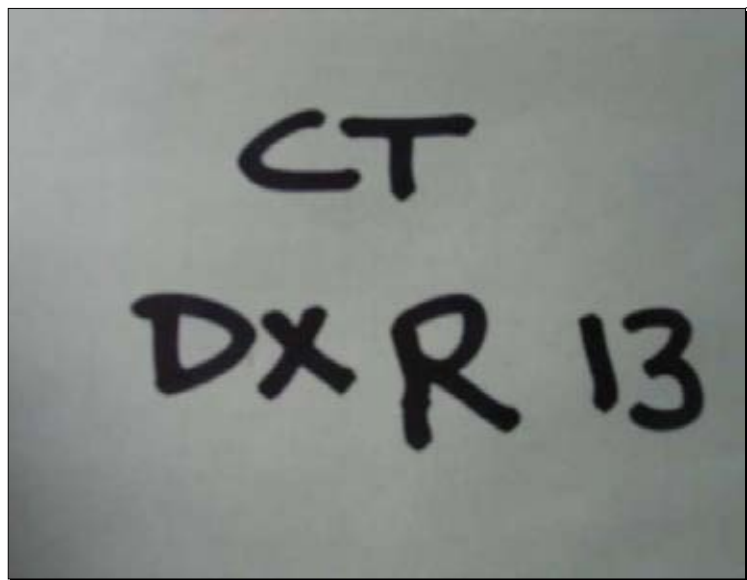
PUB. CONTROL

PHOTO I.D.

X **NEW CONTROL**

NATURAL

PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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JOB REFERENCE
NE Lidar

POINT ID: DXR 14
Proj. No.: 75980S

STATE CT

COUNTY Fairfield

LOCATION: Easton

OPERATOR E Jellison

GENERAL GPS CONTROL POINT LOCATION

LATITUDE	N 41-14-48.85	HGT. MTS	
LONGITUDE	W 073-19-11.77		69.55

RECEIVER MODEL TOPCON HIPER GD

RECEIVER S/N 272-0515

ANTENNA INFO

RADIUS (M)	
Antenna Serial #	
Antenna Type	

SESSION
K

DATE: 01/20/11
DAY OF YEAR 020

START TIME 17:23
END TIME 17:47

U.T.C.
 LOCAL

ANTENNA HEIGHT (SLANT)

MTRS/FT	
<input type="checkbox"/> MEASURED	<input type="checkbox"/> FIXED HGT.

Collection Rate
5 SECONDS

ANTENNA HEIGHT (ARP)

MTRS/FT	2.0 Meters
<input type="checkbox"/> MEASURED	<input checked="" type="checkbox"/> X FIXED HGT

TOP OF MONUMENT IS:	<input checked="" type="checkbox"/> X	FLUSH
MTRS/FEET		ABOVE GROUND
MTRS/FEET		BELOW GROUND

DESCRIPTION

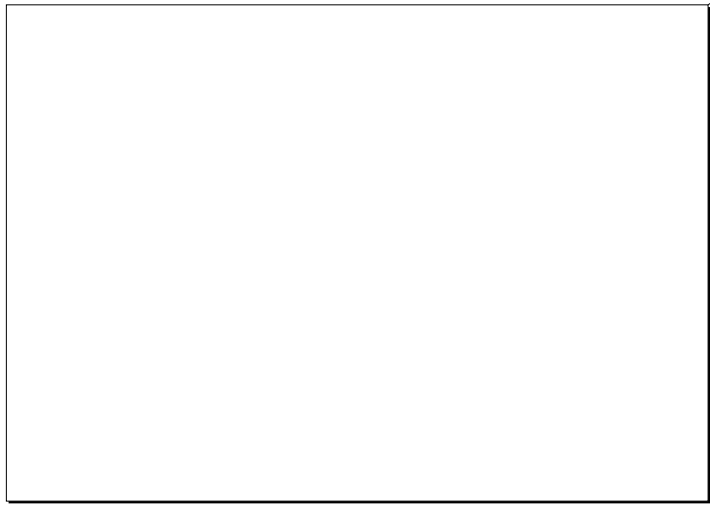
Point in lawn near resevoir

<input type="checkbox"/>	AERIAL TARGET	<input type="checkbox"/>	PHOTO I.D.
<input type="checkbox"/>	PUB. BENCH MARK	<input checked="" type="checkbox"/> X	NEW CONTROL
<input type="checkbox"/>	PUB. CONTROL	<input type="checkbox"/>	NATURAL

PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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Imagery Date: Aug 31, 2010

41°14'48.66" N 73°19'11.69" W elev 0 ft

Eye alt 450 ft

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FIELD DATA SHEET**

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JOB REFERENCE
NE Lidar

POINT ID: DXR 15
Proj. No.: 75980S

STATE CT

COUNTY Fairfield

LOCATION: Redding

OPERATOR P Messier

GENERAL GPS CONTROL POINT LOCATION

RECEIVER MODEL TOPCON HIPER GD

LATITUDE N 41-18-09.64

RECEIVER S/N 272-0788

LONGITUDE W 073-21-13.44

HGT. MTS 214.86

ANTENNA INFO

RADIUS (M)

Antenna Serial #

Antenna Type

SESSION
K

DATE: 01/20/11
DAY OF YEAR 020

START TIME 16:45
END TIME 17:04

U.T.C.
 LOCAL

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED **FIXED HGT.**

Collection Rate
5 SECONDS

ANTENNA HEIGHT (ARP)

MTRS/FT 1.5 Meters

MEASURED **FIXED HGT**

TOP OF MONUMENT IS: **FLUSH**

MTRS/FEET **ABOVE GROUND**

MTRS/FEET **BELOW GROUND**

DESCRIPTION

Point marked w/ flagging

AERIAL TARGET

PUB. BENCH MARK

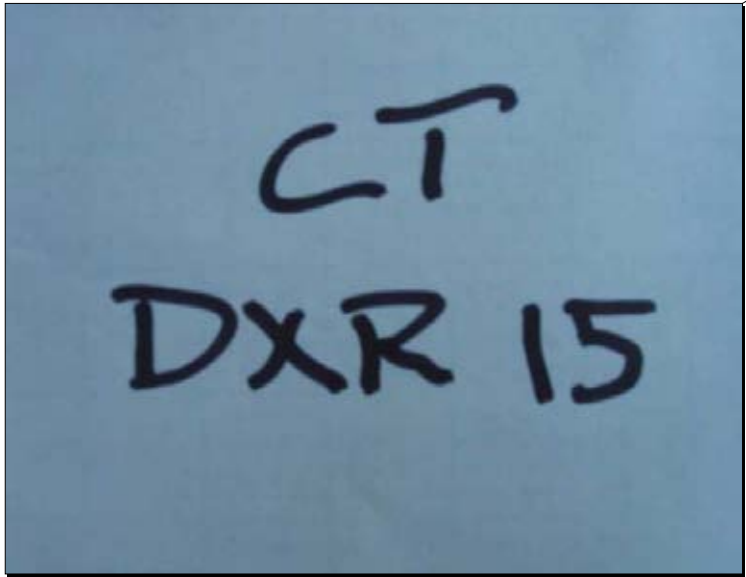
PUB. CONTROL

PHOTO I.D.

NEW CONTROL

NATURAL

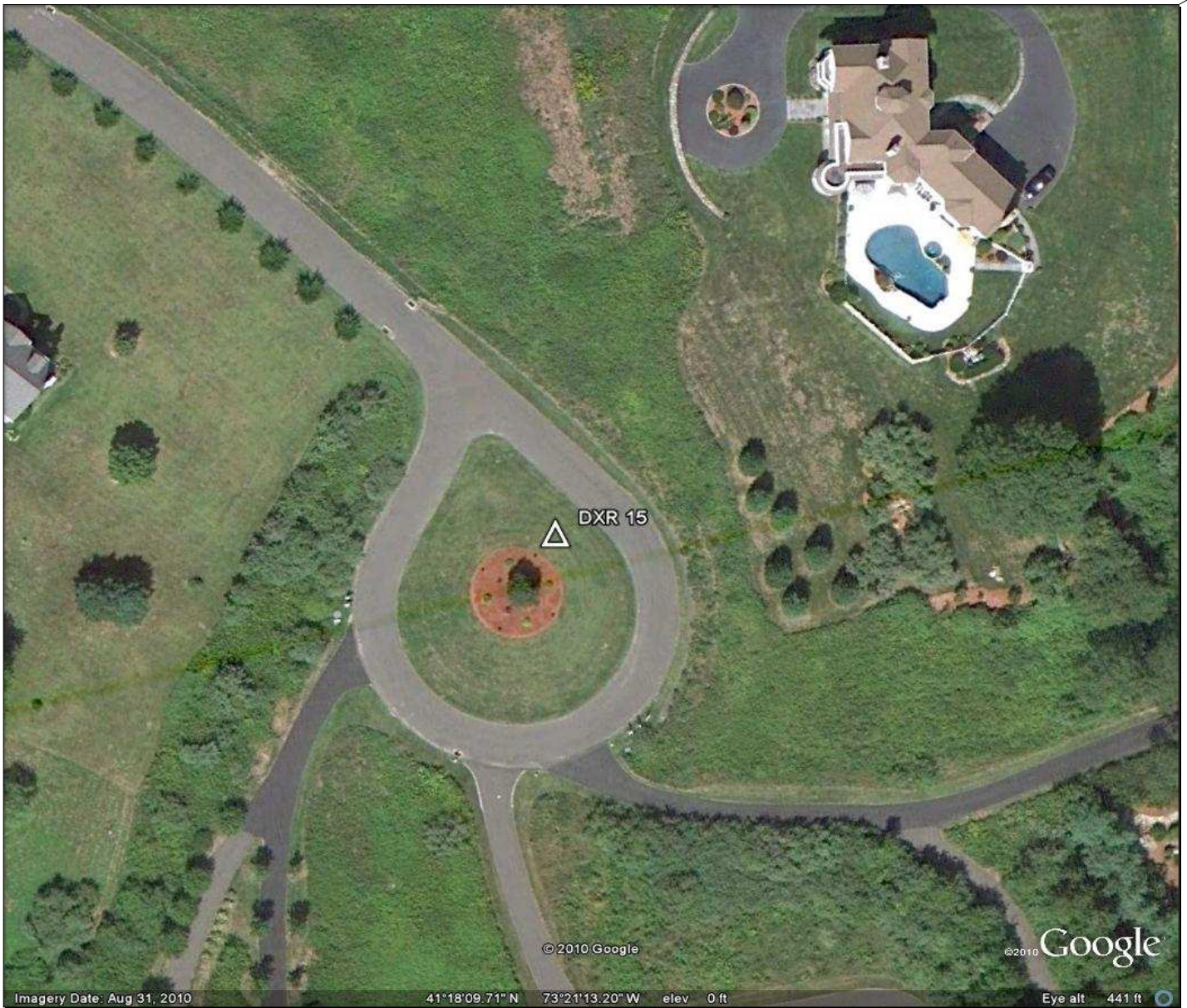
PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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sewall.com

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800 648 4202

JOB REFERENCE
NE LIDAR

POINT ID: CT BP 1
Proj. No.: 75980S

STATE: Connecticut **COUNTY:** Fairfield **LOCATION:** Greenwich

OPERATOR: P Messier

GPS OBSERVATIONS

RECEIVER MODEL: TOPCON HIPER GD

LATITUDE: N 41-05-48.2 **HGT. MTS:**

RECEIVER S/N: 272-0788

LONGITUDE: W 073-41-19.1 154.45

ANTENNA INFO

SESSION:
D

DATE: 01/20/11
DAY OF YEAR: 020

RADIUS (M):
Antenna Serial #:
Antenna Type:

START TIME: 10:34
END TIME: 10:55

U.T.C.:
 LOCAL:

ANTENNA HEIGHT (SLANT)
MTRS/FT:
 MEASURED **FIXED HGT.**

Collection Rate:
5 SECONDS

ANTENNA HEIGHT (ARP)
MTRS/FT: 1.5 Meters
 MEASURED **FIXED HGT**

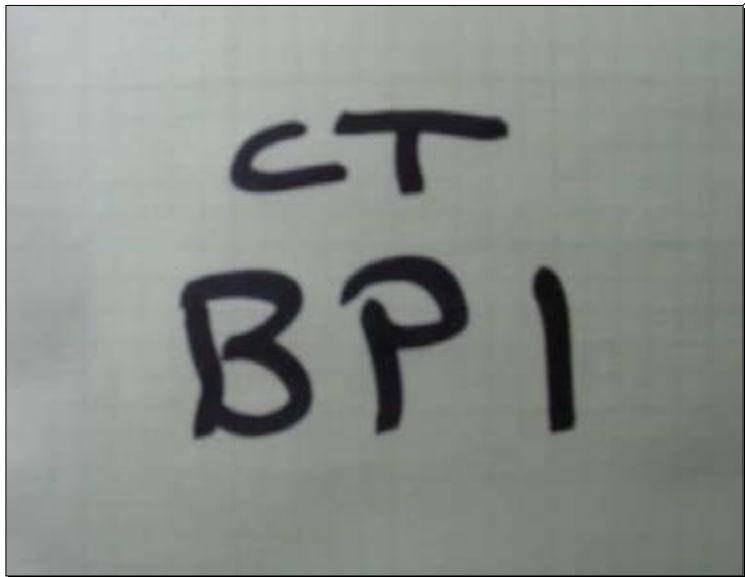
TOP OF MONUMENT IS: **FLUSH**
MTRS/FEET: ABOVE GROUND
MTRS/FEET: BELOW GROUND

DESCRIPTION

Point marked by flagging

AERIAL TARGET **PHOTO I.D.**
 PUB. BENCH MARK **NEW CONTROL**
 PUB. CONTROL **NATURAL**

PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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fax: 207 827 3641
800 648 4202

JOB REFERENCE
NE LIDAR

POINT ID: CT BP 2
Proj. No.: 75980S

STATE Connecticut

COUNTY Fairfield

LOCATION: Greenwich

OPERATOR P Messier

GPS OBSERVATIONS

LATITUDE	N 41-01-57.1	HGT. MTS	
LONGITUDE	W 073-37-15.2		40.06

RECEIVER MODEL TOPCON HIPER GD

RECEIVER S/N 272-0788

ANTENNA INFO

SESSION

DATE: 01/20/11

RADIUS (M)

B

DAY OF YEAR 020

Antenna Serial #

START TIME 08:42

U.T.C.

Antenna Type

END TIME 09:04

X LOCAL

ANTENNA HEIGHT (SLANT)

Collection Rate

MTRS/FT

5 SECONDS

MEASURED FIXED HGT.

ANTENNA HEIGHT (ARP)

TOP OF MONUMENT IS: X FLUSH

MTRS/FT

1.5 Meters

MTRS/FEET ABOVE GROUND

MEASURED X FIXED HGT

MTRS/FEET BELOW GROUND

DESCRIPTION

Point marked by flagging

AERIAL TARGET

PHOTO I.D.

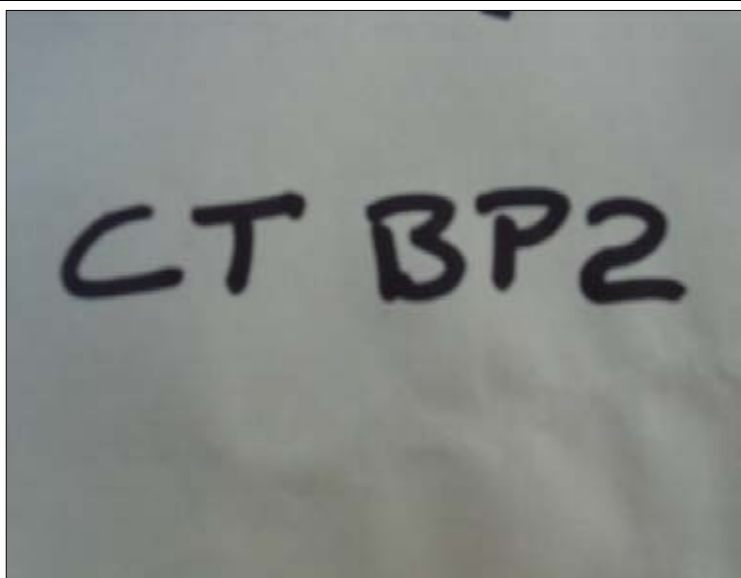
PUB. BENCH MARK

X NEW CONTROL

PUB. CONTROL

NATURAL

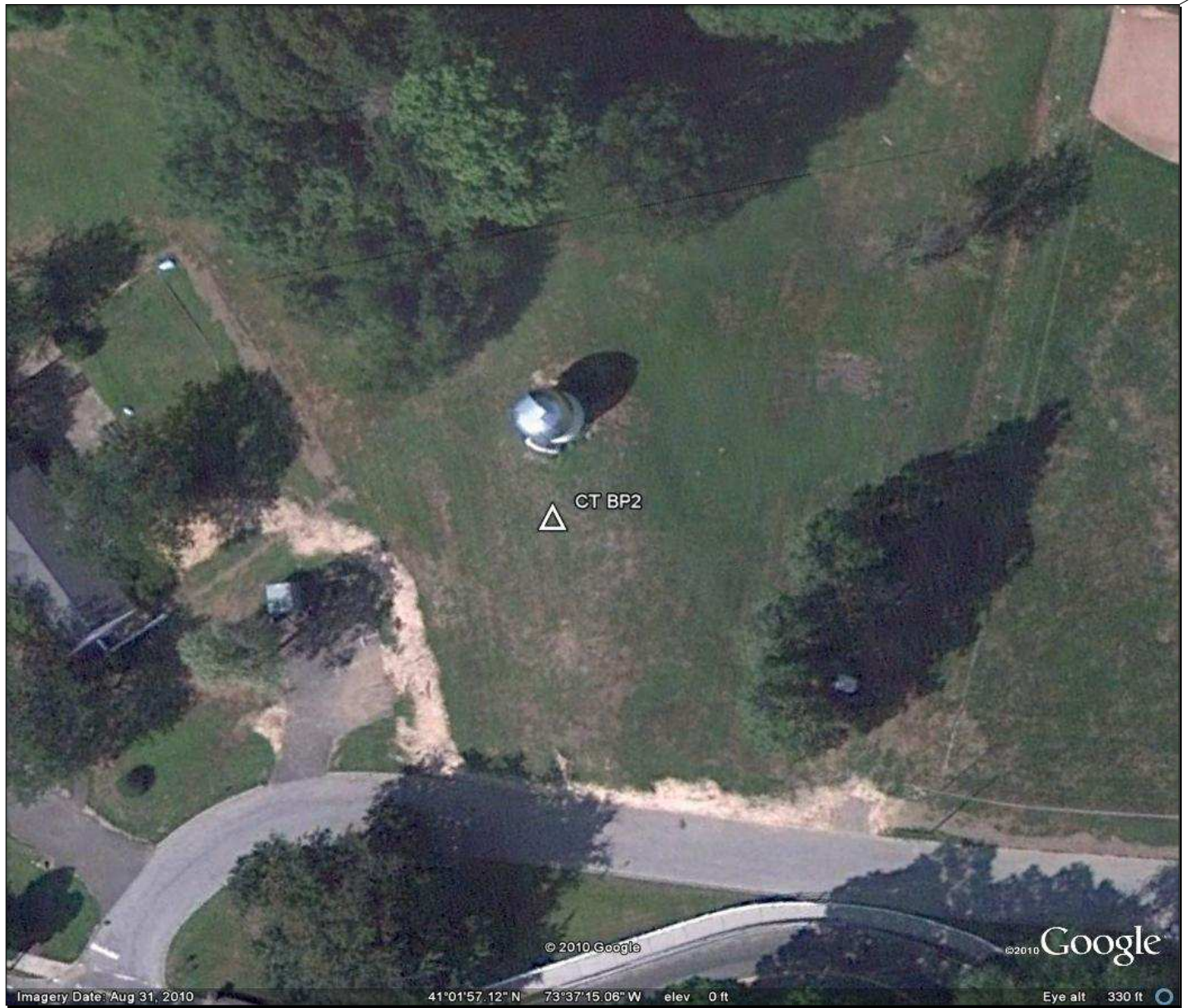
PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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JOB REFERENCE
NE LIDAR

