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Date: July 30, 2021

Project Number: 19-009

Subject: 301 Mission Retrofit Monitoring Report 009: Results as of July 29, 2021

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## **CONTEXT**

This memorandum summarizes results from the monitoring plan implemented at the 301 Mission property. Instrumentation to monitor the structure prior to, during and after the retrofit was installed in January 2021, including piezometers and extensometers. Settlement markers installed in April 2009 and January 2017, survey prisms mounted on the exterior of the structure in December 2016, and crack gauges installed in April 2009 have also been monitored.

## **INTERPRETATION**

Figure 01 presents the instrument locations as referenced in later figures.

Figure 02 presents the historical settlement data interpreted from settlement markers installed on the B-1 Level of 301 Mission Tower. In addition, data from surveys performed during the retrofit are included. Figure 03 presents differential settlement data since the start of production pile installation (May 12, 2021; baseline readings on May 10, 2021) through July 26, 2021. Figure 04 presents current differential settlement contours (in inches) on July 26, 2021.

Figure 05 presents historical lateral roof deflections in the project north-south and project east-west directions interpreted from survey prisms mounted on the exterior of the Tower, from InSAR data, and from a planar fit of the settlement marker data. In addition, data from survey performed during the retrofit are included. Figure 06 presents differential lateral roof deflection data from a planar fit of the settlement marker data and from survey prisms mounted on the exterior of the Tower since the start of production pile installation (May 12, 2021; baseline readings on May 10 and 13, 2021, respectively) through July 29, 2021.

## **CLOSING**

Please contact us if you have any comments or questions, or if you would like to discuss the results presented in this memorandum.

## **FIGURES**

Figure 01A – Instrument Location Map: Settlement Markers, Piezometers, Extensometers

Figure 01B – Tower Survey Prism Location Schematic

Figure 02 – Historical Settlement Marker Data

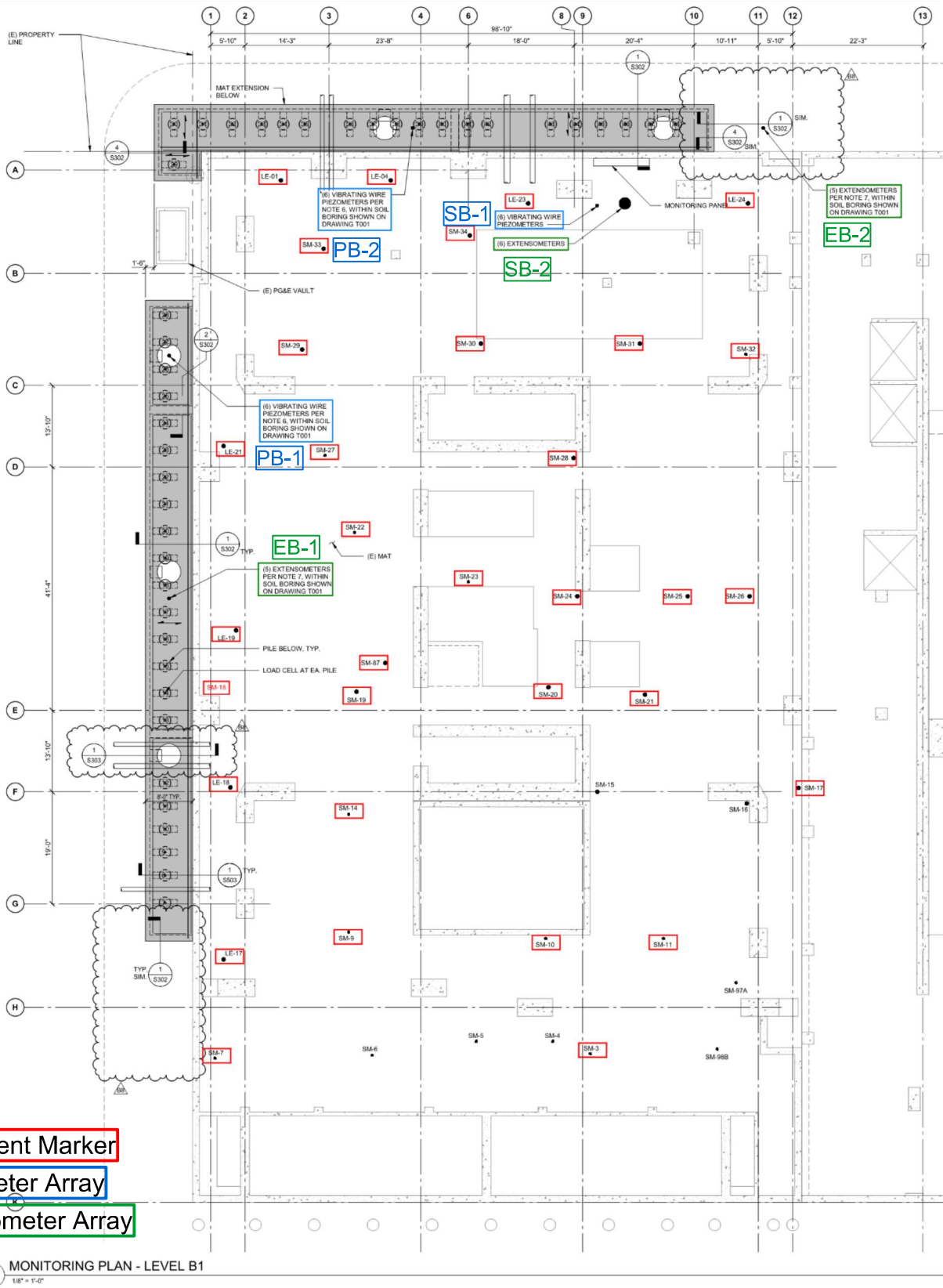
Figure 03 – Differential Settlement Marker Data since 05/10/2021 through 07/26/2021

