


TO	Mr. Gregory R. Dubell	FROM	James W. Feuerborn Jr. P.E.
COMPANY	PUBLIC ARCHAEOLOGY LABORATORY, INC.	DATE	October 04, 2012
RE	319 Coles Street Construction Monitoring Summary	PROJECT NO	N12132.00
CC	Luis Valderruten, Gary Castleberry, Paul Mitchell	PROJECT NAME	319 COLES STREET JERSEY CITY NJ, CONSTRUCCION MONITORING SUMMARY

As requested by Public Archeology Laboratory (PAL), Thornton Tomasetti (TT) prepared this memorandum summarizing the vibration monitoring data at the 319 Coles Street Jersey City NJ from September 17, 2012 through September 21, 2012. In addition, this memorandum reports on the crack gauge data and optical monitoring data recordings September 17, 2012 through September 21, 2012. Summary tables of the vibrations recorded at 319 Coles are attached with this report. The installed vibration monitor is located in the basement on the concrete slab-on-grade along the closest foundation wall to the construction site. TT will record data at all vibration levels but only report data (via email alerts) when the peak particle velocity (PPV) is 0.3 in/sec or greater (See Table 1). In the event that vibration limits are exceeded specific procedures are to take place as stated in Table 1 from the Construction Protection Plan shown below.



LEGEND

 Approx. Vibration Monitor location and direction
VM-01 (BExxxx) Seismograph No. (Serial No.)

Note: Base plan taken from Bing.com Maps.

Figure #2: Approximate Location of Seismograph (Langan Ambient Vibrations Report)

Table 1 – Recommended Vibration Limits at 319 Coles Street New Jersey NJ

Peak Vibration Level (inches/second) ¹	Reporting	Engineer Action	Contractor Action
$0.1 \leq 0.3$	Engineer (daily vibration monitor email at 7 AM and 4 PM)	Routine weekly inspection Bi-weekly optical monitoring	None
$0.3 \leq 0.4$	Engineer/Contractor will receive trigger email	Routine weekly inspection Bi-Weekly optical monitoring	None
$0.4 \leq 0.49$	Engineer/Contractor will receive trigger email	Daily inspection with optical monitoring	Alternate construction methods to be used ²
≥ 0.50	Engineer/Contractor/ Owner will receive trigger email	Priority ³ survey	Cease vibration producing work ⁴

1. Vibration level recorded at Building
2. Warning level indicating that maximum level of allowable vibration by ordinances is within proximity of being breached. The shall contractor stop the vibration producing work and an alternate construction method shall be used until the cause of the excessive vibration is determined, remediated and engineer has been able to perform a post event survey of the building. Contractor may resume activity without altering methods after visual and optical survey of the building have been completed and engineer has given approval to proceed.
3. Survey within 24 hours of vibration limits being exceeded (to the extent feasible) with optical monitoring.
4. Maximum level of allowable vibration by ordinances. Vibration producing work shall be stopped until the cause of the excessive vibration is determined, remediated and engineer has been able to perform a post event survey of the building. Contractor may resume activity without altering methods after visual and optical survey of the building have been completed and engineer has given approval to proceed. However, if excessive vibration readings persist and visible damage becomes evident the contractor shall use alternate construction methods.

Table 1 contains specific actions for the contractor in the event of excessive vibrations. These requirements are intended to avoid damage-causing, steady-state vibrations at the building. Depending upon the level of recorded vibration, a damage survey may be required prior to restarting construction. After completion of all inspection surveys, a report will be completed and submitted to PAL and Spectra Energy. The report will indicate the location of any changed condition on the building. Note that although ordinances permit work to continue up to a peak particle velocity of 0.5 inches per second, TT will be implementing a maximum peak particle velocity threshold of 0.4 inches per second. At 0.4 inches per second the contractor shall stop vibration producing activity per the instructions set forth in Table 1 to mitigate the projects liability exposure.

Re: 319 Coles Street NJ Construction Monitoring Summary Page 3

Vibration Monitoring:

Note that all vibration readings have been summarized in the attached Langan Reports. All PPV vibration readings recorded are below the 0.3 in/sec that would trigger an email alert. All PPV vibration readings are below the 0.5 in/sec.

Crack Gauge Monitoring:

No movement had been recorded in the crack gauges. Note that two crack gauges have been obstructed on the south façade and a third in the interior can no longer be accessed as the storage room has been leased and access is no longer permitted.

Optical Monitoring/Surveying:

Optical monitoring readings have not registered movements. Additionally, all vibration PPV readings have been below 0.125 in/sec which are well below any vibration level that would cause structural damage to the building. See Langan Engineering Reports included in the previously issued summary for details

VIBRATION MONITORING REPORT

PROJECT No.	170206801	CLIENT:	DATE:
PROJECT	Spectra Pipeline	Thornton Tomasetti	Week 9
LOCATION	319 Coles Street		(09/15/2012-09/21/2012)
	Jersey City, New Jersey		

EQUIPMENT:

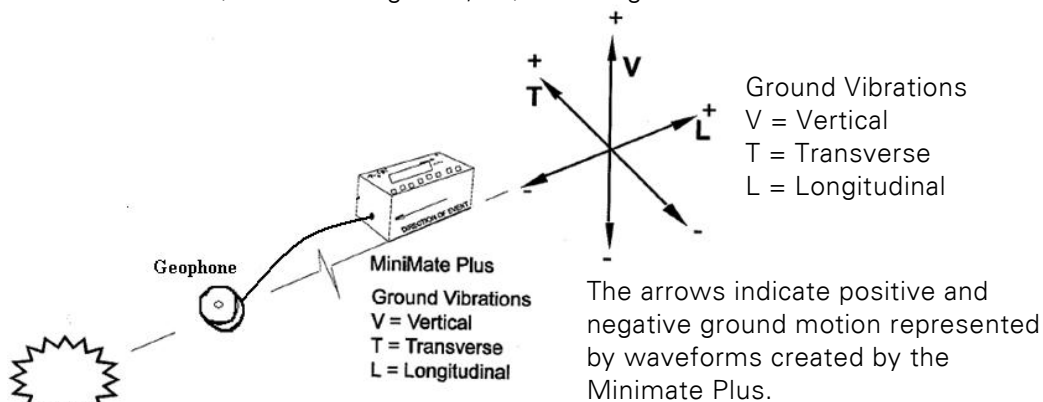
One InstanTel Minimate-Plus Seismographs
 VM-01: Serial No. BE12200

Introduction

This report summarizes the vibration readings of the installed seismograph during the report period.

One InstanTel Minimate Plus seismograph (VM-01) was installed by Langan Engineering as part of the Spectra Pipelines Building Monitoring project. Seismograph VM-01 was installed in the cellar level of the existing American Self Storage warehouse located at 319 Coles Street building of Jersey City, New Jersey. The approximate seismograph location is shown in attached Figure 1.

The Minimate Plus seismograph is connected to a standard geophone, which is weighted down by a sandbag. In measuring the vibrations, the Minimate Plus calculates the Peak Particle Velocity, Frequency, Peak Acceleration, and Peak Displacement for each of the three orthogonal axes: Vertical (V), Longitudinal (L), and Transverse (T) (see sketch below). The seismograph is set to continuously monitor vibration throughout the day. When the vibration exceeds the preset trigger value, an email notification will be sent remotely from the seismograph to a list of designated people. The list of designated party to receive email notifications includes Thornton Tomasetti (Structural Engineer; TT) and Langan.



Reference: InstanTel Blastware Manual

cc:	Ken Huber (Langan); Luis Valderruten (TT)	By:	Scott Borecki
			Langan Engineering and Environmental Services

VIBRATION MONITORING REPORT

PROJECT No.	170206801	CLIENT:	DATE:
PROJECT	Spectra Pipeline	Thornton Tomasetti	Week 9
LOCATION	319 Coles Street		(09/15/2012-09/21/2012)
	Jersey City, New Jersey		

Vibration Monitoring Results

The following tables show the peak particle velocities of the subject building over the reported period. The approximate location of the seismograph is presented in Figure 1.