POINT ID: CT BP 3
Proj. No.: 75980S

STATE: Connecticut **COUNTY:** Fairfield **LOCATION:** Darien

OPERATOR: P Messier

GPS OBSERVATIONS

RECEIVER MODEL: TOPCON HIPER GD

LATITUDE: N 41-03-40.4 **HGT. MTS:**

RECEIVER S/N: 272-0788

LONGITUDE: W 073-27-36.0 **1.00**

ANTENNA INFO

SESSION:
G

DATE: 01/20/11
DAY OF YEAR: 020

RADIUS (M):
Antenna Serial #:
Antenna Type:

START TIME: 13:24
END TIME: 13:44

U.T.C.:
 LOCAL

ANTENNA HEIGHT (SLANT)
MTRS/FT:
 MEASURED **FIXED HGT.**

Collection Rate:
5 **SECONDS**

ANTENNA HEIGHT (ARP)
MTRS/FT: 1.5 Meters
 MEASURED **FIXED HGT**

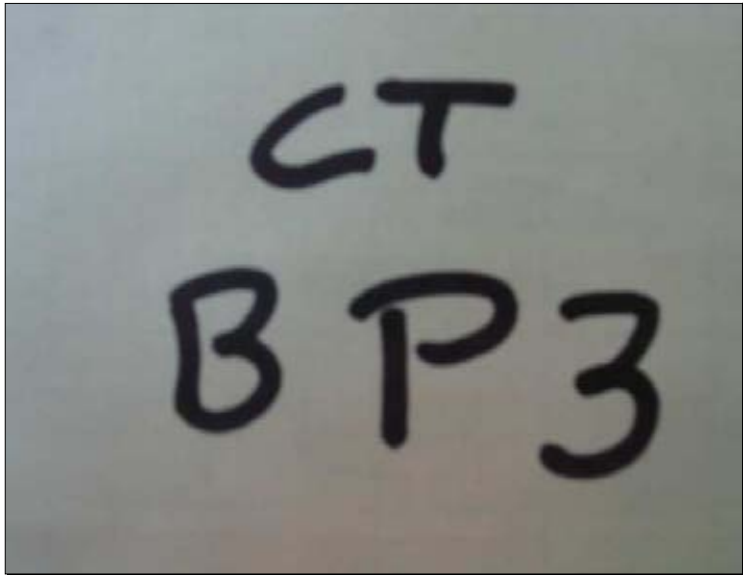
TOP OF MONUMENT IS: **FLUSH**
 ABOVE GROUND
 BELOW GROUND

DESCRIPTION

Point marked by flagging

AERIAL TARGET **PHOTO I.D.**
 PUB. BENCH MARK **NEW CONTROL**
 PUB. CONTROL **NATURAL**

PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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JOB REFERENCE
NE LIDAR

POINT ID: CT BP 4
Proj. No.: 75980S

STATE Connecticut **COUNTY** Fairfield **LOCATION:** Westport

OPERATOR E Jellison

GPS OBSERVATIONS

RECEIVER MODEL TOPCON HIPER GD
RECEIVER S/N 272-0515

LATITUDE	N 41-07-01.99	HGT. MTS	
LONGITUDE	W 073-19-55.69		5.50

ANTENNA INFO

RADIUS (M)

Antenna Serial #

Antenna Type

SESSION
A

DATE: 01/21/11
DAY OF YEAR 021

START TIME 07:45
END TIME 08:05

U.T.C.
 LOCAL

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED **FIXED HGT.**

Collection Rate
5 SECONDS

ANTENNA HEIGHT (ARP)

MTRS/FT 2.0 Meters

MEASURED **FIXED HGT**

TOP OF MONUMENT IS: **FLUSH**

MTRS/FEET ABOVE GROUND

MTRS/FEET BELOW GROUND

DESCRIPTION

Point in island at Sherwood state park

AERIAL TARGET

PUB. BENCH MARK

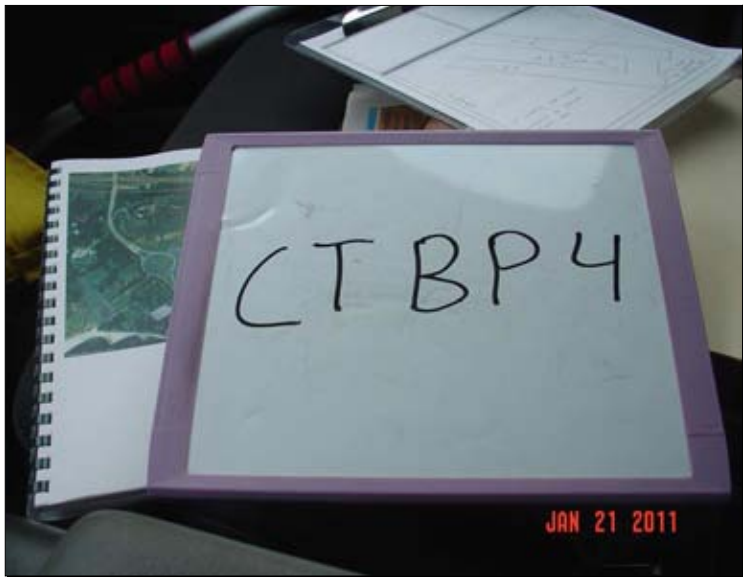
PUB. CONTROL

PHOTO I.D.

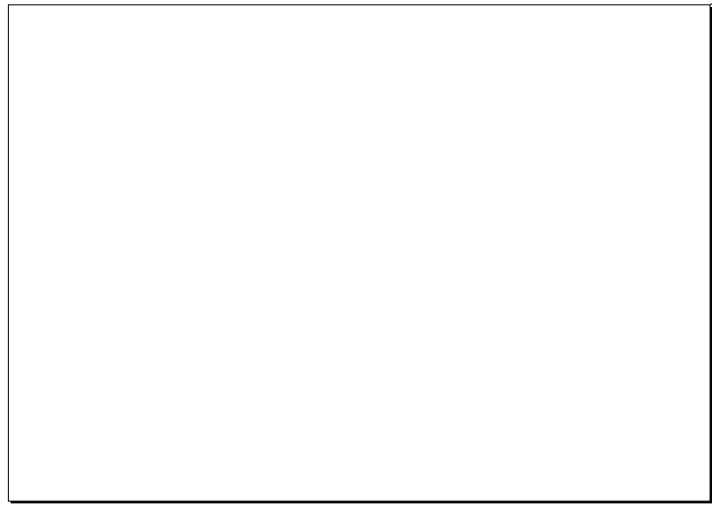
NEW CONTROL

NATURAL

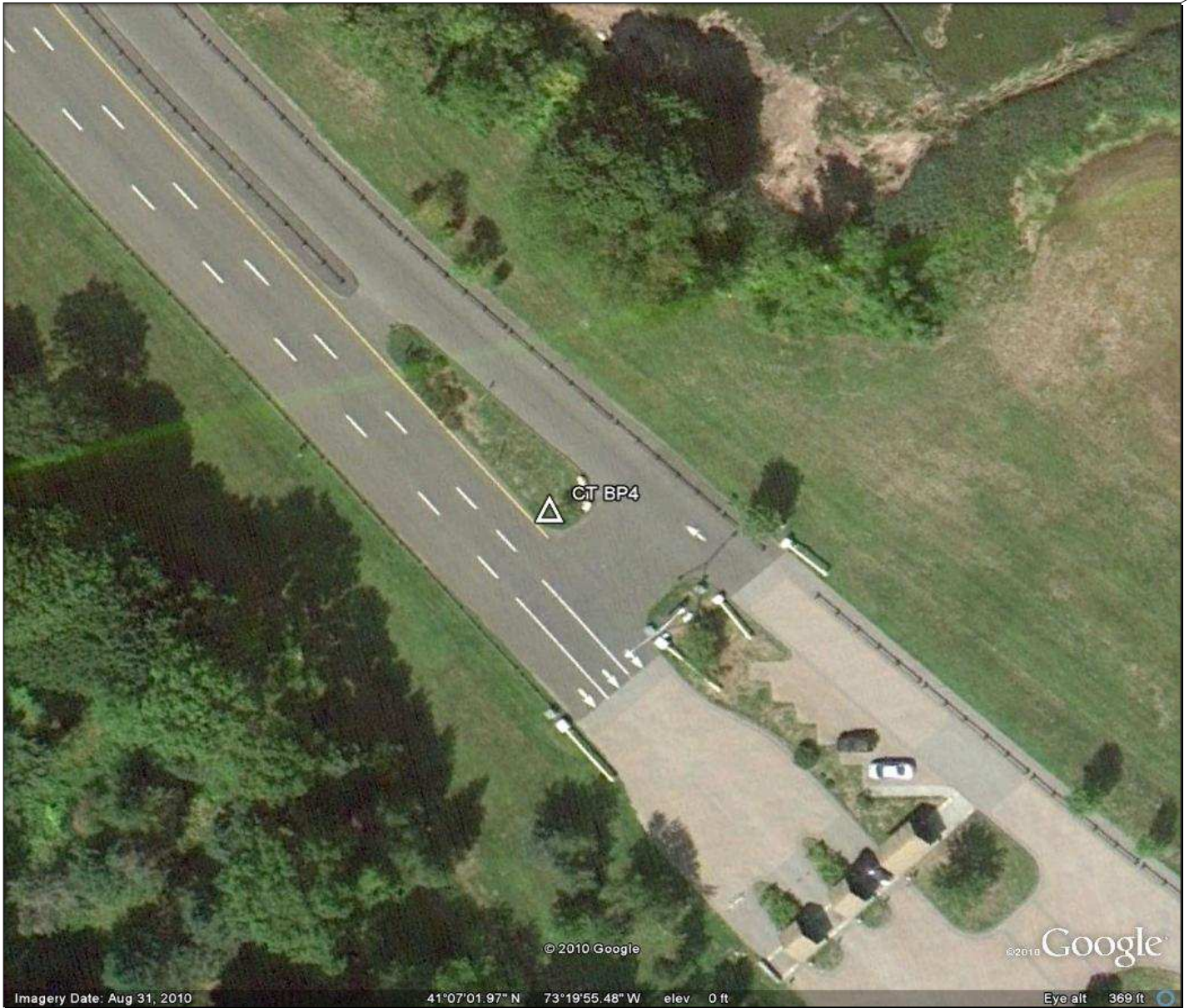
PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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JOB REFERENCE
NE LIDAR

POINT ID: CT BP 5
Proj. No.: 75980S

STATE: Connecticut **COUNTY:** Fairfield **LOCATION:** Wilton

OPERATOR: P Messier

GPS OBSERVATIONS

RECEIVER MODEL: TOPCON HIPER GD
RECEIVER S/N: 272-0788

LATITUDE	N 41-14-17.5	HGT. MTS	
LONGITUDE	W 073-26-12.5		154.48

ANTENNA INFO

RADIUS (M)

Antenna Serial #

Antenna Type

SESSION
I

DATE: 01/20/11
DAY OF YEAR: 020

START TIME: 15:15
END TIME: 15:36

U.T.C.
 LOCAL

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED **FIXED HGT.**

Collection Rate
5 SECONDS

ANTENNA HEIGHT (ARP)

MTRS/FT 1.5 Meters

MEASURED **FIXED HGT**

TOP OF MONUMENT IS: **FLUSH**

MTRS/FEET **ABOVE GROUND**

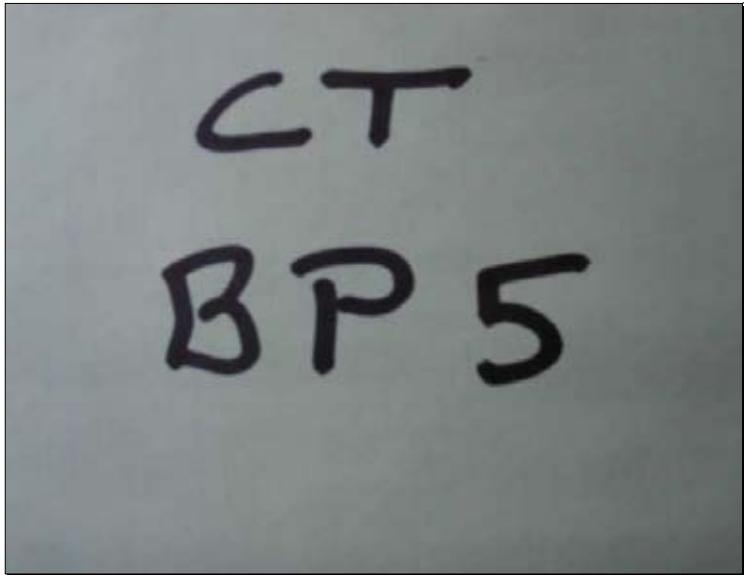
MTRS/FEET **BELOW GROUND**

DESCRIPTION

Point marked by flagging

<input type="checkbox"/>	AERIAL TARGET	<input type="checkbox"/>	PHOTO I.D.
<input type="checkbox"/>	PUB. BENCH MARK	<input checked="" type="checkbox"/>	NEW CONTROL
<input type="checkbox"/>	PUB. CONTROL	<input type="checkbox"/>	NATURAL

PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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JOB REFERENCE
NE LIDAR

POINT ID: CT BP 6
Proj. No.: 75980S

STATE: Connecticut **COUNTY:** Fairfield **LOCATION:** Bethel

OPERATOR: E Jellison

GPS OBSERVATIONS

RECEIVER MODEL: TOPCON HIPER GD

LATITUDE: N 41-21-04.1 **HGT. MTS:**

RECEIVER S/N: 272-0515

LONGITUDE: W 073-24-03.3 199.36

ANTENNA INFO

RADIUS (M):

Antenna Serial #:

Antenna Type:

SESSION

B

DATE: 01/20/11
DAY OF YEAR: 020

START TIME: 08:37
END TIME: 09:10

U.T.C.
 LOCAL

ANTENNA HEIGHT (SLANT)

MTRS/FT:

MEASURED **FIXED HGT.**

Collection Rate

5 SECONDS

ANTENNA HEIGHT (ARP)

MTRS/FT: 2.0 Meters

MEASURED **FIXED HGT**

TOP OF MONUMENT IS: **FLUSH**

MTRS/FEET: ABOVE GROUND

MTRS/FEET: BELOW GROUND

DESCRIPTION

Point in dirt rd/path

AERIAL TARGET **PHOTO I.D.**

PUB. BENCH MARK **NEW CONTROL**

PUB. CONTROL **NATURAL**

PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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JOB REFERENCE
NE LIDAR

POINT ID: CT BP 7
Proj. No.: 75980S

STATE: Connecticut **COUNTY:** Fairfield **LOCATION:** Monroe Town

OPERATOR: E Jellison

GPS OBSERVATIONS

RECEIVER MODEL: TOPCON HIPER GD

LATITUDE: N 41-20-18.5 **HGT. MTS:**

RECEIVER S/N: 272-0515

LONGITUDE: W 073-15-29.2 126.76

ANTENNA INFO

RADIUS (M):

Antenna Serial #:

Antenna Type:

SESSION:
C

DATE: 01/20/11
DAY OF YEAR: 020

START TIME: 10:16
END TIME: 10:38

U.T.C.:
 LOCAL

ANTENNA HEIGHT (SLANT)

MTRS/FT:

MEASURED FIXED HGT.

