Design Report

WT FRS 4 OUTLET FACILITY

Van Buren St. - Jackrabbit Trail to Cotton Lane

DESIGN CONTRACT FCD No. 2010 C029
CONSTRUCTION CONTRACT FCD NO. 2011 C016

Prepared for:
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009
Project No. 2006C027

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1.0 INTRODUCTION

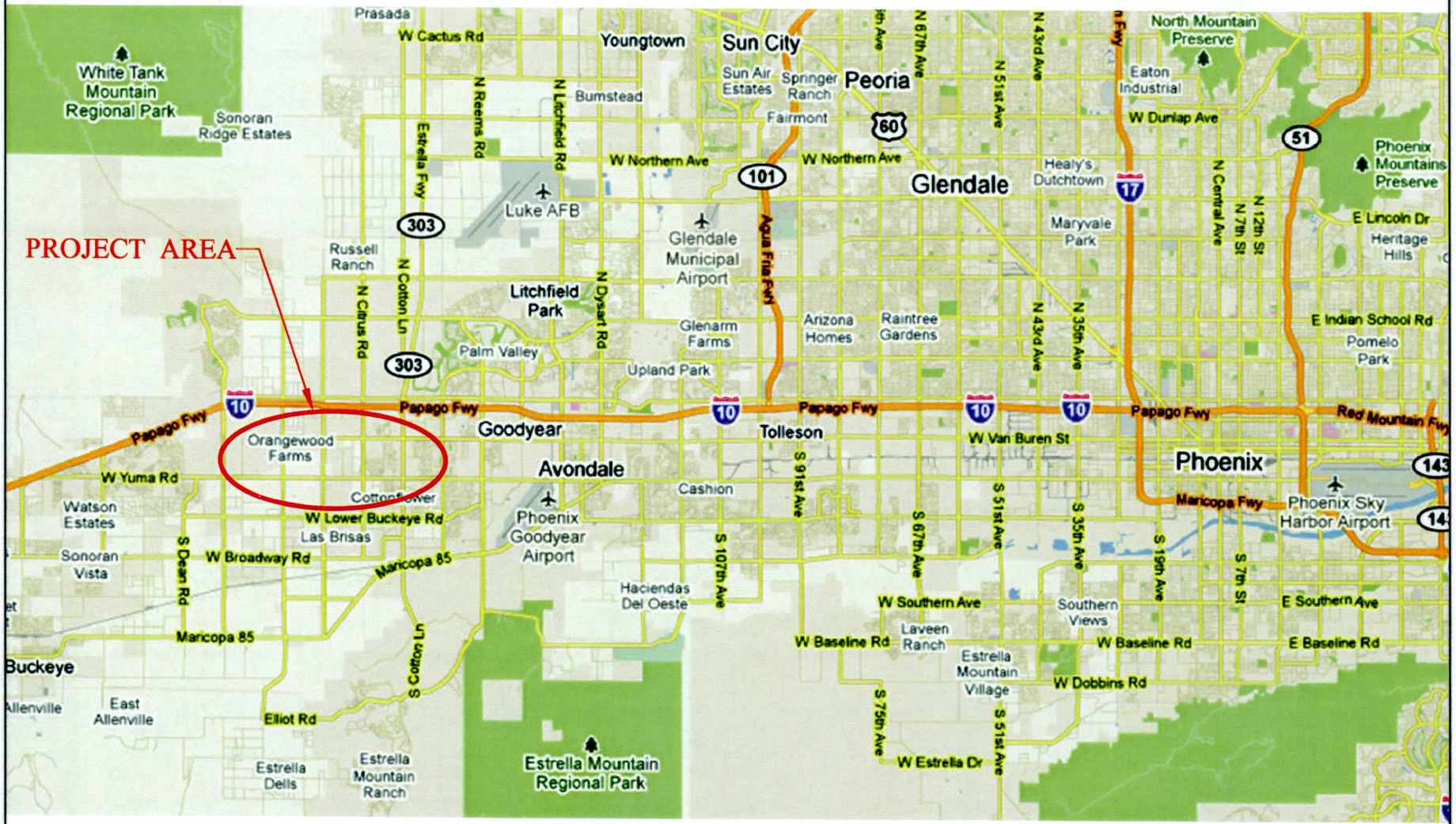
1.1 Purpose

The purpose of the White Tanks FRS 4 Outlet Facility project is to provide a dedicated outlet for the White Tanks FRS 4 Facility in order to meet the Natural Resources Conservation Service (NRCS) required post event 10 day drawdown of the FRS 4 Facility. The dedicated outlet will connect to the upstream FRS 4 Facility and tie-in to the downstream Loop 303 drainage channel which ultimately drains to the Gila River. Both the upstream FRS 4 Facility Rehabilitation and the downstream Loop 303 Drainage Channel projects are currently in design.

The FRS 4 Facility Outlet project is being lead by the Flood Control District of Maricopa County (FCDMC) in both design and construction. Stakeholders include the Roosevelt Irrigation District due to the crossing of the RID Canal at the Van Buren Street crossing, the City of Goodyear, the Town of Buckeye, and MCDOT.

1.2 Location of Project

The FRS 4 Facility Outlet project area is located within the Town of Buckeye and City of Goodyear area, and encompasses Sections 2 through 5 and Sections 8 through 11 of Township 1N, Range 2W of the Gila and Salt River Base Line and Meridian, Maricopa County. The FRS 4 Facility Outlet alignment is situated within Van Buren Street beginning at the upstream FRS 4 Facility located west of Jackrabbit Trail continuing to the east tying into the downstream Loop 303 Drainage Channel which is just west of Cotton Lane the proposed Loop 303 freeway.

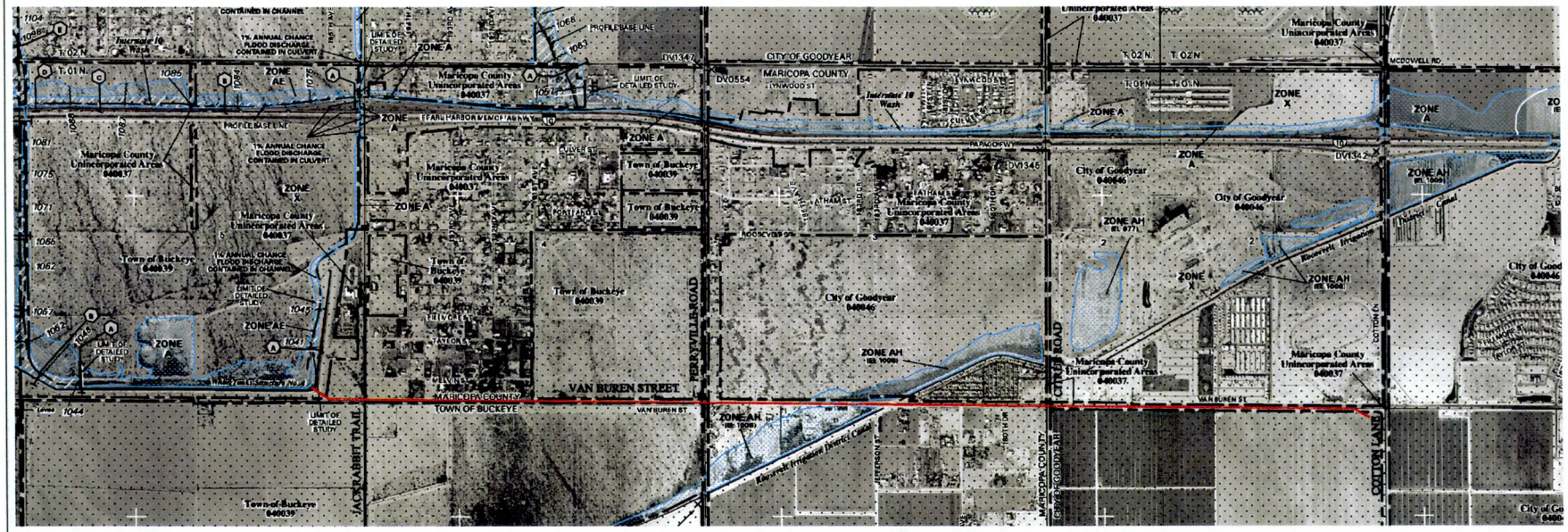


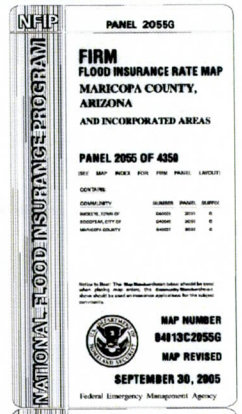
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY FCD PROJ. NO. 2010 C029	PROJECT VICINITY MAP WT FRS 4 FACILITY OUTLET	N NTS	OLSSON ASSOCIATES 7250 North 16th Street Suite 210 Phoenix, AZ 85020 TEL 602.748.1000 FAX 602.748.1001	Figure 1

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY FCD PROJ. NO. 2010 C029	SITE LOCATION MAP WT FRS 4 FACILITY OUTLET	N NTS	OLSSON ASSOCIATES 7250 North 16th Street Suite 210 Phoenix, AZ 85020 TEL 602.748.1000 FAX 602.748.1001	Figure 2

1.3 Existing Conditions

Stormwater from the White Tanks watershed sheet flows in a southeast direction, originating from the White Tanks Mountains and continuing south until it reaches the Gila River. The topography within the project area slopes to the southeast at 0.35%. A floodplain classified as a Zone "AH" exists upstream of the RID Canal. A pending floodplain is in the area of the northeast and southeast corner of Perryville Road and Van Buren Street. Areas north of the Zone "AH" designation are designated shaded Zone "X", which corresponds to areas outside the 100-year floodplains or areas of 100-year sheet flow flooding where average depths are less than 1 foot. A FIRM map showing the existing floodplain of the project area is provided in Figure 3.





LEGEND

PROPOSED FRS 4 FACILITY OUTFALL

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY FCD PROJ. NO. 2010 C029	**FLOOD INSURANCE RATE MAP** **WHITE TANKS FRS 4 FACILITY OUTLET, VAN BUREN STREET - JACKRABBIT TRAIL TO COTTON LANE**	NTS	OLSSON ASSOCIATES	Figure 3

1.4 Basis of Design

The basis of design for this project is the *White Tanks FRS 4 Outlet Final Design Concept Report* (Olsson Associates, 2010). This report evaluated eight design alignment alternatives to provide a dedicated outlet for the WT FRS 4, and recommended Design Alternative No. 6 as the preferred alternative.

1.4.1 Basis of Hydrology

The basis of hydrology for this project was determined from the upstream FRS 4 Dam Rehabilitation project. Wood Patel is currently working on phase 2 which includes design of a dual outlet structure at the FRS 4 Facility. The design flow for the FRS 4 Facility Outlet was based on the Natural Resources Conservation Service which requires the post event drawdown of the FRS 4 Facility to occur within ten days. The total design flow as defined by the upstream FRS 4 Facility project is 300 cfs. No additional offsite hydrology was or will be done by this project.

1.5 Design Criteria

The proposed drainage facilities for the FRS 4 Outlet Facility is located within three jurisdictional areas: Town of Buckeye, City of Goodyear, and Maricopa County. The design will adhere to meet the standards and guidelines set forth in the FCDMC's *Drainage Design Manual, Volume 1 (Hydrology)*, and *Volume 2 (Hydraulics)*. The following summarizes the design criteria for the project:

- The hydraulic grade line (HGL) will be at least 1 foot below the ground or rim elevation for any manholes for the 300 cfs design flow.
- The minimum velocity in the storm drain pipe will be 5 ft/sec and the maximum velocity will be 15 ft/sec.

2.0 SURVEY

2.1 Scope

Aerial mapping and topographic ground survey work was performed for the project area, which included approximately 3.5 miles from the FRS 4 Facility (appoximately 2,200ft west of the Jackrabbit Trail and Van Buren Street intersection) a 450 ft wide swath encompassing 225 ft along each side of the Van Buren Street monument line. Existing surface utilities were located. Control elevations were established in the field areas to create contours or spot elevations, including ground elevations, grade breaks, curbs and/or edge of pavement elevations. Surface features such as structures and trees were identified and located. Survey data is provided in Appendix B.

2.2 Datum

The ground survey performed for this project was performed by Wood Patel Engineering.

Projection: Arizona Central Zone, NAD 83, (Epoch 2007)
Datum: GRS-80
Units: International Feet
Geoid Model: Geoid 09

Control point: 4AC1

PID: AJ3819
Latitude: 33°22'53.60485"N
Longitude: 112°23'01.77450"W
Ellipsoid Height: 252.240 (M)
Description: Survey disk set in rock outcrop

Modified to ground at (grid) N: 0, E: 0, using a scale factor of 1.00016 per Arizona Department of Transportation parameters.

Horizontal adjustment: None

Horizontal rotation: None

The vertical datum for this Survey is based on NGS monument F 520, southeast of MC 85 near a high line tower, having an elevation of 894.82, NGS NAVD 88 Datum.

3.0 HYDROLOGY

3.1 Design Flows

The FRS 4 Facility Rehabilitation project is currently in design of a dual outlet riser system which is required to meet the NRCS design parameters. A 300 cfs design flow has been defined by the upstream FRS 4 Facility Rehabilitation Riser design in order to achieve the NRCS 10 day drawdown requirements for the FRS 4 facility. Fifteen inch diameter stub out pipes with plugs, with one every 900 ft. (nominal spacing), will be provided by this project for its full length. This is a provision for possible future connections for on-site (only) drainage of street improvements to Van Buren Street. No other future storm drain tie-ins will be allowed.

4.0 HYDRAULICS

The hydraulic analysis follows procedures described in Section 3.3 of Flood Control District's *Drainage Design Manual, Volume 2, Hydraulics*.

4.1 Outlet Design

4.1.1 Profile Constraints

There are three constraint areas along the FRS 4 Outfall Alignment:

- Jackrabbit Trail Intersection
- RID Canal
- City of Goodyear Sanitary Sewer Lines

Jackrabbit Trail Intersection:

There are several existing utilities within the intersection of Jackrabbit Trail and Van Buren Street. Utilities include:

- Town of Buckeye 15-inch VCP Sanitary Sewer
- Southwest Gas - 12-inch High Pressure Gas Line
- Southwest Gas - 4-inch PE Natural Gas Line
- Qwest - Local Telephone Network
- Cox Communications - Fiber Optic
- AZ Water Company - 12-inch DIP Water Main

Adding a drop structure prior to Jackrabbit Trail and dropping the outlet 2 ft below the existing Town of Buckeye 15-inch sanitary sewer avoids utility relocations with both SWG gas lines, Cox Fiber Optic, and AZ Water Company water main.

RID Canal:

As the hydraulic modeling developed it was determined that a 66-inch equivalent elliptical pipe (53"x83" with 7-inch wall thickness) allows for 12-inches of separation between the bottom of a 6-inch canal liner and the top of elliptical pipe.

City of Goodyear Sanitary Sewer Lines:

The constraint on the vertical alignment is a series of City of Goodyear sanitary sewer crossings within Van Buren Street. An existing 12-inch sanitary sewer line approximately 900ft east of Citrus Road crosses Van Buren Street and forces the outlet pipe to run at a minimum 0.01% slope from the RID canal to 173rd Avenue. The existing 12-inch sanitary sewer line is a deep line which has a slope of 0.02% and conveys sewage flow to the south and then to the east along Van Buren Street. Unfortunately there is no opportunity to drop the sanitary sewer line down to provide an increase separation between the sanitary sewer and the outlet pipe. An option of penetrating the outlet with a sanitary sewer line encasement through the interior of the outlet pipe is a costly, last resort type of action. The tie-in outlet with the Loop 303 outfall channel is 981.00.

4.2 Hydraulic Model

Final Iteration

After several iterations of the hydraulic model the team looked at utilizing an elliptical pipe in lieu of an 8'x5' concrete box at the RID canal crossing. The final model also involves an 84-inch pipe with a drop structure prior to the Jackrabbit Trail intersection to avoid 5 utilities. From the drop structure at Jackrabbit Trail the outlet transitions to a 78-inch circular pipe continuing for 3,000 ft and then upsizing to an 84-inch and 90-inch circular pipe prior to the RID canal crossing. An elliptical pipe crosses the RID Canal and utilizes two 1' wide transition plates for the transition between the 90-inch circular pipe and the 53"x83" elliptical pipe. The 90-inch circular pipe continues downstream to the Loop 303 drainage channel tie-in just before Cotton Lane.

The storm drain system was modeled using Bentley's StormCAD program. Curves were used in the storm drains to minimize loss at deflection points. Losses at manholes and junctions were determined using the procedures in the District's *Drainage Design Manual, Hydraulics*. The FRS 4 Facility Outlet model's tail water elevation of 987.00 at

the Loop 303 drainage channel tie-in was provided by Wood Patel. The StormCAD outputs are provided in Appendix A.

4.3 Velocity in Storm Drain

The FCDMC standards specify 15 ft/s as the maximum allowable velocity in storm drains. Table 1 below lists the velocity within the storm drains for various pipe sizes and flow values flowing under pressure condition:

Table 1
Pipe Velocities

Pipe Size (inches)	Area (ft^3)	V (Q=300 cfs) (ft/s)
78	33.2	9.0
84	38.5	7.8
90	44.2	6.8
53x83	24.8	12.1

The hydraulic design has been done to determine the smallest pipes that will work from a hydraulic perspective. Additionally, the velocities above are for pipe full conditions where the downstream HGL dictates flow capacity. The VA meeting has been scheduled for the week of April 4th, 2011.

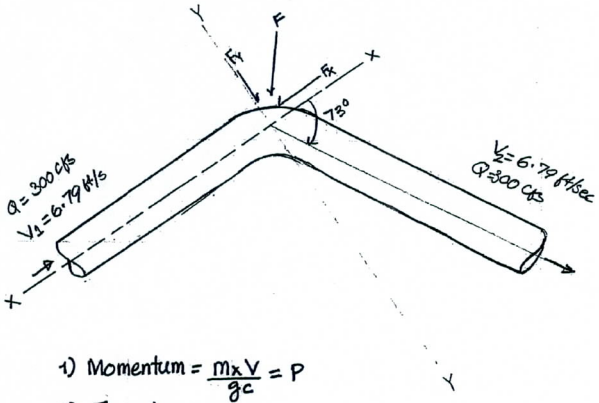
5.0 GEOTECHNICAL INVESTIGATION

A copy of the Geotechnical Investigation Report by Ninyo & Moore can be found in Appendix D of this report.

Bearing Pressure Calculations

Section 9.1.8 in the Geotechnical Investigation Report in Appendix D of this Design Report provides further information regarding the fill placement and compaction requirements.

The following calculations provides the bearing pressure calculations at the 73 degree bend at station 102+85.52 and the 62 degree bend at station 103+45.99.



1) Momentum = $\frac{m \times V}{gc} = P$

2) Impulse = $F \times \Delta t$

Impulse-momentum principle states that Impulse applied to a body is equal to change in momentum

$$F \times \Delta t = \Delta P = \frac{m \cdot \Delta V}{gc}$$

$$F = \frac{m}{\Delta t} \times \frac{\Delta V}{gc} = \dot{m} \times \frac{\Delta V}{gc}$$

$\dot{m}$ = mass of flow rate = lbm/sec

$= \rho \times A \times V = \rho \times Q$

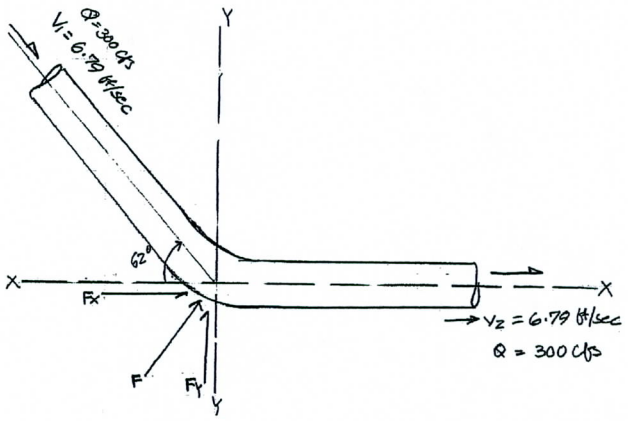
$$Fx = \frac{\dot{m} \times (V_1 - V_2 \cos\theta)}{gc} = \frac{62.4 \times 300 \times (6.79 - 6.79 \times \cos 73^\circ)}{32.2}$$

$= 2793$ lbf

$$Fy = \frac{\dot{m} \times V_2 \sin\theta}{gc} = \frac{62.4 \times 300 \times 6.79 \times \sin 73^\circ}{32.2} = 3775 \text{ lbf}$$

PROJECT: $F = \sqrt{Fx^2 + Fy^2} = 4696$ lbf.

73 degree bend at station 102+85.52



$$F = \dot{m} \times \frac{\Delta V}{gc}$$

$$Fx = \frac{\dot{m} \times (V_2 - V_1 \times \cos 62^\circ)}{32.2} = \frac{62.4 \times 300 \times (6.79 - 6.79 \times \cos 62^\circ}{32.2}$$

$= 2094$ lbf

$$Fy = \frac{\dot{m} \times V_2 \sin 62^\circ}{32.2} = \frac{62.4 \times 300 \times 6.79 \times \sin 62^\circ}{32.2} = 3485 \text{ lbf}$$

$$F = \sqrt{Fx^2 + Fy^2} = 4065 \text{ lbf}$$

62 degree bend at station 103+45.99

Soil Pressure

A conservative soil bearing capacity for undisturbed native soil is 3,000 1b/ft^2. Therefore, as long as the pipe is placed with a well compacted backfill all the way to undisturbed soil, no special joints or reinforcing should be required. The soil opposing the pipe is approximately 4,700 lbs of force is 56 sf (7' high by 8' long), and with 3,000 lb/sf bearing capacity, it has a capacity of approximately 162,000 pounds.

6.0 UTILITIES

The White Tanks FRS 4 Facility Outlet project utilized the following steps to acquire utility mapping and as-built plan information.