Figure 04 – Differential Settlement Contours since 05/10/2021 through 07/26/2021

Figure 05 – Historical Lateral Roof Deflection Data

Figure 06 – Differential Lateral Roof Deflection Data since 05/10/2021 through 07/29/2021

Filepath: S:\StateDrive - Documents\Projects\_2019\19-009.00\_Millennium Tower Retrofit\10\_Construction\01\_Monitoring Reports\TowerSoilWater\00\_Figures\Fig\_013-01A\_Instrument\_Map.grf



From 301 Mission Perimeter Pile Upgrade Bulletin 8 Set S 207 2021-06-15

Project No: 19-009.00

Date: 7/26/2021

Created By: NBW

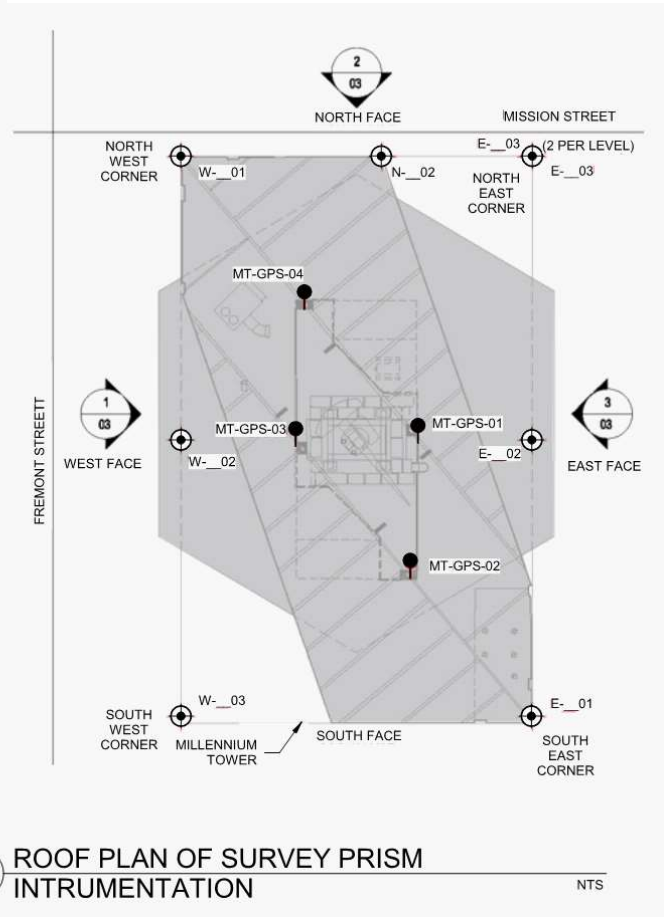
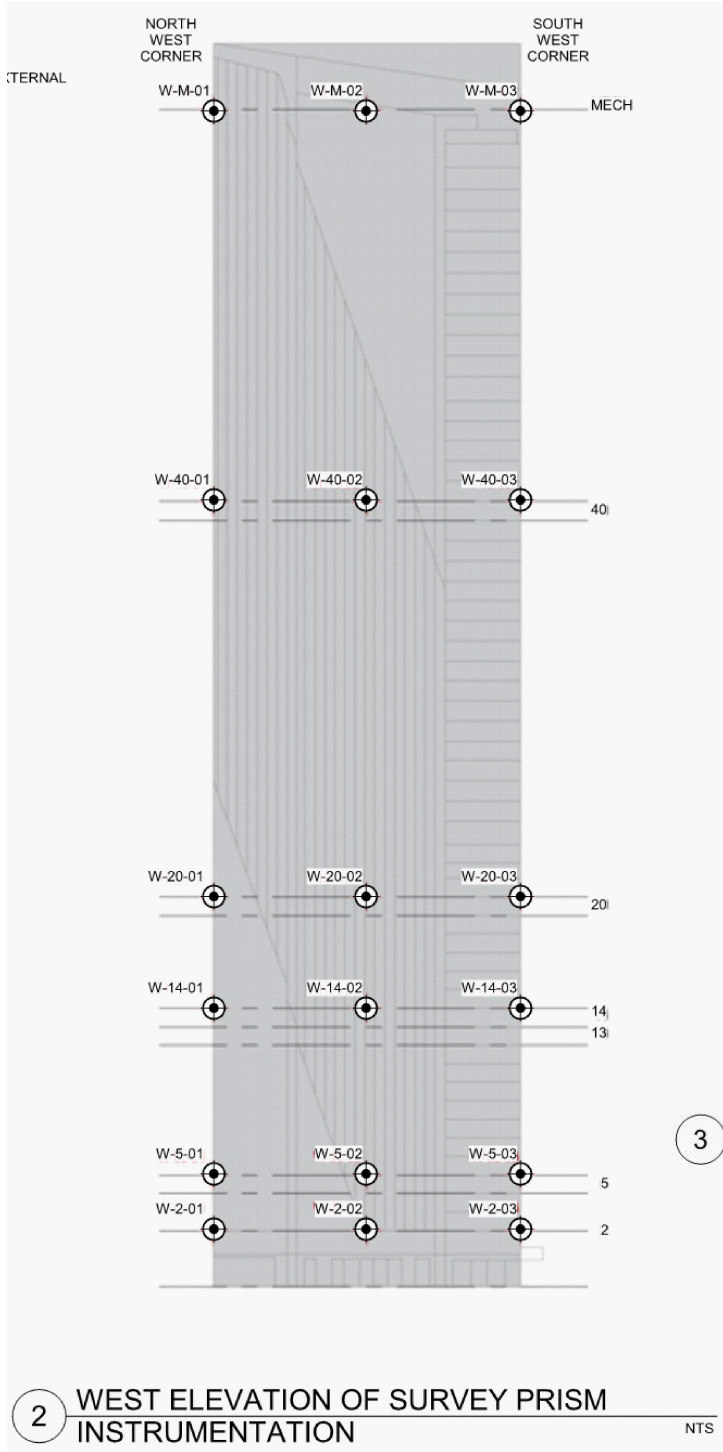
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Figure No: 013-01A



INSTRUMENT LOCATION MAP  
SETTLEMENT MARKERS, PIEZOMETERS, EXTENSOMETERS

Millennium Tower Perimeter Pile Upgrade: Instrumentation Monitoring Data  
City and County of San Francisco, California