VM-01 Serial No. BE12200				
DATE		TRANSVERSE	VERTICAL	LONGITUDINAL
9/15/2012	PPV (in/sec)	0.015	0.020	0.015
	Freq. (Hz)	6	9	7
9/16/2012	PPV (in/sec)	0.010	0.010	0.010
	Freq. (Hz)	>100	>100	>100
9/17/2012	PPV (in/sec)	0.010	0.015	0.010
	Freq. (Hz)	>100	20.5	>100
9/18/2012	PPV (in/sec)	0.010	0.020	0.015
	Freq. (Hz)	>100	7	11
9/19/2012	PPV (in/sec)	0.010	0.010	0.010
	Freq. (Hz)	>100	>100	>100
9/20/2012	PPV (in/sec)	0.010	0.010	0.010
	Freq. (Hz)	>100	>100	>100
9/21/2012	PPV (in/sec)	0.010	0.010	0.010
	Freq. (Hz)	>100	>100	>100
Maximum PPV	PPV (in/sec)	0.015	0.020	0.015
	Freq. (Hz)	6	9, 7	7, 11

cc:	Ken Huber (Langan); Luis Valderruten (TT)	By:	Scott Borecki
			Langan Engineering and Environmental Services

VIBRATION MONITORING REPORT

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

PROJECT No.	170206801	CLIENT:	Week 9
PROJECT	Spectra Pipeline	Thornton Tomasetti	(09/15/2012-09/21/2012)
LOCATION	319 Coles Street Jersey City, New Jersey		

Observations, Discussions, Test Results, etc.:

Figure 1. Approximate Location of Seismograph



LEGEND



Approx. Vibration Monitor location and direction

VM-01 (BExxxx)

Seismograph No. (Serial No.)

Note: Base plan taken from Bing.com Maps.

cc:	Ken Huber (Langan); Luis Valderruten (TT)	By:	Scott Borecki
			Langan Engineering and Environmental Services

OPTICAL SURVEY MONITORING REPORT

PROJECT No.	170192702	CLIENT:	REPORT DATE:
PROJECT	Spectra Pipeline Building Monitoring	Thornton Tomasetti	09/26/2012
LOCATION	319 Coles Street, Jersey City, NJ		Report 2

SURVEY DATES: 07/24/2012 to 09/18/2012
 LOCATION: Building Façade

PRESENT AT SITE:
 Donald Fleck – Langan

INTRODUCTION

This report presents the results of the optical survey monitoring by Langan Engineering and Environmental Services, P.C. (Langan) during construction activities for the new Spectra natural gas pipeline being performed adjacent to the American Storage Facility at 319 Coles Street, Jersey City, New Jersey. This report encompasses the monitoring data between the survey dates shown above.

The purpose of the optical survey monitoring is to compile a quantitative record of movements of the existing building walls and columns during the construction of the Spectra Energy natural gas pipeline. This report presents a site description, monitoring locations and the results of our optical survey monitoring.

OPTICAL SURVEY MONITORING – Building Façade

Twelve optical monitoring points, identified as PMP1 through PMP12, were installed on 07/24/2012 prior to the beginning of construction activities. Baseline reading of all monitoring points was taken on 07/24/2012. An additional optical monitoring point PMP13 was installed and baselined on 08/06/2012. Additional optical monitoring points PMP14 and PMP15 were installed and baselined on 08/28/2012. The approximate locations of the monitoring points are shown in Drawing 09.01.

OPTICAL SURVEY RESULTS

The following tables show the lateral and vertical movements of the monitoring targets during the report period. Movement trend plots are presented in Appendix A.

DISCUSSION

- Monitoring points PMP6 and PMP7 were blocked by storage pods on survey dates following 08/14/2012.
- No significant movements were observed during the period shown above. All movements are less than 0.2 inches.

cc:	Luis Valderruten (Thornton Tomasetti); Ken Huber (Langan)	By:	Scott Borecki
			Langan Engineering and Environmental Services

OPTICAL SURVEY MONITORING REPORT



PROJECT No.	170192702	CLIENT:	REPORT DATE:
PROJECT	Spectra Pipeline Building Monitoring	Thornton Tomasetti	
LOCATION	319 Coles Street, Jersey City, NJ		Report 2

OPTICAL SURVEY RESULTS

SURVEY
DATE: 07/24/12 (Initial Reading)

Monitoring Target Number	Northing (ft)	Easting (ft)	Elevation (ft)	Δ To Previous Monitoring			Cumulative		
				Δ North (in)	Δ East (in)	Δ Elev. (in)	Δ North (in)	Δ East (in)	Δ Elev. (in)
PMP1	10048.828	19825.990	180.207	-	-	-	-	-	-
PMP2	10048.673	19865.518	180.206	-	-	-	-	-	-
PMP3	10048.548	19895.408	180.212	-	-	-	-	-	-
PMP4	10051.574	19935.382	180.055	-	-	-	-	-	-
PMP5	10076.750	19935.383	180.134	-	-	-	-	-	-
PMP6	10049.436	19826.541	112.737	-	-	-	-	-	-
PMP7	10049.353	19868.061	112.760	-	-	-	-	-	-
PMP8	10049.169	19894.628	113.826	-	-	-	-	-	-
PMP9	10049.339	19934.520	111.507	-	-	-	-	-	-
PMP10	10075.935	19934.676	111.253	-	-	-	-	-	-
PMP11	10070.326	19825.818	180.261	-	-	-	-	-	-
PMP12	10063.788	19826.393	112.680	-	-	-	-	-	-

cc:	Luis Valderruten (Thornton Tomasetti); Ken Huber (Langan)	By:	Scott Borecki
			Langan Engineering and Environmental Services

OPTICAL SURVEY MONITORING REPORT



PROJECT No.	170192702	CLIENT:	REPORT DATE:
PROJECT	Spectra Pipeline Building Monitoring	Thornton Tomasetti	
LOCATION	319 Coles Street, Jersey City, NJ		Report 2

OPTICAL SURVEY RESULTS (cont'd)

SURVEY
DATE: 08/06/12

Monitoring Target Number	Northing (ft)	Easting (ft)	Elevation (ft)	Δ To Previous Monitoring			Cumulative		
				Δ North (in)	Δ East (in)	Δ Elev. (in)	Δ North (in)	Δ East (in)	Δ Elev. (in)
PMP1	10048.829	19825.987	180.207	0.017	-0.039	0.009	0.017	-0.039	0.009
PMP2	10048.671	19865.517	180.210	-0.024	-0.009	0.041	-0.024	-0.009	0.041
PMP3	10048.548	19895.408	180.216	-0.005	0.008	0.044	-0.005	0.008	0.044
PMP4	10051.574	19935.383	180.056	0.006	0.006	0.015	0.006	0.006	0.015
PMP5	10076.750	19935.379	180.133	0.000	-0.055	-0.005	0.000	-0.055	-0.005
PMP6	10049.437	19826.539	112.737	0.019	-0.017	-0.005	0.019	-0.017	-0.005
PMP7	10049.350	19868.059	112.760	-0.046	-0.025	0.000	-0.046	-0.025	0.000
PMP8	10049.168	19894.627	113.827	-0.012	-0.005	0.017	-0.012	-0.005	0.017
PMP9	10049.340	19934.520	111.508	0.019	-0.002	0.006	0.019	-0.002	0.006
PMP10	10075.936	19934.675	111.254	0.007	-0.010	0.004	0.007	-0.010	0.004
PMP11	10070.329	19825.821	180.260	0.042	0.030	-0.013	0.042	0.030	-0.013
PMP12	10063.793	19826.396	112.679	0.058	0.031	-0.018	0.058	0.031	-0.018
PMP13	10049.470	19895.155	186.207	-	-	-	-	-	-

Notes: New point PMP13.

cc:	Luis Valderruten (Thornton Tomasetti); Ken Huber (Langan)	By:	Scott Borecki
			Langan Engineering and Environmental Services

OPTICAL SURVEY MONITORING REPORT



PROJECT No.	170192702	CLIENT:	REPORT DATE:
PROJECT	Spectra Pipeline Building Monitoring	Thornton Tomasetti	
LOCATION	319 Coles Street, Jersey City, NJ		Report 2

OPTICAL SURVEY RESULTS (cont'd)