1. Bluestake Design Ticket Request for the FRS 4 Facility Outlet project area.
2. Identification of Utility Company, type of utility, and contact with phone number.
3. Send out Utility Mapping / Conflict Requests to obtain mapping / as-built plans.
4. Collection of Utility Mapping from Utility companies.
5. Meetings with Roosevelt Irrigation District, Town of Buckeye, W.C. Scoutten, and City of Goodyear to acquire as-built plans.
6. Utility Potholing - Ten potholes were completed during the FRS 4 Facility Outlet Alignment Design Concept Report. Five additional potholes for the AT&T Fiber Optic Lines were completed with the survey mapping during the RID dry up period in November 2010. An additional 35 utility potholes have been completed with the 70% plan submittal.

Table 2 – Utility Contact Information

Company	Utility	Number	Contact
AT&T	Fiber Optic	925 977-2413	Rosemary Hamill Walter Werstiuk
APS Electric	Electric	602 439-4225	Jolie Burow
Qwest Local Networks	Coaxial, Fiber	602 630-0492	Chris Lertique
Cox Communications	Cable TV, Fiber	623 328-4073	Gwendalyn Garcia
MCI	Fiber	602 430-3615	Collin Sword
Roosevelt Irrigation District	Irrigation	623 386-2046	Ken Craig
Level 3	Fiber	877 366-8344	Judy Henry
Cotton Lane RV MH Resort	Mobile Home Resort	602 309 3023	Chip Jordan
Southwest Gas	Gas	602 763-4542	Ric Torres
Southwest Gas	High Pressure	602 271-4277	Andy Lugo
Arizona Water Company	Water	623 853-9302	Tom Seuberling
City of Goodyear	Reclaimed Water, Sewer, Traffic Signals, Water	623 932-3010	Public Works & Water Resources

An initial utility base map was created using as-built maps, quarter section maps, and facility maps obtained from the utility companies. Currently a third pothole list is being prepared and potholes will be performed at the storm drain crossings to identify potential conflicts. Pothole results are provided in Appendix G.

Existing Utilities

Existing Water Lines:

There are two water service providers within the project area: Arizona Water Company and the City of Goodyear. The Arizona Water Company has two 12-inch water lines in Van Buren Street within the Town of Buckeye jurisdictional limits near the upstream end of the project. The southern AWC 12-inch DIP water line is a well supply line while the northern 12-inch DIP line is a domestic water main. The 12-inch water main traveling north/south within the intersection of Jackrabbit Trail and Van Buren Street will require vertical realignment at Sta: 20+17.07 as shown in the construction plans.

The City of Goodyear has a 24-inch water transmission line within Van Buren Street beginning east of Citrus Road at continuing to the east through Cotton Lane. A 12-inch City of Goodyear water main from the 24-inch transmission line extends to the south at the T-intersection of N. 173rd Avenue and Van Buren Street. This 12-inch DIP water main will require vertical realignment at Sta: 164+11.48 as shown on the construction plans.

Existing Sewer Lines:

There are two sanitary sewer service providers within the project area: Town of Buckeye and City of Goodyear. The Town of Buckeye has a 15-inch VCP sanitary sewer line within Jackrabbit trail, but the depth is approximately 14 ft and will not require relocation as the proposed facility outlet pipe is approximately 3 ft above the existing sanitary sewer line.

The City of Goodyear has four pvc sanitary sewer line crossings of the proposed facility outlet within Van Buren Street beginning east of the RID Canal up to Cotton Lane. These sanitary sewer lines range from 8-inch, 12-inch and 18-inches in size. The depth

of these sanitary sewer lines have been potholed at the proposed facility outlet crossings as shown on the plans.

APS Power Distribution Lines:

There are several locations within the project vicinity where APS 12kv and 230kv overhead lines and underground power conduits either parallel or cross the alignment of the facility outlet pipe. These power facilities within the construction zone are in conflict with the proposed improvements and will be relocated by APS prior to construction. All remaining lines and poles will be protected-in-place. The Contractor shall be very cautious working around power poles and overhead lines. Any damage to the power poles, anchors and other items will be repaired and paid by the Contractor at no cost to the Owner.

Qwest:

Qwest has a telephone lines crossing or paralleling the facility outlet. The telephone lines in conflict with the facility outlet pipe will be relocated horizontally outside the construction zone or vertically below the storm drain pipe by Qwest prior to start of construction within this area.

Cox Communications:

Cox has a communication line crossing or paralleling the facility outlet pipe. The communication lines in conflict with the facility outlet pipe will be relocated horizontally outside the construction zone or vertically below the facility outlet pipe by Cox prior to the start of construction within this area.

AT&T Fiber Optic Line:

AT&T has fiber optic lines around the RID canal area. These lines shall be protected in place by the contractor as the proposed facility outlet pipe crosses the AT&T Fiber Optic lines at the RID crossing. These line has been potholed and the existing locations and depths are shown on the construction plans.

MCI/Verizon Fiber Optic Line:

MCI/Verizon has a fiber optic line within Perryville Road. This line shall be protected in place by the contractor at the proposed facility outlet pipe crossing. This line has been potholed and the existing location and depth has been shown on the construction plans.

Level 3 Fiber Optic Line:

Level 3 has a fiber optic line within Cotton Lane. This line is outside the project area limits.

Southwest Gas Lines:

There are several locations within the project vicinity where southwest natural gas and high pressure gas lines either parallel or cross the alignment of the facility outlet pipe. These gas facilities within the construction zone are in conflict with the proposed improvements and will be relocated by Southwest Gas prior to construction. All remaining lines, gas valves, and service lines will be protected-in-place. The Contractor shall be very cautious working around natural gas and high pressure gas lines.

Roosevelt Irrigation District Coordination

The main utility conflicts will be with Roosevelt Irrigation District facilities.

The RID will not allow structures within the RID ROW which is 50 ft on each of the Canal centerline. The canal centerline is not defined legally, but approximated. See Appendix E for RID crossing exhibits.

The RID criteria requires a 2 ft separation between bottom of canal liner (4-inch thick liner) and top of structure when the canal is lined. A 4 ft separation is required for areas where the canal is unlined. The topic of allowing a 1 ft separation distance was discussed for this project at the kick off meeting back in January 2011. The RID is allowing this project to construct a 6-inch thick replacement liner and provide 12-inch separation between the replacement liner and top of pipe.

The RID will review the District's construction documents and add notes to the plans. Safety items or improvements to meet the current RID requirements and standards will be included on the District's plans.

Lateral Crossings

The RID area of influence for laterals 7 thru 10.5 includes the Jackrabbit Trail to Cotton Lane project area. Laterals 8, 7-3/4 & 7-2/3 extend to the south from the RID canal across Van Buren Street. Lateral 8 along Citrus Road is a 30-inch diameter RGRCP crossing, while laterals 7-3/4 & 7-2/3 east of Citrus Road are both 24-inch diameter RGRCP pipes.

The 24-inch concrete pipe crossing west of Citrus Road through Van Buren Street is a tailwater pick up pipe. If a siphon (10ft depth) is used for the crossing relocation will require a maintenance agreement with the property owner, FCDMC & RID which will carry with the land. The siphon will need to be vacuumed once or twice a year.

Lateral 8 will be able to utilize a siphon system. There will not be a tie in with the delivery system, but will require reconstruction of headwalls. There are two additional shallow lateral crossings within Van Buren Street that will require siphon relocations as well. The FCD contractor will construct the improvements, but Stantec will complete the design.

The RID will require RGRCP, Class III replacement; however the DOT will require RGRCP Class V pipe replacement within DOT ROW. Lateral / tile crossing relocation will require the RID to produce and provide the construction documents for the lateral relocations. If a contractor is on-board the plans will be provided to be included in the overall FCD construction documents.

The Watermaster and RID construction observation personnel will not likely allow a bypass pump during the lateral relocation. Construction at the lateral 8 crossing within

Citrus Road will only be allowed in the winter most likely a week prior to the dry up period.

If the construction cannot make the 11-day dry up period in November the RID can handle the construction by utilizing a JOC type on-call list of contractors. The RID has four or five qualified contractors available to solicit bids from. In order to make the November construction window the RID would require bid documents by August 2011.

The RID will need an IGA with the Flood Control to start a scope of services for design and construction administration services.

RID will need a TCE as the RID blanket easement does not cover within the roadway ROW.

Construction

RID shuts off water on Friday to allow for a 2 day dry up on Saturday and Sunday. The contractor can start work on Monday at 6:00am. The contractor typically installs small earthen cofferdams upstream and downstream of the work area. The contractor usually has a pump onsite to help with transient flows. The contractor can use the water as dust control or can pump into a private irrigation ditch, but not a RID lateral. On day 12 of the dry up the water comes online Friday at 6:00pm for delivery on Monday to the RID customers. The flow through the RID canal is approximately 250 cfs in this area.

Work outside of the canal prism can be completed before or after the dry up period.

Canal liner replacement will require the replacement up to the nearest joint within the disturbance area. The condition of the canal lining will need to be evaluated as the contractor will need to tie into a good joint.

The RID would like a perpendicular crossing of the canal rather than a diagonal crossing with the outlet alignment. They would require a valid reason to allow a large diameter utility to cross the canal diagonally.

The bridge along Van Buren crossing the RID canal is a MCDOT bridge which was constructed in 1986.

RID Review and Approval Process

The RID can approve plans for up to one year; additional approval time will require a quick look to re-approve the plans. The RID issues a license to construct to the project owner or the contractor – the preference is up to the project owner. The license is good for one year and the RID does not like to issue until a contractor has been selected.

7.0 SUMMARY AND RECOMMENDATION

This project will construct a dedicated outlet for the FRS 4 Facility within Van Buren Street connecting the upstream to the downstream Loop 303 drainage channel which ultimately discharges to the Gila River. The project also includes the undercrossing of the RID Canal between Perryville and Citrus Road.

The storm drain system will be designed for a capacity of 300 cfs.

8.0 REFERENCES

1. *Drainage Design Manual for Maricopa County, Arizona, Volume 1 – Hydrology*, Flood Control District of Maricopa County, November 2003 (Draft).

2. *Drainage Design Manual for Maricopa County, Arizona, Volume 2 – Hydraulics*, Flood Control District of Maricopa County, September 2003 (Draft

Appendix A

StormCAD Output

Scenario: Base

Node Report

Label	Headloss Coefficient	Absolute Headloss (ft)	Sump Elevation (ft)	Rim Elevation (ft)	Total System Flow (cfs)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Headloss Method
I-1		0.50	1,023.74	1,037.43	300.00	1,031.75	1,031.25	Absolute
J-1	0.05		1,023.68	1,037.61	300.00	1,031.05	1,030.99	Standard
J-2	0.05		1,023.66	1,037.13	300.00	1,030.92	1,030.86	Standard
J-3	0.05		1,023.61	1,036.71	300.00	1,030.69	1,030.63	Standard
J-4	0.05		1,023.59	1,035.50	300.00	1,030.56	1,030.49	Standard
J-5	0.05		1,023.20	1,034.54	300.00	1,029.19	1,029.12	Standard
J-6	0.05		1,023.18	1,033.92	300.00	1,029.04	1,028.97	Standard
J-7	1.00		1,021.00	1,032.40	300.00	1,027.82	1,025.65	Standard
J-8	0.05		1,018.20	1,029.20	300.00	1,023.91	1,023.83	Standard
J-9	0.05		1,015.85	1,027.30	300.00	1,021.55	1,021.47	Standard
J-10	0.05		1,012.81	1,024.43	300.00	1,018.53	1,018.45	Standard
J-11	0.05		1,009.78	1,022.36	300.00	1,015.53	1,015.45	Standard
J-12	0.05		1,006.74	1,018.85	300.00	1,012.59	1,012.52	Standard
J-13	1.00		999.81	1,017.31	300.00	1,009.89	1,008.94	Standard
J-14	0.20		997.61	1,010.88	300.00	1,007.12	1,006.98	Standard
J-15	0.05		996.23	1,008.79	300.00	1,005.60	1,005.57	Standard
J-16	0.05		994.87	1,007.77	300.00	1,004.22	1,004.19	Standard
J-17	0.05		994.84	1,007.90	300.00	1,004.16	1,004.13	Standard
J-18	0.70		994.08	1,006.32	300.00	1,003.37	1,002.87	Standard
J-19	0.18		994.06	1,007.70	300.00	1,002.84	1,002.43	Standard
J-20	0.24		993.96	1,011.75	300.00	1,001.82	1,001.65	Standard
J-21	0.05		993.94	1,011.47	300.00	1,001.63	1,001.59	Standard
J-22	0.50		993.91	1,011.48	300.00	1,001.55	1,001.18	Standard
J-23	0.05		993.00	1,004.68	300.00	1,000.05	1,000.01	Standard
J-24	0.05		991.91	1,002.24	300.00	998.63	998.59	Standard
J-25	0.05		990.82	1,003.37	300.00	997.10	997.06	Standard
J-26	0.05		989.73	1,002.50	300.00	994.89	994.82	Standard
J-27	0.05		987.36	998.22	300.00	992.53	992.46	Standard
J-28	0.05		984.99	996.47	300.00	990.32	990.26	Standard
J-29	0.05		983.43	994.54	300.00	989.17	989.12	Standard
J-30	0.37		981.43	992.78	300.00	988.68	988.40	Standard
J-31	0.37		981.22	992.57	300.00	988.34	988.05	Standard
J-32		1.00	981.02	991.54	300.00	988.00	987.00	Absolute
O-1			981.00	991.55	300.00	987.00	987.00	

Scenario: Base

Junction Report

Label	Calculated Station (ft)	Ground Elevation (ft)	Set Rim Equal to Ground Elevation?	Rim Elevation (ft)	Sump Elevation (ft)	Bolted Cover?	Structure Diameter (ft)	Description
J-1	162+25	1,037.61	true	1,037.61	1,023.68	true	4.00	
J-2	162+04	1,037.13	true	1,037.13	1,023.66	true	4.00	
J-3	161+53	1,036.71	true	1,036.71	1,023.61	true	4.00	
J-4	161+32	1,035.50	true	1,035.50	1,023.59	true	4.00	
J-5	157+40	1,034.54	true	1,034.54	1,023.20	true	4.00	
J-6	157+19	1,033.92	true	1,033.92	1,023.18	true	4.00	
J-7	155+42	1,032.40	true	1,032.40	1,021.00	true	4.00	
J-8	151+42	1,029.20	true	1,029.20	1,018.20	true	4.00	
J-9	143+67	1,027.30	true	1,027.30	1,015.85	true	4.00	
J-10	133+67	1,024.43	true	1,024.43	1,012.81	true	4.00	
J-11	123+67	1,022.36	true	1,022.36	1,009.78	true	4.00	
J-12	113+67	1,018.85	true	1,018.85	1,006.74	true	4.00	
J-13	104+27	1,017.31	true	1,017.31	999.81	true	4.00	
J-14	96+01	1,010.88	true	1,010.88	997.61	true	4.00	
J-15	87+03	1,008.79	true	1,008.79	996.23	true	4.00	
J-16	78+22	1,007.77	true	1,007.77	994.87	true	4.00	
J-17	78+05	1,007.90	true	1,007.90	994.84	true	4.00	
J-18	73+07	1,006.32	true	1,006.32	994.08	true	4.00	
J-19	72+88	1,007.70	true	1,007.70	994.06	true	4.00	
J-20	71+97	1,011.75	true	1,011.75	993.96	true	4.00	
J-21	71+79	1,011.47	true	1,011.47	993.94	true	4.00	
J-22	71+52	1,011.48	true	1,011.48	993.91	true	4.00	
J-23	63+14	1,004.68	true	1,004.68	993.00	true	4.00	
J-24	53+14	1,002.24	true	1,002.24	991.91	true	4.00	
J-25	43+14	1,003.37	true	1,003.37	990.82	true	4.00	
J-26	33+14	1,002.50	true	1,002.50	989.73	true	4.00	
J-27	23+14	998.22	true	998.22	987.36	true	4.00	
J-28	13+14	996.47	true	996.47	984.99	true	4.00	
J-29	6+54	994.54	true	994.54	983.43	true	4.00	
J-30	1+15	992.78	true	992.78	981.43	true	4.00	
J-31	0+59	992.57	true	992.57	981.22	true	4.00	
J-32	0+05	991.54	true	991.54	981.02	true	4.00	

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Scenario: Base

Pipe Report

Label	Upstream Node	Downstream Node	Total System Flow (cfs)	Length (ft)	Constructed Slope (ft/ft)	Section Size	Mannings n	Full Capacity (cfs)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)	Upstream Cover (ft)	Downstream Cover (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Average Velocity (ft/s)	Description
P-33	J-32	O-1	300.00	5.00	0.004000	90 inch	0.013	485.62	981.02	981.00	991.54	991.55	3.02	3.05	987.00	987.00	11.57	
P-32	J-31	J-32	300.00	54.41	0.003676	90 inch	0.013	465.52	981.22	981.02	992.57	991.54	3.85	3.02	988.05	988.00	11.20	
P-31	J-30	J-31	300.00	55.42	0.003789	90 inch	0.013	472.65	981.43	981.22	992.78	992.57	3.85	3.85	988.40	988.34	11.33	
P-30	J-29	J-30	300.00	539.34	0.003708	90 inch	0.013	467.57	983.43	981.43	994.54	992.78	3.61	3.85	989.12	988.68	11.23	
P-29	J-28	J-29	300.00	660.00	0.002364	90 inch	0.013	373.30	984.99	983.43	996.47	994.54	3.98	3.61	990.26	989.17	9.40	
P-28	J-27	J-28	300.00	1,000.00	0.002370	90 inch	0.013	373.80	987.36	984.99	998.22	996.47	3.36	3.98	992.46	990.32	9.41	
P-27	J-26	J-27	300.00	1,000.00	0.002370	90 inch	0.013	373.80	989.73	987.36	1,002.50	998.22	5.27	3.36	994.82	992.53	9.41	
P-26	J-25	J-26	300.00	1,000.00	0.001090	90 inch	0.013	253.50	990.82	989.73	1,003.37	1,002.50	5.05	5.27	997.06	994.89	6.79	
P-25	J-24	J-25	300.00	1,000.00	0.001090	90 inch	0.013	253.50	991.91	990.82	1,002.24	1,003.37	2.83	5.05	998.59	997.10	6.79	
P-24	J-23	J-24	300.00	1,000.00	0.001090	90 inch	0.013	253.50	993.00	991.91	1,004.68	1,002.24	4.18	2.83	1,000.01	998.63	6.79	
P-23	J-22	J-23	300.00	837.68	0.001086	90 inch	0.013	253.07	993.91	993.00	1,011.48	1,004.68	10.07	4.18	1,001.18	1,000.05	6.79	
P-22	J-21	J-22	300.00	27.45	0.001093	90 inch	0.013	253.84	993.94	993.91	1,011.47	1,011.48	10.03	10.07	1,001.59	1,001.55	6.79	
P-21	J-20	J-21	300.00	17.56	0.001139	90 inch	0.013	259.13	993.96	993.94	1,011.75	1,011.47	10.29	10.03	1,001.65	1,001.63	6.79	
P-20	J-19	J-20	300.00	91.50	0.001093	53x83	0.013	122.14	994.06	993.96	1,007.70	1,011.75	9.22	13.37	1,002.43	1,001.82	12.10	
P-19	J-18	J-19	300.00	18.84	0.001062	90 inch	0.013	250.17	994.08	994.06	1,006.32	1,007.70	4.74	6.14	1,002.87	1,002.84	6.79	
P-18	J-17	J-18	300.00	497.52	0.001528	90 inch	0.013	300.10	994.84	994.08	1,007.90	1,006.32	5.56	4.74	1,004.13	1,003.37	6.79	
P-17	J-16	J-17	300.00	17.28	0.001736	90 inch	0.013	319.93	994.87	994.84	1,007.77	1,007.90	5.40	5.56	1,004.19	1,004.16	6.79	
P-16	J-15	J-16	300.00	880.77	0.001544	90 inch	0.013	301.72	996.23	994.87	1,008.79	1,007.77	5.06	5.40	1,005.57	1,004.22	6.79	
P-15	J-14	J-15	300.00	898.56	0.001536	90 inch	0.013	300.91	997.61	996.23	1,010.88	1,008.79	5.77	5.06	1,006.98	1,005.60	6.79	
P-14	J-13	J-14	300.00	825.69	0.002059	84 inch	0.013	289.85	999.81	998.11	1,017.31	1,010.88	10.50	5.77	1,008.94	1,007.12	7.80	
P-13	J-12	J-13	300.00	940.38	0.003020	78 inch	0.013	288.10	1,006.74	1,003.90	1,018.85	1,017.31	5.61	6.91	1,012.52	1,009.89	9.86	
P-12	J-11	J-12	300.00	1,000.00	0.003040	78 inch	0.013	289.05	1,009.78	1,006.74	1,022.36	1,018.85	6.08	5.61	1,015.45	1,012.59	9.90	
P-11	J-10	J-11	300.00	1,000.00	0.003030	78 inch	0.013	288.57	1,012.81	1,009.78	1,024.43	1,022.36	5.12	6.08	1,018.45	1,015.53	9.88	
P-10	J-9	J-10	300.00	1,000.00	0.003040	78 inch	0.013	289.05	1,015.85	1,012.81	1,027.30	1,024.43	4.95	5.12	1,021.47	1,018.53	9.90	
P-9	J-8	J-9	300.00	774.62	0.003034	78 inch	0.013	288.75	1,018.20	1,015.85	1,029.20	1,027.30	4.50	4.95	1,023.83	1,021.55	9.88	
P-8	J-7	J-8	300.00	400.00	0.007000	78 inch	0.013	438.62	1,021.00	1,018.20	1,032.40	1,029.20	4.90	4.50	1,025.65	1,023.91	14.23	
P-7	J-6	J-7	300.00	177.46	0.001014	78 inch	0.013	166.96	1,023.18	1,023.00	1,033.92	1,032.40	4.24	2.90	1,028.97	1,027.82	9.04	
P-6	J-5	J-6	300.00	20.62	0.000970	78 inch	0.013	163.27	1,023.20	1,023.18	1,034.54	1,033.92	4.84	4.24	1,029.12	1,029.04	9.04	
P-5	J-4	J-5	300.00	392.36	0.000994	78 inch	0.013	165.28	1,023.59	1,023.20	1,035.50	1,034.54	5.41	4.84	1,030.49	1,029.19	9.04	
P-4	J-3	J-4	300.00	20.63	0.000969	78 inch	0.013	163.23	1,023.61	1,023.59	1,036.71	1,035.50	6.60	5.41	1,030.63	1,030.56	9.04	
P-3	J-2	J-3	300.00	51.23	0.000976	78 inch	0.013	163.78	1,023.66	1,023.61	1,037.13	1,036.71	6.97	6.60	1,030.86	1,030.69	9.04	
P-2	J-1	J-2	300.00	20.62	0.000970	78 inch	0.013	163.27	1,023.68	1,023.66	1,037.61	1,037.13	7.43	6.97	1,030.99	1,030.92	9.04	
P-1	I-1	J-1	300.00	59.38	0.001010	78 inch	0.013	166.65	1,023.74	1,023.68	1,037.43	1,037.61	7.19	7.43	1,031.25	1,031.05	9.04	