Collection Rate:
5 SECONDS

ANTENNA HEIGHT (ARP)

MTRS/FT: 2.0 Meters

MEASURED X FIXED HGT

TOP OF MONUMENT IS: FLUSH

MTRS/FEET: ABOVE GROUND

MTRS/FEET: BELOW GROUND

DESCRIPTION:

Point in lawn

AERIAL TARGET
 PUB. BENCH MARK
 PUB. CONTROL

PHOTO I.D.:
 NEW CONTROL
 NATURAL

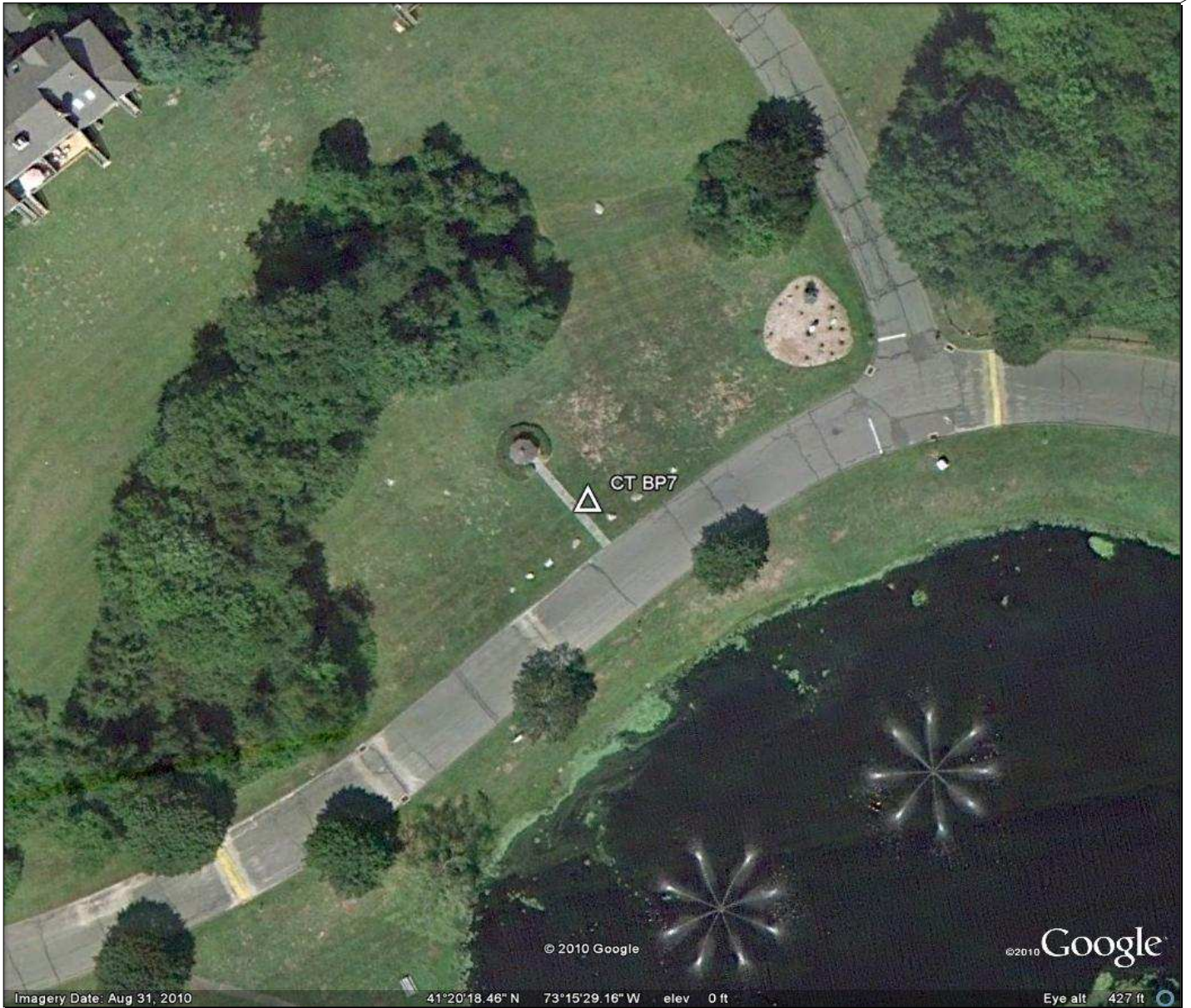
PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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JOB REFERENCE
NE LIDAR

POINT ID: CT BP 8
Proj. No.: 75980S

STATE: Connecticut **COUNTY:** Fairfield **LOCATION:** Easton

OPERATOR: P Messier

GPS OBSERVATIONS

RECEIVER MODEL: TOPCON HIPER GD
RECEIVER S/N: 272-0788

LATITUDE	N 41-16-24.4	HGT. MTS	
LONGITUDE	W 073-17-45.6		125.02

ANTENNA INFO

RADIUS (M)

Antenna Serial #

Antenna Type

SESSION
A

DATE: 01/21/11
DAY OF YEAR: 021

START TIME: 06:56
END TIME: 07:21

U.T.C.
 LOCAL

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED **FIXED HGT.**

Collection Rate
5 SECONDS

ANTENNA HEIGHT (ARP)

MTRS/FT 1.5 Meters

MEASURED **FIXED HGT**

TOP OF MONUMENT IS: **FLUSH**

MTRS/FEET **ABOVE GROUND**

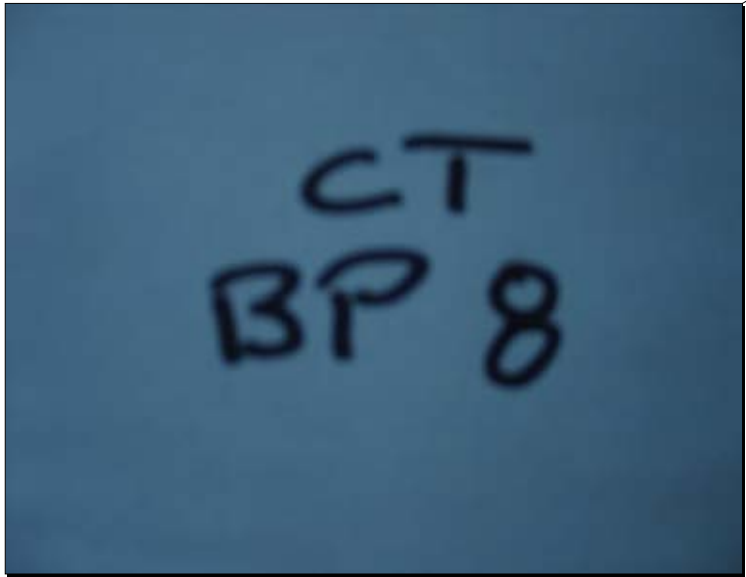
MTRS/FEET **BELOW GROUND**

DESCRIPTION

Point marked with flagging

<input type="checkbox"/>	AERIAL TARGET	<input type="checkbox"/>	PHOTO I.D.
<input type="checkbox"/>	PUB. BENCH MARK	<input checked="" type="checkbox"/>	NEW CONTROL
<input type="checkbox"/>	PUB. CONTROL	<input type="checkbox"/>	NATURAL

PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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JOB REFERENCE
NE LIDAR

POINT ID: CT BP 9
Proj. No.: 75980S

STATE: Connecticut **COUNTY:** Fairfield **LOCATION:** Fairfield

OPERATOR: E Jellison

GPS OBSERVATIONS

RECEIVER MODEL: TOPCON HIPER GD

LATITUDE: N 41-10-49.7 **HGT. MTS:**

RECEIVER S/N: 272-0515

LONGITUDE: W 073-13-33.1 13.77

ANTENNA INFO

RADIUS (M):

Antenna Serial #:

Antenna Type:

SESSION
J

DATE: 01/20/11
DAY OF YEAR: 020

START TIME: 16:20
END TIME: 16:46

U.T.C.:
 LOCAL

ANTENNA HEIGHT (SLANT)

MTRS/FT:

MEASURED FIXED HGT.

Collection Rate
5 SECONDS

ANTENNA HEIGHT (ARP)

MTRS/FT: 2.0 Meters

MEASURED X FIXED HGT

TOP OF MONUMENT IS: FLUSH

MTRS/FEET: ABOVE GROUND

MTRS/FEET: BELOW GROUND

DESCRIPTION

Point in ground near tennis courts

AERIAL TARGET
 PUB. BENCH MARK
 PUB. CONTROL

PHOTO I.D.:
 NEW CONTROL
 NATURAL

PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



**GPS CONTROL SURVEY
FIELD DATA SHEET**

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JOB REFERENCE
NE LIDAR

POINT ID: CT BP 10
Proj. No.: 75980S

STATE: Connecticut **COUNTY:** Fairfield **LOCATION:** Shelton

OPERATOR: E Jellison

GPS OBSERVATIONS

RECEIVER MODEL: TOPCON HIPER GD

LATITUDE: N 41-16-15.6 **HGT. MTS:**

RECEIVER S/N: 272-0515

LONGITUDE: W 073-09-29.1 **HGT. MTS:** 105.93

ANTENNA INFO

RADIUS (M):

Antenna Serial #:

Antenna Type:

SESSION

F

DATE: 01/20/11
DAY OF YEAR: 020

START TIME: 13:04
END TIME: 13:27

U.T.C.:
LOCAL: X

ANTENNA HEIGHT (SLANT)

MTRS/FT:

MEASURED **FIXED HGT.**

Collection Rate

5 SECONDS

ANTENNA HEIGHT (ARP)

MTRS/FT: 2.0 Meters

MEASURED X **FIXED HGT**

TOP OF MONUMENT IS: X FLUSH

MTRS/FEET: ABOVE GROUND

MTRS/FEET: BELOW GROUND

DESCRIPTION

Point in lawn

AERIAL TARGET

PUB. BENCH MARK

PUB. CONTROL

PHOTO I.D.:

X **NEW CONTROL**

NATURAL

PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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FIELD DATA SHEET**

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JOB REFERENCE
NE LIDAR

POINT ID: CT BP 18
Proj. No.: 75980S

STATE: Connecticut **COUNTY:** Fairfield **LOCATION:** Shelton

OPERATOR: E Jellison

GPS OBSERVATIONS

RECEIVER MODEL: TOPCON HIPER GD

LATITUDE: N 41-16-58.7 **HGT. MTS:**

RECEIVER S/N: 272-0515

LONGITUDE: W 073-11-57.1 **146.02**

ANTENNA INFO

SESSION:
G

DATE: 01/20/11
DAY OF YEAR: 020

RADIUS (M):
Antenna Serial #:
Antenna Type:

START TIME: 13:58
END TIME: 14:22

U.T.C.:
 LOCAL

ANTENNA HEIGHT (SLANT)
MTRS/FT:
 MEASURED **FIXED HGT.**

Collection Rate:
5 **SECONDS**

ANTENNA HEIGHT (ARP)
MTRS/FT: 2.0 Meters
 MEASURED **FIXED HGT**

TOP OF MONUMENT IS: **FLUSH**
MTRS/FEET: **ABOVE GROUND**
MTRS/FEET: **BELOW GROUND**

DESCRIPTION

Point in cemetery

AERIAL TARGET **PHOTO I.D.**
 PUB. BENCH MARK **NEW CONTROL**
 PUB. CONTROL **NATURAL**

PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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JOB REFERENCE
NE LIDAR

POINT ID: CT BP 19
Proj. No.: 75980S

STATE Connecticut **COUNTY** Fairfield **LOCATION:** New Canaan

OPERATOR P Messier

GPS OBSERVATIONS

RECEIVER MODEL TOPCON HIPER GD
RECEIVER S/N 272-0788

LATITUDE	N 41-08-26.3	HGT. MTS	
LONGITUDE	W 073-29-46.5		78.78

ANTENNA INFO

RADIUS (M)

Antenna Serial #

Antenna Type

SESSION
F

DATE: 01/20/11
DAY OF YEAR 020

START TIME 12:33
END TIME 12:54

U.T.C.
 LOCAL

ANTENNA HEIGHT (SLANT)

MTRS/FT

MEASURED **FIXED HGT.**

Collection Rate
5 SECONDS

ANTENNA HEIGHT (ARP)

MTRS/FT 1.5 Meters

MEASURED **FIXED HGT**

TOP OF MONUMENT IS: **FLUSH**

MTRS/FEET ABOVE GROUND

MTRS/FEET BELOW GROUND

DESCRIPTION

Point marked by flagging

AERIAL TARGET

PUB. BENCH MARK

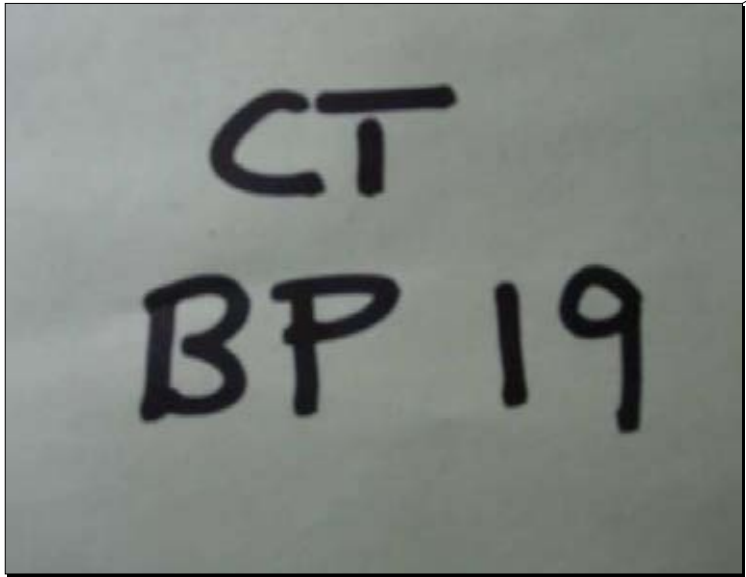
PUB. CONTROL

PHOTO I.D.

NEW CONTROL

NATURAL

PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



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JOB REFERENCE
NE LIDAR

POINT ID: CT BP 20
Proj. No.: 75980S

STATE Connecticut

COUNTY Fairfield

LOCATION: Fairfield

OPERATOR P Messier

GPS OBSERVATIONS

RECEIVER MODEL TOPCON HIPER GD

LATITUDE N 41-12-06.8

RECEIVER S/N 272-0788

LONGITUDE W 073-18-38.1

ANTENNA INFO

SESSION
B

DATE: 01/21/11
DAY OF YEAR 021

RADIUS (M)
Antenna Serial #
Antenna Type

START TIME 07:53
END TIME 08:16

U.T.C.
 LOCAL

ANTENNA HEIGHT (SLANT)

Collection Rate
5 SECONDS

MTRS/FT
 MEASURED FIXED HGT.

ANTENNA HEIGHT (ARP)

TOP OF MONUMENT IS: FLUSH
MTRS/FEET ABOVE GROUND
MTRS/FEET BELOW GROUND

MTRS/FT 1.5 Meters
 MEASURED X FIXED HGT

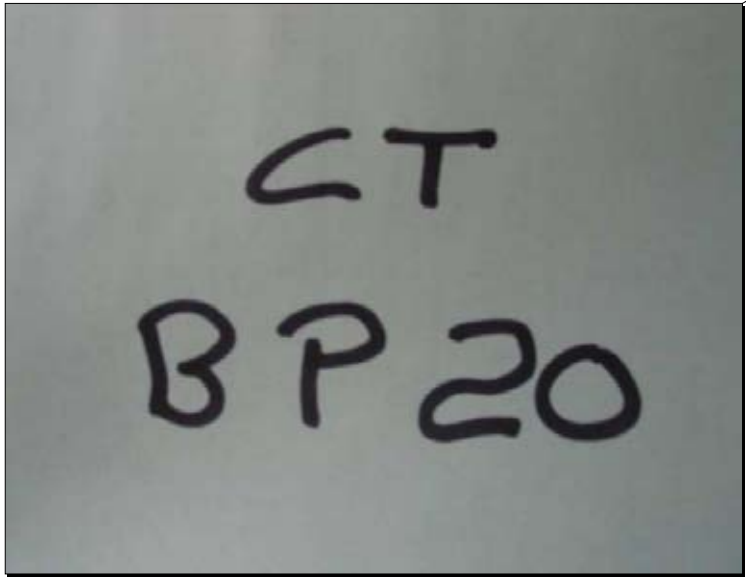
DESCRIPTION

Point marked by flagging

AERIAL TARGET
 PUB. BENCH MARK
 PUB. CONTROL

PHOTO I.D.
 NEW CONTROL
 NATURAL

PHOTOS:



PHOTOS CONT'D:



SITE SKETCH:



HPN 5

FILE: 0788log0120c.tps 000198054

NGS OPUS-RS SOLUTION REPORT
=====

USER: JOHN.ALLEN@SEWALL.COM DATE: January 24, 2011
RINEX FILE: 0788020o.11o TIME: 16:49:38 UTC

SOFTWARE: rsgps 1.35.1 RS10.prl 1.66 START: 2011/01/20 14:33:55
EPHEMERIS: igr16194.eph [rapid] STOP: 2011/01/20 14:54:50
NAV FILE: brdc0200.11n OBS USED: 1944 / 2070 : 94%
ANT NAME: TPSHIPER_GD QUALITY IND. 18.49/ 5.64
ARP HEIGHT: 1.5 NORMALIZED RMS: 0.290

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2011.05374)

X: 1354396.468(m) 0.008(m) 1354395.700(m) 0.008(m)
Y: -4621690.337(m) 0.019(m) -4621688.901(m) 0.019(m)
Z: 4167712.483(m) 0.017(m) 4167712.400(m) 0.017(m)

LAT: 41 3 45.81233 0.009(m) 41 3 45.84425 0.009(m)
E LON: 286 20 0.01766 0.007(m) 286 20 0.00339 0.007(m)
W LON: 73 39 59.98234 0.007(m) 73 39 59.99661 0.007(m)
EL HGT: 52.526(m) 0.024(m) 51.270(m) 0.024(m)
ORTHO HGT: 83.100(m) 0.028(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 18) SPC (0600 CT)
Northing (Y) [meters] 4546576.602 178284.579
Easting (X) [meters] 612030.818 227750.422
Convergence [degrees] 0.87594064 -0.60780125
Point Scale 0.99975447 1.00001671
Combined Factor 0.99974623 1.00000847

US NATIONAL GRID DESIGNATOR: 18TXL1203046576(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DF9200	RVDI RIVERSIDE COOP CORS ARP	N410231.146	W0733452.378	7543.7
DI0624	NYVH VALHALLA CORS ARP	N410456.221	W0734904.125	12887.7
AJ4872	LAMT LAMONT EARTH OBS CORS ARP	N410016.233	W0735432.057	21372.4
DI0616	NYQN QUEENS CORS ARP	N404310.261	W0734348.267	38486.9
DI0470	NYLC LAKE CARMEL CORS ARP	N412851.876	W0733905.369	46480.2
DM4134	NYBP BATTERY PARK CORS ARP	N404203.817	W0740051.549	49716.5
AJ3348	NJ12 NJ INST OF TECH 2 CORS ARP	N404429.305	W0741039.727	55918.8
DI0880	SHK5 SANDY HOOK 5 CORS ARP	N402817.341	W0740041.741	71825.8
DH3768	NJMT NJMT CORS ARP	N404747.350	W0742859.340	74855.1

NEAREST NGS PUBLISHED CONTROL POINT

LX2268 D 72 N410346. W0734022. 513.4

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

HPN 6

FILE: 0788log0120e.tps 000198057

NGS OPUS-RS SOLUTION REPORT

=====

USER: JOHN.ALLEN@SEWALL.COM DATE: January 24, 2011
RINEX FILE: 0788020q.11o TIME: 16:56:39 UTC

SOFTWARE: rsgps 1.35.1 RS10.prl 1.66 START: 2011/01/20 16:35:30
EPHEMERIS: igr16194.eph [rapid] STOP: 2011/01/20 17:00:10
NAV FILE: brdc0200.11n OBS USED: 1989 / 2826 : 70%
ANT NAME: TPSHIPER_GD QUALITY IND. 22.74/ 23.09
ARP HEIGHT: 1.5 NORMALIZED RMS: 0.270

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2011.05397)

X: 1358229.485(m) 0.010(m) 1358228.717(m) 0.010(m)
Y: -4614128.413(m) 0.022(m) -4614126.977(m) 0.022(m)
Z: 4174827.389(m) 0.020(m) 4174827.307(m) 0.020(m)

