



# Memorandum

March 2, 2017

To: Dan Berman, Trinidad City Manager Ref. No.: 01063-07-001

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From: Josh Wolf, PE Tel: 707.443.8326

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cc: Steve Allen, PE

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**Subject: Storm Damage – Van Wycke Trail**

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## 1. Introduction

On February 14, 2017, GHD staff conducted an initial site review of storm damage on Van Wycke Trail. This memorandum summarized the site observations and recommended corrective actions.

## 2. Site Observations

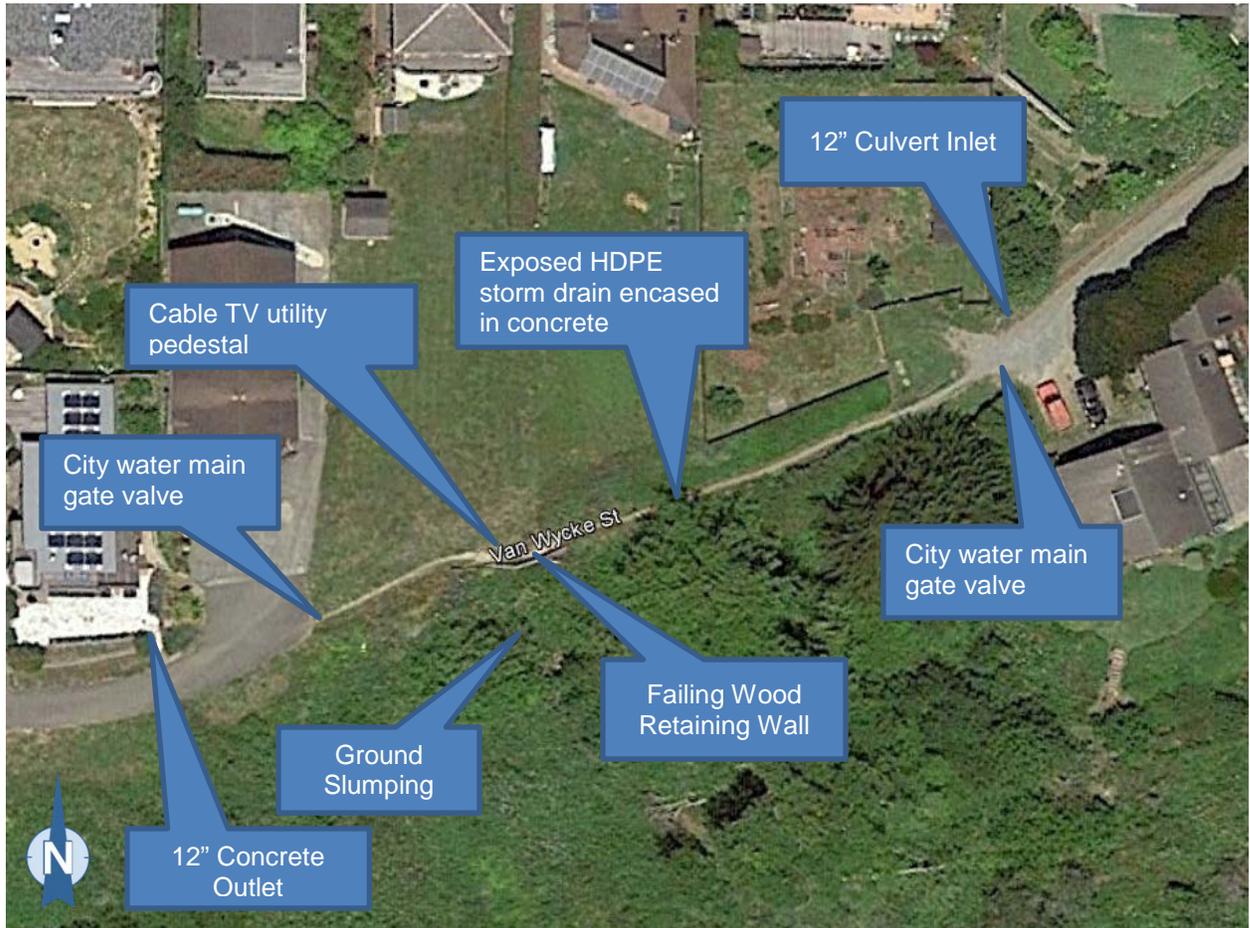
The following summarizes the primary site observations (see Figure 1 for approximate locations):

Wooden Retaining Wall – There appears to be active ground movement in the vicinity of the existing wooden retaining wall which continues to degrade and fail. The concrete dead-man anchors were exposed and appeared to be providing little to no structural support for the retaining wall.