Table 4.4 Coefficient for Contraction, Kc													
	Velocity, V2, ft/s												
D2/D1	2	3	4	5	6	7	8	10	12	15	20	30	40
1.1	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.06
1.2	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.09	0.10	0.11
1.4	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.18	0.18	0.18	0.18	0.19	0.20
1.6	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.25	0.25	0.25	0.24
1.8	0.34	0.34	0.34	0.34	0.34	0.34	0.33	0.33	0.32	0.32	0.31	0.29	0.27
2.0	0.38	0.38	0.37	0.37	0.37	0.37	0.36	0.36	0.35	0.34	0.33	0.31	0.29
2.2	0.40	0.40	0.40	0.39	0.39	0.39	0.39	0.38	0.37	0.37	0.35	0.33	0.30
2.5	0.42	0.42	0.42	0.41	0.41	0.41	0.40	0.40	0.39	0.38	0.37	0.34	0.31
3.0	0.44	0.44	0.44	0.43	0.43	0.43	0.42	0.42	0.41	0.40	0.39	0.36	0.33
4.0	0.47	0.46	0.46	0.46	0.46	0.46	0.45	0.44	0.43	0.42	0.41	0.37	0.34
5.0	0.48	0.48	0.47	0.47	0.47	0.47	0.46	0.45	0.45	0.44	0.42	0.38	0.35
10.0	0.49	0.48	0.48	0.48	0.48	0.48	0.47	0.46	0.46	0.45	0.43	0.40	0.36
∞	0.49	0.49	0.48	0.48	0.48	0.48	0.47	0.47	0.46	0.45	0.44	0.41	0.38

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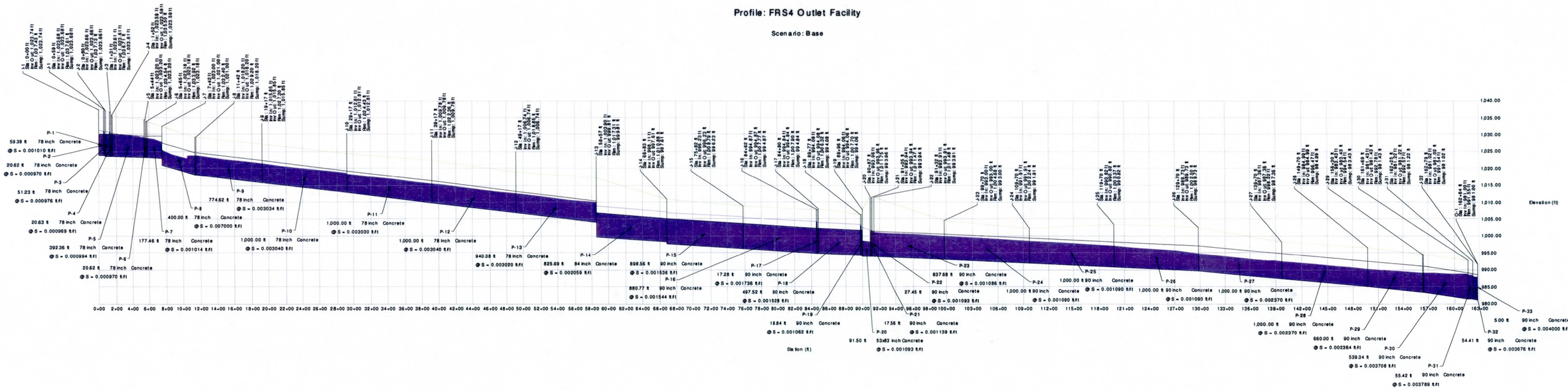
Table 4.3 Coefficient for Sudden Enlargement, Ke													
	Velocity, V1, ft/s												
D2/D1	2	3	4	5	6	7	8	10	12	15	20	30	40
1.2	0.11	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.09	0.09	0.09	0.09	0.08
1.4	0.26	0.26	0.25	0.24	0.24	0.24	0.24	0.23	0.23	0.22	0.22	0.21	0.20
1.6	0.40	0.39	0.38	0.37	0.37	0.36	0.36	0.35	0.35	0.34	0.33	0.32	0.32
1.8	0.51	0.49	0.48	0.47	0.47	0.46	0.46	0.45	0.44	0.43	0.42	0.41	0.40
2.0	0.60	0.58	0.56	0.55	0.55	0.54	0.53	0.52	0.52	0.51	0.50	0.48	0.47
2.5	0.74	0.72	0.70	0.69	0.68	0.67	0.66	0.65	0.64	0.63	0.62	0.60	0.58
3.0	0.83	0.80	0.78	0.77	0.76	0.75	0.74	0.73	0.72	0.70	0.69	0.67	0.65
4.0	0.92	0.89	0.87	0.85	0.84	0.83	0.82	0.80	0.79	0.78	0.76	0.74	0.72
5.0	0.96	0.93	0.91	0.89	0.88	0.87	0.86	0.84	0.83	0.82	0.80	0.77	0.75
10.0	1.00	0.99	0.96	0.95	0.93	0.92	0.91	0.89	0.88	0.86	0.84	0.82	0.80
∞	1.00	1.00	0.98	0.96	0.95	0.94	0.93	0.91	0.90	0.88	0.86	0.83	0.81

Drainage Design Manual for Maricopa County, Volume II, Hydraulics, p 4-15

Where D2/D1 = 1.4 = $\frac{90 \text{ inch}}{66 \text{ inch}}$ Circular Pipe
Equivalent 53"x83" Elliptical Pipe

No.	Description	Head Loss Coefficient k	Absolute Head Loss (ft)	Comment	Structure
I-1	Inlet 01		0.50		
J-1	MH 01	0.05		Straight-Through Manhole as per Eq. 4.11 on pp 4-17 in DDM VII, Hydraulics FCDMC	MAG 521
J-2	8 Deg. Bend	0.05		Figure 4.7 Bend Loss Coefficient pp 4-19 in DDM VII, Hydraulics FCDMC	PRECAST
J-3	SS 01	1.00		Drop Structure	Special Structure
J-4	MH 02	0.05		Straight-Through Manhole as per Eq. 4.11 on pp 4-17 in DDM VII, Hydraulics FCDMC	MAG 521
J-5	MH 03	0.05		Straight-Through Manhole as per Eq. 4.11 on pp 4-17 in DDM VII, Hydraulics FCDMC	MAG 521
J-6	MH 04	0.05		Straight-Through Manhole as per Eq. 4.11 on pp 4-17 in DDM VII, Hydraulics FCDMC	MAG 521
J-7	MH 05	0.05		Straight-Through Manhole as per Eq. 4.11 on pp 4-17 in DDM VII, Hydraulics FCDMC	MAG 521
J-8	MH 06	0.05		Straight-Through Manhole as per Eq. 4.11 on pp 4-17 in DDM VII, Hydraulics FCDMC	MAG 521
J-9	SS 02	1.00		Drop Structure	Special Structure
J-10	MH 07	0.20		Change in Pipe from 84" to 90"	COP 1560
J-11	MH 08	0.05		Straight-Through Manhole as per Eq. 4.11 on pp 4-17 in DDM VII, Hydraulics FCDMC	MAG 521
J-12	MH 09	0.05		Straight-Through Manhole as per Eq. 4.11 on pp 4-17 in DDM VII, Hydraulics FCDMC	MAG 521
J-13	11 Deg. Bend	0.05		Figure 4.7 Bend Loss Coefficient pp 4-19 in DDM VII, Hydraulics FCDMC	PRECAST
J-14	MH 10: 73 Deg. Bend	0.70		Figure 4.7 Bend Loss Coefficient pp 4-19 in DDM VII, Hydraulics FCDMC	PRECAST
J-15	Transition Plate 90" to 66" Equivalent	0.18		Table 4.4 Coefficient for Contraction, Kc, on pp 4-16 in DDM VII, Hydraulics FCDMC	PRECAST
J-16	Transition Plate 66" Equivalent to 90"	0.24		Table 4.3 Coefficient for Sudden Enlargement, Ke, on pp 4-15 in DDM VII Hydraulics FCDMC	PRECAST
J-17	MH 11	0.05		Straight-Through Manhole as per Eq. 4.11 on pp 4-17 in DDM VII, Hydraulics FCDMC	MAG 521
J-18	62 Deg. Bend	0.50		Figure 4.7 Bend Loss Coefficient pp 4-19 in DDM VII, Hydraulics FCDMC	PRECAST
J-19	MH 12	0.05		Straight-Through Manhole as per Eq. 4.11 on pp 4-17 in DDM VII, Hydraulics FCDMC	MAG 521
J-20	MH 13	0.05		Straight-Through Manhole as per Eq. 4.11 on pp 4-17 in DDM VII, Hydraulics FCDMC	MAG 521
J-21	MH 14	0.05		Straight-Through Manhole as per Eq. 4.11 on pp 4-17 in DDM VII, Hydraulics FCDMC	MAG 521
J-22	MH 15	0.05		Straight-Through Manhole as per Eq. 4.11 on pp 4-17 in DDM VII, Hydraulics FCDMC	MAG 521
J-23	MH 16	0.05		Straight-Through Manhole as per Eq. 4.11 on pp 4-17 in DDM VII, Hydraulics FCDMC	MAG 521
J-24	MH 17	0.05		Straight-Through Manhole as per Eq. 4.11 on pp 4-17 in DDM VII, Hydraulics FCDMC	MAG 521
J-25	MH 18	0.05		Straight-Through Manhole as per Eq. 4.11 on pp 4-17 in DDM VII, Hydraulics FCDMC	MAG 521
J-26	MH 19: 45 Deg Bend	0.37		Figure 4.7 Bend Loss Coefficient pp 4-19 in DDM VII, Hydraulics FCDMC	PRECAST
J-27	MH 20: 45 Deg Bend	0.37		Figure 4.7 Bend Loss Coefficient pp 4-19 in DDM VII, Hydraulics FCDMC	PRECAST
J-28	Outlet Head Loss		1.00	Head Loss at Outfall	

Profile
Scenario: Base



Appendix B

Survey Data / Plats

WOOD/PATEL
MISSION: CLIENT SERVICE™

CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS • CONSTRUCTION MANAGERS • WATER/WASTEWATER

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January 25, 2011
WP# 103548

SURVEY CONTROL REPORT
Maricopa County Flood Control District White Tanks FRS #4 Outfall Structure

The horizontal datum for this survey is based on Arizona Department of Transportation parameters and information from the Maricopa County Department of Transportation (MCDOT) Geodetic Densification and Cadastral Survey (GDACS) website www.mcdot.maricopa.gov, under the Survey Information Link on July 19, 2010.

Projection: Arizona Central Zone, NAD 83, (Epoch 2007)
Datum: GRS-80
Units: International Feet
Geoid Model: Geoid 09

Control point: 4AC1
PID: AJ3819
Latitude: 33° 22' 53.60485" N
Longitude: 112° 23' 01.77450" W
Ellipsoid Height: 252.240 (M)
Description: Survey disk set in rock outcrop

Modified to ground at (grid) N: 0, E: 0, using a scale factor of 1.00016 per Arizona Department of Transportation parameters.

Horizontal adjustment: None
Horizontal rotation: None

The vertical datum for this Survey is based on NGS monument F 520, southeast of MC 85 near a high line tower, having an elevation of 894.82, NGS NAVD 88 Datum. See NGS datasheet for particulars.

Wood, Patel & Associates, Inc.

EXPIRES 03-31-11

Emily C. Schad, R.L.S.
Survey Project Manager

Y:\WP\Survey Standards\Control Reports\103548 MCFCD White Tanks FRS #4 Outfall Structure MCDOT GDACS SCR 01-25-11.doc

FINAL PLAT
OF
" JACKRABBIT CROSSING "

A COMMERCIAL SUBDIVISION

IN THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 5, TOWNSHIP 1 NORTH, RANGE 2 WEST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA

UNOFFICIAL DOCUMENT

LEGAL DESCRIPTION

THAT PORTION OF THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION FIVE (5), TOWNSHIP ONE (1) NORTH, RANGE TWO (2) WEST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE SOUTHEAST CORNER OF SECTION 5; THENCE SOUTH 89 DEGREES 57 MINUTES WEST (RECORDED) NORTH 89 DEGREES 37 MINUTES 59 SECONDS WEST (MEASURED) AND ALONG THE SOUTH LINE OF SAID SECTION 5, A DISTANCE OF 601.25 FEET TO A POINT;

THENCE NORTH 7 DEGREES 38 MINUTES EAST, 680.90 FEET (RECORDED) NORTH 08 DEGREES 03 MINUTES 04 SECONDS EAST 680.84 FEET (MEASURED) TO A POINT,

THENCE NORTH 89 DEGREES 57 MINUTES EAST (RECORDED) SOUTH 89 DEGREES 38 MINUTES 08 SECONDS EAST (MEASURED), 510.22 FEET TO A POINT ON THE EAST LINE OF SAID SECTION 5,

THENCE SOUTH 00 DEGREES 02 MINUTES EAST (RECORDED) SOUTH 00 DEGREES 22 MINUTES 05 SECONDS WEST (MEASURED), AND ALONG SAID EAST LINE, 674.75 FEET TO THE POINT OF BEGINNING;

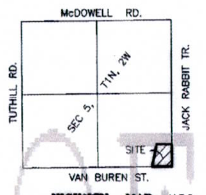
(TOTAL AREA CONTAINING 374,976 SQ. FT. OR 8.608 ACRES MORE OR LESS)

NOTES

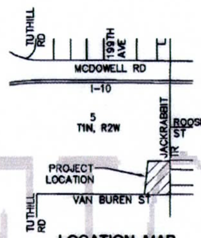
1. THE SUBDIVISION IS SUBJECT TO MAINTENANCE IMPROVEMENT DISTRICT (MID) # 2008-001,AND STREET LIGHT IMPROVEMENT DISTRICT (SLID) # 2008-001 FILED WITH THE TOWN OF BUCKEYE.
2. NO CONSTRUCTION OF ANY KIND SHALL BE CONSTRUCTED OR PLACED WITHIN THE UTILITY EASEMENTS, EXCEPT UTILITIES, WOOD, WIRE, OR REMOVABLE SECTION TYPE FENCING, AND/OR PAVING, NOR ANY PLANTING EXCEPT GRASS. IT SHALL BE FURTHER UNDERSTOOD THAT THE TOWN OF BUCKEYE SHALL NOT BE REQUIRED TO REPLACE ANY OBSTRUCTION OR PLANTING THAT MUST BE REMOVED DURING THE COURSE OF MAINTENANCE, CONSTRUCTION OR RECONSTRUCTION.
3. ALL NEW AND EXISTING UTILITY, ELECTRICAL FACILITIES LESS THAT 69 KVA, CABLE TV, TELECOMMUNICATIONS FIBER OPTICS, CELLULAR, GAS, ETC. SHALL BE INSTALLED UNDERGROUND AS PART OF THE STREET IMPROVEMENTS.
4. MAINTENANCE OF SURFACE AND UNDERGROUND DRAINAGE FACILITIES WITHIN ALL TRACTS, EASEMENTS AND RIGHT-OF-WAY SHALL BE THE RESPONSIBILITY OF THE OWNERS ASSOCIATION.
5. ALL LOT CORNERS SHALL BE MONUMENTED WITH 1/ 2" REBAR AND CAPPED OR TAGGED BEARING THE REGISTRATION NUMBER OF THE SURVEYOR RESPONSIBLE FOR THEIR PLACEMENT.
6. SIGNS, FENCES, WALLS, UTILITY BOXES, STRUCTURES, SHRUBS, HEDGES OR OTHER PLANTS, BUT EXCLUDING TREES OVER 30 INCHES IN HEIGHT SHALL NOT BE PERMITTED WITHIN VIEW EASEMENTS OR THE SIGHT DISTANCE TRIANGLES. NO LIMBS, LEAVES, NEEDLES OR OTHER FOLIAGE ABOVE 30 INCHES IN HEIGHT OR BELOW 84 INCHES ARE PERMITTED. TREES ARE TO BE PLANTED SO AS NOT TO OBSTRUCT 20% OF THE VISIBILITY WITH OTHER OBSTRUCTIONS.
7. THE TOWN OF BUCKEYE IS NOT DESIGNATED AS AN ASSURED WATER PROVIDER PURSUANT TO ARS 45-576.
8. THIS SUBDIVISION IS LOCATED WITHIN THE TOWN OF BUCKEYE SEWER SERVICE AREA.
9. THIS SUBDIVISION IS LOCATED WITHIN THE VICINITY OF A MILITARY AIRPORT (LUKE AIR FORCE BASE).
10. THIS SUBDIVISION IS LOCATED IN THE VICINITY OF A DESIGNATED TRUCK ROUTE. (I-10 FREEWAY).
11. NO STRUCTURE OF ANY KIND SHALL BE CONSTRUCTED OR ANY VEGETATION BE PLANTED NOR BE ALLOWED TO GROW WITHIN THE DRAINAGE EASEMENT OR TRACT WHICH WOULD IMPEDE THE FLOW OF WATER OVER, UNDER, OR THROUGH THE EASEMENT OR TRACT.
12. AN ASSOCIATION, INCLUDING ALL PROPERTY OWNERS IN THE DEVELOPMENT, WILL BE FORMED AND HAVE THE RESPONSIBILITY FOR MAINTAINING ALL COMMON AREAS TO BE NOTED AS "TRACTS" OR EASEMENTS (INCLUDING LANDSCAPING AREAS AND DRAINAGE FACILITIES) IN ACCORDANCE WITH APPROVED PLANS.
13. VISIBILITY EASEMENT RESTRICTION. ANY OBJECT, WALLS, STRUCTURE, MOUND OR LANDSCAPING (MATURE) OVER 24" IN HEIGHT IS NOT ALLOWED WITHIN THE 33' X 33' VISIBILITY EASEMENT. TREE CANOPIES OVERHANGING THE EASEMENT, SHALL BE KEPT TRIMMED TO A HEIGHT OF NO LESS THAN 7'.
14. LIMITED PURPOSE PUBLIC USE EASEMENT, ("LPPUE") SHALL BE RESTRICTED TO USES RELATING TO STREET AND SIDEWALK LIGHTING, CATV, NATURAL GAS, ELECTRIC, TELEPHONE, AND OTHER UTILITIES NOT INVOLVING THE CONVEYANCE OF AND LIQUID SUBSTANCE EXCEPT AS HEREAFTER PROVIDED. NOTWITHSTANDING THE FOREGOING, UTILITIES CONVEYING A LIQUID SUBSTANCE, INCLUDING BUT NOT LIMITED TO WATER, SEWER, EFFLUENT AND LIQUID PETROLEUM PRODUCTS MAY CROSS SUCH LPPUE AT AN APPROXIMATELY PERPENDICULAR ANGLE TO THE LENGTH OF THE LPPUE OR IN SUCH MANNER AS OTHERWISE DETERMINED BY THE TOWN AND TO THE EXTENT NECESSARY TO PROVIDE A SERVICE CONNECTION(S) TO THE PARCEL OR LOT ADJACENT TO OR SERVED BY THE LPPUE. UTILITIES CONVEYING ANY LIQUID SUBSTANCE SHALL BE LOCATED IN PUBLIC STREETS AND RIGHT-OF-WAY AT THE LOCATIONS DESIGNATED BY THE TOWN.

FINAL PLAT STIPULATIONS

1. ALL PROPERTY OWNERS OF THIS SUBJECT PROPERTY SHALL EXECUTE A WAIVER OF ANY CLAIM FOR DIMINUTION OF VALUE UNDER PROPOSITION 207, IN FORM APPROVED BY THE TOWN ATTORNEY
2. ALL PRELIMINARY PLAT STIPULATIONS (APPLICATION NO.: PP06-07) NOT PREVIOUSLY ADDRESSED OR MODIFIED BY THESE FINAL PLAT STIPULATIONS REMAIN IN FULL FORCE AND EFFECT.
3. MAJOR CHANGES TO THIS FINAL PLAT WITH REGARDS TO USE, DENSITY AND INTENSITY MUST BE PROCESSED AS A REVISED APPLICATION WITH APPROVAL BY THE TOWN COUNCIL UPON RECOMMENDATION OF THE DEVELOPMENT BOARD. THE TOWN MANAGER AND THE COMMUNITY DEVELOPMENT DIRECTOR MAY ADMINISTRATIVELY APPROVE MINOR CHANGES TO THE FINAL PLAT.
4. THE DEVELOPER SHALL SUBMIT AN ELECTRONIC AUTOCAD FILE, ON DISK, OF THE FINAL PLAT, REVISED AS NECESSARY TO COMPLY WITH THESE APPROVED STIPULATIONS PRIOR TO APPROVAL OF ANY FURTHER APPLICATIONS OR PERMITS.
5. PRIOR TO FINAL PLAT RECORDATION, THE TOWN ENGINEER SHALL APPROVE ALL ENGINEERING AND CONSTRUCTION PLANS AND REPORTS FOR THE REQUIRED INFRASTRUCTURE FOR THE PROJECT.
6. PRIOR TO FINAL PLAT RECORDATION, THE DEVELOPER SHALL HAVE A SOLUTION, AS APPROVED BY THE TOWN ENGINEER, FOR THE INSTALLATION OF DRY EFFLUENT IRRIGATION PIPING ("PURPLE PIPE"), WITH TRACER WIRE, NECESSARY TO SERVE ALL OPEN SPACE AND LANDSCAPED AREAS WITHIN THE SUBJECT PROPERTY. AT SUCH TIME AS A TOWN EFFLUENT DELIVERY SYSTEM IS INSTALLED AND OPERATIONAL, THE DEVELOPER SHALL CONNECT THE SYSTEM TO THE TOWN SYSTEM FOR EFFLUENT SERVICE.