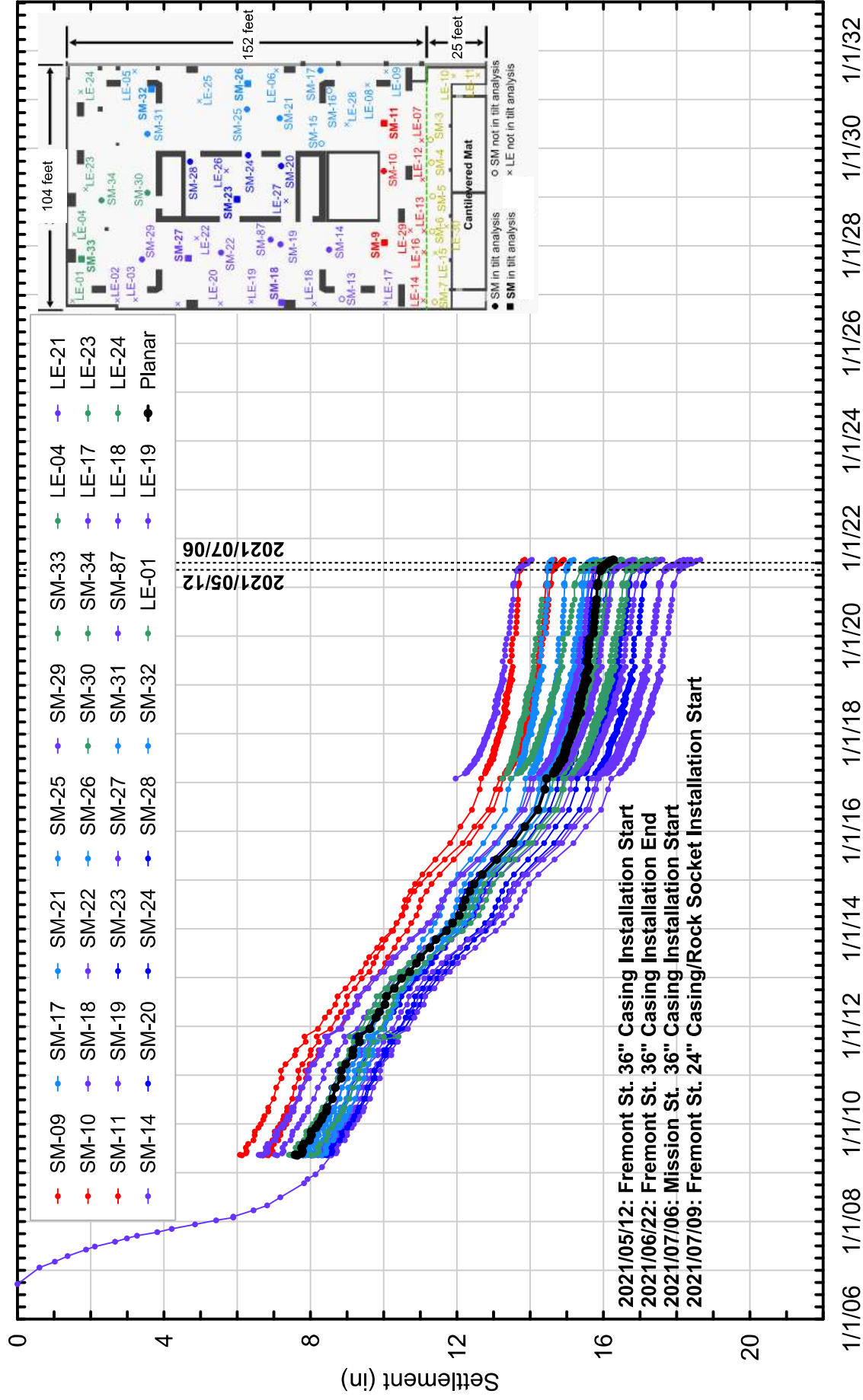
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TOWER SURVEY PRISM LOCATION SCHEMATIC

Millennium Tower Perimeter Pile Upgrade: Instrumentation Monitoring Data  
City and County of San Francisco, California