**SURVEY
DATE:** 08/14/12

Monitoring Target Number	Northing (ft)	Easting (ft)	Elevation (ft)	Δ To Previous Monitoring			Cumulative		
				Δ North (in)	Δ East (in)	Δ Elev. (in)	Δ North (in)	Δ East (in)	Δ Elev. (in)
PMP1	10048.834	19825.987	180.207	0.056	0.007	0.000	0.073	-0.031	0.008
PMP2	10048.675	19865.517	180.207	0.055	-0.008	-0.032	0.031	-0.018	0.009
PMP3	10048.551	19895.405	180.214	0.047	-0.040	-0.016	0.042	-0.032	0.027
PMP4	10051.579	19935.379	180.056	0.064	-0.043	-0.007	0.070	-0.037	0.008
PMP5	10076.755	19935.381	180.131	0.060	0.021	-0.025	0.060	-0.034	-0.029
PMP6	-	-	-	-	-	-	-	-	-
PMP7	-	-	-	-	-	-	-	-	-
PMP8	10049.172	19894.624	113.826	0.046	-0.035	-0.015	0.034	-0.040	0.002
PMP9	10049.344	19934.517	111.507	0.042	-0.038	-0.006	0.061	-0.041	0.001
PMP10	10075.941	19934.671	111.255	0.057	-0.050	0.014	0.064	-0.060	0.019
PMP11	10070.328	19825.822	180.264	-0.009	0.009	0.041	0.034	0.039	0.028
PMP12	10063.791	19826.397	112.681	-0.019	0.014	0.029	0.039	0.045	0.011
PMP13	10049.473	19895.155	186.204	0.032	-0.004	-0.036	0.032	-0.004	-0.036

Notes: Points PMP6 & PMP7 blocked.

cc:	Luis Valderruten (Thornton Tomasetti); Ken Huber (Langan)	By:	Scott Borecki
			Langan Engineering and Environmental Services

OPTICAL SURVEY MONITORING REPORT



PROJECT No.	170192702	CLIENT:	REPORT DATE:
PROJECT	Spectra Pipeline Building Monitoring	Thornton Tomasetti	
LOCATION	319 Coles Street, Jersey City, NJ		Report 2

OPTICAL SURVEY RESULTS (cont'd)

**SURVEY
DATE:** 08/28/12

Monitoring Target Number	Northing (ft)	Easting (ft)	Elevation (ft)	Δ To Previous Monitoring			Cumulative		
				Δ North (in)	Δ East (in)	Δ Elev. (in)	Δ North (in)	Δ East (in)	Δ Elev. (in)
PMP1	10048.836	19825.987	180.210	0.024	-0.001	0.036	0.098	-0.033	0.045
PMP2	10048.675	19865.516	180.208	-0.006	-0.005	0.010	0.026	-0.023	0.019
PMP3	10048.550	19895.405	180.214	-0.017	-0.002	-0.006	0.025	-0.034	0.021
PMP4	10051.579	19935.381	180.054	-0.005	0.016	-0.017	0.065	-0.021	-0.009
PMP5	10076.751	19935.381	180.131	-0.048	0.005	-0.004	0.012	-0.029	-0.033
PMP6	-	-	-	-	-	-	-	-	-
PMP7	-	-	-	-	-	-	-	-	-
PMP8	10049.173	19894.623	113.825	0.005	-0.012	-0.009	0.039	-0.051	-0.007
PMP9	10049.343	19934.517	111.508	-0.008	0.000	0.003	0.053	-0.041	0.004
PMP10	10075.938	19934.673	111.253	-0.029	0.022	-0.023	0.034	-0.038	-0.004
PMP11	10070.327	19825.824	180.262	-0.019	0.028	-0.018	0.014	0.067	0.010
PMP12	10063.789	19826.399	112.682	-0.029	0.025	0.004	0.010	0.070	0.015
PMP13	10049.480	19895.156	186.203	0.087	0.019	-0.007	0.118	0.015	-0.043
PMP14	10049.187	19826.704	117.867	-	-	-	-	-	-
PMP15	10049.354	19868.136	117.244	-	-	-	-	-	-

Notes: Points PMP6 & PMP7 blocked; New points PMP14 & PMP15.

cc:	Luis Valderruten (Thornton Tomasetti); Ken Huber (Langan)	By:	Scott Borecki
			Langan Engineering and Environmental Services

OPTICAL SURVEY MONITORING REPORT



PROJECT No.	170192702	CLIENT:	REPORT DATE:
PROJECT	Spectra Pipeline Building Monitoring	Thornton Tomasetti	
LOCATION	319 Coles Street, Jersey City, NJ		Report 2

OPTICAL SURVEY RESULTS (cont'd)

**SURVEY
DATE:** 09/04/12

Monitoring Target Number	Northing (ft)	Easting (ft)	Elevation (ft)	Δ To Previous Monitoring			Cumulative		
				Δ North (in)	Δ East (in)	Δ Elev. (in)	Δ North (in)	Δ East (in)	Δ Elev. (in)
PMP1	10048.829	19825.990	180.207	-0.086	0.028	-0.041	0.012	-0.005	0.003
PMP2	10048.668	19865.518	180.207	-0.081	0.017	-0.010	-0.055	-0.006	0.010
PMP3	10048.546	19895.407	180.213	-0.049	0.020	-0.016	-0.024	-0.013	0.005
PMP4	10051.575	19935.381	180.052	-0.047	0.005	-0.026	0.017	-0.015	-0.035
PMP5	10076.748	19935.381	180.131	-0.040	-0.005	-0.001	-0.028	-0.034	-0.034
PMP6	-	-	-	-	-	-	-	-	-
PMP7	-	-	-	-	-	-	-	-	-
PMP8	10049.168	19894.624	113.826	-0.054	0.009	0.013	-0.015	-0.042	0.005
PMP9	10049.344	19934.519	111.507	0.008	0.019	-0.006	0.061	-0.023	-0.002
PMP10	10075.937	19934.671	111.255	-0.014	-0.020	0.016	0.020	-0.059	0.012
PMP11	10070.328	19825.823	180.267	0.009	-0.010	0.051	0.023	0.057	0.061
PMP12	10063.790	19826.398	112.686	0.012	-0.016	0.052	0.022	0.054	0.067
PMP13	10049.468	19895.154	186.205	-0.146	-0.035	0.023	-0.028	-0.021	-0.020
PMP14	10049.178	19826.706	117.871	-0.109	0.022	0.038	-0.109	0.022	0.038
PMP15	10049.347	19868.134	117.243	-0.089	-0.029	-0.021	-0.089	-0.029	-0.021

Notes: Points PMP6 & PMP7 blocked.

cc:	Luis Valderruten (Thornton Tomasetti); Ken Huber (Langan)	By:	Scott Borecki
			Langan Engineering and Environmental Services

OPTICAL SURVEY MONITORING REPORT



PROJECT No.	170192702	CLIENT:	REPORT DATE:
PROJECT	Spectra Pipeline Building Monitoring	Thornton Tomasetti	09/26/2012
LOCATION	319 Coles Street, Jersey City, NJ		Report 2

OPTICAL SURVEY RESULTS (cont'd)

**SURVEY
DATE:** 09/10/12

Monitoring Target Number	Northing (ft)	Easting (ft)	Elevation (ft)	Δ To Previous Monitoring			Cumulative		
				Δ North (in)	Δ East (in)	Δ Elev. (in)	Δ North (in)	Δ East (in)	Δ Elev. (in)
PMP1	10048.842	19825.988	180.204	0.166	-0.019	-0.038	0.178	-0.024	-0.035
PMP2	10048.681	19865.517	180.204	0.160	-0.004	-0.032	0.104	-0.010	-0.022
PMP3	10048.557	19895.405	180.212	0.127	-0.016	-0.012	0.103	-0.029	-0.007
PMP4	10051.586	19935.382	180.053	0.134	0.010	0.017	0.151	-0.005	-0.018
PMP5	10076.755	19935.384	180.132	0.080	0.038	0.011	0.053	0.004	-0.023
PMP6	-	-	-	-	-	-	-	-	-
PMP7	-	-	-	-	-	-	-	-	-
PMP8	10049.177	19894.625	113.826	0.112	0.011	-0.001	0.097	-0.032	0.005
PMP9	10049.345	19934.515	111.508	0.007	-0.041	0.011	0.068	-0.063	0.009
PMP10	10075.942	19934.672	111.255	0.061	0.014	0.011	0.081	-0.044	0.024
PMP11	10070.325	19825.823	180.262	-0.034	0.001	-0.056	-0.010	0.057	0.005
PMP12	10063.787	19826.398	112.684	-0.031	0.007	-0.025	-0.008	0.061	0.042
PMP13	10049.474	19895.154	186.202	0.077	0.007	-0.035	0.050	-0.013	-0.055
PMP14	10049.190	19826.704	117.869	0.138	-0.017	-0.020	0.029	0.005	0.018
PMP15	10049.352	19868.133	117.246	0.062	-0.008	0.045	-0.028	-0.037	0.024