VICINITY MAP N.T.S.



LOCATION MAP
NTS

DEVELOPER / OWNER

ARMSTRONG DEVELOPMENT PROPERTIES, INC.
1500 N PRIEST DRIVE
TEMPE, AZ 85281
PHONE: (602) 385-4100
FAX: (602) 385-4101
CONTACT: DIANA RINCK

ENGINEER

SUNRISE ENGINEERING, INC.
2152 S. VINEYARD
SUITE 123
MESA, ARIZONA 85210
PHONE: (480) 768-8600
FAX: (480) 768-8609
CONTACT: CHRIS MOORE

SURVEYOR

SUNRISE ENGINEERING, INC
2152 S. VINEYARD, SUITE 123
MESA, AZ 85210
PHONE: (480) 768-8600
CONTACT: DEAN R. CROUSE

UTILITIES / SERVICES

WATER	ARIZONA WATER COMPANY
SEWER	TOWN OF BUCKEYE
ELECTRIC	APS
GAS	SOUTHWEST GAS
TELEPHONE	QWEST
CABLE	COX COMMUNICATIONS

BASIS OF BEARING

BASED UPON THE AZ. STATE PLAN 1983 COORDINATE SYSTEM (CONVERTED TO GROUND DATUM) AND G.P.S. INSTRUMENTATION; THE BASIS OF BEARING FOR THIS SURVEY IS S00°22'05"W ALONG THE EAST LINE OF THE SE 1/4 OF SECTION 5, TOWNSHIP 1 NORTH, RANGE 2 WEST

TOWN OF BUCKEYE CERTIFICATIONS

THIS PLAT REVIEWED AND APPROVED BY THE TOWN ENGINEER OF BUCKEYE, ARIZONA.

THIS 28th DAY OF JULY, 2008

BY: ______________________
TOWN ENGINEER

THIS PLAT APPROVED BY THE COMMUNITY DEVELOPMENT DIRECTOR OF BUCKEYE, ARIZONA.

THIS 25th DAY OF July, 2008.

BY: ______________________
COMMUNITY DEVELOPMENT DIRECTOR

THIS PLAT APPROVED BY THE TOWN COUNCIL OF BUCKEYE, ARIZONA.

THIS 20th DAY OF May, 2008.

BY: ______________ ATTEST: ______________
MAYOR TOWN CLERK

SURVEYORS CERTIFICATION

I, HEREBY CERTIFY THAT I AM A REGISTERED LAND SURVEYOR IN THE STATE OF ARIZONA; THAT THIS MAP OR PLAT CONSISTING OF 2 SHEETS REPRESENTING A SURVEY PERFORMED UNDER MY SUPERVISION DURING THE MONTH OF AUG. 2007; THAT THE SURVEY IS CORRECT AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF; THAT THE BOUNDARY MONUMENTS, CONTROL POINTS AND LOT CORNERS SHALL BE LOCATED AFTER PLAT APPROVAL AS SHOWN AND WILL BE SUFFICIENT TO ENABLE THE SURVEY TO BE RETRACED.

Dean R. Crouse
DEAN R. CROUSE RLS # 25070

25070 DEAN R. CROUSE 6/20/08 ARIZONA, U.S.A.

EXPIRES 6/30/11

DEDICATION

STATE OF ARIZONA)
) S.S.
COUNTY OF MARICOPA)

KNOW ALL MEN BY THESE PRESENTS: ARMSTRONG VAN BUREN JACK RABBIT LLC, AN ARIZONA LIMITED LIABILITY COMPANY AND ARIZONA CVS STORES L.L.C., AN ARIZONA LIMITED LIABILITY COMPANY AS OWNERS, HAS SUBDIVIDED UNDER THE NAME OF "JACKRABBIT CROSSING", A COMMERCIAL SUBDIVISION BEING A PORTION OF THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 5, TOWNSHIP 1 NORTH, RANGE 2 WEST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, AS SHOWN PLATTED HEREON AND HEREBY PUBLISHES THIS PLAT AS AND FOR THE PLAT OF SAID "JACKRABBIT CROSSING", AND HEREBY DECLARES THAT THIS PLAT SETS FORTH THE LOCATION AND GIVES THE DIMENSIONS OF THE LOTS, TRACTS, STREETS, AND EASEMENTS CONSTITUTING SAME AND THAT EACH LOT, TRACT, AND STREET SHALL BE KNOW BY THE NUMBER, LETTER, OR NAME THAT IS GIVEN TO EACH SUCH LOT, TRACT, AND STREET ON SAID PLAT. ARMSTRONG VAN BUREN JACK RABBIT LLC, AS OWNERS, HEREBY DEDICATES TO THE TOWN OF BUCKEYE THE PUBLIC STREETS KNOWN AS VAN BUREN STREET AND JACKRABBIT TRAIL. EASEMENTS ARE DEDICATED AS SHOWN ON THE PLAT FOR THE PURPOSES SHOWN.

THE INGRESS AND EGRESS (I/E) AND PUBLIC UTILITY (PUE) EASEMENTS SHOWN HEREON WILL BE OWNED AND MAINTAINED BY THE LOT OWNERS ASSOCIATION.

ALL COMMON AREAS SHALL BE IMPROVED IN ACCORDANCE WITH APPROVED PLANS AND DEEDED TO THE OWNERS AFTER PLAT RECORDATION. EACH LOT OWNER, AS GRANTOR, HEREBY GRANTS TO THE OTHER OWNERS, THEIR RESPECTIVE TENANTS OR SUBTENANTS, CONTRACTORS, EMPLOYEES, AGENTS, CUSTOMERS, LICENSEES AND INVITEES, A NONEXCLUSIVE EASEMENT FOR INGRESS AND EGRESS FOR REFUSE COLLECTION, EMERGENCY AND SERVICE TYPE ACCESS BY VEHICULAR AND PEDESTRIAN TRAFFIC AND VEHICULAR PARKING UPON, OVER AND ACROSS THAT PORTION OF COMMON PROPERTY INTENDED FOR SUCH USE AND LOCATED ON THE GRANTOR'S LOT(S). COMMON PROPERTY FOR THE USE AND ENJOYMENT OF OWNER(S) ARE MORE FULLY SET FORTH IN THE DECLARATION OF COVENANTS, CONDITIONS AND RESTRICTIONS TO BE RECORDED PRIOR TO OR WITH THIS FINAL PLAT.

THE TOWN OF BUCKEYE IS HEREBY GIVEN AN EASEMENT FOR ACCESS, MAINTENANCE OF LANDSCAPING, RETENTION AND DRAINAGE FACILITIES. THIS EASEMENT MAY BE EXERCISED BY THE TOWN OF BUCKEYE AT SUCH TIME THAT THE LOT OWNERS ASSOCIATIONS FAILS TO EXIST AND IS IMMEDIATELY REPLACED BY THE FORMATION OF THE MAINTENANCE IMPROVEMENT DISTRICT. THE MAINTENANCE IMPROVEMENT DISTRICT (MID # 2008-001) WILL PROVIDE THE CONTINUED, REQUIRED MAINTENANCE AND OPERATION OF THE LANDSCAPE, RETENTION AND DRAINAGE FACILITIES. AS LONG AS THE LOT OWNERS ASSOCIATION IS IN EXISTENCE, IT WILL BE RESPONSIBLE FOR PROVIDING ALL MAINTENANCE OF LANDSCAPING, RETENTION AND DRAINAGE FACILITIES, REGARDLESS OF THE DEDICATION OF THE EASEMENT.

ARMSTRONG VAN BUREN JACK RABBIT LLC, AN ARIZONA LIMITED LIABILITY COMPANY AND ARIZONA CVS STORES L.L.C., AN ARIZONA LIMITED LIABILITY COMPANY AS OWNERS, DO HEREBY GRANT TO THE TOWN OF BUCKEYE, AN ARIZONA MUNICIPAL CORPORATION, IN MARICOPA COUNTY, ARIZONA, ITS SUCCESSORS AND ASSIGNS A PERMANENT AND PERPETUAL FIRE LANE EASEMENT AS SHOWN ON THIS PLAT.

IN WITNESS WHEREOF ARMSTRONG VAN BUREN JACK RABBIT LLC, AN ARIZONA LIMITED LIABILITY COMPANY AND ARIZONA CVS STORES L.L.C., AN ARIZONA LIMITED LIABILITY COMPANY AS OWNERS, HAVE HEREUNTO CAUSED THEIR NAMES TO BE SIGNED BY THE UNDERSIGNED DUTY AUTHORIZED REPRESENTATIVES THIS _______ DAY OF __________, 2008.

ARMSTRONG VAN BUREN JACK RABBIT LLC, AN ARIZONA LIMITED LIABILITY COMPANY
BY: CUSTINE INVESTMENTS, INC., A PENNSYLVANIA CORPORATION, ITS SOLE MEMBER

BY: Douglas J. Kyle
ITS: Executive Vice President

ARIZONA CVS STORES L.L.C., AN ARIZONA LIMITED LIABILITY COMPANY

BY: ______________________
ITS: Secretary

BOOK 998 PAGE 11
OFFICIAL RECORDS OF
MARICOPA COUNTY RECORDER
HELEN PURCELL
2008-0662093
07/30/2008 11:32 AM

ACKNOWLEDGEMENT

ARMSTRONG VAN BUREN JACK RABBIT LLC

STATE OF ARIZONA)
)SS
COUNTY OF MARICOPA)

ON THIS 3rd DAY OF July 2008, BEFORE ME, THE UNDERSIGNED NOTARY PUBLIC, APPEARED Douglas J. Kyle WHO ACKNOWLEDGED HIMSELF/HERSELF TO BE E.V.P. OF ARMSTRONG VAN BUREN JACK RABBIT LLC, AN ARIZONA LIMITED LIABILITY COMPANY, AND THAT HE/SHE EXECUTED THIS INSTRUMENT FOR THE PURPOSES HEREIN CONTAINED.

IN WITNESS WHEREOF: I HEREUNTO SET MY HAND AND OFFICIAL SEAL.

BY: ______________ 7/3/08 MY COMMISSION EXPIRES: 6/18/2011
NOTARY PUBLIC DATE

MARTIN L. HEDSTROM II
Notary Public - Arizona
Maricopa County
My Comm. Expires Jun 18, 2011

ACKNOWLEDGEMENT

ARIZONA CVS STORES L.L.C.

STATE OF ARIZONA)
)SS
COUNTY OF MARICOPA)

ON THIS 1st DAY OF July, BEFORE ME, THE UNDERSIGNED NOTARY PUBLIC, APPEARED Michael DeVitto WHO ACKNOWLEDGED HIMSELF/HERSELF TO BE Secretary OF ARIZONA CVS STORES L.L.C., AN ARIZONA LIMITED LIABILITY COMPANY, AND THAT HE/SHE EXECUTED THIS INSTRUMENT FOR THE PURPOSES HEREIN CONTAINED.

IN WITNESS WHEREOF: I HEREUNTO SET MY HAND AND OFFICIAL SEAL.

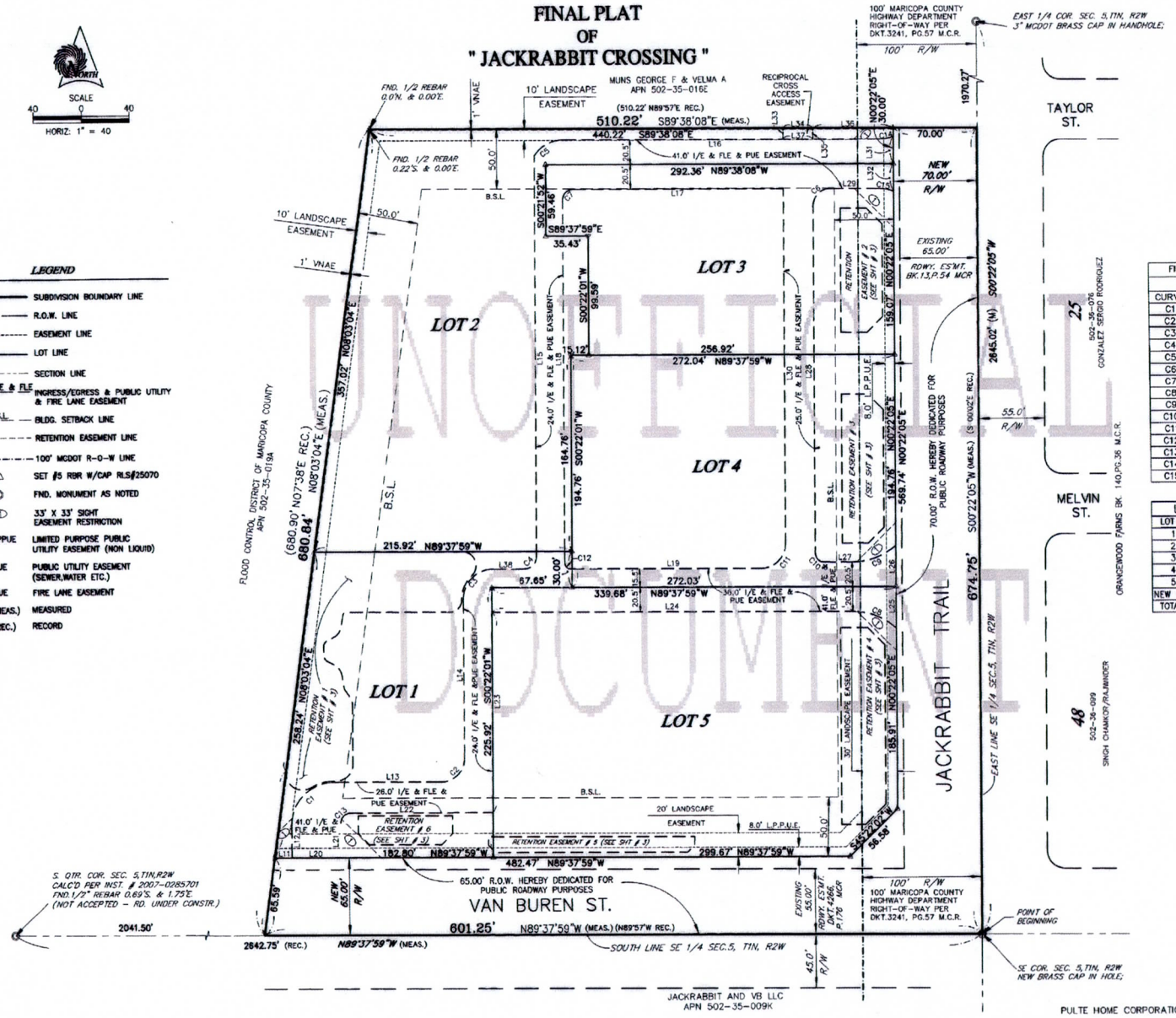
BY: ______________ 7/1/08 MY COMMISSION EXPIRES: 6/18/2011
NOTARY PUBLIC DATE

MARTIN L. HEDSTROM II
Notary Public - Arizona
Maricopa County
My Comm. Expires Jun 18, 2011

SUNRISE ENGINEERING
2152 SOUTH VINEYARD, SUITE 123
MESA, ARIZONA 85210
TEL 480.768.8600 · FAX 480.768.8609

U:\Armstrong Development\Van Buren Jack Rabbit\FINAL PLAT\Jackrabbit REVISED F-P.dwg Jun 30, 2008 9:29am dcrouse

FINAL PLAT
OF
" JACKRABBIT CROSSING "



FIRE LANE EASEMENT CURVE TABLE		
CURVE	LENGTH	RADIUS
C1	55.74'	35.50'
C2	30.62'	19.50'
C3	39.27'	25.00'
C4	15.71'	10.00'
C5	29.43'	30.50'
C6	22.77'	14.50'
C7	13.35'	8.50'
C8	40.00'	54.50'
C9	40.00'	54.50'
C10	11.78'	7.50'
C11	31.41'	20.00'
C12	7.85'	5.00'
C13	13.11'	8.50'
C14	11.82'	29.50'
C15	11.82'	29.50'

LOT AREA TABLE		
LOT #	SQ. FT.	ACRES
1	44,392	1.019
2	76,409	1.754
3	42,974	0.987
4	52,983	1.216
5	75,939	1.743
NEW R/W	82,279	1.889
TOTALS	374,976	8.608

FIRE LANE ES'MT LINE TABLE		
LINE	LENGTH	BEARING
L11	14.56'	S89°37'59"E
L12	27.99'	N00°22'01"E
L13	89.27'	S89°39'53"E
L14	133.38'	N00°22'01"E
L15	335.73'	N00°21'52"E
L16	265.62'	S89°37'59"E
L17	176.68'	N89°37'59"W
L18	304.35'	S00°21'52"W
L19	160.12'	S89°37'59"E
L20	41.00'	S89°37'59"E
L21	29.00'	N00°22'01"E
L22	118.99'	S89°39'53"E
L23	167.85'	N00°22'01"E
L24	303.18'	S89°37'59"E
L25	34.53'	N00°22'05"E
L26	34.53'	N00°22'05"E
L27	24.05'	N89°37'59"W
L28	290.86'	N00°22'33"E
L29	42.01'	N89°37'59"W
L30	297.86'	N00°22'33"E
L31	22.86'	S00°22'05"W
L32	22.81'	S00°22'05"W
L33	9.47'	N00°22'33"E
L34	25.00'	S89°38'08"E
L35	9.47'	N00°22'33"E
L36	68.01'	S89°38'08"E
L37	25.00'	S89°37'59"E
L38	26.51'	S89°37'59"E

NOTE

SEE SHEET 3 FOR RETENTION EASEMENT DIMENSIONS

BOOK 996 PAGE 11
OFFICIAL RECORDS OF MARICOPA COUNTY RECORDER HELEN PURCELL
2008-0662093
07/30/2008 11:32 AM

UNOFFICIAL DOCUMENT

EXPIRES 6/30/08

SUNRISE ENGINEERING
2152 SOUTH VINEYARD, SUITE 123
MESA, ARIZONA 85210
TEL 480.768.8600 · FAX 480.768.8609
www.sunrise-eng.com

FINAL PLAT

FOR : ARMSTONG DEVELOPMENT
AT : VAN BUREN ST. & JACKRABBIT TR., BUCKEYE, AZ.

SD NO.	DESIGNED	DRAWN	CHECKED	SUNRISE ENG. INC.	SHEET NO.
02711	DRC	DRC	TE	DWG#2711-031108	2 of 3

U:\Armstrong Development\Van Buren - Jack Rabbit\FINAL PLAT\Van Buren -Jack F-P2.dwg May 22, 2008 12:36pm dcrouse

Appendix C

Utility / Pothole Results

WHITE TANKS FRS4 OUTLET FACILITY
VAN BUREN STREET
JACKRABBIT TRAIL TO COTTON LANE
UTILITY CONTACT DISTRIBUTION LIST
11/15/2011

	UTILITY COMPANY	CONTACT NAME	PHONE	ADDRESS FOR REVIEW	PLANS SENT	40% COMMENTS RECEIVED	70% COMMENTS RECEIVED	CONFLICT	EMAIL ADDRESS
1	AT&T	Rosemary Hamill Walter Werstiuk	(925) 977-2413 (714) 963-7964	AT&T Inquiries 22311 Brookhurst Street, Ste #203 Huntington Beach, CA 92646	USPS 3/31/11 USPS 6/26/11	04/01/11	7/8/2011	NO	walterw@forkerteng.com
2	Qwest Local Networks	Matt Philips	(602) 630-0492	Qwest 5025 n. Black Canyon Highway Phoenix, AZ 85015	USPS 3/31/11 USPS 6/26/11	01/22/10			Mathew.Phillips@qwest.com
3	APS	John Rael	(602) 371 6945	APS Mail Station 3876 P.O. Box 53933 Phoenix, AZ 85072-3933	USPS 3/31/11 USPS 6/26/11	05/02/11		YES	John.Rael@aps.com
4	Arizona Water Company	Joe Whelan - Engineering Henry Adan - Field Inspection	(623) 240 6860 (623) 853-9302	3805 N. Black Canyon Hwy Phoenix, AZ 85015	Courier 3/31/11 Courier 6/26/11	04/28/11		YES	jwhelan@amwater.com
5	City of Goodyear Traffic Signals Reclaimed Water Water Sanitary Sewer Effluent Fiber	Darren Farar, City of Goodyear Engineering Robert Silver, City of Goodyear Engineering	(623) 932-3010	195 N. 145th Avenue #D Goodyear, AZ 85338	Courier 4/11 Courier 6/26/11	05/12/11		YES	darren.farar@goodyearaz.gov
6	Cox Communications	Randy Sims	(602) 694-1783	1550 W. Deer Valley Rd. Phoenix, AZ 85027	USPS 3/31/11 USPS 6/26/11	05/11/11	7/29/2011	YES	daniel.dischinger@cox.com
7	Level 3	Adam Edwards	(720) 888-4518		USPS 4/11/11 USPS 6/26/11	05/09/11		NO	Adam.Edwards@level3.com
8	MCI (Verizon Business)	Beth Seubert OSP National Support / Invest. Brad Landius	(972) 729-6016 (425) 201 0901	2400 North Glenvile Richardson, TX 75082	USPS 3/31/11 USPS 6/26/11	01/12/10		NO	brad.landis@verizon.com
9	Roosevelt Irrigation District	Zane Hoit	(602) 438-2200	Stantec 8211 S. 48th St. Phoenix, AZ	USPS 3/31/11 USPS 6/26/11	04/05/11		YES	melody.zyburt@stantec.com
10	Southwest Gas	Valerie Gallardo-Weller	(602) 484-5342	9 S. 43rd Avenue Phoenix, AZ 85009	Courier 3/31/11 Courier 6/26/11	04/19/11	7/26/2011	YES	valerie.gallardo-weller@swgas.com
11	Southwest Gas High Pressure Gas	Andy Lugo	(602) 271-4277			04/19/11	7/26/2011	NO	
12	Cotton Lane RV MH Resort	Chip Jordan	(602) 309-3023	Roles Inn of America PO Box 74767 Phoenix, AZ 85087	USPS 3/31/11 USPS 6/26/11		7/11/2011	NO	
13	Town of Buckeye	Tom Leticia Scott Z. Woody Scoutten	(623) 547-4661	WC Scoutten 1626 N. Litchfield Rd. ste 310 Goodyear, AZ 85395	USPS 3/31/11 FCD 6-26-2011		7/21/2011	YES	scott@scoutten.com
14	MCDOT	Sakda Kesgomol	(602) 506-8624		FCD 7-22-2011		8/11/2011	NO	