Project No: 19-009.00

Date: 7/30/2021

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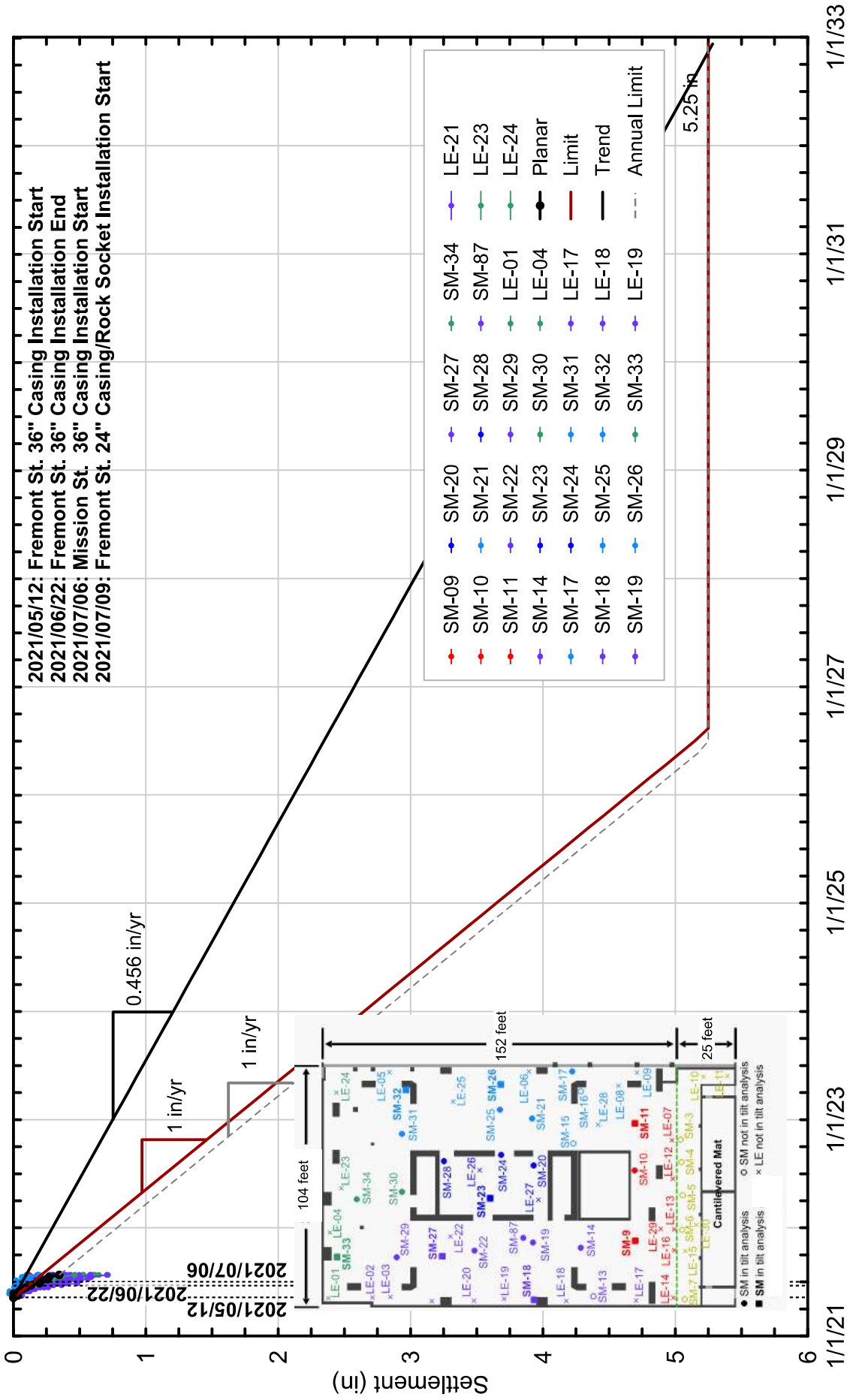
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Figure No: 013-02



HISTORICAL SETTLEMENT MARKER DATA

Millennium Tower Perimeter Pile Upgrade: Instrumentation Monitoring Data  
City and County of San Francisco, California