LAT: 41 8 51.20182 0.007(m) 41 8 51.23383 0.007(m)
E LON: 286 24 8.95354 0.008(m) 286 24 8.93934 0.008(m)
W LON: 73 35 51.04646 0.008(m) 73 35 51.06066 0.008(m)
EL HGT: 77.058(m) 0.030(m) 75.804(m) 0.030(m)
ORTHO HGT: 107.359(m) 0.034(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 18) SPC (0600 CT)
Northing (Y) [meters] 4556085.282 187645.819
Easting (X) [meters] 617689.471 233654.948
Convergence [degrees] 0.92294291 -0.56195145
Point Scale 0.99977047 1.00000571
Combined Factor 0.99975838 0.99999362

US NATIONAL GRID DESIGNATOR: 18TXL1768956085(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DH5827	CTDA DARIEN CORS ARP	N410357.069	W0733025.942	11827.2
DI0624	NYVH VALHALLA CORS ARP	N410456.221	W0734904.125	19872.3
DI0470	NYLC LAKE CARMEL CORS ARP	N412851.876	W0733905.369	37316.5
DH5825	CTBR BROOKFIELD CORS ARP	N412949.864	W0732505.674	41630.0
DI0616	NYQN QUEENS CORS ARP	N404310.261	W0734348.267	48828.5
DK7181	NYNB NEWBURGH CORS ARP	N412942.806	W0740131.973	52680.3
AJ3348	NJ12 NJ INST OF TECH 2 CORS ARP	N404429.305	W0741039.727	66487.0
DI0600	NYMD MIDDLETOWN CORS ARP	N412424.522	W0742634.078	76449.3
DJ5208	MOR6 MORICHES 6 CORS ARP	N404721.826	W0724447.868	81925.6

NEAREST NGS PUBLISHED CONTROL POINT

LX3877 SHAD N410949.039 W0733600.295 1801.4

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

HPN 7

FILE: 0788log0120h.tps 000198061

NGS OPUS-RS SOLUTION REPORT

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USER: JOHN.ALLEN@SEWALL.COM DATE: January 24, 2011
RINEX FILE: 0788020t.11o TIME: 16:57:45 UTC

SOFTWARE: rsgps 1.35.1 RS28.prl 1.66 START: 2011/01/20 19:15:25
EPHEMERIS: igr16194.eph [rapid] STOP: 2011/01/20 19:35:00
NAV FILE: brdc0200.11n OBS USED: 1845 / 2259 : 82%
ANT NAME: TPSHIPER_GD QUALITY IND. 33.03/ 18.44
ARP HEIGHT: 1.5 NORMALIZED RMS: 0.327

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2011.05427)

X: 1375246.789(m) 0.010(m) 1375246.021(m) 0.010(m)
Y: -4612256.791(m) 0.006(m) -4612255.354(m) 0.006(m)
Z: 4171209.993(m) 0.006(m) 4171209.911(m) 0.006(m)

LAT: 41 6 18.07083 0.005(m) 41 6 18.10285 0.005(m)
E LON: 286 36 11.22542 0.010(m) 286 36 11.21148 0.010(m)
W LON: 73 23 48.77458 0.010(m) 73 23 48.78852 0.010(m)
EL HGT: -12.673(m) 0.007(m) -13.930(m) 0.007(m)
ORTHO HGT: 17.410(m) 0.017(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 18) SPC (0600 CT)
Northing (Y) [meters] 4551653.624 182776.341
Easting (X) [meters] 634612.881 250461.479
Convergence [degrees] 1.05411401 -0.42892111
Point Scale 0.99982302 1.00001095
Combined Factor 0.99982501 1.00001294

US NATIONAL GRID DESIGNATOR: 18TXL3461251653(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DH5827	CTDA DARIEN CORS ARP	N410357.069	W0733025.942	10239.9
DF9200	RVDI RIVERSIDE COOP CORS ARP	N410231.146	W0733452.378	17000.0
DI0624	NYVH VALHALLA CORS ARP	N410456.221	W0734904.125	35455.1
DI0446	NYCI CENTRAL ISLIP CORS ARP	N404538.237	W0731151.787	41762.6
AJ4872	LAMT LAMONT EARTH OBS CORS ARP	N410016.233	W0735432.057	44467.5
DI0616	NYQN QUEENS CORS ARP	N404310.261	W0734348.267	51192.6
DI1874	NYRH RIVERHEAD CORS ARP	N405524.088	W0724250.560	60877.7
DH5833	CTGU GILFORD CORS ARP	N411721.742	W0724004.444	64485.5
DK7181	NYNB NEWBURGH CORS ARP	N412942.806	W0740131.973	68192.3

NEAREST NGS PUBLISHED CONTROL POINT

LX0795 X 32 N410617. W0732402. 309.9

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

BDR 8

FILE: log0121b.tps 000197968

NGS OPUS-RS SOLUTION REPORT

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USER: john.allen@sewall.com DATE: January 24, 2011
RINEX FILE: log0021n.11o TIME: 15:39:02 UTC

SOFTWARE: rsgps 1.35.1 RS11.prl 1.66 START: 2011/01/21 13:28:05
EPHEMERIS: igr16195.eph [rapid] STOP: 2011/01/21 13:48:30
NAV FILE: brdc0210.11n OBS USED: 1845 / 2079 : 89%
ANT NAME: TPSHIPER_GD QUALITY IND. 12.23/ 15.01
ARP HEIGHT: 2.0 NORMALIZED RMS: 0.285

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2011.05635)

X: 1379245.664(m) 0.008(m) 1379244.895(m) 0.008(m)
Y: -4606726.625(m) 0.018(m) -4606725.188(m) 0.018(m)
Z: 4176039.894(m) 0.013(m) 4176039.813(m) 0.013(m)

LAT: 41 9 44.56926 0.008(m) 41 9 44.60137 0.008(m)
E LON: 286 40 3.37970 0.009(m) 286 40 3.36578 0.009(m)
W LON: 73 19 56.62030 0.009(m) 73 19 56.63422 0.009(m)
EL HGT: 35.897(m) 0.020(m) 34.641(m) 0.020(m)
ORTHO HGT: 65.778(m) 0.025(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 18) SPC (0600 CT)
Northing (Y) [meters] 4558123.363 189107.988
Easting (X) [meters] 639906.089 255921.365
Convergence [degrees] 1.09778777 -0.38616220
Point Scale 0.99984090 1.00000401
Combined Factor 0.99983527 0.99999838

US NATIONAL GRID DESIGNATOR: 18TXL3990658123(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DH5827	CTDA DARIEN CORS ARP	N410357.069	W0733025.942	18179.5
DF9200	RVDI RIVERSIDE COOP CORS ARP	N410231.146	W0733452.378	24812.9
DH5825	CTBR BROOKFIELD CORS ARP	N412949.864	W0732505.674	37871.8
DI0624	NYVH VALHALLA CORS ARP	N410456.221	W0734904.125	41724.6
DI0446	NYCI CENTRAL ISLIP CORS ARP	N404538.237	W0731151.787	46034.5
AJ4872	LAMT LAMONT EARTH OBS CORS ARP	N410016.233	W0735432.057	51518.9
DH5833	CTGU GILFORD CORS ARP	N411721.742	W0724004.444	57473.0
DJ5208	MOR6 MORICHES 6 CORS ARP	N404721.826	W0724447.868	64391.6
DK7181	NYNB NEWBURGH CORS ARP	N412942.806	W0740131.973	68801.5

NEAREST NGS PUBLISHED CONTROL POINT

LX7489 WESTPORT N410929.763 W0731951.362 473.9

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

BDR 9

FILE: log0120i.tps 000197890

NGS OPUS-RS SOLUTION REPORT

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USER: john.allen@sewall.com DATE: January 24, 2011
RINEX FILE: log0020u.11o TIME: 14:37:10 UTC

SOFTWARE: rsgps 1.35.1 RS40.prl 1.66 START: 2011/01/20 20:34:40
EPHEMERIS: igr16194.eph [rapid] STOP: 2011/01/20 20:56:00
NAV FILE: brdc0200.11n OBS USED: 1376 / 1944 : 71%
ANT NAME: TPSHIPER_GD QUALITY IND. 28.60/ 3.71
ARP HEIGHT: 2.0 NORMALIZED RMS: 0.261

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2011.05442)

X: 1394569.339(m) 0.007(m) 1394568.570(m) 0.007(m)
Y: -4599415.229(m) 0.011(m) -4599413.792(m) 0.011(m)
Z: 4178906.741(m) 0.007(m) 4178906.661(m) 0.007(m)

LAT: 41 11 49.57462 0.005(m) 41 11 49.60680 0.005(m)
E LON: 286 52 3.38688 0.006(m) 286 52 3.37319 0.006(m)
W LON: 73 7 56.61312 0.006(m) 73 7 56.62681 0.006(m)
EL HGT: -18.189(m) 0.012(m) -19.444(m) 0.012(m)
ORTHO HGT: 11.656(m) 0.019(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 18) SPC (0600 CT)
Northing (Y) [meters] 4562319.264 192870.575
Easting (X) [meters] 656603.532 272724.072
Convergence [degrees] 1.23035186 -0.25354899
Point Scale 0.99990184 1.00000029
Combined Factor 0.99990469 1.00000315

US NATIONAL GRID DESIGNATOR: 18TXL5660362319(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DH5827	CTDA DARIEN CORS ARP	N410357.069	W0733025.942	34683.7
DH5833	CTGU GILFORD CORS ARP	N411721.742	W0724004.444	40261.7
DI1874	NYRH RIVERHEAD CORS ARP	N405524.088	W0724250.560	46484.5
DI0624	NYVH VALHALLA CORS ARP	N410456.221	W0734904.125	58941.8
DH7113	CTNE PAQUETTE CORS ARP	N414024.717	W0724252.252	63400.3
AJ4872	LAMT LAMONT EARTH OBS CORS ARP	N410016.233	W0735432.057	68649.3
DI0616	NYQN QUEENS CORS ARP	N404310.261	W0734348.267	73107.6
DH5839	CTWI WINCHESTER CORS ARP	N415351.907	W0730410.968	77993.5

NEAREST NGS PUBLISHED CONTROL POINT

LX0878 Y 2 N411139. W0730755. 329.1

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

BDR 10

FILE: log0120h.tps 000197887

NGS OPUS-RS SOLUTION REPORT
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USER: john.allen@sewall.com DATE: January 24, 2011
RINEX FILE: log0020t.11o TIME: 14:31:38 UTC

SOFTWARE: rsgps 1.35.1 RS29.prl 1.66 START: 2011/01/20 19:41:20
EPHEMERIS: igr16194.eph [rapid] STOP: 2011/01/20 20:08:50
NAV FILE: brdc0200.11n OBS USED: 2475 / 2970 : 83%
ANT NAME: TPSHIPER_GD QUALITY IND. 29.00/ 33.93
ARP HEIGHT: 2.0 NORMALIZED RMS: 0.284

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2011.05433)

X: 1385237.948(m) 0.007(m) 1385237.179(m) 0.007(m)
Y: -4596128.228(m) 0.013(m) -4596126.792(m) 0.013(m)
Z: 4185732.633(m) 0.013(m) 4185732.553(m) 0.013(m)

LAT: 41 16 40.88694 0.006(m) 41 16 40.91914 0.006(m)
E LON: 286 46 20.66029 0.006(m) 286 46 20.64646 0.006(m)
W LON: 73 13 39.33971 0.006(m) 73 13 39.35354 0.006(m)
EL HGT: 84.802(m) 0.018(m) 83.549(m) 0.018(m)
ORTHO HGT: 114.436(m) 0.023(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 18) SPC (0600 CT)
Northing (Y) [meters] 4571136.021 201897.009
Easting (X) [meters] 648437.019 264787.924
Convergence [degrees] 1.16949296 -0.31667346
Point Scale 0.99987117 0.99999304
Combined Factor 0.99985787 0.99997974

US NATIONAL GRID DESIGNATOR: 18TXL4843771136(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DH5825	CTBR BROOKFIELD CORS ARP	N412949.864	W0732505.674	29098.8
DH5827	CTDA DARIEN CORS ARP	N410357.069	W0733025.942	33253.5
DF9200	RVDI RIVERSIDE COOP CORS ARP	N410231.146	W0733452.378	39599.0
DH5833	CTGU GILFORD CORS ARP	N411721.742	W0724004.444	46904.5
DI0624	NYVH VALHALLA CORS ARP	N410456.221	W0734904.125	54084.1
DI0446	NYCI CENTRAL ISLIP CORS ARP	N404538.237	W0731151.787	57514.9
DH7113	CTNE PAQUETTE CORS ARP	N414024.717	W0724252.252	61369.4
AJ4872	LAMT LAMONT EARTH OBS CORS ARP	N410016.233	W0735432.057	64765.1
DH5839	CTWI WINCHESTER CORS ARP	N415351.907	W0730410.968	70079.1

NEAREST NGS PUBLISHED CONTROL POINT

LX2332 A 74 N411643. W0731343. 107.3

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

DXR 11

FILE: log0120d.tps 000197880

NGS OPUS-RS SOLUTION REPORT
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USER: john.allen@sewall.com DATE: January 24, 2011
RINEX FILE: log0020q.11o TIME: 14:37:36 UTC

SOFTWARE: rsgps 1.35.1 RS53.prl 1.66 START: 2011/01/20 16:13:45
EPHEMERIS: igr16194.eph [rapid] STOP: 2011/01/20 16:37:05
NAV FILE: brdc0200.11n OBS USED: 2340 / 2601 : 90%
ANT NAME: TPSHIPER_GD QUALITY IND. 35.74/ 24.22
ARP HEIGHT: 2.0 NORMALIZED RMS: 0.331

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2011.05393)

X: 1384715.362(m) 0.012(m) 1384714.593(m) 0.012(m)
Y: -4592605.755(m) 0.018(m) -4592604.320(m) 0.018(m)
Z: 4189845.732(m) 0.015(m) 4189845.652(m) 0.015(m)

LAT: 41 19 36.42599 0.007(m) 41 19 36.45821 0.007(m)
E LON: 286 46 42.85397 0.009(m) 286 46 42.84013 0.009(m)
W LON: 73 13 17.14603 0.009(m) 73 13 17.15987 0.009(m)
EL HGT: 152.679(m) 0.023(m) 151.428(m) 0.023(m)
ORTHO HGT: 182.225(m) 0.028(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 18) SPC (0600 CT)
Northing (Y) [meters] 4576560.123 207309.413
Easting (X) [meters] 648842.393 265333.957
Convergence [degrees] 1.17469925 -0.31258576
Point Scale 0.99987265 0.99998963
Combined Factor 0.99984871 0.99996568

US NATIONAL GRID DESIGNATOR: 18TXL4884276560(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DH5825	CTBR BROOKFIELD CORS ARP	N412949.864	W0732505.674	25079.1
DH5827	CTDA DARIEN CORS ARP	N410357.069	W0733025.942	37609.6
DF9200	RVDI RIVERSIDE COOP CORS ARP	N410231.146	W0733452.378	43722.6
DI0624	NYVH VALHALLA CORS ARP	N410456.221	W0734904.125	56917.0
DI1874	NYRH RIVERHEAD CORS ARP	N405524.088	W0724250.560	61829.0
DJ5208	MOR6 MORICHES 6 CORS ARP	N404721.826	W0724447.868	71796.2
DH5829	CTEG EAST GRANBY CORS ARP	N415524.347	W0724155.881	79296.0
DG7012	NYNP SUNY-NEW PALTZ CORS ARP	N414432.852	W0740455.915	85389.3
DH5835	CTMA MANSFIELD CORS ARP	N414352.917	W0721238.877	95568.3

NEAREST NGS PUBLISHED CONTROL POINT

LX7444 MONROE N411949.288 W0731218.441 1420.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

DXR 12

FILE: log0120a.tps 000197873

NGS OPUS-RS SOLUTION REPORT

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USER: john.allen@sewall.com DATE: January 24, 2011
RINEX FILE: log0020m.11o TIME: 14:25:02 UTC

SOFTWARE: rsgps 1.35.1 RS29.prl 1.66 START: 2011/01/20 12:26:25
EPHEMERIS: igr16194.eph [rapid] STOP: 2011/01/20 12:55:20
NAV FILE: brdc0200.11n OBS USED: 2610 / 3654 : 71%
ANT NAME: TPSHIPER_GD QUALITY IND. 22.54/ 43.72
ARP HEIGHT: 2.0 NORMALIZED RMS: 0.268

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2011.05350)

X: 1368460.686(m) 0.009(m) 1368459.917(m) 0.009(m)
Y: -4595151.674(m) 0.017(m) -4595150.240(m) 0.017(m)
Z: 4192279.335(m) 0.012(m) 4192279.255(m) 0.012(m)

LAT: 41 21 23.33412 0.007(m) 41 21 23.36631 0.007(m)
E LON: 286 35 1.72417 0.010(m) 286 35 1.71007 0.010(m)
W LON: 73 24 58.27583 0.010(m) 73 24 58.28993 0.010(m)
EL HGT: 88.143(m) 0.019(m) 86.894(m) 0.019(m)
ORTHO HGT: 117.854(m) 0.024(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 18) SPC (0600 CT)
Northing (Y) [meters] 4579541.188 210714.735
Easting (X) [meters] 632482.961 249055.083
Convergence [degrees] 1.04664310 -0.44172208
Point Scale 0.99981601 0.99998790
Combined Factor 0.99980218 0.99997407

US NATIONAL GRID DESIGNATOR: 18TXL3248279541(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DH5825	CTBR BROOKFIELD CORS ARP	N412949.864	W0732505.674	15627.9
DI0470	NYLC LAKE CARMEL CORS ARP	N412851.876	W0733905.369	24051.8
DH5827	CTDA DARIEN CORS ARP	N410357.069	W0733025.942	33167.3
DF9200	RVDI RIVERSIDE COOP CORS ARP	N410231.146	W0733452.378	37570.7
DI0624	NYVH VALHALLA CORS ARP	N410456.221	W0734904.125	45404.8
DK7181	NYNB NEWBURGH CORS ARP	N412942.806	W0740131.973	53217.1
AJ4872	LAMT LAMONT EARTH OBS CORS ARP	N410016.233	W0735432.057	56895.8
DH5833	CTGU GILFORD CORS ARP	N411721.742	W0724004.444	63090.7
DH5839	CTWI WINCHESTER CORS ARP	N415351.907	W0730410.968	66691.8

NEAREST NGS PUBLISHED CONTROL POINT

LX0945 N 15 N412127. W0732506. 212.1

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

DXR 13

FILE: 0788log0120j.tps 000198295

NGS OPUS-RS SOLUTION REPORT

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USER: JOHN.ALLEN@SEWALL.COM DATE: January 24, 2011
RINEX FILE: 0788020u.11o TIME: 19:25:06 UTC