FRS 4 - Utility Relocations - By Utility

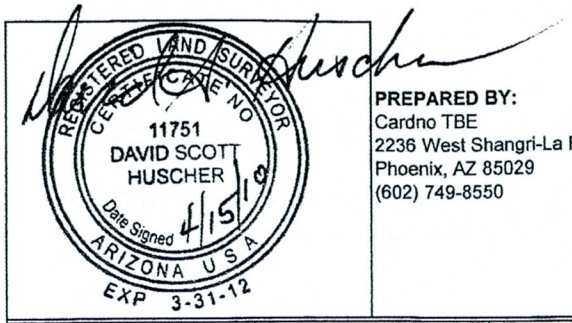
	Utility Company	Utility Type	Station	Size	Material	To Be Relocated	Relocated By	Quantity	Pothole No.	Located
1	APS	ELECTRIC	22+17.46	(2) 5-1/2-INCH	CONDUIT	YES	APS	2 EA	39	YES
2	APS	ELECTRIC	46+04.82	(4) 2-1/2-INCH	CONDUIT	YES	APS	4 EA	40	YES
3	APS	ELECTRIC	46+04.82	(1) 5-1/2-INCH	CONDUIT	YES	APS	1 EA	40	YES
4	APS	ELECTRIC	107+75.25	(2) 4-1/2-INCH	CONDUIT	YES	APS	2 EA	43	YES
5	Arizona Water Company	WATER	20+17.07	12-INCH	DIP	YES	Arizona Water Company	76 LF	16	YES
6	Cox	FIBER	20+30.84	(1) 2-INCH	CONDUIT	YES	COX	1 EA	17A	YES
7	Cox	FIBER	20+30.84	(3) 3-3/4-INCH	CONDUIT	YES	COX	3 EA	17A	YES
8	Cox	FIBER	20+67.89	6 1/2-INCH	CONDUIT	YES	COX	1 EA	2	YES
9	Qwest	TELEPHONE	125+20.00	400 PAIR (1) 2-1/4-INCH	DIRECT BURY CABLE	YES	Qwest	1 EA	44	YES
10	Qwest	TELEPHONE	125+20.00	600 PAIR (1) 1 3/4-INCH	DIRECT BURY CABLE	YES	Qwest	1 EA	45	YES
11	RID	IRRIGATION	126+25.40	36-INCH	CONCRETE	YES	FRS 4 Project	1 EA	SURVEY	YES
12	RID	IRRIGATION	135+23.44	24-INCH	CONCRETE	YES	FRS 4 Project	1 EA	SURVEY	YES
13	RID	IRRIGATION	140+00.80	24-INCH	CONCRETE	YES	FRS 4 Project	1 EA	SURVEY	YES
14	Southwest Gas	NATURAL GAS	20+39.78	4 1/2-INCH	PLASTIC	YES	SOUTHWEST GAS	1 EA	18A	YES
15	Southwest Gas	NATURAL GAS	125+58.61	1-1/4-INCH IN 2-1/2-INCH STL SLEEVE	STEEL	YES	SOUTHWEST GAS	1 EA	25	YES
16	Southwest Gas*	NATURAL GAS	125+58.61 TO 155+00	1-1/4-INCH	STEEL	YES	SOUTHWEST GAS	2941 LF	9A, 27, 28	YES
17	Southwest Gas	NATURAL GAS	163+66.99	4-1/2-INCH	PLASTIC	YES	SOUTHWEST GAS	1 EA	34	YES
18	City of Goodyear	TEL, ELEC, TRAFFIC	163+36.15	(4) 3-1/2-INCH	CONDUIT	YES	FRS 4 Project	4 EA	33	YES
19	City of Goodyear	WATER	164+10.83	12-INCH	DIP	YES	FRS 4 Project	50 LF	36	YES
20	City of Goodyear	TEL, ELEC, TRAFFIC	164+72.51	(2) 3-1/2-INCH	CONDUIT	YES	FRS 4 Project	2 EA	37	YES
21	City of Goodyear	TEL, ELEC, TRAFFIC	164+72.51	(1) 4-1/2-INCH	CONDUIT	YES	FRS 4 Project	1 EA	37	YES

*To be Abandoned by SWG

FRS 4 - Utility Relocations - By Plan Station

	Utility Company	Utility Type	Station	Size	Material	To Be Relocated	Relocated By	Quantity	Pothole No.	Located
1	Arizona Water Company	WATER	20+17.07	12-INCH	DIP	YES	Arizona Water Company	76 LF	16	YES
2	Cox	FIBER	20+30.84	(1) 2-INCH	CONDUIT	YES	COX	1 EA	17A	YES
3	Cox	FIBER	20+30.84	(3) 3-3/4-INCH	CONDUIT	YES	COX	3 EA	17A	YES
4	Southwest Gas	NATURAL GAS	20+39.78	4 1/2-INCH	PLASTIC	YES	SOUTHWEST GAS	1 EA	18A	YES
5	Cox	FIBER	20+67.89	6 1/2-INCH	CONDUIT	YES	COX	1 EA	2	YES
6	APS	ELECTRIC	22+17.46	(2) 5-1/2-INCH	CONDUIT	YES	APS	2 EA	39	YES
7	APS	ELECTRIC	46+04.82	(4) 2-1/2-INCH	CONDUIT	YES	APS	4 EA	40	YES
8	APS	ELECTRIC	46+04.82	(1) 5-1/2-INCH	CONDUIT	YES	APS	1 EA	40	YES
9	APS	ELECTRIC	107+75.25	(2) 4-1/2-INCH	CONDUIT	YES	APS	2 EA	43	YES
10	RID	IRRIGATION	126+25.40	36-INCH	CONCRETE	YES	FRS 4 Project	1 EA	SURVEY	YES
11	Qwest	TELEPHONE	125+20.00	400 PAIR (1) 2-1/4-INCH	DIRECT BURY CABLE	YES	Qwest	1 EA	44	YES
12	Qwest	TELEPHONE	125+20.00	600 PAIR (1) 1 3/4-INCH	DIRECT BURY CABLE	YES	Qwest	1 EA	45	YES
13	Southwest Gas	NATURAL GAS	125+58.61	1-1/4-INCH IN 2-1/2-INCH STL SLEEVE	STEEL	YES	SOUTHWEST GAS	1 EA	25	YES
14	Southwest Gas*	NATURAL GAS	125+58.61 TO 155+00	1-1/4-INCH	STEEL	YES	SOUTHWEST GAS	2941 LF	9A, 27, 28	YES
15	RID	IRRIGATION	135+23.44	24-INCH	CONCRETE	YES	FRS 4 Project	1 EA	SURVEY	YES
16	RID	IRRIGATION	140+00.80	24-INCH	CONCRETE	YES	FRS 4 Project	1 EA	SURVEY	YES
17	City of Goodyear	TEL, ELEC, TRAFFIC	163+36.15	(4) 3-1/2-INCH	CONDUIT	YES	FRS 4 Project	4 EA	33	YES
18	Southwest Gas	NATURAL GAS	163+66.99	4-1/2-INCH	PLASTIC	YES	SOUTHWEST GAS	1 EA	34	YES
19	City of Goodyear	WATER	164+10.83	12-INCH	DIP	YES	FRS 4 Project	50 LF	36	YES
20	City of Goodyear	TEL, ELEC, TRAFFIC	164+72.51	(2) 3-1/2-INCH	CONDUIT	YES	FRS 4 Project	2 EA	37	YES
21	City of Goodyear	TEL, ELEC, TRAFFIC	164+72.51	(1) 4-1/2-INCH	CONDUIT	YES	FRS 4 Project	1 EA	37	YES

*To be Abandoned by SWG



TESTHOLE DATA SUMMARY

PREPARED BY:
Cardno TBE
2236 West Shangri-La Rd.
Phoenix, AZ 85029
(602) 749-8550

DATE: April 15, 2010
PROJECT NAME: White Tanks FRS #4
PROJECT NO: 2008 C013

NOTE: The coordinate and elevation values provided below depict the actual utility location. Adjustments were made, as needed, to the surveyed request location.

All Data is English

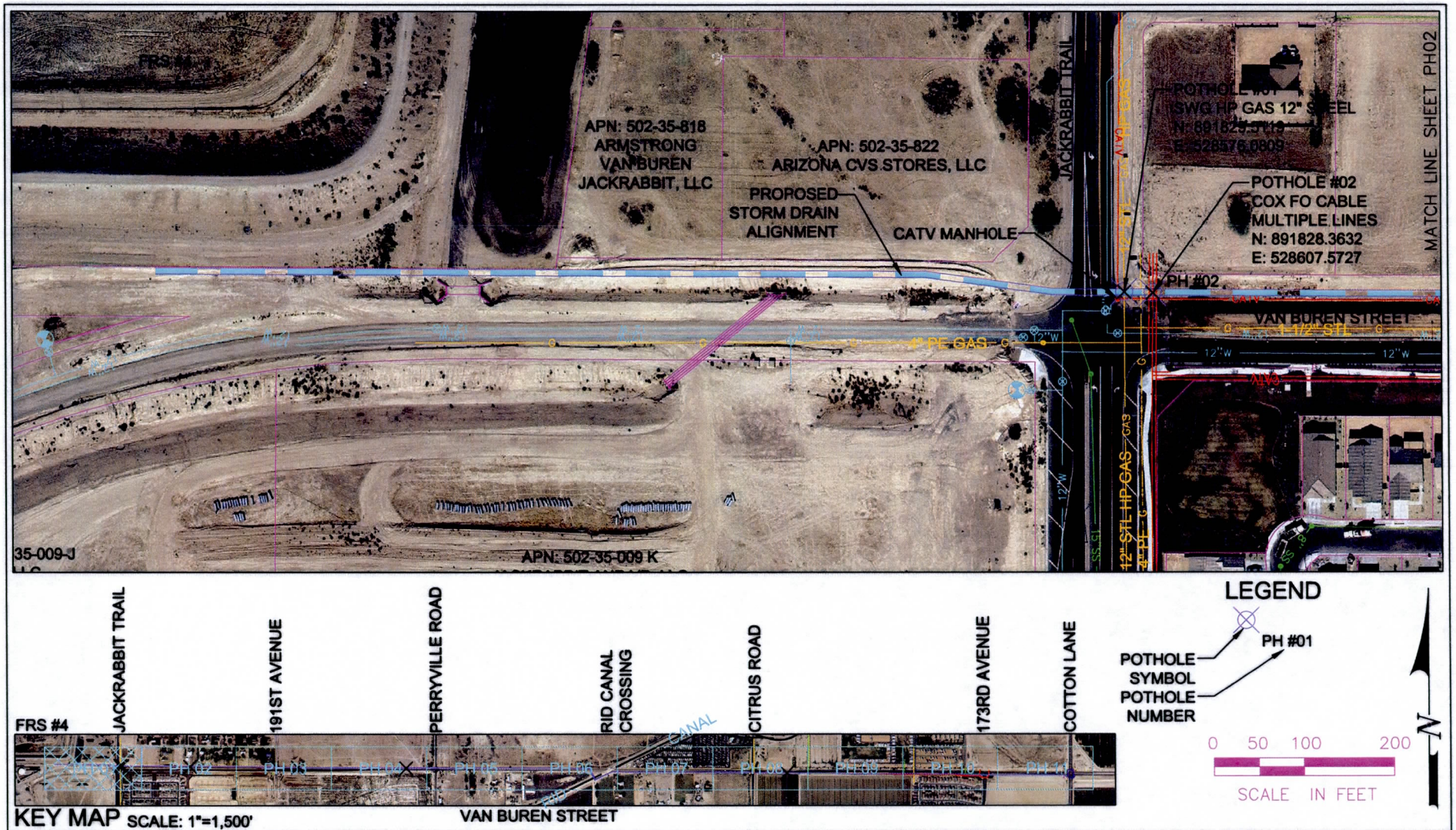
TBE Project Number: AZ015-005-01

TH#	Street	Coordinates		Anticipated Utility	Date	Ground Elevation	Top Elevation	Bottom Elevation	Material Type, Outside Diameter and Comments	Depth of Cover
		Northing	Easting							
1	Jackrabbit Trail	891829.50	528580.13	12" Gas	03/18/10	1030.01	1018.40	-------	12 1/2" Steel Pipe N - S	11.61
2	Van Buren St	891816.39	528607.56	FO	03/18/10	1029.45	1024.12	1021.52	(2) 2 1/2" & (2) 2" Plastic Conduit E - W Laid 5" Wide & Stacked 2 X 2 A 6 1/2" Plastic Pipe Was Found Below The 2 X 2 Conduit Stack, This Pipe runs Perpendicular (N - S) and the Type of Utility is Unknown, Top = Top of 2 1/2" & 2 Conduit Stack & Bottom = Bottom of 6 1/2" Pipe	5.33
3	Van Buren St	891810.02	529740.88	FO	03/18/10	1024.88	1019.53	1018.83	(2) 2 1/2" & (2) 2" Plastic Conduits E - W Laid 5" Wide & Stacked 2 X 2	5.35
4	Van Buren St	891797.67	531540.87	FO	03/18/10	1020.17	1014.96	1014.59	(2) 2 1/2" & (2) 2" Plastic Conduits E - W Laid 5" Wide & Stacked 2 X 2	5.21
5	Van Buren St	891787.18	533340.75	FO	03/18/10	1013.79	1008.81	1008.03	(2) 2 1/2" & (2) 2" Plastic Conduits E - W Laid 5" Wide & Stacked 2 X 2	4.98
6	Van Buren St	891794.75	533808.61	FO	03/18/10	1012.49	1006.52	-------	5" Plastic Conduit N - S (Bluestake Marked as MCI)	5.97
7	Van Buren St	891658.65	536449.16	FO	03/18/10	1006.47	1002.34	1001.47	(5) Visible 2" Conduits NE-SW Laid 6 1/2" Wide & Randomly Stacked	4.13
8	Van Buren St	891666.55	536449.16	FO	03/18/10	1006.24	999.94	-------	3/4" Direct Buried Cable N E - SW	6.30
9	Van Buren St	891701.54	539679.41	Telephone	03/18/10	1000.87	997.67	-------	1 1/4" Direct Buried Cable E - W	3.20
9A	Van Buren St	891717.87	539679.41	1 1/4" Gas	03/18/10	1001.40	998.81	-------	1 3/4" Steel Pipe E - W	2.59

WHITE TANKS FRS#4
VAN BUREN STREET
JACKRABBIT TRAIL TO COTTON LANE
FCD PROJECT NO. 2008 C013
POTHOLE REQUEST

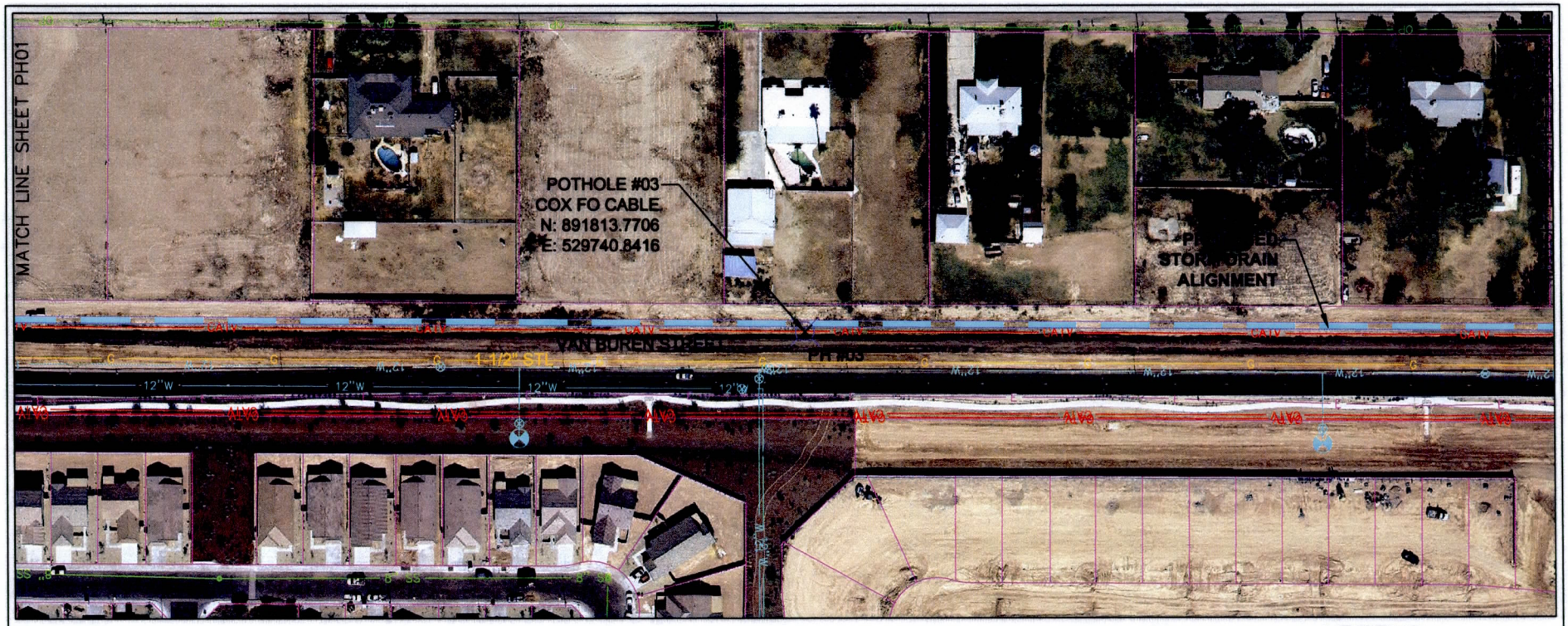
PH#	Coordinates		Anticipated Utility	Comments	Plan Sheet No.
	Northing	Easting			
10	891859.8372	536849.9512	AT&T FIBER OPTIC	3/4-INCH DIRECT BURIED FIBER OPTIC CABLE NE -SW START OF THE DIP SECTION	Sheet PH 01
11	891855.4933	536840.9439	AT&T FIBER OPTIC	3/4-INCH DIRECT BURIED FIBER OPTIC CABLE NE -SW DIP SECTION	Sheet PH 01
12	891851.1494	536831.9367	AT&T TELEPHONE UNKNOWN CROSSING	AT&T SHOWS A UTILITY CROSSING - REASON FOR DIP OF FIBER OPTIC LINE. POSSIBLE TELEPHONE CONDUIT	Sheet PH 01
13	891846.8055	536822.9294	AT&T FIBER OPTIC	3/4-INCH DIRECT BURIED FIBER OPTIC CABLE NE -SW DIP SECTION	Sheet PH 01
14	891842.4616	536813.9222	AT&T FIBER OPTIC	3/4-INCH DIRECT BURIED FIBER OPTIC CABLE NE -SW END OF THE DIP SECTION	Sheet PH 01

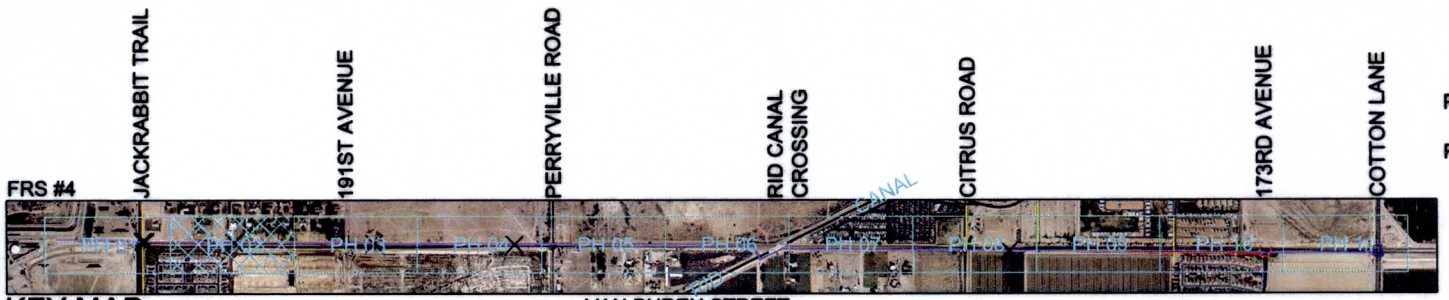
NOTE: CARDINO TBE CONDUCTED UTILITY POTHOLING ON MARCH 18TH, 2010 FOR THE FRS #4 OUTLET ALIGNMENT STUDY. THIS POTHOLE REQUEST IS TO FURTHER INVESTIGATE THE AT&T FIBER OPTIC LINE ALONG THE RID CANAL. THE AT&T AS-BUILT SHOWS THE FIBER OPTIC LINE DIPPING JUST PAST VAN BUREN STREET. SEE ATTACHED SHEET PH 01.