Notes: Point PMP6 & PMP7 blocked.

cc:	Luis Valderruten (Thornton Tomasetti); Ken Huber (Langan)	By:	Scott Borecki
			Langan Engineering and Environmental Services

OPTICAL SURVEY MONITORING REPORT



PROJECT No.	170192702	CLIENT:	REPORT DATE:
PROJECT	Spectra Pipeline Building Monitoring	Thornton Tomasetti	
LOCATION	319 Coles Street, Jersey City, NJ		Report 2

OPTICAL SURVEY RESULTS (cont'd)

**SURVEY
DATE:** 09/18/12

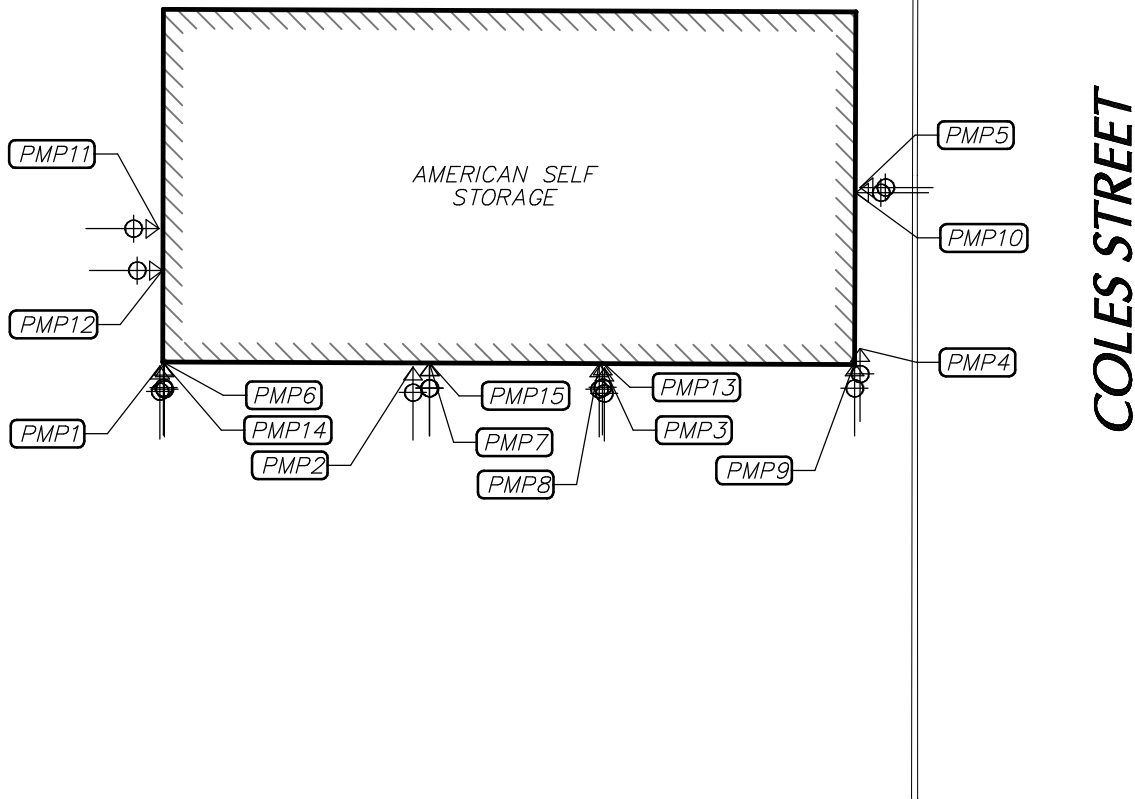
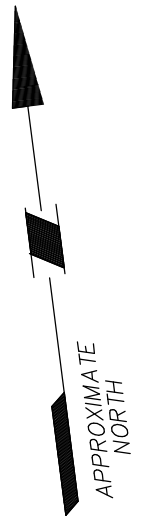
Monitoring Target Number	Northing (ft)	Easting (ft)	Elevation (ft)	Δ To Previous Monitoring			Cumulative		
				Δ North (in)	Δ East (in)	Δ Elev. (in)	Δ North (in)	Δ East (in)	Δ Elev. (in)
PMP1	10048.836	19825.993	180.203	-0.079	0.059	-0.012	0.099	0.036	-0.047
PMP2	10048.680	19865.521	180.203	-0.016	0.050	-0.011	0.088	0.040	-0.033
PMP3	10048.552	19895.408	180.212	-0.052	0.034	0.011	0.052	0.005	0.003
PMP4	10051.584	19935.386	180.052	-0.023	0.052	-0.022	0.128	0.046	-0.040
PMP5	10076.753	19935.382	180.127	-0.022	-0.018	-0.053	0.030	-0.014	-0.077
PMP6	-	-	-	-	-	-	-	-	-
PMP7	-	-	-	-	-	-	-	-	-
PMP8	10049.174	19894.628	113.826	-0.040	0.037	-0.004	0.057	0.006	0.000
PMP9	10049.348	19934.520	111.507	0.044	0.053	-0.013	0.112	-0.011	-0.004
PMP10	10075.942	19934.676	111.253	0.001	0.047	-0.025	0.082	0.003	-0.001
PMP11	10070.326	19825.825	180.262	0.010	0.022	0.000	-0.001	0.079	0.005
PMP12	10063.787	19826.399	112.683	0.002	0.013	-0.014	-0.007	0.074	0.028
PMP13	10049.474	19895.154	186.202	-0.005	0.001	-0.001	0.045	-0.013	-0.056
PMP14	10049.187	19826.711	117.872	-0.034	0.082	0.036	-0.005	0.088	0.054
PMP15	10049.349	19868.136	117.245	-0.033	0.037	-0.013	-0.061	-0.001	0.011

Notes: point 6 & 7 blocked

cc:	Luis Valderruten (Thornton Tomasetti); Ken Huber (Langan)	By:	Scott Borecki
			Langan Engineering and Environmental Services

DRAWING

TO HOBOKEN
AVENUE



PROGRESS PLOT **Sep 13, 2012**

09-13-12	Added PMP 13, 14, and 15 only	1
Date	Description	No.
Revisions		
Project 319 COLE STREET MONITORING TARGET LOCATION PLAN JERSEY CITY HUDSON COUNTY NEW JERSEY		
Project No. 170206801	Date 07/26/12	Scale 1"=30'
		Dwg. No. 09.01