SOFTWARE: rsgps 1.35.1 RS40.prl 1.66 START: 2011/01/20 20:51:05
EPHEMERIS: igr16194.eph [rapid] STOP: 2011/01/20 21:12:05
NAV FILE: brdc0200.11n OBS USED: 2268 / 2268 : 100%
ANT NAME: TPSHIPER_GD QUALITY IND. 27.41/ 34.25
ARP HEIGHT: 1.5 NORMALIZED RMS: 0.282

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2011.05446)

X: 1367182.711(m) 0.011(m) 1367181.942(m) 0.011(m)
Y: -4605785.875(m) 0.016(m) -4605784.440(m) 0.016(m)
Z: 4181156.365(m) 0.017(m) 4181156.284(m) 0.017(m)

LAT: 41 13 22.19193 0.008(m) 41 13 22.22401 0.008(m)
E LON: 286 31 58.83239 0.010(m) 286 31 58.81827 0.010(m)
W LON: 73 28 1.16761 0.010(m) 73 28 1.18173 0.010(m)
EL HGT: 133.808(m) 0.022(m) 132.555(m) 0.022(m)
ORTHO HGT: 163.717(m) 0.027(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 18) SPC (0600 CT)
Northing (Y) [meters] 4564626.863 195906.212
Easting (X) [meters] 628495.261 244680.883
Convergence [degrees] 1.01037438 -0.47540767
Point Scale 0.99980320 0.99999777
Combined Factor 0.99978222 0.99997679

US NATIONAL GRID DESIGNATOR: 18TXL2849564626(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DH5827	CTDA DARIEN CORS ARP	N410357.069	W0733025.942	17758.2
DF9200	RVDI RIVERSIDE COOP CORS ARP	N410231.146	W0733452.378	22257.3
DH5825	CTBR BROOKFIELD CORS ARP	N412949.864	W0732505.674	30742.3
AJ4872	LAMT LAMONT EARTH OBS CORS ARP	N410016.233	W0735432.057	44334.6
DK7181	NYNB NEWBURGH CORS ARP	N412942.806	W0740131.973	55675.1
DI0616	NYQN QUEENS CORS ARP	N404310.261	W0734348.267	60121.9
DH5833	CTGU GILFORD CORS ARP	N411721.742	W0724004.444	67377.4
DI1874	NYRH RIVERHEAD CORS ARP	N405524.088	W0724250.560	71486.9
DG7012	NYNP SUNY-NEW PALTZ CORS ARP	N414432.852	W0740455.915	77270.4

NEAREST NGS PUBLISHED CONTROL POINT

LX3808 BALD HILL 2 N411249.742 W0732840.242 1353.8

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

DXR 14

FILE: log0120k.tps 000197893

NGS OPUS-RS SOLUTION REPORT

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USER: john.allen@sewall.com DATE: January 24, 2011
RINEX FILE: log0020w.11o TIME: 14:35:05 UTC

SOFTWARE: rsgps 1.35.1 RS28.prl 1.66 START: 2011/01/20 22:23:15
EPHEMERIS: igr16194.eph [rapid] STOP: 2011/01/20 22:47:55
NAV FILE: brdc0200.11n OBS USED: 2646 / 2862 : 92%
ANT NAME: TPSHIPER_GD QUALITY IND. 43.18/ 52.56
ARP HEIGHT: 2.0 NORMALIZED RMS: 0.247

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2011.05463)

X: 1378473.231(m) 0.004(m) 1378472.462(m) 0.004(m)
Y: -4600506.019(m) 0.012(m) -4600504.583(m) 0.012(m)
Z: 4183104.860(m) 0.009(m) 4183104.779(m) 0.009(m)

LAT: 41 14 48.84999 0.004(m) 41 14 48.88213 0.004(m)
E LON: 286 40 48.22708 0.004(m) 286 40 48.21314 0.004(m)
W LON: 73 19 11.77292 0.004(m) 73 19 11.78686 0.004(m)
EL HGT: 39.839(m) 0.015(m) 38.586(m) 0.015(m)
ORTHO HGT: 69.553(m) 0.021(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 18) SPC (0600 CT)
Northing (Y) [meters] 4567527.132 198487.689
Easting (X) [meters] 640769.968 257028.804
Convergence [degrees] 1.10785582 -0.37790207
Point Scale 0.99984388 0.99999560
Combined Factor 0.99983763 0.99998935

US NATIONAL GRID DESIGNATOR: 18TXL4076967527(NAD 83)

BASE STATIONS USED

PID DESIGNATION LATITUDE LONGITUDE DISTANCE(m)
DH5827 CTDA DARIEN CORS ARP N410357.069 W0733025.942 25521.9
DH5825 CTBR BROOKFIELD CORS ARP N412949.864 W0732505.674 28987.9
DI0470 NYLC LAKE CARMEL CORS ARP N412851.876 W0733905.369 38027.0
DI0624 NYVH VALHALLA CORS ARP N410456.221 W0734904.125 45609.2
DH5833 CTGU GILFORD CORS ARP N411721.742 W0724004.444 54839.2
DI1874 NYRH RIVERHEAD CORS ARP N405524.088 W0724250.560 62313.5
DI0616 NYQN QUEENS CORS ARP N404310.261 W0734348.267 67981.7
DH5839 CTWI WINCHESTER CORS ARP N415351.907 W0730410.968 75239.8
DG7012 NYNP SUNY-NEW PALTZ CORS ARP N414432.852 W0740455.915 84146.3

NEAREST NGS PUBLISHED CONTROL POINT

LX7488 WELLS N411409.540 W0732001.404 1676.1

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

DXR 15

FILE: 0788log0120k.tps 000198064

NGS OPUS-RS SOLUTION REPORT
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USER: JOHN.ALLEN@SEWALL.COM DATE: January 24, 2011
RINEX FILE: 0788020v.11o TIME: 17:02:16 UTC

SOFTWARE: rsgps 1.35.1 RS26.prl 1.66 START: 2011/01/20 21:44:40
EPHEMERIS: igr16194.eph [rapid] STOP: 2011/01/20 22:04:30
NAV FILE: brdc0200.11n OBS USED: 2160 / 2160 : 100%
ANT NAME: TPSHIPER_GD QUALITY IND. 32.30/ 13.95
ARP HEIGHT: 1.5 NORMALIZED RMS: 0.277

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2011.05456)

X: 1374620.048(m) 0.010(m) 1374619.279(m) 0.010(m)
Y: -4597508.014(m) 0.013(m) -4597506.579(m) 0.013(m)
Z: 4187856.125(m) 0.013(m) 4187856.045(m) 0.013(m)

LAT: 41 18 9.63681 0.006(m) 41 18 9.66899 0.006(m)
E LON: 286 38 46.55829 0.008(m) 286 38 46.54429 0.008(m)
W LON: 73 21 13.44171 0.008(m) 73 21 13.45571 0.008(m)
EL HGT: 185.187(m) 0.019(m) 183.936(m) 0.019(m)
ORTHO HGT: 214.862(m) 0.024(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 18) SPC (0600 CT)
Northing (Y) [meters] 4573665.009 204700.965
Easting (X) [meters] 637820.675 254239.289
Convergence [degrees] 1.08676692 -0.40031141
Point Scale 0.99983377 0.99999122
Combined Factor 0.99980472 0.99996218

US NATIONAL GRID DESIGNATOR: 18TXL3782073665(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DH5825	CTBR BROOKFIELD CORS ARP	N412949.864	W0732505.674	22266.5
DH5827	CTDA DARIEN CORS ARP	N410357.069	W0733025.942	29285.0
DF9200	RVDI RIVERSIDE COOP CORS ARP	N410231.146	W0733452.378	34679.5
DI0624	NYVH VALHALLA CORS ARP	N410456.221	W0734904.125	45987.4
AJ4872	LAMT LAMONT EARTH OBS CORS ARP	N410016.233	W0735432.057	57168.6
DI0446	NYCI CENTRAL ISLIP CORS ARP	N404538.237	W0731151.787	61611.7
DH7113	CTNE PAQUETTE CORS ARP	N414024.717	W0724252.252	67425.8
DI0616	NYQN QUEENS CORS ARP	N404310.261	W0734348.267	72086.7
DJ5208	MOR6 MORICHES 6 CORS ARP	N404721.826	W0724447.868	76516.2

NEAREST NGS PUBLISHED CONTROL POINT

LX2315 F 73 N411827. W0732052. 732.4

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

CT BP1

FILE: 0788log0120d.tps 000198056

NGS OPUS-RS SOLUTION REPORT

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USER: JOHN.ALLEN@SEWALL.COM DATE: January 24, 2011
RINEX FILE: 0788020p.11o TIME: 16:54:08 UTC

SOFTWARE: rsgps 1.35.1 RS28.prl 1.66 START: 2011/01/20 15:34:20
EPHEMERIS: igr16194.eph [rapid] STOP: 2011/01/20 15:55:05
NAV FILE: brdc0200.11n OBS USED: 1638 / 2205 : 74%
ANT NAME: TPSHIPER_GD QUALITY IND. 30.25/ 5.68
ARP HEIGHT: 1.5 NORMALIZED RMS: 0.290

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2011.05385)

X: 1351942.215(m) 0.004(m) 1351941.447(m) 0.004(m)
Y: -4619880.190(m) 0.012(m) -4619878.754(m) 0.012(m)
Z: 4170605.134(m) 0.008(m) 4170605.051(m) 0.008(m)

LAT: 41 5 48.18937 0.008(m) 41 5 48.22131 0.008(m)
E LON: 286 18 40.91006 0.005(m) 286 18 40.89576 0.005(m)
W LON: 73 41 19.08994 0.005(m) 73 41 19.10424 0.005(m)
EL HGT: 123.897(m) 0.012(m) 122.641(m) 0.012(m)
ORTHO HGT: 154.451(m) 0.019(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 18) SPC (0600 CT)
Northing (Y) [meters] 4550322.409 182079.416
Easting (X) [meters] 610127.662 225944.445
Convergence [degrees] 0.86208806 -0.62237154
Point Scale 0.99974927 1.00001204
Combined Factor 0.99972984 0.99999260

US NATIONAL GRID DESIGNATOR: 18TXL1012750322(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DF9200	RVDI RIVERSIDE COOP CORS ARP	N410231.146	W0733452.378	10884.6
DH5827	CTDA DARIEN CORS ARP	N410357.069	W0733025.942	15627.2
DI0616	NYQN QUEENS CORS ARP	N404310.261	W0734348.267	42034.8
DH5825	CTBR BROOKFIELD CORS ARP	N412949.864	W0732505.674	49910.1
DI0446	NYCI CENTRAL ISLIP CORS ARP	N404538.237	W0731151.787	55702.8
DI0600	NYMD MIDDLETOWN CORS ARP	N412424.522	W0742634.078	71983.1
DG7012	NYNP SUNY-NEW PALTZ CORS ARP	N414432.852	W0740455.915	78904.7
DI1874	NYRH RIVERHEAD CORS ARP	N405524.088	W0724250.560	84214.9
DH5833	CTGU GILFORD CORS ARP	N411721.742	W0724004.444	88260.7

NEAREST NGS PUBLISHED CONTROL POINT

LX7368 6049 TP 1 N410528. W0734116. 628.4

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

CT BP2

FILE: 0788log0120b.tps 000198053

NGS OPUS-RS SOLUTION REPORT
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USER: JOHN.ALLEN@SEWALL.COM DATE: January 24, 2011
RINEX FILE: 0788020n.11o TIME: 16:57:10 UTC

SOFTWARE: rsgps 1.35.1 RS23.prl 1.66 START: 2011/01/20 13:41:40
EPHEMERIS: igr16194.eph [rapid] STOP: 2011/01/20 14:04:00
NAV FILE: brdc0200.11n OBS USED: 2268 / 2268 : 100%
ANT NAME: TPSHIPER_GD QUALITY IND. 27.58/ 33.12
ARP HEIGHT: 1.5 NORMALIZED RMS: 0.287

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2011.05364)

X: 1358699.130(m) 0.008(m) 1358698.362(m) 0.008(m)
Y: -4622688.587(m) 0.017(m) -4622687.150(m) 0.017(m)
Z: 4165155.378(m) 0.016(m) 4165155.294(m) 0.016(m)

LAT: 41 1 57.11517 0.006(m) 41 1 57.14707 0.006(m)
E LON: 286 22 44.75981 0.010(m) 286 22 44.74561 0.010(m)
W LON: 73 37 15.24019 0.010(m) 73 37 15.25439 0.010(m)
EL HGT: 9.481(m) 0.022(m) 8.223(m) 0.022(m)
ORTHO HGT: 40.057(m) 0.027(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 18) SPC (0600 CT)
Northing (Y) [meters] 4543284.455 174891.749
Easting (X) [meters] 615928.939 231563.003
Convergence [degrees] 0.90546244 -0.57745852
Point Scale 0.99976541 1.00002114
Combined Factor 0.99976392 1.00001965

US NATIONAL GRID DESIGNATOR: 18TXL1592843284(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DF9200	RVDI RIVERSIDE COOP CORS ARP	N410231.146	W0733452.378	3498.2
DH5827	CTDA DARIEN CORS ARP	N410357.069	W0733025.942	10249.8
DI0624	NYVH VALHALLA CORS ARP	N410456.221	W0734904.125	17450.9
AJ4872	LAMT LAMONT EARTH OBS CORS ARP	N410016.233	W0735432.057	24423.9
DI0616	NYQN QUEENS CORS ARP	N404310.261	W0734348.267	35958.2
DI0446	NYCI CENTRAL ISLIP CORS ARP	N404538.237	W0731151.787	46727.1
DI0470	NYLC LAKE CARMEL CORS ARP	N412851.876	W0733905.369	49881.9
DH5825	CTBR BROOKFIELD CORS ARP	N412949.864	W0732505.674	54326.4
DK7181	NYNB NEWBURGH CORS ARP	N412942.806	W0740131.973	61565.6

NEAREST NGS PUBLISHED CONTROL POINT

LX3910 GREENWICH CHURCH SPIRE N410207.134 W0733723.191 361.1

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

CT BP3

FILE: 0788log0120g.tps 000198060

NGS OPUS-RS SOLUTION REPORT

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USER: JOHN.ALLEN@SEWALL.COM DATE: January 24, 2011
RINEX FILE: 0788020s.11o TIME: 16:59:47 UTC

SOFTWARE: rsgps 1.35.1 RS50.prl 1.66 START: 2011/01/20 18:23:50
EPHEMERIS: igr16194.eph [rapid] STOP: 2011/01/20 18:44:10
NAV FILE: brdc0200.11n OBS USED: 1647 / 1809 : 91%
ANT NAME: TPSHIPER_GD QUALITY IND. 22.58/ 10.26
ARP HEIGHT: 1.5 NORMALIZED RMS: 0.443

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2011.05417)

X: 1371071.121(m) 0.010(m) 1371070.353(m) 0.010(m)
Y: -4616820.539(m) 0.023(m) -4616819.102(m) 0.023(m)
Z: 4167533.547(m) 0.024(m) 4167533.464(m) 0.024(m)

LAT: 41 3 40.42954 0.009(m) 41 3 40.46150 0.009(m)
E LON: 286 32 23.99557 0.010(m) 286 32 23.98156 0.010(m)
W LON: 73 27 36.00443 0.010(m) 73 27 36.01844 0.010(m)
EL HGT: -29.275(m) 0.032(m) -30.533(m) 0.032(m)
ORTHO HGT: 0.997(m) 0.035(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 18) SPC (0600 CT)
Northing (Y) [meters] 4546696.686 177955.029
Easting (X) [meters] 629398.490 245119.502
Convergence [degrees] 1.01171169 -0.47077303
Point Scale 0.99980608 1.00001692
Combined Factor 0.99981067 1.00002151

US NATIONAL GRID DESIGNATOR: 18TXL2939846696(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DH5827	CTDA DARIEN CORS ARP	N410357.069	W0733025.942	4000.9
DF9200	RVDI RIVERSIDE COOP CORS ARP	N410231.146	W0733452.378	10412.2
DI0624	NYVH VALHALLA CORS ARP	N410456.221	W0734904.125	30162.8
AJ4872	LAMT LAMONT EARTH OBS CORS ARP	N410016.233	W0735432.057	38272.1
DI0616	NYQN QUEENS CORS ARP	N404310.261	W0734348.267	44249.8
DH5825	CTBR BROOKFIELD CORS ARP	N412949.864	W0732505.674	48543.1
DM4134	NYBP BATTERY PARK CORS ARP	N404203.817	W0740051.549	61502.8
DI1874	NYRH RIVERHEAD CORS ARP	N405524.088	W0724250.560	64608.3
DK7181	NYNB NEWBURGH CORS ARP	N412942.806	W0740131.973	67587.6

NEAREST NGS PUBLISHED CONTROL POINT

LX3806 FISH N410253.826 W0732727.362 1455.1

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

CT BP4

FILE: log0121a.tps 000198004

NGS OPUS-RS SOLUTION REPORT

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USER: JOHN.ALLEN@SEWALL.COM DATE: January 24, 2011
RINEX FILE: log0021m.11o TIME: 16:05:55 UTC

SOFTWARE: rsgps 1.35.1 RS28.prl 1.66 START: 2011/01/21 12:46:00
EPHEMERIS: igr16195.eph [rapid] STOP: 2011/01/21 13:06:55
NAV FILE: brdc0210.11n OBS USED: 1962 / 2457 : 80%
ANT NAME: TPSHIPER_GD QUALITY IND. 20.28/ 10.95
ARP HEIGHT: 2.0 NORMALIZED RMS: 0.321

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2011.05627)

X: 1380199.833(m) 0.008(m) 1380199.065(m) 0.008(m)
Y: -4609837.739(m) 0.012(m) -4609836.302(m) 0.012(m)
Z: 4172223.085(m) 0.014(m) 4172223.003(m) 0.014(m)

LAT: 41 7 1.99348 0.007(m) 41 7 2.02552 0.007(m)
E LON: 286 40 4.31213 0.009(m) 286 40 4.29826 0.009(m)
W LON: 73 19 55.68787 0.009(m) 73 19 55.70174 0.009(m)
EL HGT: -24.512(m) 0.017(m) -25.769(m) 0.017(m)
ORTHO HGT: 5.495(m) 0.022(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

	UTM (Zone 18)	SPC (0600 CT)
Northing (Y) [meters]	4553110.186	184092.612
Easting (X) [meters]	640023.864	255909.316
Convergence [degrees]	1.09696839	-0.38599046
Point Scale	0.99984131	1.00000939
Combined Factor	0.99984515	1.00001324