KEY MAP SCALE: 1"=1,500'

PROJECT NO: 009-2519 DRAWN BY: SRW DATE: 03-10-2010	Flood Control District of Maricopa County	WHITE TANKS FRS #4 OUTLET ALIGNMENT STUDY FCD 2008 C013	POTHOLE REQUEST MAP VAN BUREN STREET	OLSSON ASSOCIATES	Figure PH 01





KEY MAP SCALE: 1"=1,500'

VAN BUREN STREET

LEGEND

POTHOLE SYMBOL — PH #01

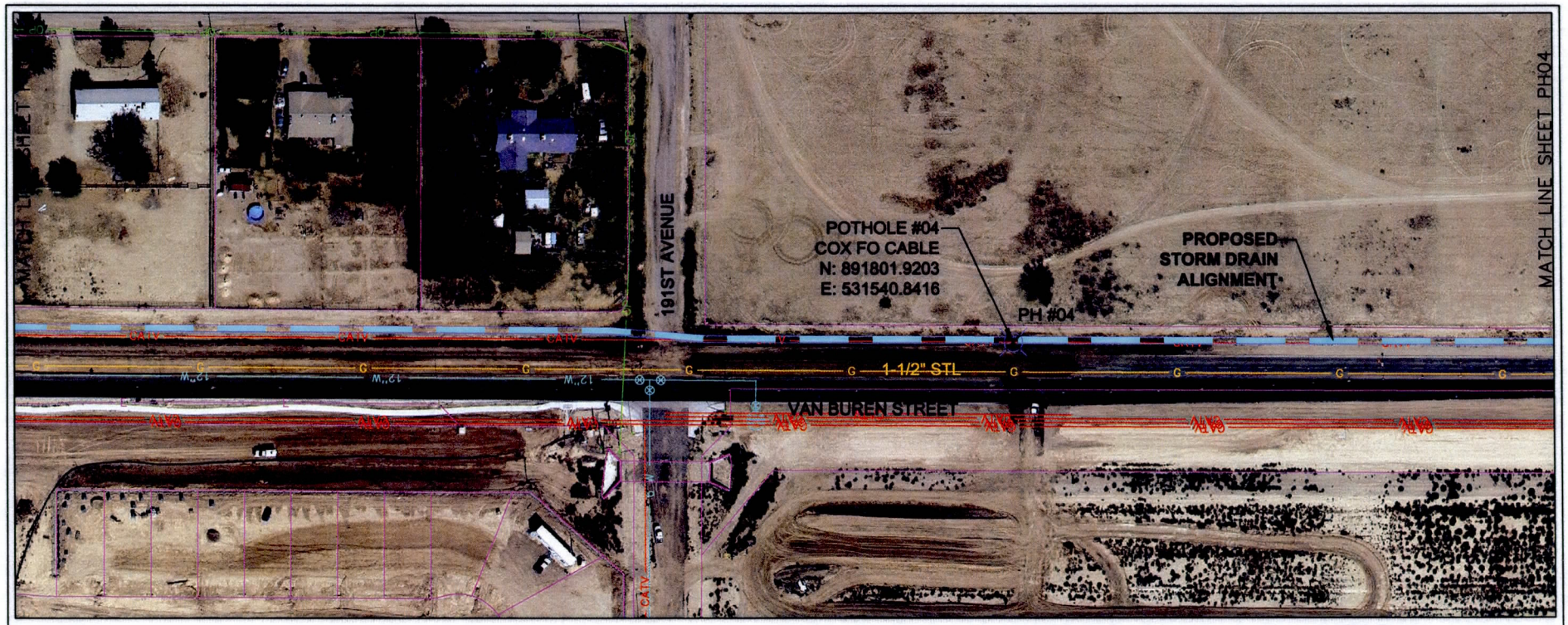
POTHOLE NUMBER

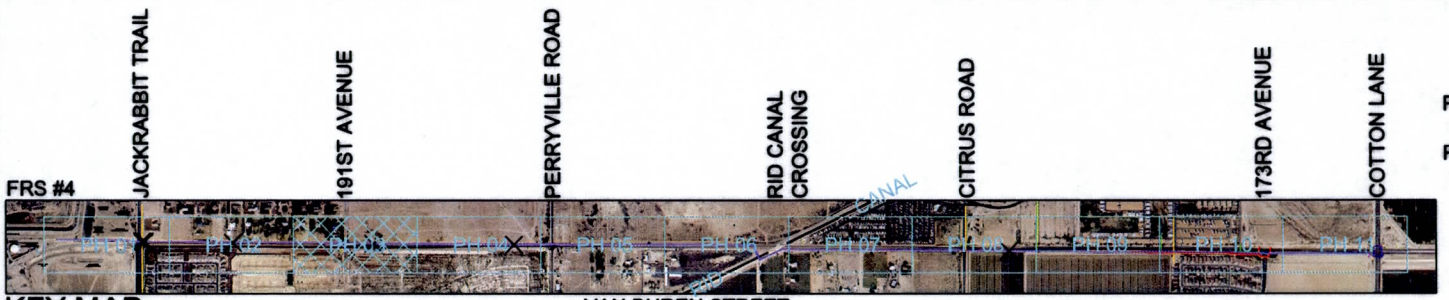
0 50 100 200

SCALE IN FEET

N

PROJECT NO: 009-2519 DRAWN BY: SRW DATE: 03-10-2010	WHITE TANKS FRS #4 OUTLET ALIGNMENT STUDY FCD 2008 C013	POTHOLE REQUEST MAP VAN BUREN STREET	OLSSON ASSOCIATES	Figure PH 02





KEY MAP SCALE: 1"=1,500'

LEGEND

POTHOLE SYMBOL — PH #01

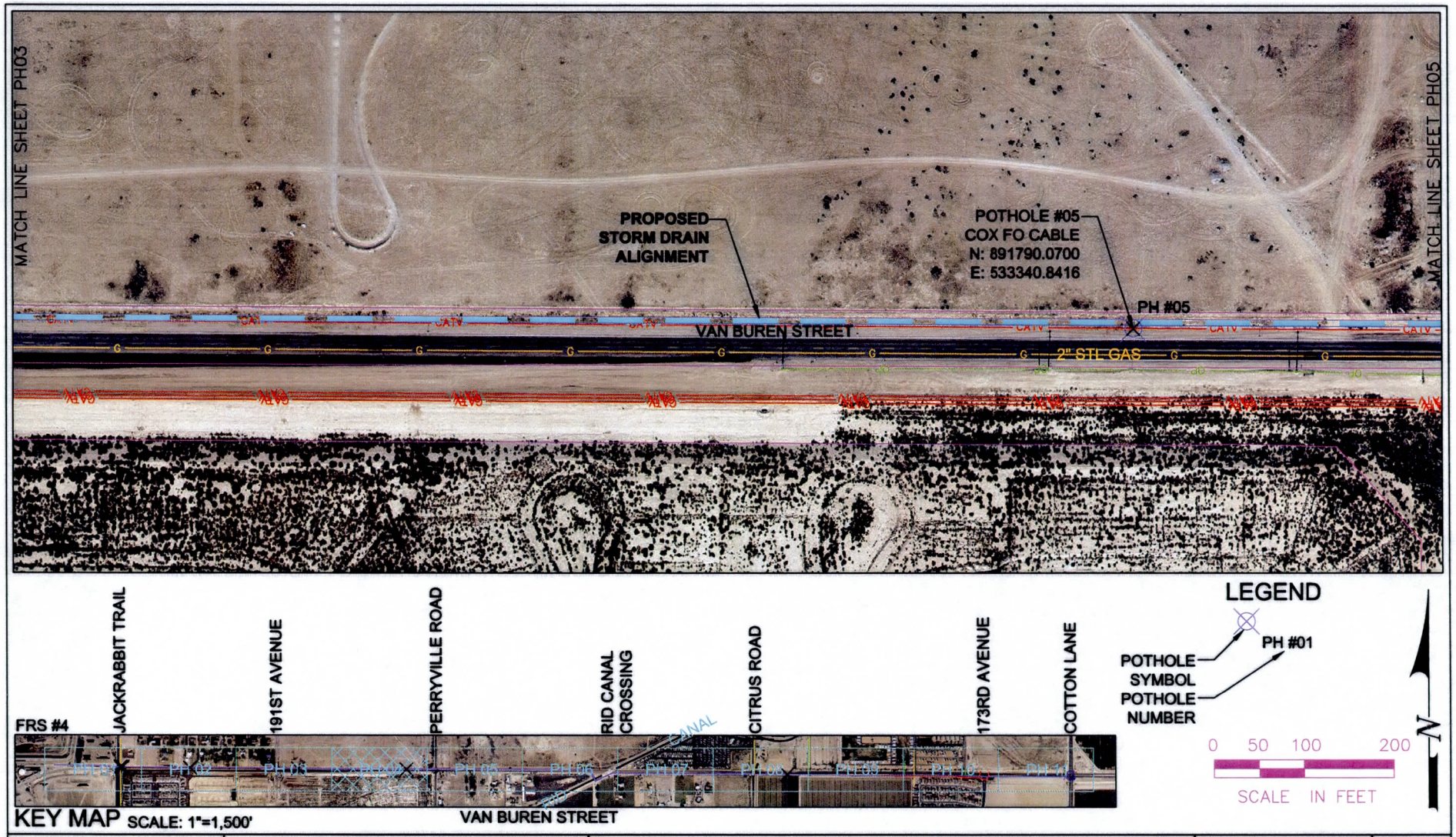
POTHOLE NUMBER

N

0 50 100 200

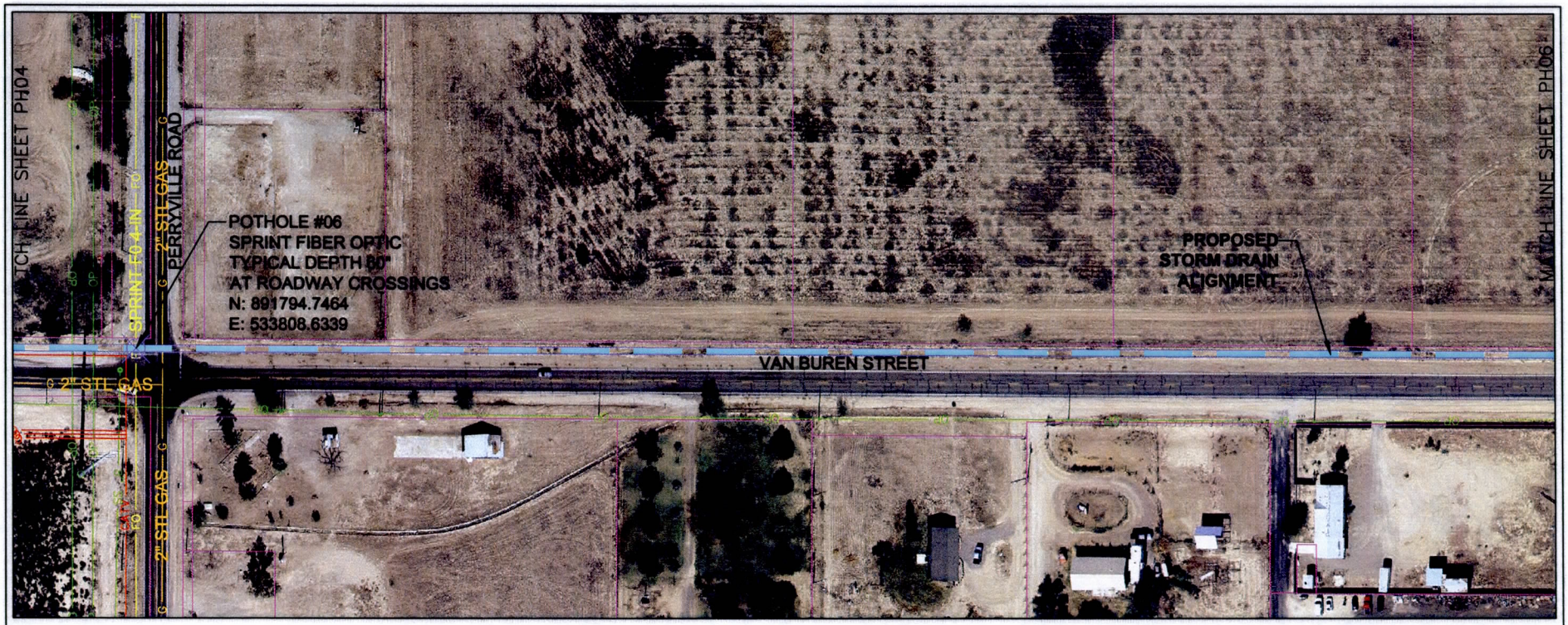
SCALE IN FEET

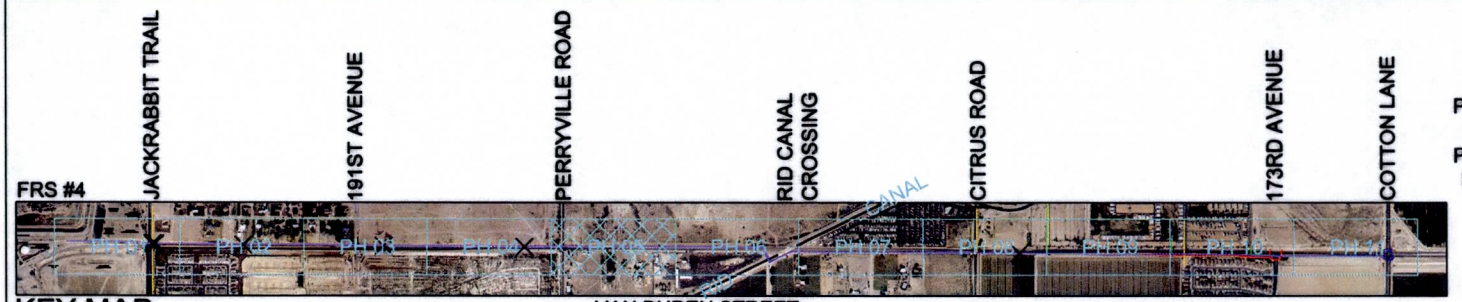
PROJECT NO: 009-2519 DRAWN BY: SRW DATE: 03-10-2010	WHITE TANKS FRS #4 OUTLET ALIGNMENT STUDY FCD 2008 C013	POTHOLE REQUEST MAP VAN BUREN STREET	OLSSON ASSOCIATES	Figure PH 03



KEY MAP SCALE: 1"=1,500'

PROJECT NO: 009-2519 DRAWN BY: SRW DATE: 03-10-2010	WHITE TANKS FRS #4 OUTLET ALIGNMENT STUDY FCD 2008 C013	POTHOLE REQUEST MAP VAN BUREN STREET	OLSSON ASSOCIATES	Figure PH 04





KEY MAP SCALE: 1"=1,500'

LEGEND

POTHOLE SYMBOL — PH #01

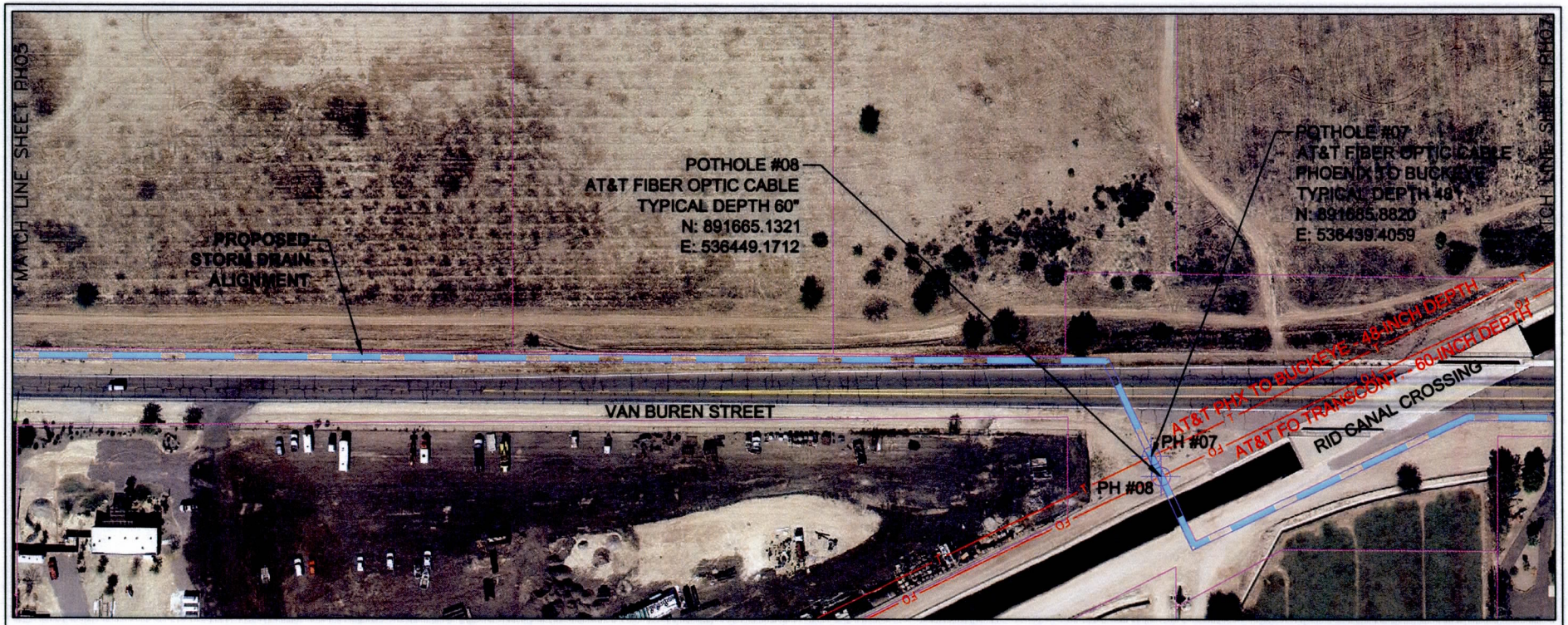
POTHOLE NUMBER

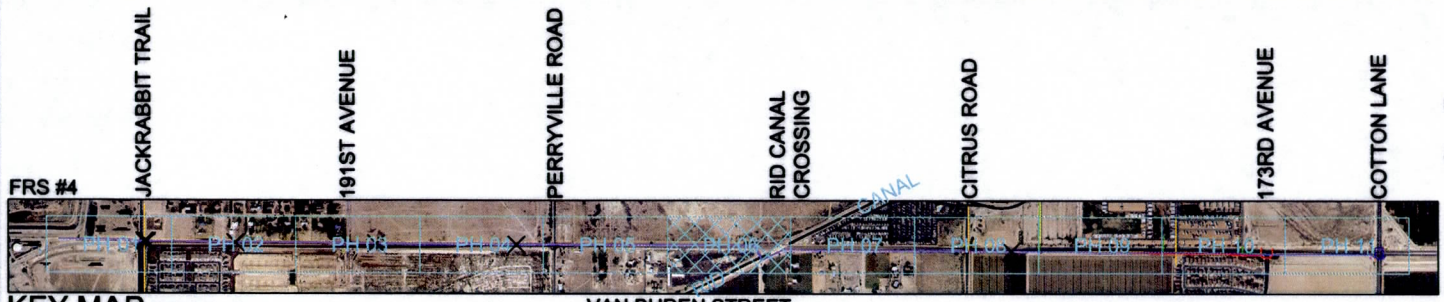
0 50 100 200

SCALE IN FEET

N

PROJECT NO: 009-2519 DRAWN BY: SRW DATE: 03-10-2010	WHITE TANKS FRS #4 OUTLET ALIGNMENT STUDY FCD 2008 C013	POTHOLE REQUEST MAP VAN BUREN STREET	OLSSON ASSOCIATES	Figure PH 05





KEY MAP SCALE: 1"=1,500'

LEGEND

POTHOLE SYMBOL — PH #01

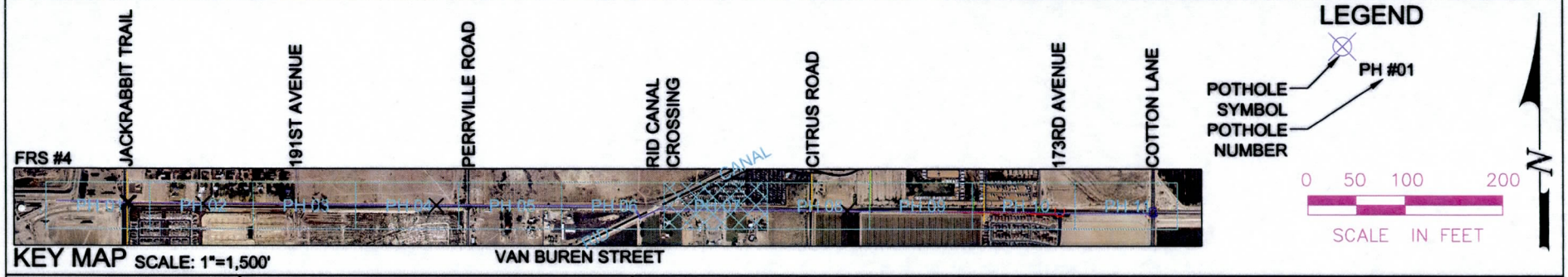
POTHOLE NUMBER

0 50 100 200

SCALE IN FEET

N

PROJECT NO: 009-2519 DRAWN BY: SRW DATE: 03-10-2010	WHITE TANKS FRS #4 OUTLET ALIGNMENT STUDY FCD 2008 C013	POTHOLE REQUEST MAP VAN BUREN STREET	OLSSON ASSOCIATES	Figure PH 06



KEY MAP SCALE: 1"=1,500'

LEGEND

POTHOLE SYMBOL — PH #01

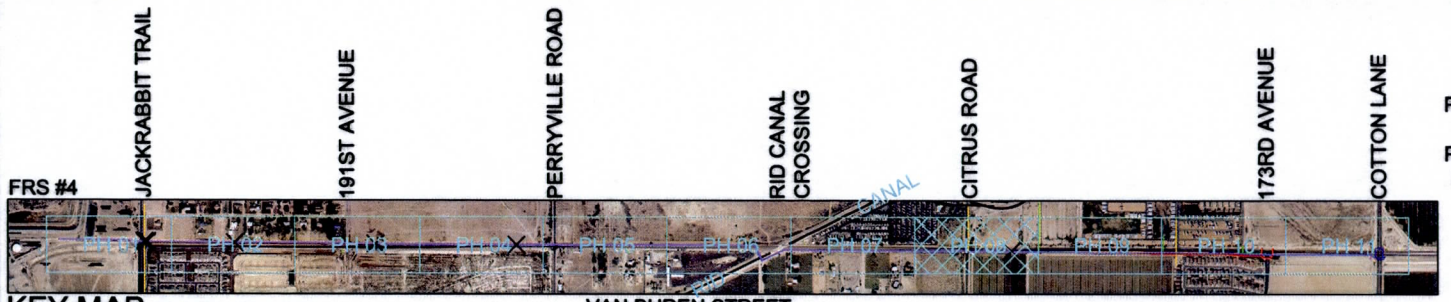
POTHOLE NUMBER

N

0 50 100 200

SCALE IN FEET

PROJECT NO: 009-2519 DRAWN BY: SRW DATE: 03-10-2010	WHITE TANKS FRS #4 OUTLET ALIGNMENT STUDY FCD 2008 C013	POTHOLE REQUEST MAP VAN BUREN STREET	OLSSON ASSOCIATES	Figure PH 07