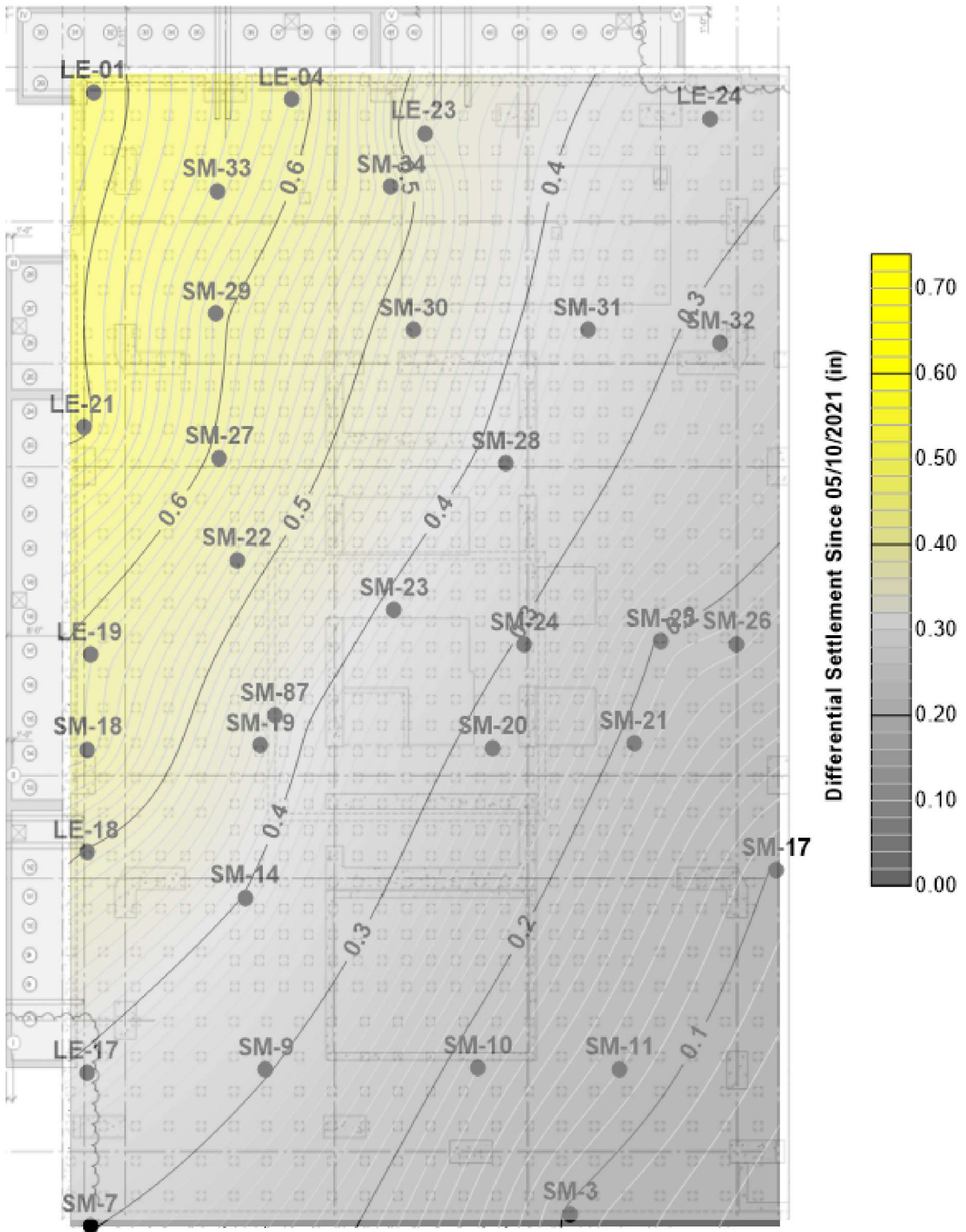


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**DIFFERENTIAL SETTLEMENT MARKER DATA**  
 SINCE 05/10/2021 THROUGH 07/26/2021

Millennium Tower Perimeter Pile Upgrade: Instrumentation Monitoring Data  
 City and County of San Francisco, California