US NATIONAL GRID DESIGNATOR: 18TXL4002353110(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DH5827	CTDA DARIEN CORS ARP	N410357.069	W0733025.942	15776.7
DF9200	RVDI RIVERSIDE COOP CORS ARP	N410231.146	W0733452.378	22537.2
DI0624	NYVH VALHALLA CORS ARP	N410456.221	W0734904.125	40985.1
DI0470	NYLC LAKE CARMEL CORS ARP	N412851.876	W0733905.369	48460.9
DI0616	NYQN QUEENS CORS ARP	N404310.261	W0734348.267	55446.3
DH5833	CTGU GILFORD CORS ARP	N411721.742	W0724004.444	58902.0
DK7181	NYNB NEWBURGH CORS ARP	N412942.806	W0740131.973	71654.5
DH7113	CTNE PAQUETTE CORS ARP	N414024.717	W0724252.252	80530.4
DH5839	CTWI WINCHESTER CORS ARP	N415351.907	W0730410.968	89415.0

NEAREST NGS PUBLISHED CONTROL POINT

LX0814 C 2 N410712. W0731942. 444.3

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

CT BP5

FILE: 0788log0120i.tps 000198063

NGS OPUS-RS SOLUTION REPORT

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USER: JOHN.ALLEN@SEWALL.COM DATE: January 24, 2011
RINEX FILE: 0788020u.11o TIME: 16:58:12 UTC

SOFTWARE: rsgps 1.35.1 RS11.prl 1.66 START: 2011/01/20 20:14:30
EPHEMERIS: igr16194.eph [rapid] STOP: 2011/01/20 20:35:35
NAV FILE: brdc0200.11n OBS USED: 2124 / 2223 : 96%
ANT NAME: TPSHIPER_GD QUALITY IND. 24.80/ 26.22
ARP HEIGHT: 1.5 NORMALIZED RMS: 0.295

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2011.05439)

X: 1369287.301(m) 0.005(m) 1369286.532(m) 0.005(m)
Y: -4603979.654(m) 0.006(m) -4603978.219(m) 0.006(m)
Z: 4182434.111(m) 0.009(m) 4182434.030(m) 0.009(m)

LAT: 41 14 17.52462 0.006(m) 41 14 17.55672 0.006(m)
E LON: 286 33 47.54413 0.006(m) 286 33 47.53004 0.006(m)
W LON: 73 26 12.45587 0.006(m) 73 26 12.46996 0.006(m)
EL HGT: 124.637(m) 0.009(m) 123.384(m) 0.009(m)
ORTHO HGT: 154.481(m) 0.017(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 18) SPC (0600 CT)
Northing (Y) [meters] 4566378.334 197592.574
Easting (X) [meters] 630995.793 247226.474
Convergence [degrees] 1.03059800 -0.45538479
Point Scale 0.99981119 0.99999636
Combined Factor 0.99979164 0.99997681

US NATIONAL GRID DESIGNATOR: 18TXL3099566378(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DH5827	CTDA DARIEN CORS ARP	N410357.069	W0733025.942	20032.9
DF9200	RVDI RIVERSIDE COOP CORS ARP	N410231.146	W0733452.378	24937.9
DH5825	CTBR BROOKFIELD CORS ARP	N412949.864	W0732505.674	28805.3
DI0470	NYLC LAKE CARMEL CORS ARP	N412851.876	W0733905.369	32409.8
DI0624	NYVH VALHALLA CORS ARP	N410456.221	W0734904.125	36366.9
AJ4872	LAMT LAMONT EARTH OBS CORS ARP	N410016.233	W0735432.057	47387.7
DI0446	NYCI CENTRAL ISLIP CORS ARP	N404538.237	W0731151.787	56723.7
DI0616	NYQN QUEENS CORS ARP	N404310.261	W0734348.267	62667.8
DI1874	NYRH RIVERHEAD CORS ARP	N405524.088	W0724250.560	70080.0

NEAREST NGS PUBLISHED CONTROL POINT

LX1874 R 54 N411420. W0732553. 458.8

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

CT BP6

FILE: log0120b.tps 000197875

NGS OPUS-RS SOLUTION REPORT

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USER: john.allen@sewall.com DATE: January 24, 2011
RINEX FILE: log0020n.11o TIME: 14:25:42 UTC

SOFTWARE: rsgps 1.35.1 RS10.prl 1.66 START: 2011/01/20 13:37:30
EPHEMERIS: igr16194.eph [rapid] STOP: 2011/01/20 14:10:35
NAV FILE: brdc0200.11n OBS USED: 2448 / 3285 : 75%
ANT NAME: TPSHIPER_GD QUALITY IND. 26.40/ 30.79
ARP HEIGHT: 2.0 NORMALIZED RMS: 0.366

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2011.05364)

X: 1369815.103(m) 0.011(m) 1369814.334(m) 0.011(m)
Y: -4595220.801(m) 0.025(m) -4595219.367(m) 0.025(m)
Z: 4191888.062(m) 0.024(m) 4191887.982(m) 0.024(m)

LAT: 41 21 4.11245 0.006(m) 41 21 4.14464 0.006(m)
E LON: 286 35 56.71388 0.008(m) 286 35 56.69980 0.008(m)
W LON: 73 24 3.28612 0.008(m) 73 24 3.30020 0.008(m)
EL HGT: 169.665(m) 0.035(m) 168.416(m) 0.035(m)
ORTHO HGT: 199.355(m) 0.038(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 18) SPC (0600 CT)
Northing (Y) [meters] 4578971.859 210112.025
Easting (X) [meters] 633771.656 250328.773
Convergence [degrees] 1.05662847 -0.43159389
Point Scale 0.99982023 0.99998819
Combined Factor 0.99979362 0.99996158

US NATIONAL GRID DESIGNATOR: 18TXL3377178971(NAD 83)

BASE STATIONS USED

PID DESIGNATION LATITUDE LONGITUDE DISTANCE(m)
DH5825 CTBR BROOKFIELD CORS ARP N412949.864 W0732505.674 16285.0
DI0470 NYLC LAKE CARMEL CORS ARP N412851.876 W0733905.369 25439.3
DH5827 CTDA DARIEN CORS ARP N410357.069 W0733025.942 32914.8
DF9200 RVDI RIVERSIDE COOP CORS ARP N410231.146 W0733452.378 37518.8
DI0624 NYVH VALHALLA CORS ARP N410456.221 W0734904.125 45977.0
DK7181 NYNB NEWBURGH CORS ARP N412942.806 W0740131.973 54613.9
DH5833 CTGU GILFORD CORS ARP N411721.742 W0724004.444 61755.4
DH5839 CTWI WINCHESTER CORS ARP N415351.907 W0730410.968 66690.9
DG7012 NYNP SUNY-NEW PALTZ CORS ARP N414432.852 W0740455.915 71555.6

NEAREST NGS PUBLISHED CONTROL POINT

LX0945 N 15 N412127. W0732506. 1618.6

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

CT BP7

FILE: log0120c.tps 000197877

NGS OPUS-RS SOLUTION REPORT
=====

USER: john.allen@sewall.com DATE: January 24, 2011
RINEX FILE: log0020p.11o TIME: 14:26:09 UTC

SOFTWARE: rsgps 1.35.1 RS11.prl 1.66 START: 2011/01/20 15:16:40
EPHEMERIS: igr16194.eph [rapid] STOP: 2011/01/20 15:39:10
NAV FILE: brdc0200.11n OBS USED: 2340 / 2592 : 90%
ANT NAME: TPSHIPER_GD QUALITY IND. 24.35/ 28.31
ARP HEIGHT: 2.0 NORMALIZED RMS: 0.315

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2011.05382)

X: 1381516.501(m) 0.004(m) 1381515.732(m) 0.004(m)
Y: -4592630.508(m) 0.016(m) -4592629.073(m) 0.016(m)
Z: 4190783.582(m) 0.011(m) 4190783.502(m) 0.011(m)

LAT: 41 20 18.49241 0.008(m) 41 20 18.52462 0.008(m)
E LON: 286 44 30.82579 0.007(m) 286 44 30.81190 0.007(m)
W LON: 73 15 29.17421 0.007(m) 73 15 29.18810 0.007(m)
EL HGT: 97.205(m) 0.017(m) 95.955(m) 0.017(m)
ORTHO HGT: 126.758(m) 0.022(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 18) SPC (0600 CT)
Northing (Y) [meters] 4577795.147 208624.532
Easting (X) [meters] 645747.052 262271.344
Convergence [degrees] 1.15073482 -0.33690313
Point Scale 0.99986143 0.99998891
Combined Factor 0.99984618 0.99997367

US NATIONAL GRID DESIGNATOR: 18TXL4574777795(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DH5825	CTBR BROOKFIELD CORS ARP	N412949.864	W0732505.674	22135.2
DI0470	NYLC LAKE CARMEL CORS ARP	N412851.876	W0733905.369	36507.4
DF9200	RVDI RIVERSIDE COOP CORS ARP	N410231.146	W0733452.378	42649.5
DH5833	CTGU GILFORD CORS ARP	N411721.742	W0724004.444	49720.6
DI0624	NYVH VALHALLA CORS ARP	N410456.221	W0734904.125	54890.8
DH7113	CTNE PAQUETTE CORS ARP	N414024.717	W0724252.252	58690.0
DH5839	CTWI WINCHESTER CORS ARP	N415351.907	W0730410.968	64072.0
DJ5208	MOR6 MORICHES 6 CORS ARP	N404721.826	W0724447.868	74608.8
DI0616	NYQN QUEENS CORS ARP	N404310.261	W0734348.267	79374.2

NEAREST NGS PUBLISHED CONTROL POINT

LX2347 F 74 N412013. W0731543. 363.2

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

CT BP9

FILE: log0120j.tps 000197892

NGS OPUS-RS SOLUTION REPORT
=====

USER: john.allen@sewall.com DATE: January 24, 2011
RINEX FILE: log0020v.11o TIME: 14:33:31 UTC

SOFTWARE: rsgps 1.35.1 RS10.prl 1.66 START: 2011/01/20 21:20:20
EPHEMERIS: igr16194.eph [rapid] STOP: 2011/01/20 21:46:40
NAV FILE: brdc0200.11n OBS USED: 2385 / 2475 : 96%
ANT NAME: TPSHIPER_GD QUALITY IND. 48.85/ 38.09
ARP HEIGHT: 2.0 NORMALIZED RMS: 0.263

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2011.05452)

X: 1387416.655(m) 0.012(m) 1387415.886(m) 0.012(m)
Y: -4602849.660(m) 0.021(m) -4602848.223(m) 0.021(m)
Z: 4177518.505(m) 0.019(m) 4177518.424(m) 0.019(m)

LAT: 41 10 49.71660 0.006(m) 41 10 49.74873 0.006(m)
E LON: 286 46 26.94225 0.010(m) 286 46 26.92845 0.010(m)
W LON: 73 13 33.05775 0.010(m) 73 13 33.07155 0.010(m)
EL HGT: -16.075(m) 0.028(m) -17.331(m) 0.028(m)
ORTHO HGT: 13.770(m) 0.032(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 18) SPC (0600 CT)
Northing (Y) [meters] 4560309.205 191062.953
Easting (X) [meters] 648804.252 264874.460
Convergence [degrees] 1.16837334 -0.31551643
Point Scale 0.99987252 1.00000203
Combined Factor 0.99987504 1.00000455

US NATIONAL GRID DESIGNATOR: 18TXL4880460309(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DH5827	CTDA DARIEN CORS ARP	N410357.069	W0733025.942	26838.7
DF9200	RVDI RIVERSIDE COOP CORS ARP	N410231.146	W0733452.378	33578.0
DH5825	CTBR BROOKFIELD CORS ARP	N412949.864	W0732505.674	38685.0
DI0446	NYCI CENTRAL ISLIP CORS ARP	N404538.237	W0731151.787	46686.2
DI0624	NYVH VALHALLA CORS ARP	N410456.221	W0734904.125	50888.1
DJ5208	MOR6 MORICHES 6 CORS ARP	N404721.826	W0724447.868	59266.8
DI0616	NYQN QUEENS CORS ARP	N404310.261	W0734348.267	66504.6
DK7181	NYNB NEWBURGH CORS ARP	N412942.806	W0740131.973	75514.9
DH5839	CTWI WINCHESTER CORS ARP	N415351.907	W0730410.968	80722.9

NEAREST NGS PUBLISHED CONTROL POINT

LX0838 A 37 1 C OF B N411025. W0731258. 1118.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

CT BP10

FILE: log0120f.tps 000197884

NGS OPUS-RS SOLUTION REPORT
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USER: john.allen@sewall.com DATE: January 24, 2011
RINEX FILE: log0020s.11o TIME: 14:30:18 UTC

SOFTWARE: rsgps 1.35.1 RS28.prl 1.66 START: 2011/01/20 18:05:05
EPHEMERIS: igr16194.eph [rapid] STOP: 2011/01/20 18:28:05
NAV FILE: brdc0200.11n OBS USED: 2070 / 2340 : 88%
ANT NAME: TPSHIPER_GD QUALITY IND. 35.74/ 31.48
ARP HEIGHT: 2.0 NORMALIZED RMS: 0.264

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2011.05414)

X: 1390960.830(m) 0.012(m) 1390960.061(m) 0.012(m)
Y: -4594930.420(m) 0.019(m) -4594928.984(m) 0.019(m)
Z: 4185140.798(m) 0.016(m) 4185140.718(m) 0.016(m)

LAT: 41 16 15.60343 0.008(m) 41 16 15.63563 0.008(m)
E LON: 286 50 30.93020 0.008(m) 286 50 30.91646 0.008(m)
W LON: 73 9 29.06980 0.008(m) 73 9 29.08354 0.008(m)
EL HGT: 76.283(m) 0.025(m) 75.029(m) 0.025(m)
ORTHO HGT: 105.927(m) 0.029(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 18) SPC (0600 CT)
Northing (Y) [meters] 4570477.483 201087.185
Easting (X) [meters] 654275.993 270608.506
Convergence [degrees] 1.21521226 -0.27057795
Point Scale 0.99989292 0.99999359
Combined Factor 0.99988096 0.99998163

US NATIONAL GRID DESIGNATOR: 18TXL5427570477(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DH5825	CTBR BROOKFIELD CORS ARP	N412949.864	W0732505.674	33235.8
DH5827	CTDA DARIEN CORS ARP	N410357.069	W0733025.942	37115.2
DH5833	CTGU GILFORD CORS ARP	N411721.742	W0724004.444	41116.5
DI0470	NYLC LAKE CARMEL CORS ARP	N412851.876	W0733905.369	47415.4
DI1874	NYRH RIVERHEAD CORS ARP	N405524.088	W0724250.560	53685.4
DI0446	NYCI CENTRAL ISLIP CORS ARP	N404538.237	W0731151.787	56777.9
DJ5208	MOR6 MORICHES 6 CORS ARP	N404721.826	W0724447.868	63700.9
AJ4872	LAMT LAMONT EARTH OBS CORS ARP	N410016.233	W0735432.057	69641.3
DK7181	NYNB NEWBURGH CORS ARP	N412942.806	W0740131.973	76714.8

NEAREST NGS PUBLISHED CONTROL POINT

LX3678 HUNTINGTON TURNPIKE TANK N411531.364 W0730848.812 1657.4

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

CT BP18

FILE: log0120g.tps 000197974

NGS OPUS-RS SOLUTION REPORT

=====

USER: john.allen@sewall.com
RINEX FILE: log0020s.11o

DATE: January 24, 2011
TIME: 15:41:28 UTC

SOFTWARE: rsgps 1.35.1 RS11.prl 1.66 START: 2011/01/20 18:59:20
EPHEMERIS: igr16194.eph [rapid] STOP: 2011/01/20 19:23:00
NAV FILE: brdc0200.11n OBS USED: 1728 / 2349 : 74%
ANT NAME: TPSHIPER_GD QUALITY IND. 23.41/ 36.21
ARP HEIGHT: 2.0 NORMALIZED RMS: 0.263

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2011.05425)

X: 1387417.763(m) 0.009(m) 1387416.994(m) 0.009(m)
Y: -4595116.322(m) 0.016(m) -4595114.886(m) 0.016(m)
Z: 4186166.935(m) 0.017(m) 4186166.855(m) 0.017(m)

LAT: 41 16 58.72092 0.008(m) 41 16 58.75313 0.008(m)
E LON: 286 48 2.89407 0.009(m) 286 48 2.88027 0.009(m)
W LON: 73 11 57.10593 0.009(m) 73 11 57.11973 0.009(m)
EL HGT: 116.397(m) 0.021(m) 115.144(m) 0.021(m)
ORTHO HGT: 146.017(m) 0.026(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 18) SPC (0600 CT)
Northing (Y) [meters] 4571734.955 202434.414
Easting (X) [meters] 650804.036 267169.959
Convergence [degrees] 1.18835509 -0.29784372
Point Scale 0.99987989 0.99999266
Combined Factor 0.99986163 0.99997440

US NATIONAL GRID DESIGNATOR: 18TXL5080471734(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DH5825	CTBR BROOKFIELD CORS ARP	N412949.864	W0732505.674	30027.2
DH5827	CTDA DARIEN CORS ARP	N410357.069	W0733025.942	35348.3
DF9200	RVDI RIVERSIDE COOP CORS ARP	N410231.146	W0733452.378	41765.2
DI0624	NYVH VALHALLA CORS ARP	N410456.221	W0734904.125	56487.2
DJ5208	MOR6 MORICHES 6 CORS ARP	N404721.826	W0724447.868	66730.0
DK7181	NYNB NEWBURGH CORS ARP	N412942.806	W0740131.973	73024.1
DI0616	NYQN QUEENS CORS ARP	N404310.261	W0734348.267	76879.8
DH5829	CTEG EAST GRANBY CORS ARP	N415524.347	W0724155.881	82459.2
DG7012	NYNP SUNY-NEW PALTZ CORS ARP	N414432.852	W0740455.915	89653.8

NEAREST NGS PUBLISHED CONTROL POINT

LX7621 TRUMBULL ATT MICROWAVE N411648.578 W0731107.716 1189.8

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

CT BP19

FILE: 0788log0120f.tps 000198058

NGS OPUS-RS SOLUTION REPORT

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USER: JOHN.ALLEN@SEWALL.COM DATE: January 24, 2011
RINEX FILE: 0788020r.11o TIME: 16:55:02 UTC