21 Penn Plaza
8th Floor
P: 212.479.5400 F: 212.479.5444
www.langan.com

360 West 31st Street
New York, NY 10001-2727

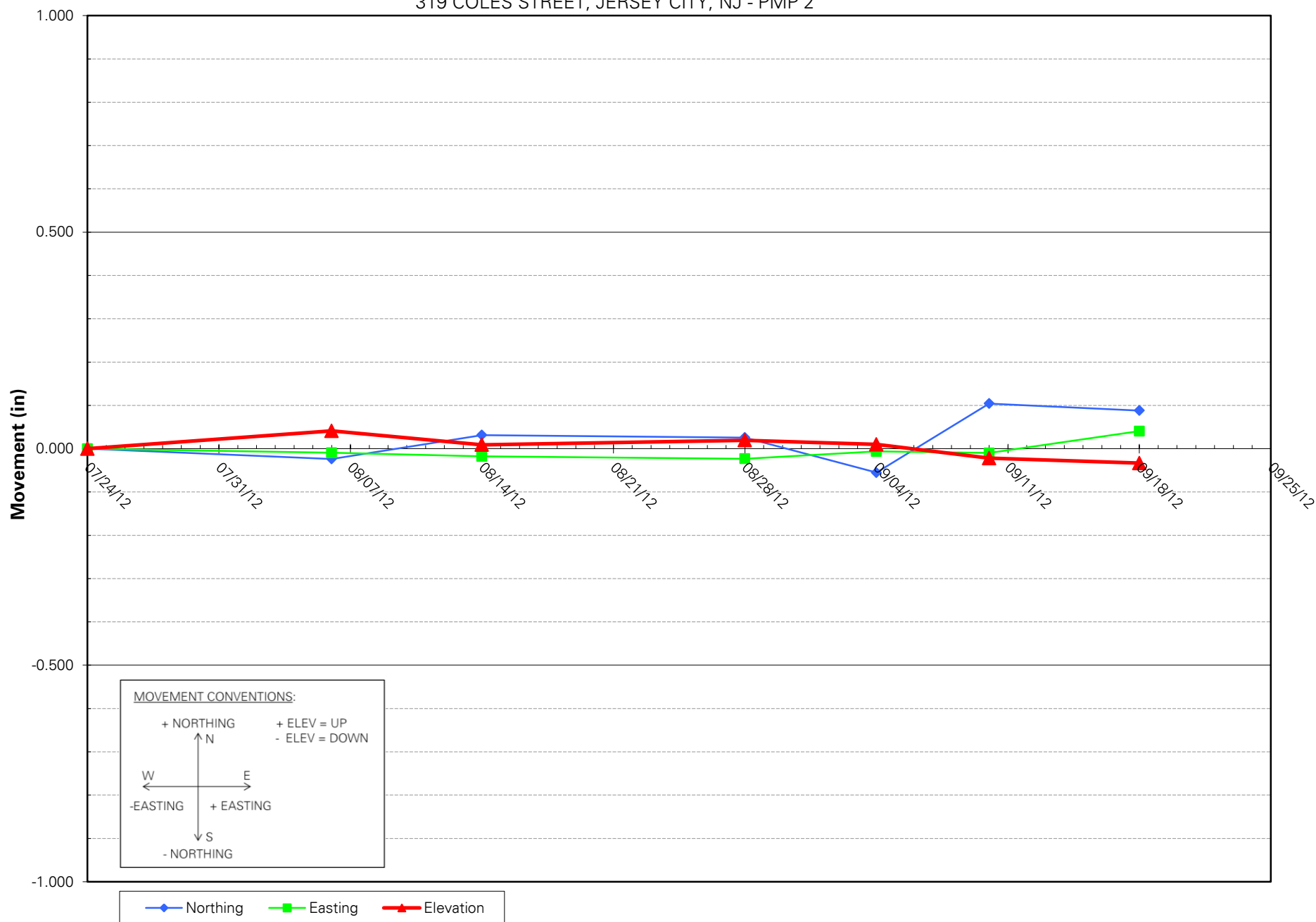
NEW JERSEY PENNSYLVANIA NEW YORK CONNECTICUT FLORIDA
VIRGINIA CALIFORNIA NEVADA

APPENDIX A MOVEMENT PLOTS

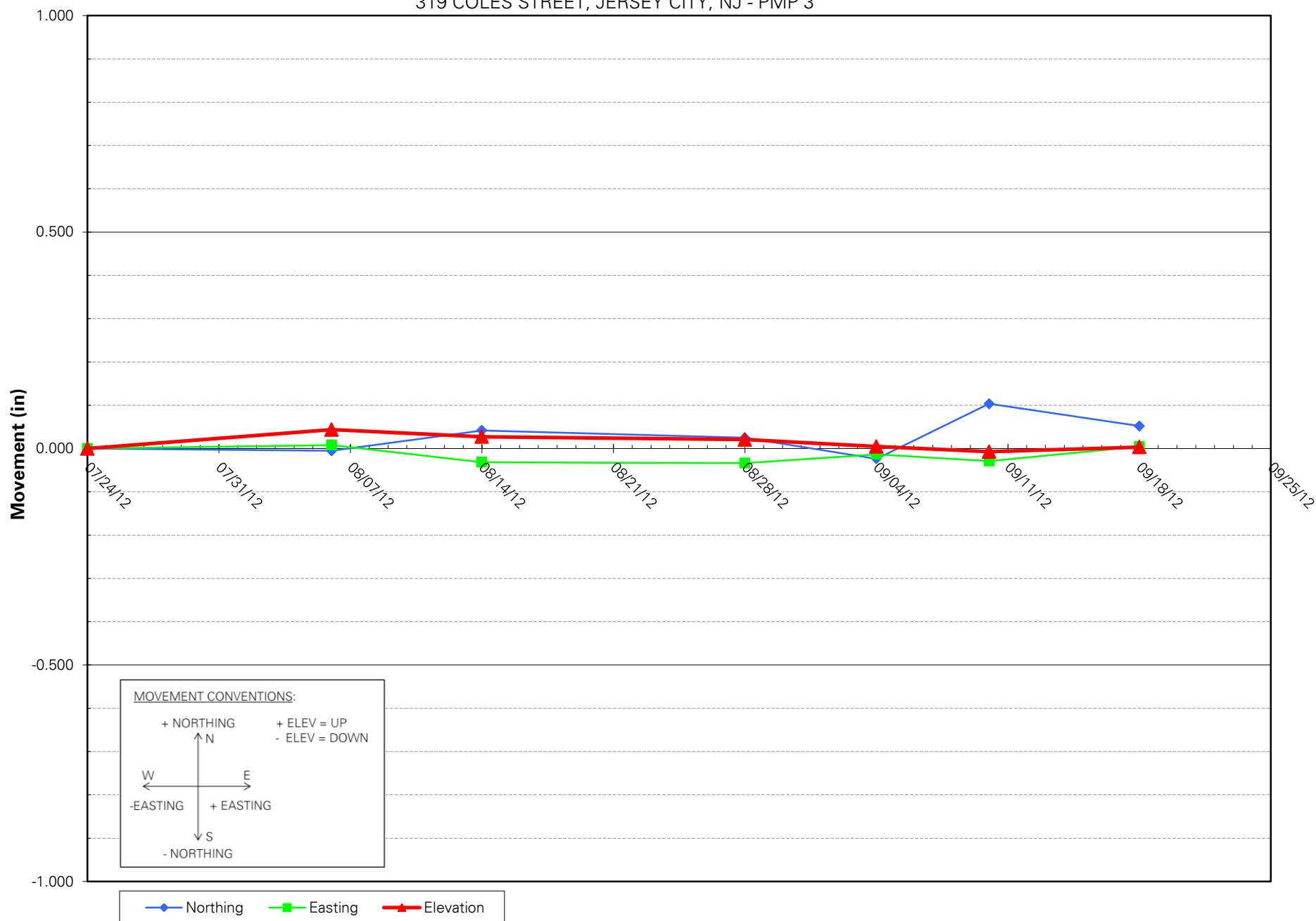
PLOT OF SURVEY DATA
SPECTRA PIPELINE BUILDING MONITORING
319 COLES STREET, JERSEY CITY, NJ - PMP 1