Project No: 19-009.00

Date: 7/30/2021

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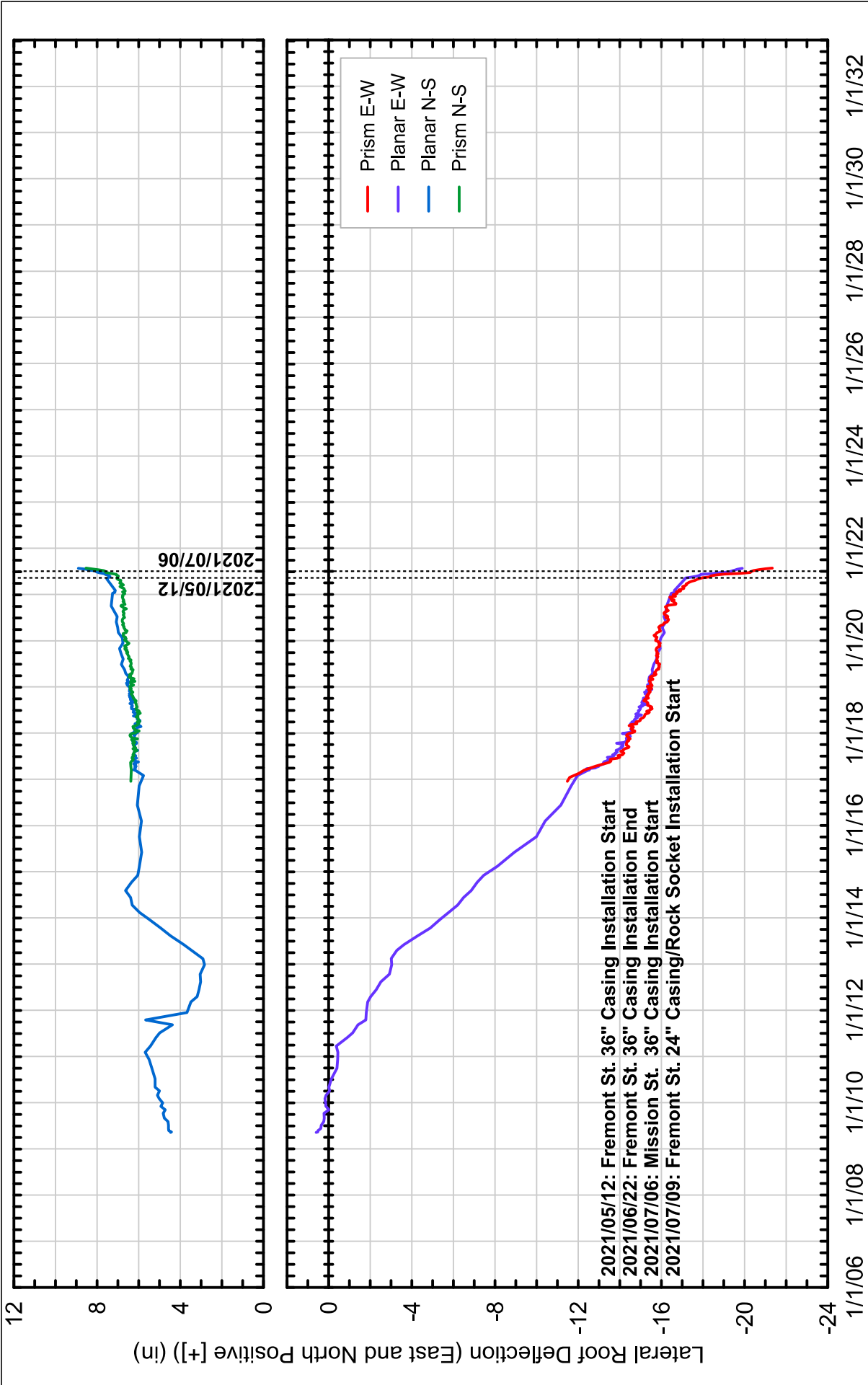
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Figure No: **013-04**