SOFTWARE: rsgps 1.35.1 RS11.prl 1.66 START: 2011/01/20 17:33:00
EPHEMERIS: igr16194.eph [rapid] STOP: 2011/01/20 17:54:35
NAV FILE: brdc0200.11n OBS USED: 1359 / 1476 : 92%
ANT NAME: TPSHIPER_GD QUALITY IND. 26.28/ 17.13
ARP HEIGHT: 1.5 NORMALIZED RMS: 0.267

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2011.05408)

X: 1366520.335(m) 0.009(m) 1366519.567(m) 0.009(m)
Y: -4612184.215(m) 0.020(m) -4612182.779(m) 0.020(m)
Z: 4174230.692(m) 0.014(m) 4174230.610(m) 0.014(m)

LAT: 41 8 26.32098 0.010(m) 41 8 26.35299 0.010(m)
E LON: 286 30 13.53164 0.009(m) 286 30 13.51756 0.009(m)
W LON: 73 29 46.46836 0.009(m) 73 29 46.48244 0.009(m)
EL HGT: 48.665(m) 0.022(m) 47.410(m) 0.022(m)
ORTHO HGT: 78.784(m) 0.027(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 18) SPC (0600 CT)
Northing (Y) [meters] 4555459.855 186799.893
Easting (X) [meters] 626201.177 242149.489
Convergence [degrees] 0.98946774 -0.49480229
Point Scale 0.99979602 1.00000653
Combined Factor 0.99978838 0.99999889

US NATIONAL GRID DESIGNATOR: 18TXL2620155459(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DH5827	CTDA DARIEN CORS ARP	N410357.069	W0733025.942	8357.3
DF9200	RVDI RIVERSIDE COOP CORS ARP	N410231.146	W0733452.378	13077.7
DI0624	NYVH VALHALLA CORS ARP	N410456.221	W0734904.125	27776.8
AJ4872	LAMT LAMONT EARTH OBS CORS ARP	N410016.233	W0735432.057	37833.8
DI0446	NYCI CENTRAL ISLIP CORS ARP	N404538.237	W0731151.787	49120.6
DK7181	NYNB NEWBURGH CORS ARP	N412942.806	W0740131.973	59286.5
DM4134	NYBP BATTERY PARK CORS ARP	N404203.817	W0740051.549	65479.4
DI1874	NYRH RIVERHEAD CORS ARP	N405524.088	W0724250.560	70064.4
DJ5208	MOR6 MORICHES 6 CORS ARP	N404721.826	W0724447.868	74184.4

NEAREST NGS PUBLISHED CONTROL POINT

LX7422 BONGI N410709.138 W0733052.973 2845.2

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

CT BP20

FILE: 0788log0121b.tps 000198066

NGS OPUS-RS SOLUTION REPORT
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USER: JOHN.ALLEN@SEWALL.COM DATE: January 24, 2011
RINEX FILE: 0788021m.11o TIME: 16:59:50 UTC

SOFTWARE: rsgps 1.35.1 RS29.prl 1.66 START: 2011/01/21 12:51:45
EPHEMERIS: igr16195.eph [rapid] STOP: 2011/01/21 13:14:20
NAV FILE: brdc0210.11n OBS USED: 1683 / 2457 : 68%
ANT NAME: TPSHIPER_GD QUALITY IND. 24.03/ 27.13
ARP HEIGHT: 1.5 NORMALIZED RMS: 0.309

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2011.05628)

X: 1380175.234(m) 0.012(m) 1380174.465(m) 0.012(m)
Y: -4603454.088(m) 0.024(m) -4603452.652(m) 0.024(m)
Z: 4179359.509(m) 0.021(m) 4179359.428(m) 0.021(m)

LAT: 41 12 6.77265 0.004(m) 41 12 6.80476 0.004(m)
E LON: 286 41 21.88468 0.007(m) 286 41 21.87077 0.007(m)
W LON: 73 18 38.11532 0.007(m) 73 18 38.12923 0.007(m)
EL HGT: 63.142(m) 0.033(m) 61.887(m) 0.033(m)
ORTHO HGT: 92.930(m) 0.036(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 18) SPC (0600 CT)
Northing (Y) [meters] 4562544.027 193482.672
Easting (X) [meters] 641650.517 257780.013
Convergence [degrees] 1.11302457 -0.37170290
Point Scale 0.99984694 0.99999981
Combined Factor 0.99983704 0.99998991

US NATIONAL GRID DESIGNATOR: 18TXL4165062544(NAD 83)

BASE STATIONS USED

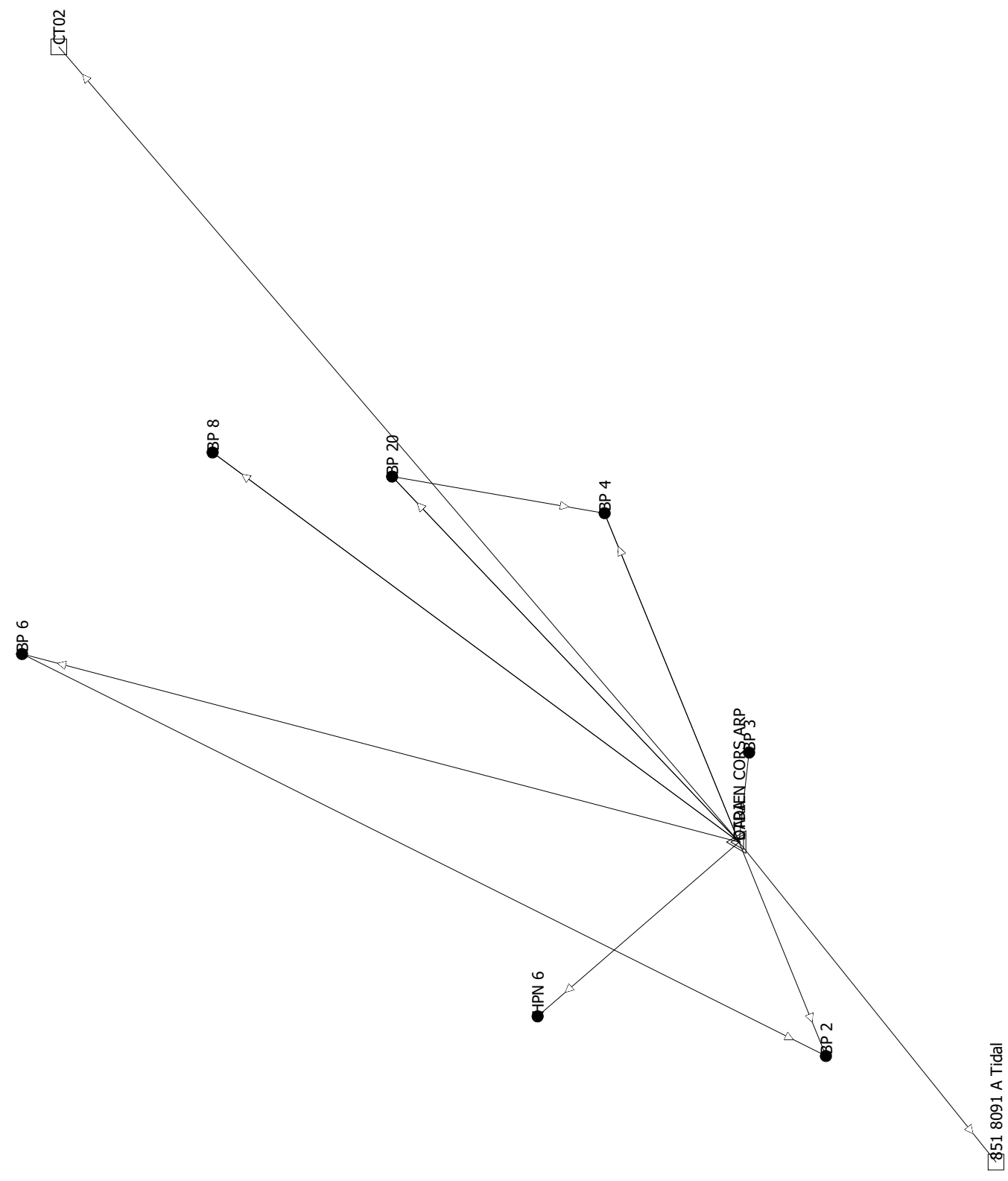
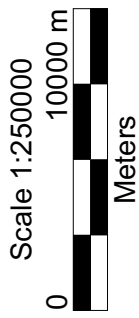
PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DH5827	CTDA DARIEN CORS ARP	N410357.069	W0733025.942	22378.0
DF9200	RVDI RIVERSIDE COOP CORS ARP	N410231.146	W0733452.378	28842.2
DH5825	CTBR BROOKFIELD CORS ARP	N412949.864	W0732505.674	34011.9
DI0470	NYLC LAKE CARMEL CORS ARP	N412851.876	W0733905.369	42139.2
DI0446	NYCI CENTRAL ISLIP CORS ARP	N404538.237	W0731151.787	49915.7
DH5833	CTGU GILFORD CORS ARP	N411721.742	W0724004.444	54740.5
DI1874	NYRH RIVERHEAD CORS ARP	N405524.088	W0724250.560	58915.4
DI0616	NYQN QUEENS CORS ARP	N404310.261	W0734348.267	64161.0
DK7181	NYNB NEWBURGH CORS ARP	N412942.806	W0740131.973	68129.5

NEAREST NGS PUBLISHED CONTROL POINT

LX7445 MURRAY 2 N411139.787 W0731712.154 2167.1

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

Field surveyor:
 Paul Messier/Eric Jellison
 Computer operator:
 Paul Messier
 Reference:
 NE LIDAR Connecticut



Site: Not selected, System: UTM
 Zone: 18 North, Datum: NAD 1983 (Conus)
 Project: 75980S PhotoSci SW Connecticut
 Metric Template

Plot Scale: 1:250000
 Printed on 3/21/2011, at 11:15:45 AM
 Printed from Trimble Geomatics Office

0°00'00"

Baseline Processing Report

Project : 75980S PhotoSci SW Connecticut

User name	mesp	Date & Time	4:22:36 PM 3/10/2011
Coordinate System	UTM	Zone	18 North
Project Datum	NAD 1983 (Conus)		
Vertical Datum	NAVD88	Geoid Model	GEIOD09(Conus)
Coordinate Units	Meters		
Distance Units	Meters		
Height Units	Meters		

Processing Summary

ID	From	To	Baseline Length	Solution Type	Ratio	Reference Variance	RMS
B1	CTDA	BP 8	29079.828m	iono free fixed	12.6	1.104	0.014m
B15	CTDA	BP 4	15776.650m	iono free fixed	26.7	0.499	0.009m
B28	CTDA	BP 8	29079.828m	iono free fixed	12.6	1.104	0.014m
B29	CTDA	BP 4	15776.650m	iono free fixed	24.1	0.480	0.009m
B24	CTDA	HPN 6	11827.204m	iono free fixed	18.4	0.690	0.012m
B18	CTDA	BP 6	32914.820m	iono free fixed	7.2	2.801	0.019m
B20	CTDA	851 8091 A Tidal	18214.248m	iono free fixed	20.6	0.527	0.009m
B21	CTDA	CT02	46459.287m	iono free fixed	7.9	1.703	0.014m
B26	CTDA	BP 20	22377.977m	iono free fixed	28.6	2.982	0.020m
B30	CTDA	BP 20	22377.975m	iono free fixed	20.1	5.004	0.026m
B5	CTDA	BP 2	10249.833m	iono free fixed	21.9	0.690	0.010m
B10	CTDA	BP 3	4000.887m	L1 fixed	7.7	7.816	0.011m

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Network Adjustment Report

Project : 75980S PhotoSci SW Connecticut

User name	mesp	Date & Time	12:17:01 PM 3/11/2011
Coordinate System	UTM	Zone	18 North
Project Datum	NAD 1983 (Conus)		
Vertical Datum	NAVD88	Geoid Model	GEIOD09(Conus)
Coordinate Units	Meters		
Distance Units	Meters		
Height Units	Meters		

Adjustment Style Settings - 95% Confidence Limits

Residual Tolerances

To End Iterations : 0.000010m
Final Convergence Cutoff : 0.005000m

Covariance Display

Horizontal

Propagated Linear Error [E] : U.S.
Constant Term [C] : 0.00000000m
Scale on Linear Error [S] : 1.96

Three-Dimensional

Propagated Linear Error [E] : U.S.
Constant Term [C] : 0.00000000m
Scale on Linear Error [S] : 1.96
Elevation Errors were used in the calculations.

Adjustment Controls

Compute Correlations for Geoid : True
Horizontal and Vertical adjustment performed

Set-up Errors

GPS

Error in Height of Antenna : 0.003m
Centering Error : 0.002m

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Statistical Summary

Successful Adjustment in 1 iteration(s)

Network Reference Factor : 0.33

Chi Square Test ($\alpha=95\%$) : PASS

Degrees of Freedom : 10.00

GPS Observation Statistics

Reference Factor : 0.35

Redundancy Number (r) : 9.00

Individual GPS Observation Statistics

Observation ID	Reference Factor	Redundancy Number
B1	1.00	1.50
B5	1.00	0.00
B10	1.00	0.00
B15	0.49	1.69
B18	1.00	0.00
B20	0.09	0.00
B21	0.09	0.00
B24	1.00	0.00
B26	0.34	0.54
B28	1.00	1.50
B29	0.49	1.31
B30	0.36	2.46

Geoid Model Statistics

Reference Factor : 0.09

Redundancy Number (r) : 1.00

Weighting Strategies

GPS Observations

Default Scalar Applied to All Observations

Scalar : 1.00

Geoid Observations

Default Scalar Applied to All Observations

Scalar : 1.00

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Adjusted Coordinates

Adjustment performed in **NAD 1983 (Conus)**

Number of Points : 10

Number of Constrained Points : 3

Horizontal Only : 1

Elevation Only : 2

Adjusted Grid CoordinatesErrors are reported using 1.96σ .

Point Name	Northing	N error	Easting	E error	Elevation	e error	Fix
CTDA	4547140.864m	0.000m	625423.178m	0.000m	16.966m	0.315m	N E
BP 8	4570512.747m	0.002m	642716.773m	0.001m	125.002m	0.315m	
BP 2	4543284.438m	0.002m	615928.955m	0.002m	40.028m	0.315m	
BP 3	4546696.669m	0.002m	629398.505m	0.002m	0.853m	0.315m	
BP 4	4553110.172m	0.002m	640023.878m	0.001m	5.480m	0.315m	
BP 6	4578971.849m	0.003m	633771.674m	0.003m	199.353m	0.315m	
851 8091 A Tidal	4535740.006m	0.002m	611223.516m	0.002m	7.529m	0.000m	e
CT02	4577336.595m	0.002m	660722.890m	0.002m	11.421m	0.000m	e
HPN 6	4556085.260m	0.003m	617689.486m	0.002m	N/A	N/A	
BP 20	4562544.012m	0.003m	641650.533m	0.003m	92.897m	0.316m	

Adjusted Geodetic CoordinatesErrors are reported using 1.96σ .

Point Name	Latitude	N error	Longitude	E error	Height	h error	Fix
CTDA	41° 03'57.06987"N	0.000m	73° 30'25.94233"W	0.000m	-13.366m	0.182m	Lat Long
BP 8	41° 16'24.39643"N	0.002m	73° 17'45.64743"W	0.001m	95.338m	0.182m	
BP 2	41° 01'57.11461"N	0.002m	73° 37'15.23951"W	0.002m	9.452m	0.182m	
BP 3	41° 03'40.42898"N	0.002m	73° 27'36.00377"W	0.002m	-29.419m	0.182m	
BP 4	41° 07'01.99301"N	0.002m	73° 19'55.68730"W	0.001m	-24.526m	0.182m	
BP 6	41° 21'04.11213"N	0.003m	73° 24'03.28533"W	0.003m	169.662m	0.182m	
851 8091 A Tidal	40° 57'54.87863"N	0.002m	73° 40'41.59136"W	0.002m	-23.306m	0.182m	e
CT02	41° 19'53.38044"N	0.002m	73° 04'45.60047"W	0.002m	-18.053m	0.182m	e
HPN 6	41° 08'51.20110"N	0.003m	73° 35'51.04582"W	0.002m	77.097m	0.182m	
BP 20	41°	0.003m	73°	0.003m	63.109m	0.182m	

12'06.77215"N

18'38.11464"W

Coordinate Deltas

Point Name	Δ Northing	Δ Easting	Δ Elevation	Δ Height	Δ Geoid Separation
CTDA	0.000m	0.000m	0.000m	0.000m	0.000m
BP 8	0.000m	0.000m	0.000m	0.000m	0.000m
BP 2	0.000m	0.000m	0.000m	0.000m	0.000m
BP 3	0.000m	0.000m	0.000m	0.000m	0.000m
BP 4	0.000m	0.000m	0.000m	0.000m	0.000m
BP 6	0.000m	0.000m	0.000m	0.000m	0.000m
851 8091 A Tidal	0.000m	0.000m	0.000m	0.000m	0.000m
CT02	0.000m	0.000m	0.000m	0.000m	0.000m
HPN 6	0.000m	0.000m	N/A	0.000m	N/A
BP 20	0.000m	0.000m	0.000m	0.000m	0.000m

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Control Coordinate Comparisons

Values shown are control coord minus adjusted coord.

Point Name	Δ Northing	Δ Easting	Δ Elevation	Δ Height
CTDA	N/A	N/A	N/A	N/A
851 8091 A Tidal	0.007m	-0.025m	N/A	0.032m
CT02	N/A	N/A	N/A	N/A

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Adjusted Observations

Adjustment performed in **NAD 1983 (Conus)**

GPS Observations

Number of Observations : 12

Number of Outliers : 0

Observation Adjustment (Critical Tau = 2.66). Any outliers are in **red**.