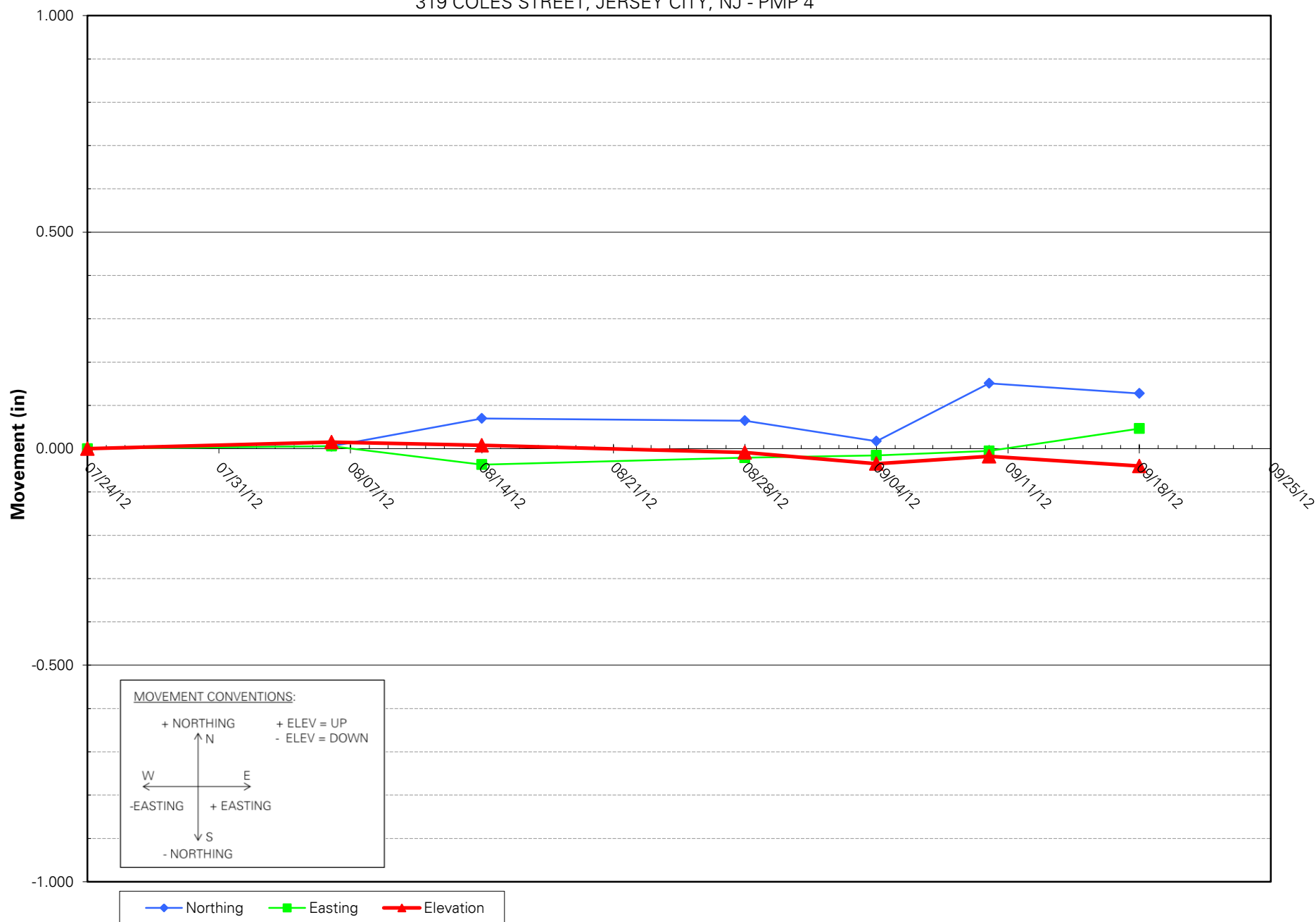
PLOT OF SURVEY DATA
SPECTRA PIPELINE BUILDING MONITORING
319 COLES STREET, JERSEY CITY, NJ - PMP 2



PLOT OF SURVEY DATA
SPECTRA PIPELINE BUILDING MONITORING
319 COLES STREET, JERSEY CITY, NJ - PMP 3



PLOT OF SURVEY DATA
SPECTRA PIPELINE BUILDING MONITORING
319 COLES STREET, JERSEY CITY, NJ - PMP 4



PLOT OF SURVEY DATA
SPECTRA PIPELINE BUILDING MONITORING
319 COLES STREET, JERSEY CITY, NJ - PMP 5



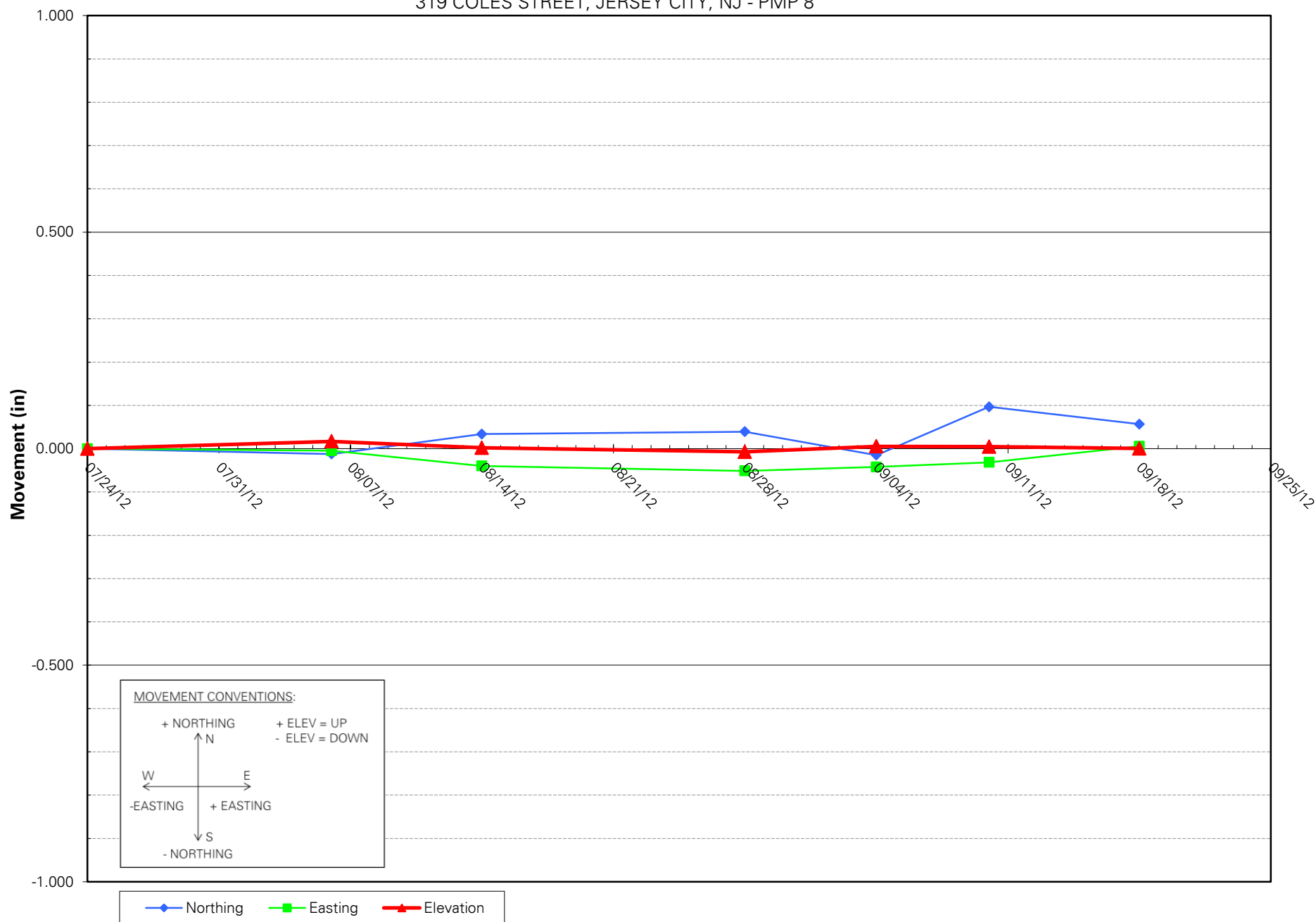
PLOT OF SURVEY DATA
SPECTRA PIPELINE BUILDING MONITORING
319 COLES STREET, JERSEY CITY, NJ - PMP 6