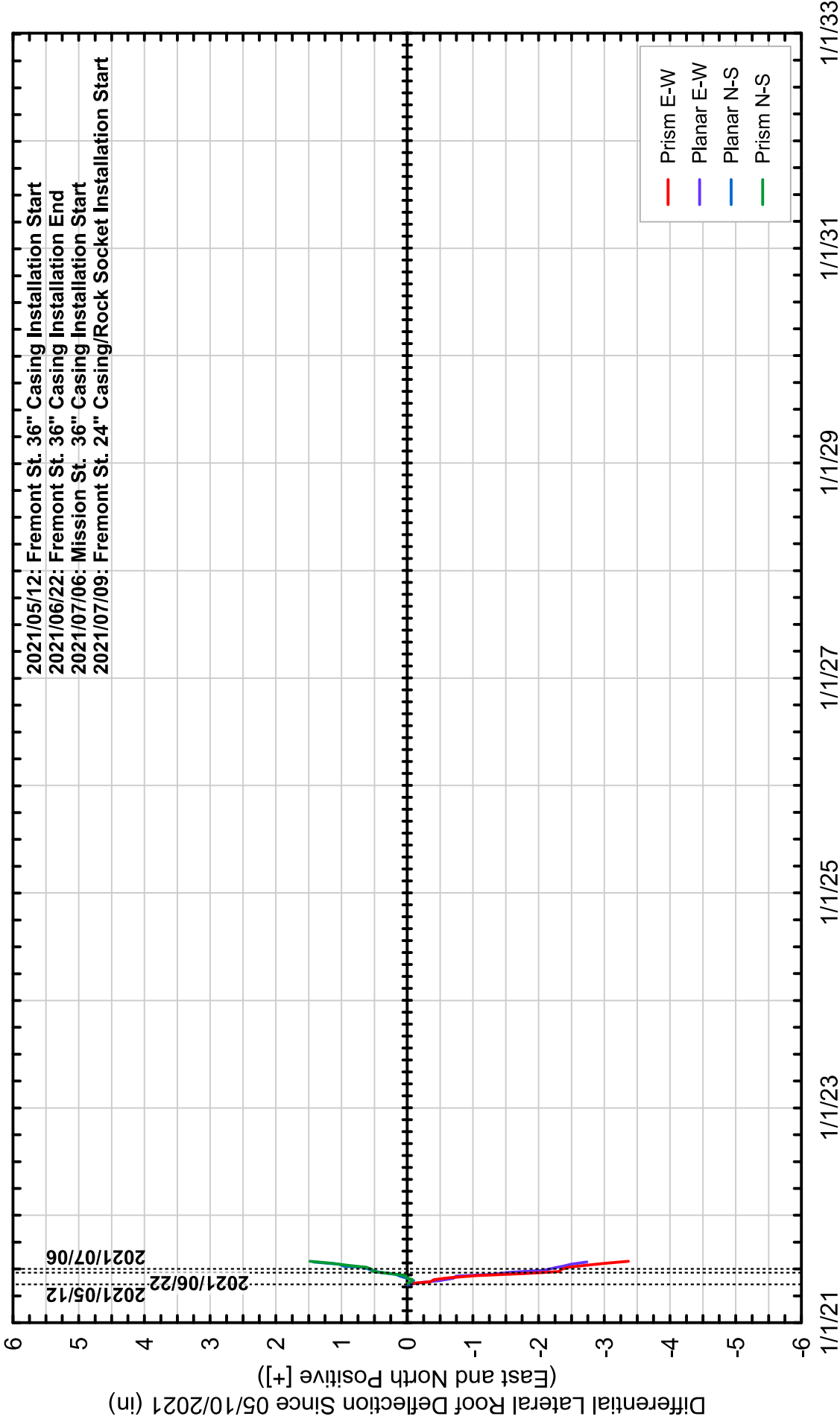
**DIFFERENTIAL SETTLEMENT CONTOURS  
SINCE 05/10/2021 THROUGH 07/26/2021**


Millennium Tower Perimeter Pile Upgrade: Instrumentation Monitoring Data  
City and County of San Francisco, California



Project No: 19-009.00	Date: 7/30/2021	Created By: NBW	Checked By: DGM
Figure No: <b>013-05</b>			
<b>HISTORICAL LATERAL ROOF DEFLECTION DATA</b>			
<p>Millennium Tower Perimeter Pile Upgrade: Instrumentation Monitoring Data                  City and County of San Francisco, California</p>			





Project No: 19-009.00	Date: 7/30/2021	Created By: NBW	Checked By: DGM	Figure No: 013-06
				
DIFFERENTIAL LATERAL ROOF DEFLECTION DATA SINCE 05/10/2021 THROUGH 07/29/2021  Millennium Tower Perimeter Pile Upgrade: Instrumentation Monitoring Data City and County of San Francisco, California				