KEY MAP SCALE: 1"=1,500'

LEGEND

POTHOLE SYMBOL — PH #01

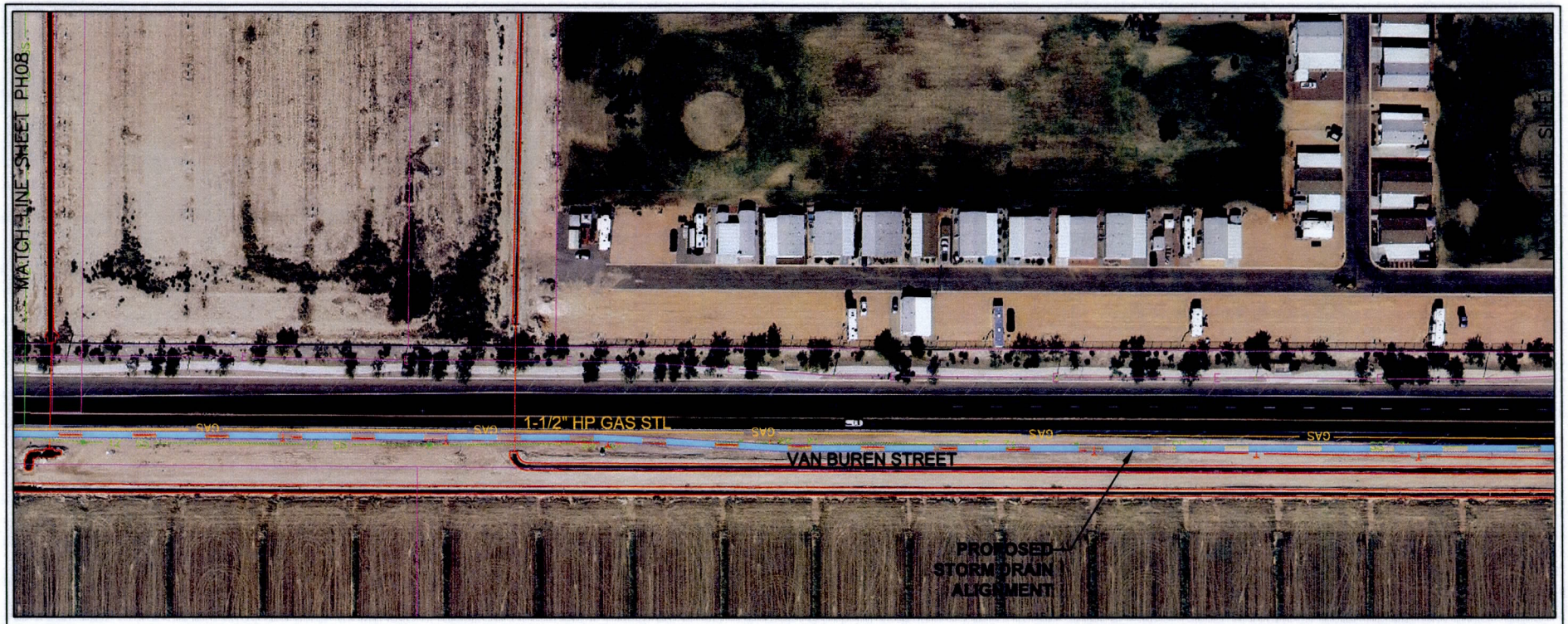
POTHOLE NUMBER

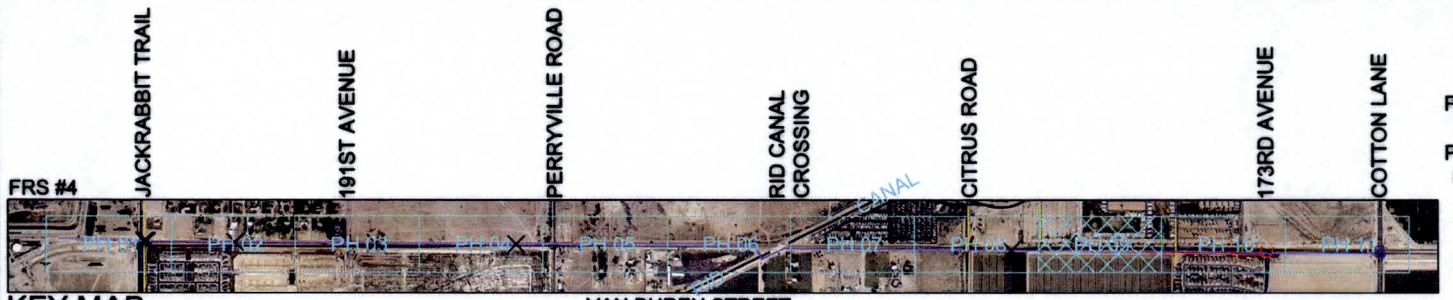
0 50 100 200

SCALE IN FEET

N

PROJECT NO: 009-2519 DRAWN BY: SRW DATE: 03-10-2010	WHITE TANKS FRS #4 OUTLET ALIGNMENT STUDY FCD 2008 C013	POTHOLE REQUEST MAP VAN BUREN STREET	OLSSON ASSOCIATES	Figure PH 08





KEY MAP SCALE: 1"=1,500'

LEGEND

POTHOLE SYMBOL — PH #01

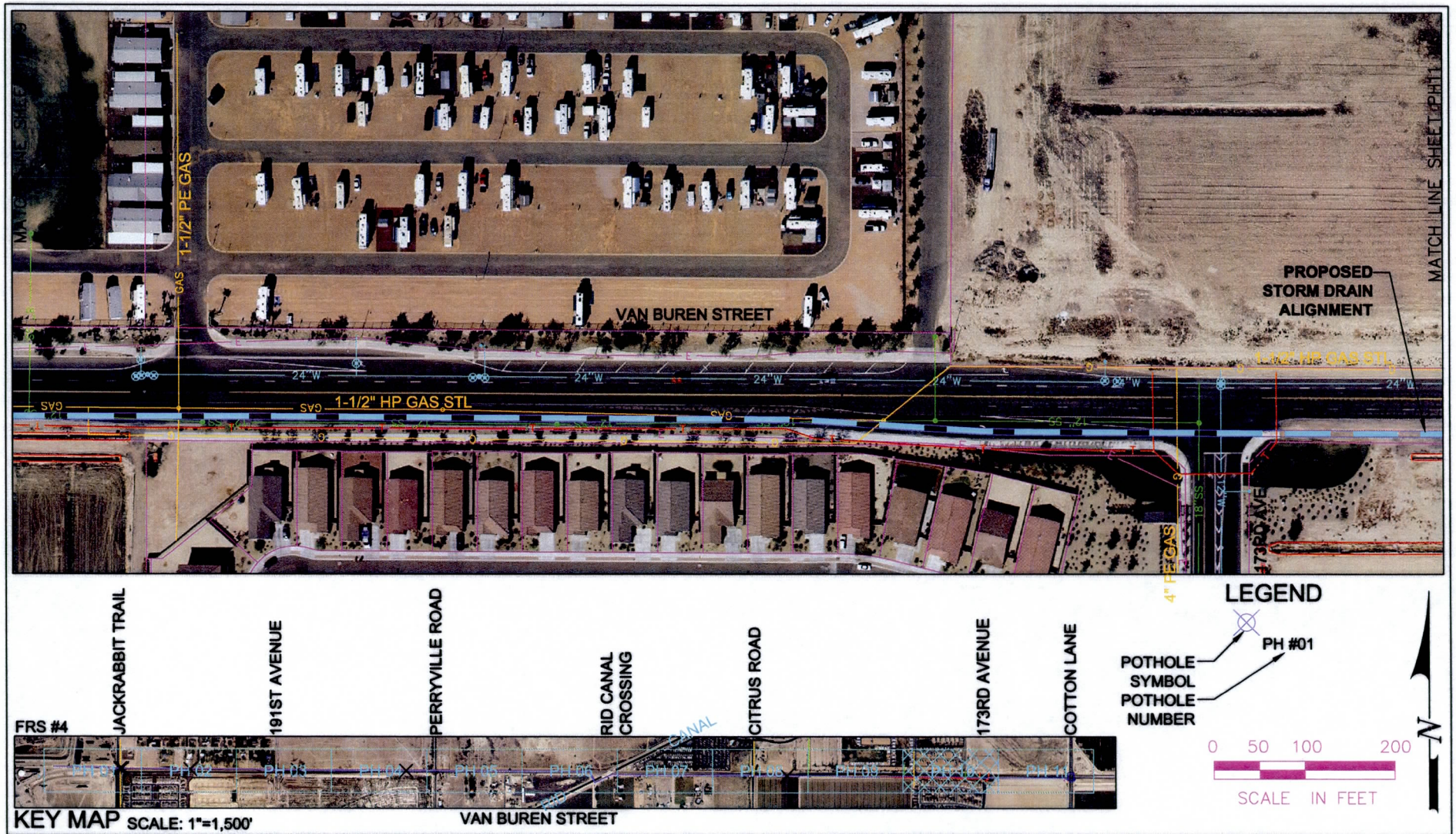
POTHOLE NUMBER

0 50 100 200

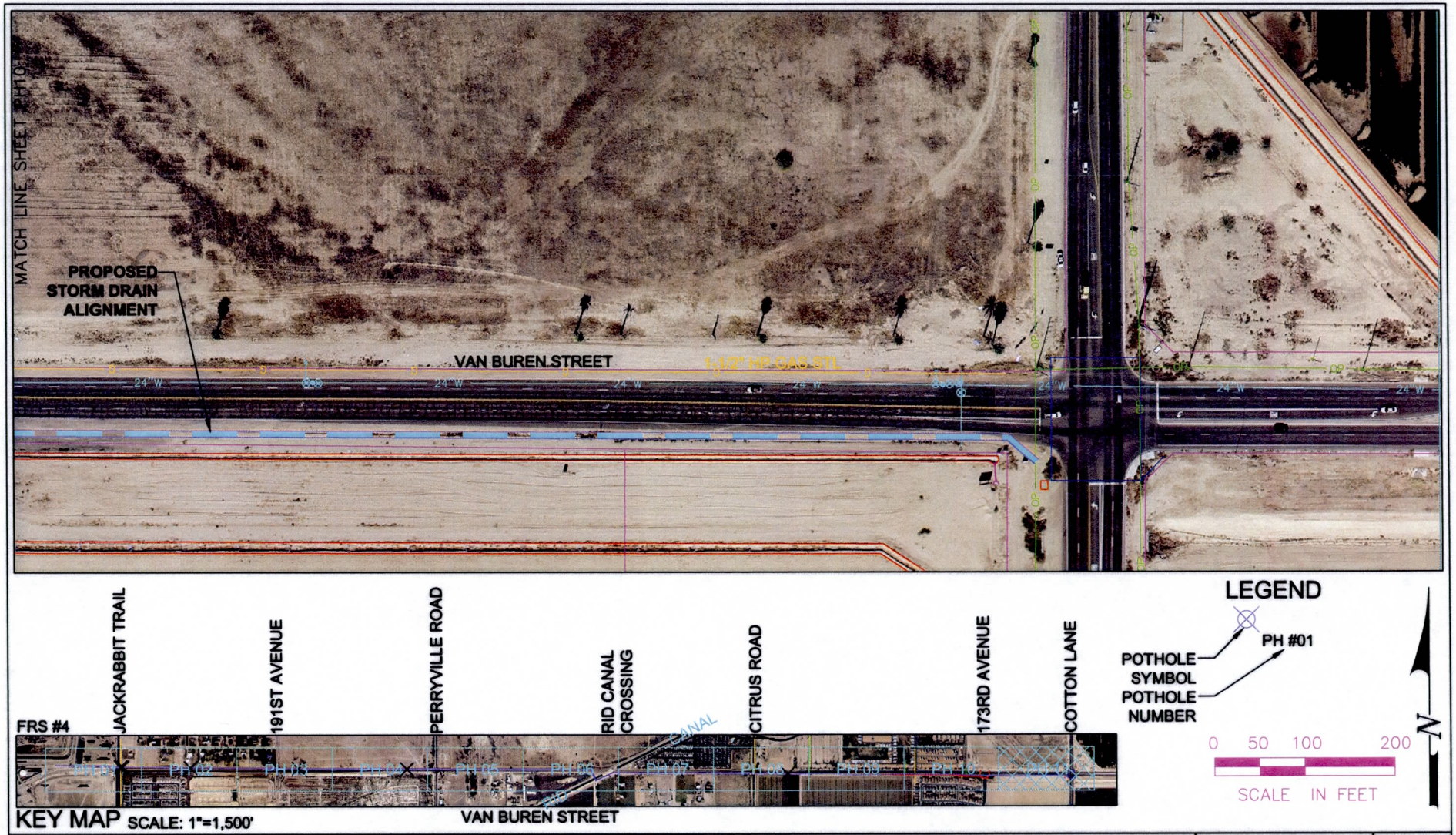
SCALE IN FEET

N

PROJECT NO: 009-2519 DRAWN BY: SRW DATE: 03-10-2010	WHITE TANKS FRS #4 OUTLET ALIGNMENT STUDY FCD 2008 C013	POTHOLE REQUEST MAP VAN BUREN STREET	OLSSON ASSOCIATES	Figure PH 09

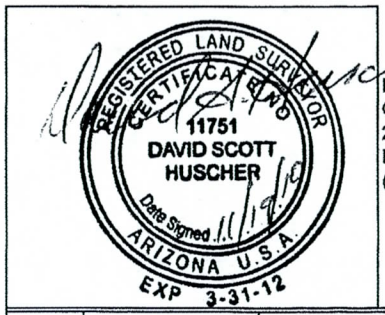


PROJECT NO: 009-2519 DRAWN BY: SRW DATE: 03-10-2010	WHITE TANKS FRS #4 OUTLET ALIGNMENT STUDY FCD 2008 C013	POTHOLE REQUEST MAP VAN BUREN STREET	OLSSON ASSOCIATES	Figure PH 10



KEY MAP SCALE: 1"=1,500'

PROJECT NO: 009-2519 DRAWN BY: SRW DATE: 03-10-2010	WHITE TANKS FRS #4 OUTLET ALIGNMENT STUDY FCD 2008 C013	POTHOLE REQUEST MAP VAN BUREN STREET	OLSSON ASSOCIATES	Figure PH 11



TESTHOLE DATA SUMMARY

PREPARED BY:
Cardno TBE
2236 West Shangri-La Rd.
Phoenix, AZ 85029
(602) 749-8550

DATE: November 19, 2010
PROJECT NAME: White Tanks FRS #4
PROJECT NO: 2008 C013 (FCD 2009 C032)

NOTE: The coordinate and elevation values provided below depict the actual utility location. Adjustments were made, as needed, to the surveyed request location.

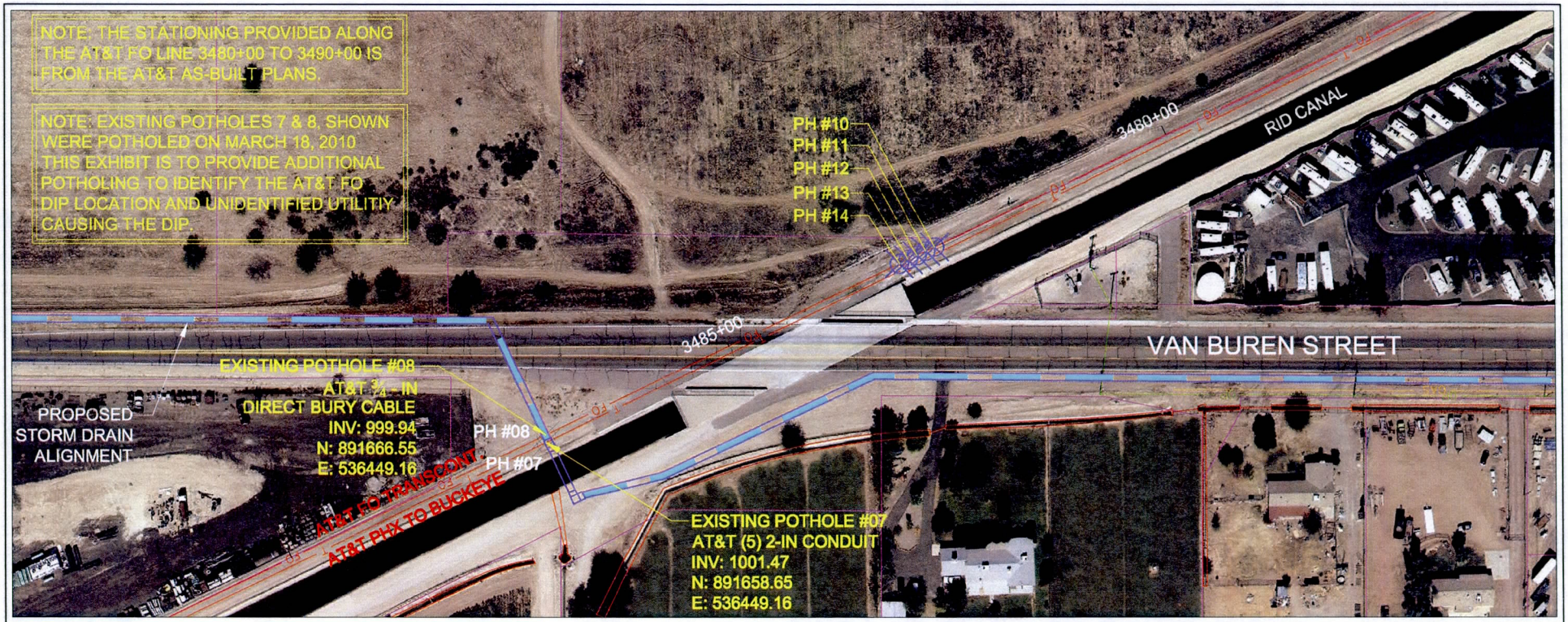
All Data is English

TBE Project Number: AZ015-005-04

TH#	Street	Coordinates		Anticipated Utility	Date	Ground Elevation	Top Elevation	Bottom Elevation	Material Type, Outside Diameter and Comments	Depth of Cover
		Northing	Easting							
10	Van Buren St	891860.86	536849.98	Fiber	11/17/10	1005.74	1001.18	999.92	48" Wide Concrete Encasement NE/SW	4.56
11	Van Buren St	891856.90	536840.93	Fiber	11/11/10	1005.82	1002.14	1000.86	12" Wide Concrete Encasement NE/SW	3.68
12	Van Buren St	891852.21	536831.97	Fiber	11/17/10	1005.96	999.90	-------	3/4" Direct Buried Cable NE/SW	6.06
13	Van Buren St	891848.28	536822.94	Fiber	11/11/10	1006.12	999.78	-------	3/4" Direct Buried Cable NE/SW	6.34
14	Van Buren St	891843.34	536813.94	Fiber	11/17/10	1006.29	999.87	-------	3/4" Direct Buried Cable NE/SW	6.42

WHITE TANKS FRS#4
VAN BUREN STREET
JACKRABBIT TRAIL TO COTTON LANE
FCD PROJECT NO. 2008 C013
POTHOLE REQUEST

PH#	Coordinates		Anticipated Utility	Comments	Plan Sheet No.
	Northing	Easting			
1	891829.5119	528576.0809	SWG HP GAS 12-IN STEEL	High Pressure Gas Line - 12-in Steel Pipe - Pothole to verify top and bottom of pipe	Sheet PH 01
2	891828.3632	528607.5727	Cox CATV Fiber Optic / Cable	Multiple Cox CATV Fiber Optic Cable Lines - Pothole to verifiy top and bottom of lines and number of lines or if it is a duct bank	Sheet PH 01
3	891813.7706	529740.8416	Cox CATV Fiber Optic / Cable	Cox CATV Fiber Optic Cable Lines - Pothole to verifiy top and bottom of lines and number of lines or if it is a duct bank	Sheet PH 02
4	891801.9203	531540.8416	Cox CATV Fiber Optic / Cable	Cox CATV Fiber Optic Cable Lines - Pothole to verifiy top and bottom of lines and number of lines or if it is a duct bank	Sheet PH 03
5	891790.0700	533340.8416	Cox CATV Fiber Optic / Cable	Cox CATV Fiber Optic Cable Lines - Pothole to verifiy top and bottom of lines and number of lines or if it is a duct bank	Sheet PH 04
6	891794.7464	533808.6339	Sprint Fiber Optic	Sprint Maps call out a Typical Depth of 60-inches at Roadway Crossings - Pothole to verify top and bottom of pipe	Sheet PH 05
7	891685.8820	536439.4059	AT&T Fiber Optic Cable	AT&T Plans call this the Phoenix to Buckeye Cable w/ a 48-inch Typical Depth - Pothole to verify top and bottom of pipe	Sheet PH06
8	891665.1321	536449.1712	AT&T Fiber Optic Cable	AT&T Plans call this the Transcontinental Cable w/ a 60-inch Typical Depth - Pothole to verify top and bottom of pipe	Sheet PH06
9	891708.6741	539679.4317	SWG HP GAS 1-1/4-IN STEEL & QWEST Local Networks Telephone	Southwest Gas High Pressure Gas - 1-1/4" steel pipe and Qwest Local Network Telephone - Pothole to verify top and bottom of pipe	Sheet PH08