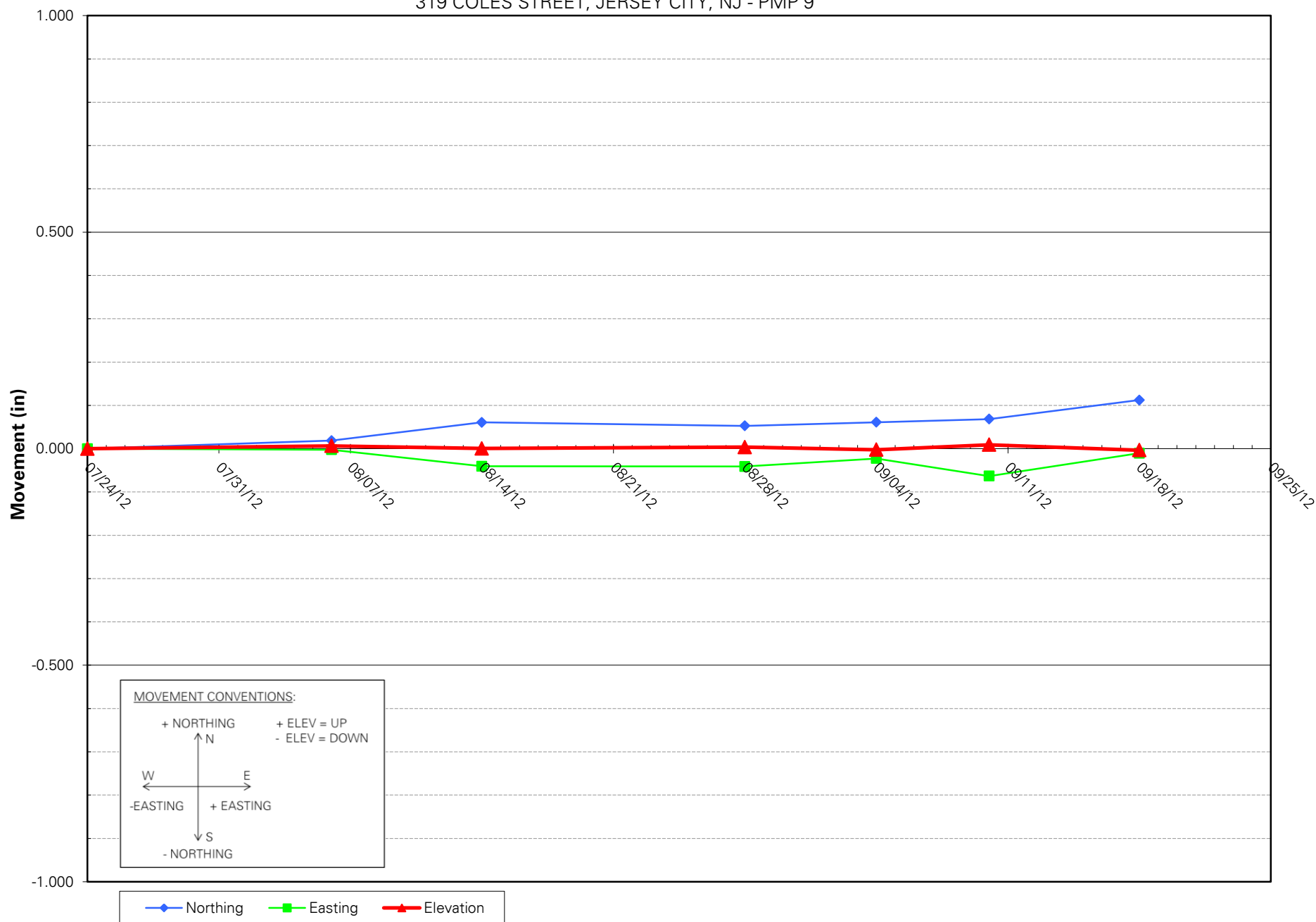
PLOT OF SURVEY DATA
SPECTRA PIPELINE BUILDING MONITORING
319 COLES STREET, JERSEY CITY, NJ - PMP 7



PLOT OF SURVEY DATA
SPECTRA PIPELINE BUILDING MONITORING
319 COLES STREET, JERSEY CITY, NJ - PMP 8



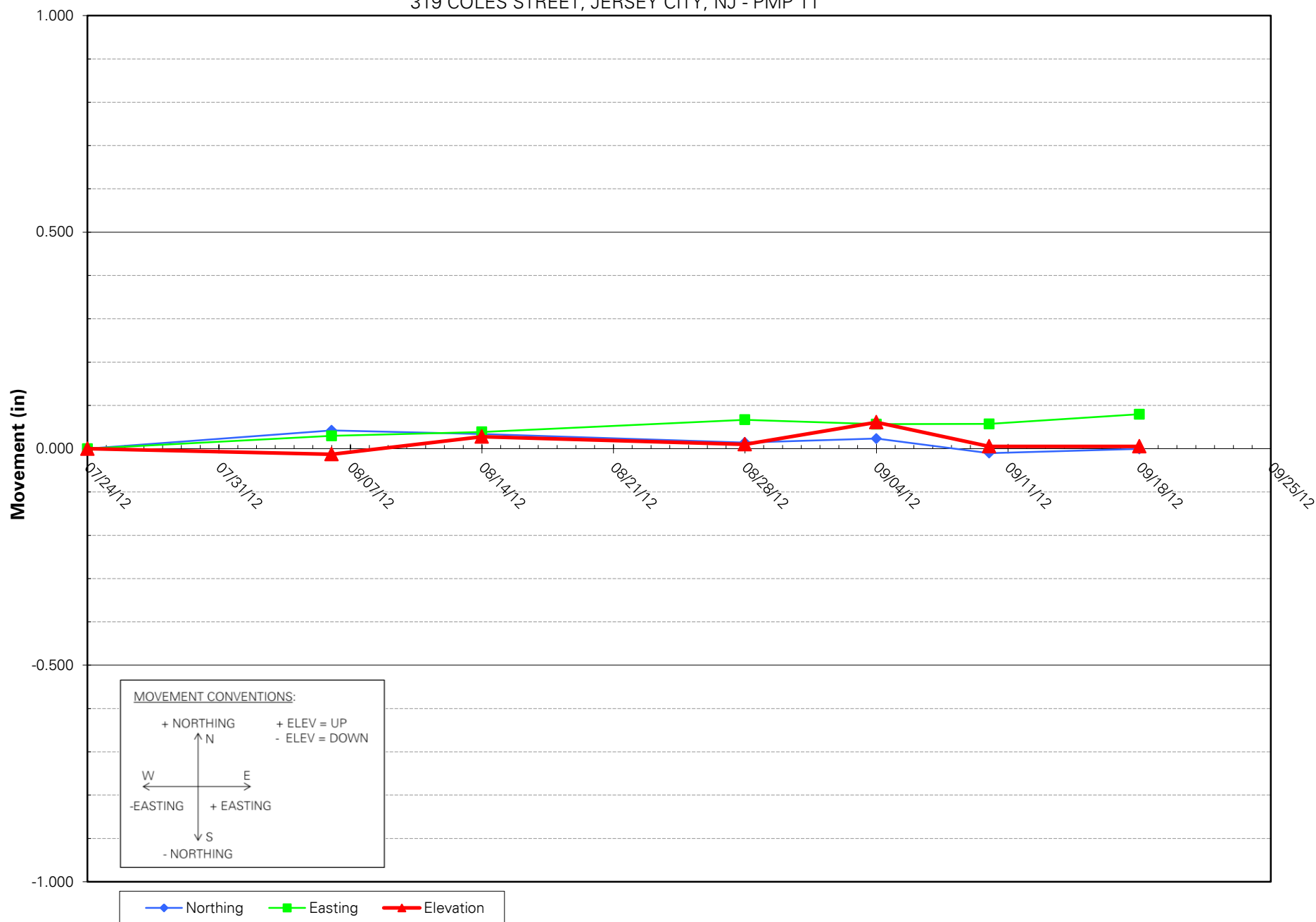
PLOT OF SURVEY DATA
SPECTRA PIPELINE BUILDING MONITORING
319 COLES STREET, JERSEY CITY, NJ - PMP 9



