

January 24, 2013  
Proposal No. ADCON-04-00

San Francisco VA Medical Center  
Building 3  
4150 Clement Street  
San Francisco, California

Attention: Mr. Matthew Szeto, Project Engineer

**North Slope Surface Drainage Monitoring and  
Inspection Report**

San Francisco VA Medical Center  
San Francisco, CA

Dear Mr. Szeto:

This letter presents the results of observations and measurements recorded during the second inspection and monitoring event in the area to the north of recently constructed retaining wall at the San Francisco VA Medical Center (SFVAMC) in San Francisco, California. In addition, this report outlines the areas which need immediate attention and outlines the engineering measures that need to be implemented during the ongoing rainy season.

**SITE DESCRIPTION**

SFVAMC is located at 4150 Clement Street on a 29-acre hilly site in northwest San Francisco. The study area is located to the north of two newly constructed retaining walls, located in the northern portion of the property. The larger of these two walls is located to the north of Veterans Drive, which separates the area to the north of Buildings 6, 31, and 3; and the shorter wall is located to the northwest of Building 11. As a part of the longer retaining wall construction, soil from the middle portion of the wall was removed and off-hauled. Therefore, the ground surface on both ends of the retaining wall slopes down towards the lower middle portion and also to the north. Flights of stairs located on both sides of the longer retaining wall, and aligned parallel to the wall along the northern side of the wall, lead to a recently-created, relatively-flat landscape area in the middle portion the retaining wall.

The larger (western) retaining wall contains three storm drain lines: Line 1, Line 2, and Line 3, connected to outfalls in the northern, downhill portions of the study area. A portion of the Storm Drain Line 1, below the stairs is buried, followed by approximately 41 feet of exposed 12-inch HDPE pipe connected with a T-joint at the end. Storm Drain Lines 2 and 3 are structurally connected to the retaining wall on the southern side and slope gently towards the outfall structures located approximately 101 feet and 104 feet north of the wall. Another outfall is located downhill and just a few feet northwest of the footpath, downhill from the smaller (eastern) retaining wall. Concrete blocks cast around the T-joint hold the northern (lower) end of the storm drain pipes in place. Water discharged from the pipes drains into filter fabric-lined, and rip-rap covered outfall areas. The T-joints at the end of the outfall pipes are provided with holes to facilitate discharge of water through the T-joints.

### **PURPOSE AND SCOPE OF SERVICES**

The purpose of our services was to inspect and monitor the conditions of: 1) the four drainage pipelines and outfall structures located to the north of the new retaining wall; and 2) the area around and downslope of the outfall pipes including the El Camino Del Mar Trail, the Coastal Trail, and connecting trails below the outfalls. Our services were provided to meet the scope of work outlined in Performance Work Statement (PWS), North Slope Surface Drainage Monitoring and Inspection Plan, Project no. 662-12-218.

### **SITE ACTIVITIES**

As a part of our monitoring plan, we placed permanent marks on the drain pipes and measured the distances of these marks from marked locations on the retaining wall. We also visually inspected the conditions of the outfall structures and the area in the immediate vicinity of the outfall areas. We took pictures of the site area to document the existing conditions. Three, four, and five points were marked on the exposed portions of the Outfall Lines 1, 2, and 3. Since the majority of the storm drain line 4 is buried, only one point was marked on Outfall Line 4. The measured distances of these points from the marked locations on the wall on August 2, 2012 and December 18, 2012 are listed below.

Distance to	Aug 9, 2012	Dec 18, 2012	Future Date	Future Date
<i>Outfall Line 1</i>				
1A	19' 2 3/8"	19' 3 1/2"		
1B	38' 3 1/2"	38' 5 1/2"		
1C	58' 4 1/2"	58' 6 1/4"		
<i>Outfall Line 2</i>				
2A	18' 11 3/8"	18' 11 1/2"		
2B	32' 7"	32' 7 1/4"		
2C	59' 1 5/8"	59' 3"*		
2D	100' 10 1/8"	101' 7"		
<i>Outfall Line 3</i>				
3A	12' 2 7/8"	12' 27/8"		
3B	36' 8 1/2"	36' 8 1/2"		
3C	55' 9"	55' 9"		
3D	85' 7 3/8"	85' 7 5/8"		
3E	103' 8"	103' 8 1/4"		
<i>Outfall Line 4</i>				
4A	63' 3/4"	63' 3/4"		

“\*” Joint pulled apart, water leaking out of the pipe caused the formation of a slope gully and an erosional scar, needs immediate attention and repairs

**OBSERVATIONS**

During our site visit on December 18, 2012, we noticed that the ground adjacent to the wall had moved relative to the wall near the western stairways. Ground cracks indicative of the slope movement away from the wall were visible in the area around Drainage Line 1, and the western stairways.

Our measurements indicate that Outfall Line 2 moved by approximately 9 inches between August 9, 2012 and December 18, 2012. The extension of the outfall pipe was likely caused by the movement of the outfall structure which may have moved with the underlying slope. We noticed that the pipeline had pulled apart near one of the joints and the water leaking out of the disconnected pipe had resulted in the formation of a deep erosional gully. It is very likely that the slope movement got exacerbated by the infiltration of water leaking out of the pipeline into the surrounding area. Therefore Outfall Line 2 needs to be repaired immediately and should be routinely monitored for any leaks as the saturated underlying sloping ground could further move. The erosional gully could be backfilled with sand bags created by using native

sandy soil. BAGG should be contacted to provide geotechnical engineering recommendations if additional slope movement is observed.

Some old drainage lines were observed in the areas downhill of outfall structures associated with Drainage Lines 1 and 2. It is not clear if these lines are still functional or are abandoned. If these lines are currently functional, then they should be provided with an energy dissipation system similar to the newly constructed outfall structures, and if they are abandoned, then they should be either plugged or removed from site.

Outfall Line 3 moved by approximately ¼-inch between August and December 2012, and Outfall Line 4 remained unchanged during the same period.

Portion of El Camino del mar Trail and the Coastal Trail downhill of the outfall structures contained some tree branches which could pose some safety hazards to the hikers. Therefore, these branches should be trimmed immediately.

The ground cracks observed near the western stairs will allow deeper penetration of surface water runoff into the sloping ground to the north of the wall. Deeper water penetration will likely result in further destabilizing the slopes and thus need to be filled immediately.

We trust this letter provides you the requested information at this point. Please do not hesitate to contact us, should you have any questions or comments.

Sincerely,  
**BAGG ENGINEERS**

Ajay Singh  
Senior Engineer



**NORTH SLOPE  
& SURFACE DRAINAGE MONITORING  
SAN FRANCISCO VA MEDICAL CENTER  
SAN FRANCISCO, CA**

**PICTURES**

JOB NO.  
ADCON-01-00

DATE  
JAN 2013

PLATE



**NORTH SLOPE  
& SURFACE DRAINAGE MONITORING  
SAN FRANCISCO VA MEDICAL CENTER  
SAN FRANCISCO, CA**

**PICTURES**

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