Storm Drain - A small amount of storm water was observed entering the inlet side of the storm drain system, however the outlet side was dry (no flow). This is likely indicative of a break or leak in the pipe. A portion of the storm drain is visible (section east of wooden retaining wall) and appears to be encased in concrete.

Utility Pedestal – There is an existing utility pedestal just north of the retaining wall which appears to be for cable television (CATV). The location, alignment and condition of the underground CATV facilities are unknown.

Water Main – There is a City water main which parallels the Van Wycke trail alignment although the exact location is unknown. According to Trinidad Public Works staff the water main has been isolated from the water distribution system by closing the gate valves located on either end of the Van Wycke trail.



**Figure 1 – Approximate locations of site observations**

### 3. Recommendations

The condition of the wooden retaining wall and embankment potentially poses a serious risk to the integrity of City’s drainage system and water main, and the CATV facilities. Ongoing slumping of the bluff could lead to complete or sudden failure of the retaining wall, which could damage and/or expose the existing water main, CATV facilities and storm drain pipe.

#### **Water Main**

Although the City’s water main is at risk of failure in the event of bluff failure, the magnitude of risk is relatively small since the portion of pipe that bisects the failure area has been valved –off and the pipe is no longer used to distribute water. If the slope does fail, portions of the water main may be pulled apart at their joints but as long as the valves are fully closed, failure of the water main should have little to no impact to water service bluff stability.



## **CATV**

The importance of the CATV facilities near the Van Wycke failure area is unknown since it is not a City owned facility. The owner of the CATV facility should be notified that their facilities are potentially at risk so that they may take necessary steps to protect their facilities should they so choose.

## **Storm Drain**

Failure of the storm drain pipe could result in storm water discharging onto the exposed bluff which could lead to accelerated bluff instability. In order to reduce the risk of failure and be better prepared to respond to a potential failure, we recommend the following actions listed below be taken. We suggest that a representative from GHD be present during any repairs to help guide the work. It's possible that additional or different improvements will be necessary based on the current condition of the facilities at the time work is completed or unforeseen circumstances.

### **Determine Storm Drain Pipe Condition and Repair as Required**

The storm drain pipe should be videoed as soon as possible to determine the pipe condition and whether the joints are still intact or if there is separation and/or leaking. It's our understanding that the City has initiated this work which is scheduled to be completed on 3/2/17.

- If the video of the pipe shows broken or separated joints, then the joints should be repaired/sealed or the storm drain system bypassed.
  - If the joints aren't too displaced, then the storm drain could be slip-lined by inserting a smaller pipe (e.g. continuous solid wall HDPE 6") into the existing 12" pipe (and sealed on the inlet side) to prevent or limit leaks.
  - If the joints are too displaced to insert a smaller storm drain pipe, then the storm drain could potentially be bypassed with a surface mounted storm drain pipe, anchored to the ground with T-posts, rope, sand bags, etc. There are some challenges to bypassing the pipe (e.g. intercepting storm water, maintaining continuous pipe slope, right-of-way limitations, maintaining access to driveways, etc.) so the feasibility and extent of the bypass will depend on the severity and location of pipe failures identified.

### **Preemptively Secure Pipe to Ground**

If the pipe/joints are found to be in good condition from the video investigation, then the City may elect to preemptively secure the pipe to the ground as a preventative measure to reduce the likelihood of pipe failure in the event of ongoing or sudden ground movement. The City should hand dig or probe near the trail failure/slumping to determine the approximate location of the storm pipe and whether it's encased in concrete. If the pipe is not encased in concrete, then the City could choose to anchor the storm drain pipe to the ground above the visible failure area. This could potentially be done with ropes and T-Posts embedded/secured into the ground above the pipe. If the storm drain pipe is encased in concrete then it may be impractical to adequately secure it to the ground.



### Prepare to Respond to an Emergency Situation

If the storm drain pipe joints are found to be in good condition with no signs of leaking, then the City should still be prepared to secure or bypass the storm drain pipe in the event the slope continues to slump or suddenly gives away. The exact approach taken to secure or bypass the pipe will depend on the nature and extent of the slope failure and actual risk or impact to City utilities. Potential action may include the following:

- Secure the pipe to the stable upslope ground.
- Bypass the pipe using a surface mounted storm drain.
- Install a temporary down drain to convey stormwater to the bottom of the bluff (to the beach).

The City should obtain the following materials (at a minimum) and have them on-hand in the event that immediate action needs to be taken to secure or bypass their utilities: storm drain pipe, T-posts, rope, sand bags, and visqueen.

The area should be monitored daily and during storm events and immediate action should be taken to secure the storm drain pipe and water main in the event of bank/wall failure.

### Engage City Attorney

The City Attorney should be engaged to determine whether the City should take any specific action to reduce or eliminate potential risk or liability to the City.