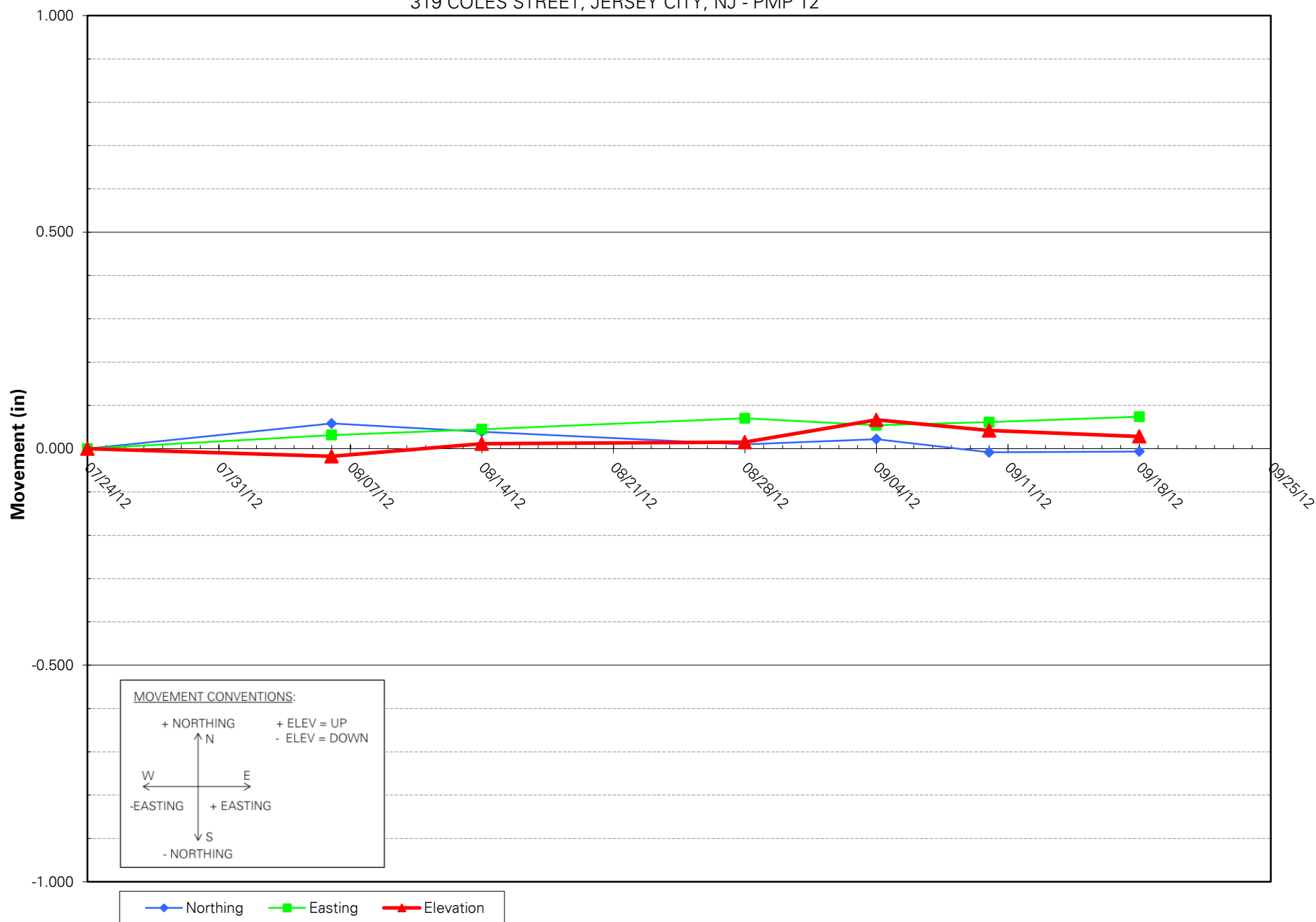
PLOT OF SURVEY DATA
SPECTRA PIPELINE BUILDING MONITORING
319 COLES STREET, JERSEY CITY, NJ - PMP 10



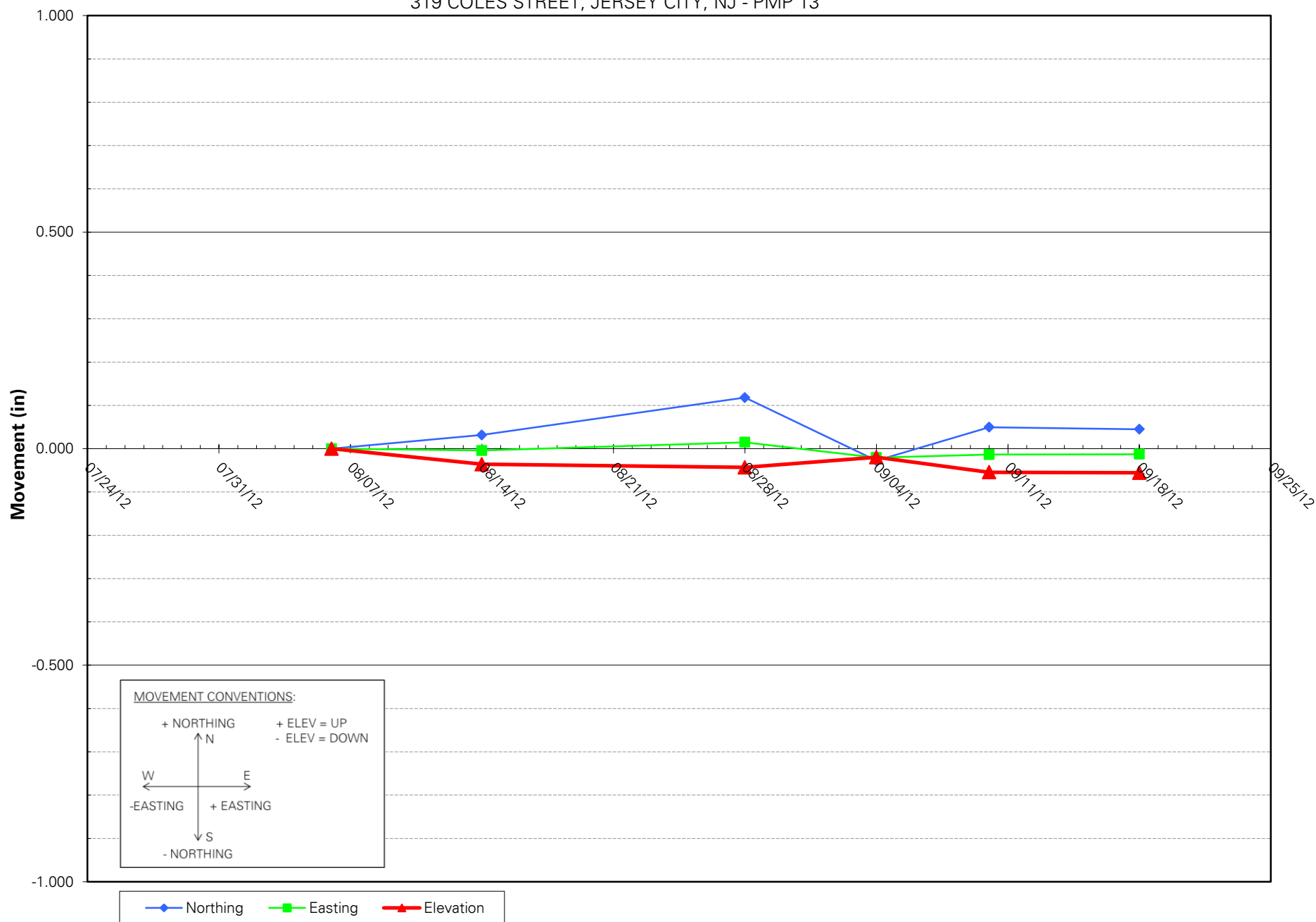
PLOT OF SURVEY DATA
SPECTRA PIPELINE BUILDING MONITORING
319 COLES STREET, JERSEY CITY, NJ - PMP 11



PLOT OF SURVEY DATA
SPECTRA PIPELINE BUILDING MONITORING
319 COLES STREET, JERSEY CITY, NJ - PMP 12



PLOT OF SURVEY DATA
SPECTRA PIPELINE BUILDING MONITORING
319 COLES STREET, JERSEY CITY, NJ - PMP 13



PLOT OF SURVEY DATA
SPECTRA PIPELINE BUILDING MONITORING
319 COLES STREET, JERSEY CITY, NJ - PMP 14



PLOT OF SURVEY DATA
SPECTRA PIPELINE BUILDING MONITORING
319 COLES STREET, JERSEY CITY, NJ - PMP 15

