D’Arcy and Harty

Contractor Statement Regarding Pipe Bursting Video

Data Response from the City of San Bruno and 2008 Pipe Bursting Contractor regarding questions from the NTSB:

1.) The construction specifications for backfill provided by the City to the Contractor performing the 2008 sewer replacement.

Response: Backfill specifications attached.

2.) A statement from the contractor describing how the backfill and compaction were performed on the for the excavation and exit pit at the job site. Specifically, the material used for the backfill, the method of compaction (make and model if available) and compaction intervals. Was there any special procedure used to ensure adequate bedding underneath the pipe?

Response: The area around the new sewer line was backfilled with ¾" drain rock per specifications. Above the sewer line pipe zone, Class II base rock was used per specifications. A hand tamper (Bomag BT 65/4, or equivalent) was used to compact the material. The material was placed in about 8" lifts and compacted with the tamper. Directly above the gas line at least 2 feet of back fill was placed before any tamping was done. The base rock was tested at random locations by an independent laboratory (Testing Engineers) and found to be at 95% relative compaction as required. Regarding the bedding under the gas line, sand bedding may have been placed under the gas pipe. Otherwise Class 2 base rock was used.

3.) What work was performed by the City to pave over the exposed trenches left by the contractors (e.g. material removal, backfill, compaction or pavement cutting.

Response: Final paving of all exposed trenches was performed by the Contractor. In general trenches and pits were T-cut for final paving. Any temporary steel plates or asphalt and base rock was removed as necessary and the sub-base compacted with a hand tamper (Bomag). After oiling the sub-base with tack oil, ~4" to 6" of Asphalt concrete final paving was placed in two lifts and compacted. The Asphalt concrete was compacted with a smooth drum roller (Bomag 90AD-2) with a 36" drum.

3.06 BACKFILL AND COMPACTION

A. Place bedding and backfill materials true to the lines, grades, and cross-sections indicated on the Drawings and compacted to the degree specified on the Drawings.

B. Place bedding and backfill materials in horizontal lifts not to exceed 12 inches in thickness measured before compaction. The difference in level on either side of a pipe shall not exceed 4 inches.

C. Backfill material shall not be placed over the pipe until after it has been inspected by the Engineer.

D. It shall be incumbent upon the Contractor to protect the pipe from damage during the construction period. It shall be his responsibility to repair broken or damaged pipe at no extra cost to the Owner. Tamping of backfill over the pipe shall be done with tampers, vibratory rollers and other machines that will not injure or disturb the pipe. Carefully place backfill around and over the pipe and do not allow it to fall directly upon the pipe.

E. Do not allow construction traffic nor highway traffic over the pipe trench until the trench backfill has been brought back even with existing adjacent grade.

F. Add water to the backfill material or dry the material as necessary to obtain the optimum moisture content for the compaction shown on the Drawings or specified. If the Engineer determines that the nature of the ground in which the trench lies precludes compaction of the backfill to the specified density, the backfill shall be compacted to the maximum practicable density. Employ such means as may be necessary to secure a uniform moisture content throughout the material of each layer being compacted. After the material has been moisture conditioned, compact it with compaction equipment approved by the Engineer to achieve specified compaction. The Contractor shall be responsible for obtaining the densities specified. Should he fail, through negligence or otherwise, to compact to specified density, or to backfill and compact to surface grade, thus permitting saturation of the backfill material from rains or from any other source, the faulty material shall be removed and replaced with approved material which shall be compacted to the specified density at optimum moisture content, and no additional payment will be made for doing such work or removal and replacement.

G. Compaction by flooding, ponding or jetting will not be permitted.

H. For all piping or conduits to be placed in any excavated and backfilled area, such as at manholes or for building connections, the structural backfill shall be first compacted to a level at least 3 feet from the top of the piping or conduit elevation and then retrenched to pipe grade.

I. Compact backfill for structures to 95% relative compaction.

Data Response from the City of San Bruno and Installation Contractor to NTSB questions related to the 2008 San Bruno Sewer installation on Earl Avenue:

1) What time did the bursting process start?

Response: The pull began at approximately 1 pm. The bursting likely began shortly thereafter.

2) What time did the bursting process finish?

Response: The total pull was completed around 8 pm. The bursting would have ceased about an hour before when the hammer approached the gas line pothole pit.

3) Did the bursting process operate continuously or was it stopped and started periodically?

Response: The bursting process likely was continuous until it approached the location of the gas line pothole.

4) If stopped and started, how many hours was the bursting head in active operation?

Response: N/A

5) How many feet of sewer pipe were burst (not counting static pulled or hand removed sections)?

Response: Approximately 260 feet of 290 feet of sewer pipe were burst, with the remainder either static pull or removed by hand (e.g. in the pot hole and extraction and entrance pits).

6) Is the pull rate constant or does it vary from start to finish?

Response: In a typical operation the winch tension is constant but the rate of pull can vary.

7) If it varies, is the maximum/minimum known and at what point in the pull do they occur (beginning, end, etc.)?

Response: The maximum/minimum is not known and in a typical operation the rate of pull may vary depending on, among other things, soil conditions around the pipe and pipe alignment.

8) Is the actual pull velocity recorded or output by the device and if so are the values known?

Response: Not recorded.

9) What was the burst rate (strokes/min)?

Response: The rate at which the hammer strokes is not recorded or displayed.

10) Was the burst rate constant or did it vary?

Response: Don't know

11) Was the bursting head pulled by a cable or a chain?

Response: A Cable.

12) If a cable, what was the diameter of the cable?

Response: 9/16 of an inch

Response from city confirming location of Winch seen in 2008 Pipe Bursting Home Video:

Figure 1: Winch Photo 1 - Still shot from 2008 Home Video

Figure 2: Winch Photo 2 - Still shot from 2008 Home Video

From: Connie Jackson
Sent: Tuesday, August 02, 2011 11:07 AM
To: 'chhatrr@ntsb.gov' <chhatrr@ntsb.gov>; 'matthew.nicholson@ntsb.com' <matthew.nicholson@ntsb.com>
Cc: Klara Fabry; Geoffrey Caldwell
Subject: FW: San Bruno 2008 Sewer Work Video and Still Shots

Ravi and Matt

The following information is from Geoff Caldwell who reviewed the location in your still shots. Geoff also provides the attached photo that he took today in the same location to assist you in understanding his response below.

Please let us know if you need any further clarification. In the meantime, we have forwarded your question to D'Arcy and Hardy for their response and will forward that when we receive it - hopefully later today. We have alerted the contractor that you may also have further questions. We and they will seek to respond to those also asap.

Connie

From Geoff:

With regard to the first picture entitled winch photo 1: The house directly to the right of the backhoe in the photo is 1731 Earl Ave. It is the fourth house west from the corner of Glenview Dr on the north side of the street. Incidentally the first three houses from the corner have all been destroyed, 1731 still exists. This determination was made by reviewing the taped footage and comparing it with the winch photo picture, and current photos of the neighborhood.

The second picture entitled winch photo 2, is of the fire hydrant at the n/w corner of Earl Ave and Glenview Dr. The hydrant still exists in the same location; in front of 1701 Earl Ave.