Obs. ID	From Pt.	To Pt.	Observation	A-posteriori Error (1.96 σ)	Residual	Stand. Residual

B26	CTDA	BP 20	Az.	47° 28'29.4334"	0°00'00.0360"	0° 00'00.0053"	0.63
			ΔHt.	76.475m	0.009m	0.003m	1.68
			Dist.	22377.770m	0.002m	-0.001m	-1.01
B29	CTDA	BP 4	Az.	68° 44'41.1510"	0°00'00.0222"	-0° 00'00.0156"	-1.58
			ΔHt.	-11.160m	0.004m	0.002m	1.15
			Dist.	15776.697m	0.001m	0.000m	-0.48
B30	CTDA	BP 20	Az.	47° 28'29.4334"	0°00'00.0360"	-0° 00'00.0407"	-0.96
			ΔHt.	76.475m	0.009m	-0.018m	-1.55
			Dist.	22377.770m	0.002m	0.002m	0.81
B15	CTDA	BP 4	Az.	68° 44'41.1510"	0°00'00.0222"	0° 00'00.0185"	1.42
			ΔHt.	-11.160m	0.004m	-0.003m	-1.11
			Dist.	15776.697m	0.001m	0.000m	0.46
B21	CTDA	CT02	Az.	50° 26'22.8870"	0°00'00.0094"	0° 00'00.0000"	-0.26
			ΔHt.	-4.687m	0.005m	0.000m	-0.26
			Dist.	46459.504m	0.002m	0.000m	0.26
B20	CTDA	851 8091 A Tidal	Az.	232° 13'08.2425"	0°00'00.0292"	0° 00'00.0000"	-0.26
			ΔHt.	-9.940m	0.006m	0.000m	0.26
			Dist.	18214.304m	0.002m	0.000m	-0.26
B1	CTDA	BP 8	Az.	37° 28'54.6763"	0°00'00.0114"	0° 00'00.0000"	0.00
			ΔHt.	108.705m	0.003m	0.000m	0.00
			Dist.	29079.463m	0.001m	0.000m	0.00
B28	CTDA	BP 8	Az.	37° 28'54.6763"	0°00'00.0114"	0° 00'00.0000"	0.00
			ΔHt.	108.705m	0.003m	0.000m	0.00
			Dist.	29079.463m	0.001m	0.000m	0.00
B10	CTDA	BP 3	Az.	97° 21'23.0622"	0°00'00.0990"	0° 00'00.0000"	0.00
			ΔHt.	-16.052m	0.005m	0.000m	0.00
			Dist.	4000.868m	0.002m	0.000m	0.00
B5	CTDA	BP 2	Az.	248° 52'26.8329"	0°00'00.0366"	0° 00'00.0000"	0.00
			ΔHt.	22.818m	0.004m	0.000m	0.00
			Dist.	10249.812m	0.002m	0.000m	0.00
				320°		0°	

B24	CTDA	HPN 6	Az.	08'00.6724"	0°00'00.0396"	00'00.0000"	0.00
			ΔHt.	90.463m	0.004m	0.000m	0.00
			Dist.	11826.801m	0.002m	0.000m	0.00
B18	CTDA	BP 6	Az.	15° 40'47.8061"	0°00'00.0155"	0° 00'00.0000"	0.00
			ΔHt.	183.028m	0.007m	0.000m	0.00
			Dist.	32913.943m	0.003m	0.000m	0.00

Geoid Observations

Number of Observations : 9

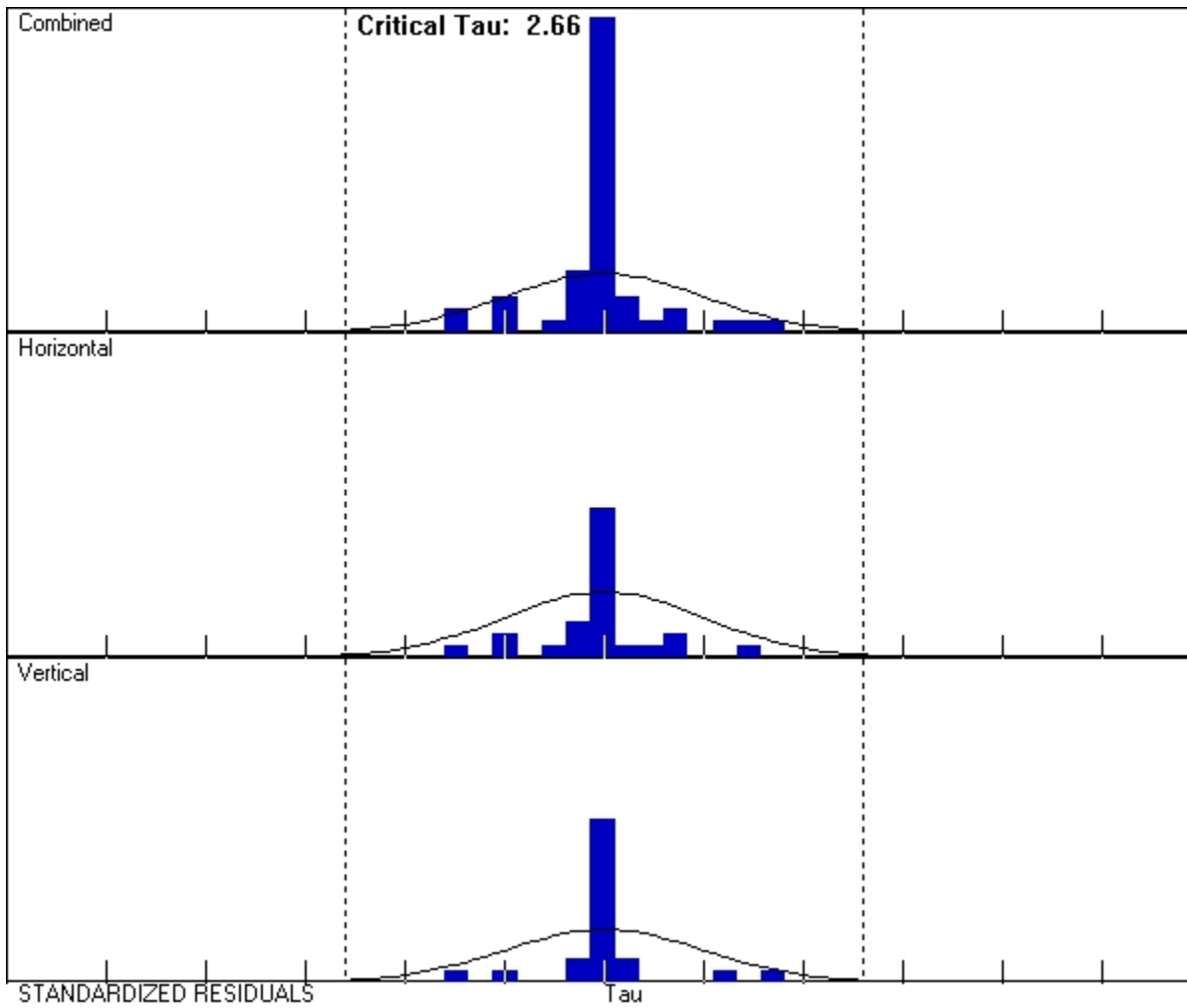
Number of Outliers : 0

Observation Adjustment (Critical Tau = 2.66). Any outliers are in **red**.

Observation ID	Point Name	Separation	A-posteriori Error (1.96σ)	Residual	Standardized Residual
G10	851 8091 A Tidal	-30.835m	0.182m	-0.024m	-0.26
G11	CT02	-29.474m	0.182m	0.024m	0.26
G1	CTDA	-30.332m	0.258m	0.000m	0.00
G2	BP 8	-29.664m	0.258m	0.000m	0.00
G3	BP 20	-29.788m	0.258m	0.000m	0.00
G4	BP 2	-30.576m	0.258m	0.000m	0.00
G6	BP 3	-30.272m	0.258m	0.000m	0.00
G8	BP 4	-30.007m	0.258m	0.000m	0.00
G9	BP 6	-29.690m	0.258m	0.000m	0.00

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Histograms of Standardized Residuals



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Point Error Ellipses

CTDA	BP 8	BP 2
<p>0°</p>	<p>-59°</p>	<p>65°</p>
Tick Size: 0.0010m Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ		
BP 3	BP 4	BP 6

Tick Size: 0.0010m Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ		
851 8091 A Tidal	CT02	HPN 6
Tick Size: 0.0010m Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ		
BP 20		
Tick Size: 0.0010m Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ		

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Covariant Terms

Adjustment performed in **NAD 1983 (Conus)**

From Point	To Point	Components	A-posteriori Error (1.96σ)	Horiz. Precision (Ratio)	3D Precision (Ratio)	
CTDA	BP 8	Az.	37° 28'54.6763"	0°00'00.0114"	1:21291012	1:21291012
		ΔHt.	108.705m	0.003m		
		ΔElev.	108.036m	0.446m		
		Dist.	29079.463m	0.001m		
CTDA	BP 2	Az.	248°	0°00'00.0366"	1:5615615	1:5615615

			52'26.8329"			
		Δ Ht.	22.818m	0.004m		
		Δ Elev.	23.062m	0.446m		
		Dist.	10249.812m	0.002m		
CTDA	BP 3	Az.	97° 21'23.0622"	0°00'00.0990"	1:2233890	1:2233890
		Δ Ht.	-16.052m	0.005m		
		Δ Elev.	-16.113m	0.446m		
		Dist.	4000.868m	0.002m		
CTDA	BP 4	Az.	68° 44'41.1510"	0°00'00.0222"	1:12165606	1:12165606
		Δ Ht.	-11.160m	0.004m		
		Δ Elev.	-11.485m	0.446m		
		Dist.	15776.697m	0.001m		
CTDA	BP 6	Az.	15° 40'47.8061"	0°00'00.0155"	1:10568047	1:10568047
		Δ Ht.	183.028m	0.007m		
		Δ Elev.	182.387m	0.446m		
		Dist.	32913.943m	0.003m		
CTDA	851 8091 A Tidal	Az.	232° 13'08.2425"	0°00'00.0292"	1:10375833	1:10375833
		Δ Ht.	-9.940m	0.006m		
		Δ Elev.	-9.437m	0.315m		
		Dist.	18214.304m	0.002m		
CTDA	CT02	Az.	50° 26'22.8870"	0°00'00.0094"	1:20121670	1:20121670
		Δ Ht.	-4.687m	0.005m		
		Δ Elev.	-5.545m	0.315m		
		Dist.	46459.504m	0.002m		
CTDA	HPN 6	Az.	320° 08'00.6724"	0°00'00.0396"	1:5233024	1:5233024
		Δ Ht.	90.463m	0.004m		
		Δ Elev.	?	?		
		Dist.	11826.801m	0.002m		
CTDA	BP 20	Az.	47° 28'29.4334"	0°00'00.0360"	1:9928884	1:9928884
		Δ Ht.	76.475m	0.009m		
		Δ Elev.	75.931m	0.446m		
		Dist.	22377.770m	0.002m		



3.0 Published Control Locations

WE 002

FILE: 0793log1207l.tps 000180707

NGS OPUS-RS SOLUTION REPORT

=====

USER: jeler@jws.com
RINEX FILE: 0793341v.10o

DATE: December 13, 2010
TIME: 19:14:35 UTC

SOFTWARE: rsgps 1.35.1 RS41.prl 1.65 START: 2010/12/07 21:09:15
EPHEMERIS: igr16132.eph [rapid] STOP: 2010/12/07 21:29:35
NAV FILE: brdc3410.10n OBS USED: 1737 / 1971 : 88%
ANT NAME: TPSHIPER_GD QUALITY IND. 26.52/ 27.74
ARP HEIGHT: 1.8 NORMALIZED RMS: 0.279

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2010.93394)

X: 1500468.020(m) 0.013(m) 1500467.251(m) 0.013(m)
Y: -4554028.725(m) 0.029(m) -4554027.284(m) 0.029(m)
Z: 4191839.517(m) 0.022(m) 4191839.442(m) 0.022(m)

LAT: 41 21 7.09761 0.007(m) 41 21 7.13025 0.007(m)
E LON: 288 14 9.93554 0.008(m) 288 14 9.92351 0.008(m)
W LON: 71 45 50.06446 0.008(m) 71 45 50.07649 0.008(m)
EL HGT: -8.451(m) 0.037(m) -9.708(m) 0.037(m)
ORTHO HGT: 22.126(m) 0.041(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 19) SPC (3800 RI)
Northing (Y) [meters] 4581516.553 29867.873
Easting (X) [meters] 268780.604 77914.818
Convergence [degrees] -1.82687335 -0.17435940
Point Scale 1.00025800 0.99999975
Combined Factor 1.00025932 1.00000108

US NATIONAL GRID DESIGNATOR: 19TBF6878081516(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DH5831	CTGR GROTON CORS ARP	N412007.035	W0720258.969	23992.7
DH5835	CTMA MANSFIELD CORS ARP	N414352.917	W0721238.877	56267.8
DH5837	CTPU PUTNAM CORS ARP	N415358.888	W0715320.889	61721.7
DH5833	CTGU GILFORD CORS ARP	N411721.742	W0724004.444	76005.6
DI0876	ACU5 ACUSHNET 5 CORS ARP	N414436.796	W0705313.027	85116.8
DI0966	XMTS MTS FOX COOP CORS ARP	N420350.018	W0711501.669	89879.3
DI1874	NYRH RIVERHEAD CORS ARP	N405524.088	W0724250.560	92893.8
DH5829	CTEG EAST GRANBY CORS ARP	N415524.347	W0724155.881	100480.2
DJ5206	MOR5 MORICHES 5 CORS ARP	N404722.259	W0724446.639	103528.0

NEAREST NGS PUBLISHED CONTROL POINT

LW5273 WE 002 N412107.096 W0714550.063 0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

CT02

FILE: log0120e.tps 000197881

NGS OPUS-RS SOLUTION REPORT
=====

USER: john.allen@sewall.com DATE: January 24, 2011
RINEX FILE: log0020r.11o TIME: 14:27:35 UTC

SOFTWARE: rsgps 1.35.1 RS29.prl 1.66 START: 2011/01/20 17:11:10
EPHEMERIS: igr16194.eph [rapid] STOP: 2011/01/20 17:36:10
NAV FILE: brdc0200.11n OBS USED: 2205 / 2250 : 98%
ANT NAME: TPSHIPER_GD QUALITY IND. 29.28/ 11.52
ARP HEIGHT: 2.0 NORMALIZED RMS: 0.257

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2011.05404)

X: 1395963.071(m) 0.007(m) 1395962.301(m) 0.007(m)
Y: -4588704.353(m) 0.010(m) -4588702.917(m) 0.010(m)
Z: 4190125.656(m) 0.011(m) 4190125.577(m) 0.011(m)

LAT: 41 19 53.37838 0.006(m) 41 19 53.41067 0.006(m)
E LON: 286 55 14.39828 0.005(m) 286 55 14.38457 0.005(m)
W LON: 73 4 45.60172 0.005(m) 73 4 45.61543 0.005(m)
EL HGT: -18.134(m) 0.015(m) -19.387(m) 0.015(m)
ORTHO HGT: 11.364(m) 0.021(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES

UTM (Zone 18) SPC (0600 CT)
Northing (Y) [meters] 4577336.531 207777.268
Easting (X) [meters] 660722.862 277231.699
Convergence [degrees] 1.26870684 -0.21836790
Point Scale 0.99991791 0.99998933
Combined Factor 0.99992076 0.9999218

US NATIONAL GRID DESIGNATOR: 18TXL6072277336(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DH5825	CTBR BROOKFIELD CORS ARP	N412949.864	W0732505.674	33786.1
DH5827	CTDA DARIEN CORS ARP	N410357.069	W0733025.942	46459.2
DI0470	NYLC LAKE CARMEL CORS ARP	N412851.876	W0733905.369	50645.1
DI1874	NYRH RIVERHEAD CORS ARP	N405524.088	W0724250.560	54729.6
DH5839	CTWI WINCHESTER CORS ARP	N415351.907	W0730410.968	62898.0
DJ5206	MOR5 MORICHES 5 CORS ARP	N404722.259	W0724446.639	66380.7
DH5829	CTEG EAST GRANBY CORS ARP	N415524.347	W0724155.881	72989.5
AJ4872	LAMT LAMONT EARTH OBS CORS ARP	N410016.233	W0735432.057	78519.9
DH5835	CTMA MANSFIELD CORS ARP	N414352.917	W0721238.877	85006.8

NEAREST NGS PUBLISHED CONTROL POINT

LX3650 ANSONIA S O AND C CO STACK N412011.984 W0730438.658 597.5

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

851 8091A

FILE: 0788log0120a.tps 000198052

NGS OPUS-RS SOLUTION REPORT
=====

USER: JOHN.ALLEN@SEWALL.COM DATE: January 24, 2011
RINEX FILE: 0788020m.11o TIME: 16:46:11 UTC

SOFTWARE: rsgps 1.35.1 RS10.prl 1.66 START: 2011/01/20 12:50:30
EPHEMERIS: igr16194.eph [rapid] STOP: 2011/01/20 13:07:05
NAV FILE: brdc0200.11n OBS USED: 1377 / 1881 : 73%
ANT NAME: TPSHIPER_GD QUALITY IND. 22.60/ 3.53
ARP HEIGHT: 1.5 NORMALIZED RMS: 0.315

REF FRAME: NAD_83(CORS96)(EPOCH:2002.0000) ITRF00 (EPOCH:2011.05354)

X: 1355444.567(m) 0.007(m) 1355443.800(m) 0.007(m)
Y: -4628726.574(m) 0.016(m) -4628725.137(m) 0.016(m)
Z: 4159494.166(m) 0.015(m) 4159494.082(m) 0.015(m)

LAT: 40 57 54.87900 0.007(m) 40 57 54.91084 0.007(m)
E LON: 286 19 18.40777 0.008(m) 286 19 18.39356 0.008(m)
W LON: 73 40 41.59223 0.008(m) 73 40 41.60644 0.008(m)
EL HGT: -23.291(m) 0.021(m) -24.550(m) 0.021(m)
ORTHO HGT: 7.519(m) 0.023(m) [NAVD88 (Computed using GEOID09)]

UTM COORDINATES STATE PLANE COORDINATES
UTM (Zone 18) SPC (3101 NY E)

Northing (Y) [meters] 4535740.017 237013.412
Easting (X) [meters] 611223.495 219170.334
Convergence [degrees] 0.86664905 0.53878114
Point Scale 0.99975226 0.99995887
Combined Factor 0.99975591 0.99996252

US NATIONAL GRID DESIGNATOR: 18TXL1122335740(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DF9200	RVDI RIVERSIDE COOP CORS ARP	N410231.146	W0733452.378	11799.7
DI0624	NYVH VALHALLA CORS ARP	N410456.221	W0734904.125	17515.4
DI0616	NYQN QUEENS CORS ARP	N404310.261	W0734348.267	27636.3
DM4134	NYBP BATTERY PARK CORS ARP	N404203.817	W0740051.549	40796.4
DI0446	NYCI CENTRAL ISLIP CORS ARP	N404538.237	W0731151.787	46448.3
DI0470	NYLC LAKE CARMEL CORS ARP	N412851.876	W0733905.369	57332.3
DI0880	SHK5 SANDY HOOK 5 CORS ARP	N402817.341	W0740041.741	61642.6
DK7181	NYNB NEWBURGH CORS ARP	N412942.806	W0740131.973	65668.1
DH3768	NJMT NJMT CORS ARP	N404747.350	W0742859.340	70385.4

NEAREST NGS PUBLISHED CONTROL POINT

AB3868 851 8091 A TIDAL N405754.878 W0734041.592 0.0

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.