LEGEND

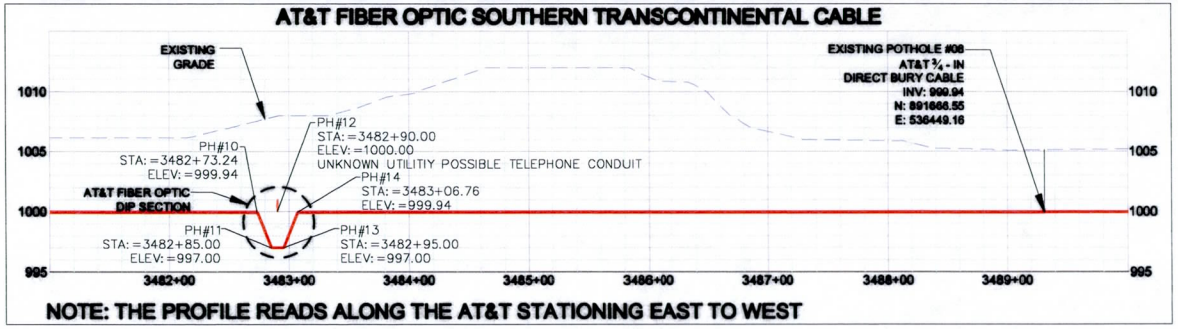
PH #01
POTHOLE SYMBOL
POTHOLE NUMBER

PROP. PH #	NORTHING	EASTING
PH #10	N: 891859.8372	E: 536849.9512
PH #11	N: 891855.4933	E: 536840.9439
PH #12	N: 891851.1494	E: 536831.9367
PH #13	N: 891846.8055	E: 536822.9294
PH #14	N: 891842.4616	E: 536813.9222

PLAN VIEW
0 50 100
SCALE IN FEET

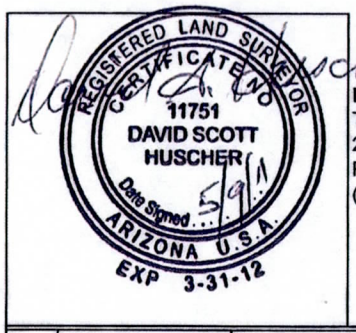
PROFILE SCALE
0 50 100 0 5 10
HORIZONTAL SCALE IN FEET VERTICAL SCALE IN FEET

AT&T FIBER OPTIC SOUTHERN TRANSCONTINENTAL CABLE



NOTE: THE PROFILE READS ALONG THE AT&T STATIONING EAST TO WEST

PROJECT NO: 009-2519 DRAWN BY: SRW DATE: 10-06-2010	WHITE TANKS FRS #4 OUTLET ALIGNMENT STUDY FCD 2008 C013	POTHOLE REQUEST MAP VAN BUREN STREET AT RID CANAL	OLSSON ASSOCIATES	Figure PH 01



TESTHOLE DATA SUMMARY

PREPARED BY:
TBE Group, Inc.
2236 West Shangri-La Rd.
Phoenix, AZ 85029
(602) 749-8550

DATE: May 9, 2011
PROJECT NAME: White Tanks FRS #4
PROJECT NO: FCD 2010 C029

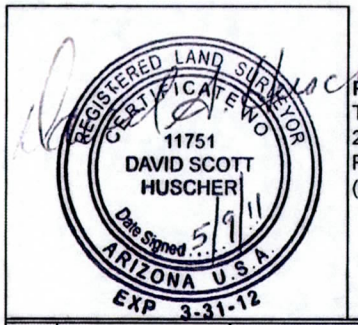
Cardno TBE

NOTE: The coordinate and elevation values provided below depict the actual utility location. Adjustments were made, as needed, to the surveyed request location.

All Data is English

TBE Project Number: AZ096-014-00

TH#	Street	Coordinates		Anticipated Utility	Date	Ground Elevation	Top Elevation	Bottom Elevation	Material Type, Outside Diameter and Comments	Depth of Cover
		Northing	Easting							
15	Van Buren St	891987.29	528602.25	Telephone	05/03/11	1033.54	--------	--------	No Telephone Per Raul Hernandez With ELM - No Signal - Not Dug	--------
16	Van Buren St.	891981.80	528643.27	Water	04/21/11	1033.41	1026.59	--------	13" Wrapped Ductile Iron Pipe N-S	6.82
17	Van Buren St.	891980.12	528657.00	CATV	04/15/11	1033.00	1032.13	1026.54	161" Wide X 67" High Concrete Encasement N-S	0.87
18	Van Buren St.	891976.98	528665.97	Gas	04/15/11	1032.83	1031.01	1026.37	161" Wide X 67" High Concrete Encasement N-S	1.82
19	Van Buren St.	891943.78	533932.71	Telephone	04/21/11	1015.15	1012.94	--------	2 1/2" Direct Buried Cable N-S	2.21
20	Van Buren St.	891943.78	533930.05	Gas	04/21/11	1015.13	1009.68	--------	2 1/2" Steel Gas Line N-S	5.45
21	Van Buren St.	891990.96	536928.11	Telephone	04/19/11	1008.39	1003.63	1002.99	(6) 2" Plastic Conduits NE-SW Laid 10" Wide	4.76
22	Van Buren St.	891999.02	536925.96	Telephone	04/19/11	1008.03	1004.73	1003.34	11" Wide Concrete Encasement NE-SW	3.30
23	Van Buren St.	891883.40	537105.74	Telephone	05/03/11	1010.39	--------	--------	Marked "No Conflict" - No Signal - Not Dug	--------
24	Van Buren St.	891871.97	539144.42	Telephone	04/21/11	1001.63	--------	--------	Marked "No Conflict" - No Signal - Not Dug	--------
25	Van Buren St.	891871.79	539184.35	Gas	04/26/11	1001.72	993.81	--------	2 1/2" Coated Steel Gas Line N-S	7.91
26	Van Buren St.	891867.14	540105.92	Sewer	05/03/11	1004.43	989.05	1004.43	15" +/- PVC Pipe N-S ** Could Not Get Accurate O.D. Due to Depth	15.38
27	Van Buren St.	891854.17	540387.16	Gas	04/21/11	1003.65	1003.29	1000.33	44" Wide Concrete Encasement E-W	0.36
28	Van Buren St.	891849.67	541207.58	Gas	04/21/11	1000.89	997.11	--------	2 1/2" Steel Gas Line E-W	3.78
29	Van Buren St.	891860.89	541338.41	Telephone	04/26/11	1000.43	--------	--------	Marked "No Conflict" - No Signal - Not Dug	--------
30	Van Buren St.	891858.94	541715.22	Sewer	05/03/11	998.56	985.94	998.56	8 1/2" PVC Pipe N-S	12.62
31	Van Buren St.	891858.09	541879.72	Gas	04/30/11	997.95	--------	--------	Bluestake Marked "No Conflict" Could Not Get Signal Going North. E-W Only Not Dug	--------
32	Van Buren St.	891853.82	542714.91	Sewer	05/05/11	996.69	983.81	996.69	12" +/- PVC Pipe N-S ** Could Not Get Accurate O.D. Due to Depth	12.88
33	Van Buren St.	891851.45	542961.86	Electric/Tele	04/30/11	996.30	988.09	987.52	(4) 3 1/2" Conduits N-S Laid 10" Wide No Bluestake in Area	8.21
34	Van Buren St.	891851.07	542992.69	Gas	04/30/11	996.15	991.99	--------	4 1/2" Plastic Gas Line N-S	4.16



TESTHOLE DATA SUMMARY

PREPARED BY:
TBE Group, Inc.
2236 West Shangri-La Rd.
Phoenix, AZ 85029
(602) 749-8550

DATE: May 9, 2011
PROJECT NAME: White Tanks FRS #4
PROJECT NO: FCD 2010 C029

Cardno TBE

NOTE: The coordinate and elevation values provided below depict the actual utility location. Adjustments were made, as needed, to the surveyed request location.

All Data is English

TBE Project Number: AZ096-014-00

TH#	Street	Coordinates		Anticipated Utility	Date	Ground Elevation	Top Elevation	Bottom Elevation	Material Type, Outside Diameter and Comments	Depth of Cover
		Northing	Easting							
35	Van Buren St.	891850.78	543013.27	Sewer	05/06/11	996.12	990.92	--------	Found Concrete @ 5.20' Deep Dug Along Concrete 4.5' E & W - No Pipe Found	5.20
36	Van Buren St.	891850.48	543036.52	Water	04/30/11	996.11	991.78	--------	13" Ductile Iron Pipe N-S	4.33
37	Van Buren St.	891849.67	543098.22	Electric/Tele	04/30/11	996.03	987.89	987.00	(2) 3 1/2" & (1) 4 1/2" Conduits N-S Laid 9" Wide	8.14
38	Van Buren St.	891806.88	544017.34	Telephone	05/04/11	992.21	990.08	992.21	2" Direct Buried Cable E-W	2.13

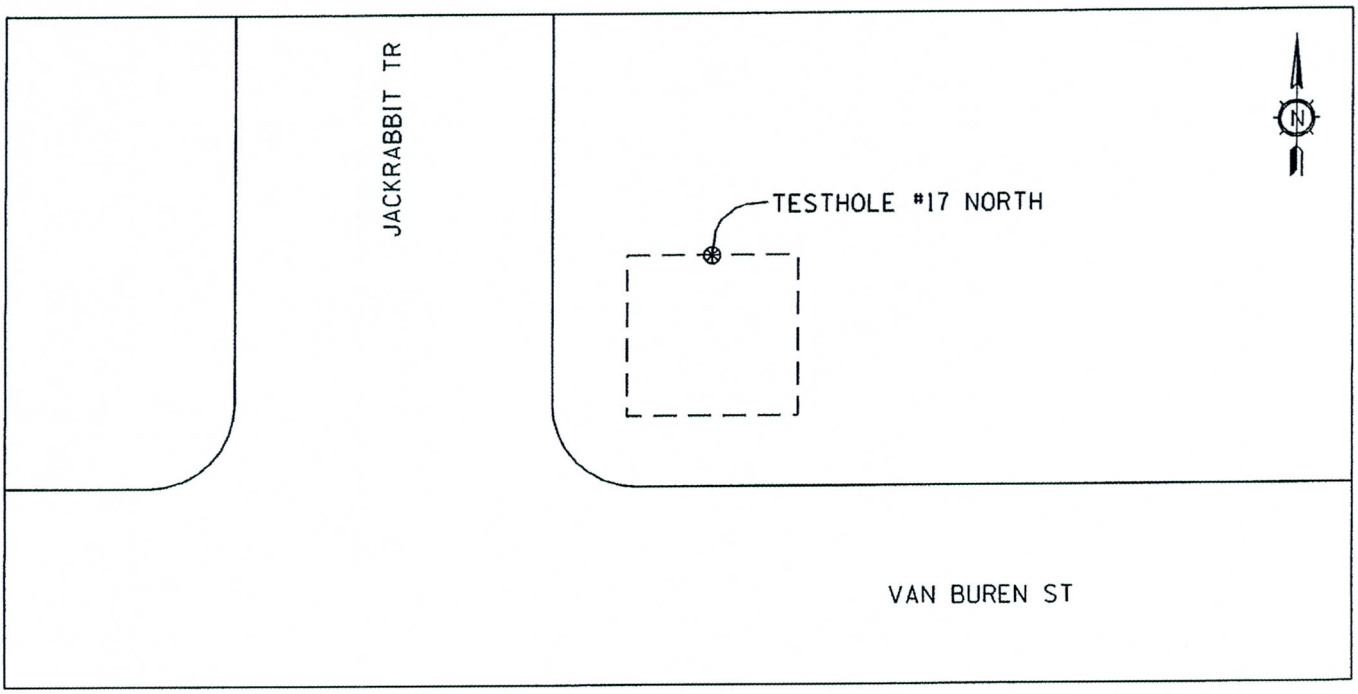
TESTHOLE DATA REPORT

TEST HOLE NO. 17 NORTH
DATE DUG 5.16.2011
CLIENT PROJECT NO. 010-2309
TBE PROJECT NO. AZ096.014.00
TBE TRUCK NO. 55.334

Cardno TBE
2236 WEST SHANGRI LA ROAD, PHOENIX, AZ85029
www.cardnotbe.com - 602.749.8550

SUE CREW JB - MM
CITY/COUNTY GOODYEAR
MARICOPA
GENERAL LOCATION INTERSECTION OF
JACKRABBIT TR & VAN BUREN ST

LOCATION PLAN - NOT TO SCALE



ALL H & V MEASURMENTS ENGLISH

COORDINATE VALUES

TESTHOLE COORDINATES

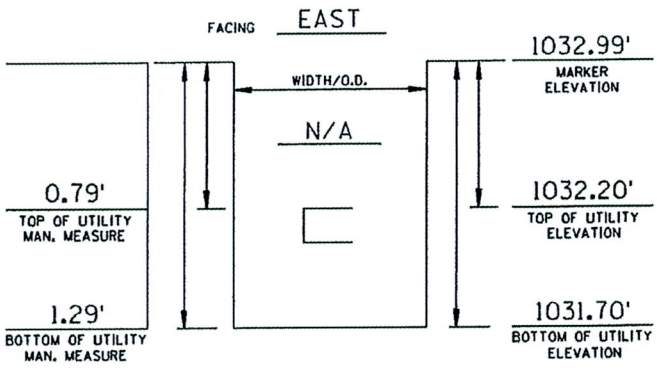
NORTHING 891988.99

EASTING 528661.98

SET AT ℄ UTILITY ___PK NAIL X STEEL PIN ___CHSLD "X" ___HUB ___OTHER

RIBBON COLOR PINK

CROSS SECTION - NOT TO SCALE



PAVING TYPE & THICKNESS OFF ROAD SOIL CONDITION MODERATE

O.D. 6" MATERIAL CONCRETE TYPE CAP

REMARKS: TESTHOLE IDENTIFIES LOCATION OF NORTH EDGE OF CONCRETE CAP AND THICKNESS

PREPARED BY: GST CHECKED BY: TSB

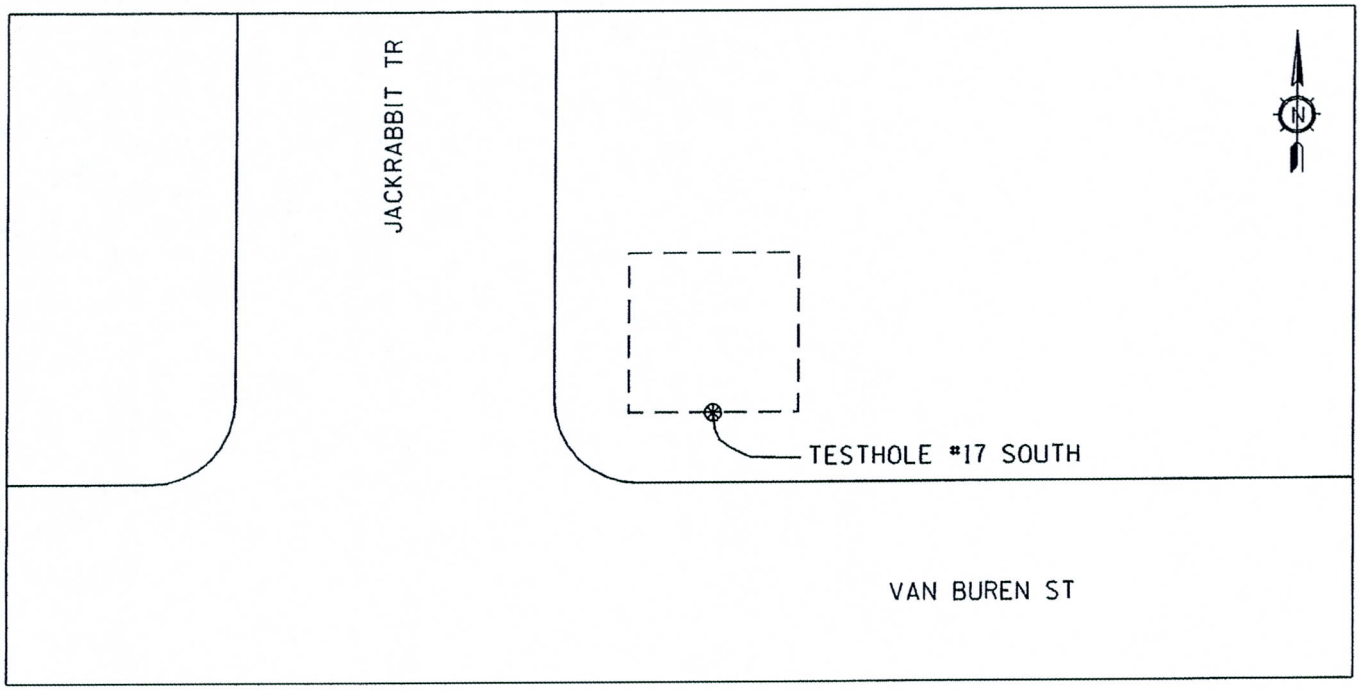
TESTHOLE DATA REPORT

TEST HOLE NO. 17 SOUTH
DATE DUG 5.16.2011
CLIENT PROJECT NO. 010-2309
TBE PROJECT NO. AZ096.014.00
TBE TRUCK NO. 55.334

Cardno TBE
2236 WEST SHANGRI LA ROAD, PHOENIX, AZ85029
www.cardnotbe.com - 602.749.8550

SUE CREW JB - MM
CITY/COUNTY GOODYEAR
MARICOPA
GENERAL LOCATION INTERSECTION OF
JACKRABBIT TR & VAN BUREN ST

LOCATION PLAN - NOT TO SCALE



ALL H & V MEASURMENTS ENGLISH

COORDINATE VALUES

TESTHOLE COORDINATES

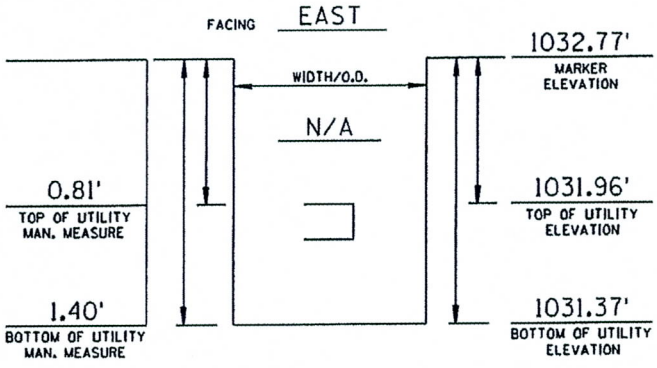
NORTHING 891965.32

EASTING 528665.84

SET AT ℄ UTILITY ___PK NAIL X STEEL PIN ___CHSLD "X" ___HUB ___OTHER

RIBBON COLOR PINK

CROSS SECTION - NOT TO SCALE



PAVING TYPE & THICKNESS OFF ROAD
SOIL CONDITION MODERATE

O.D. 7"
MATERIAL CONCRETE
TYPE CAP

REMARKS: TESTHOLE IDENTIFIES LOCATION OF SOUTH EDGE OF CONCRETE CAP AND THICKNESS

PREPARED BY: GST
CHECKED BY: TSB

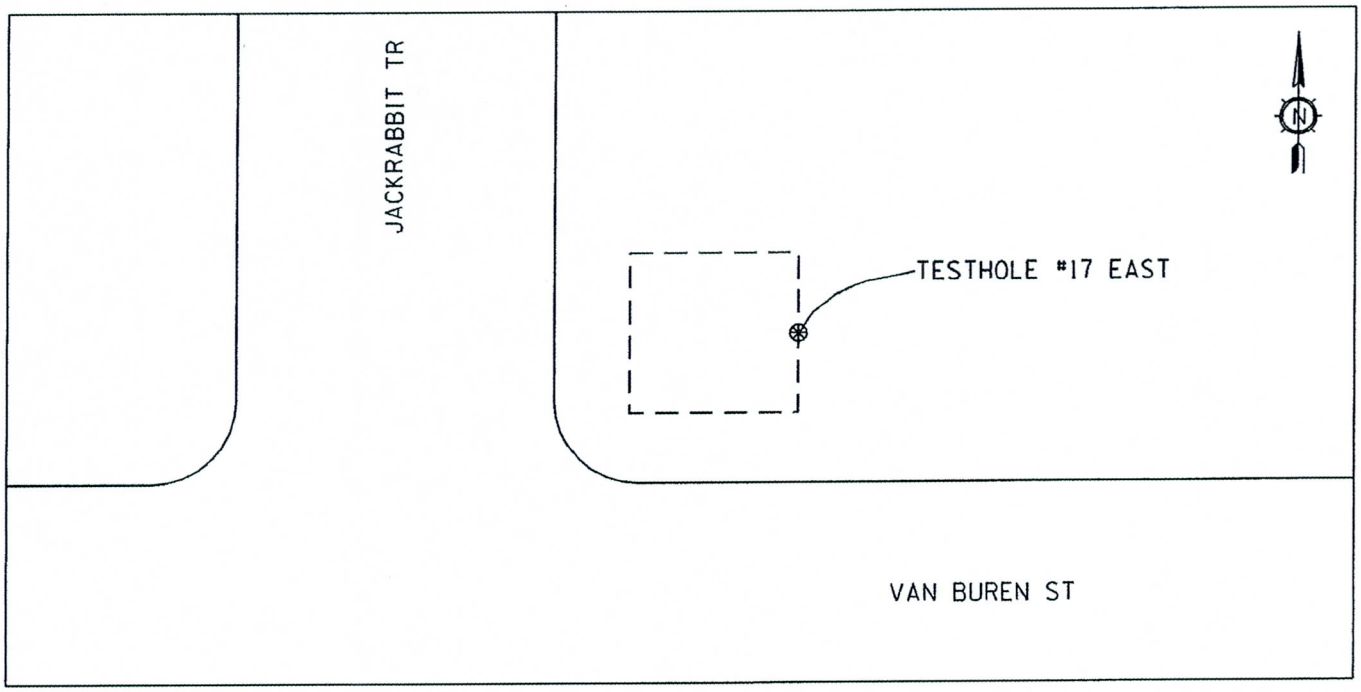
TESTHOLE DATA REPORT

TEST HOLE NO. 17 EAST
DATE DUG 5.16.2011
CLIENT PROJECT NO. 010-2309
TBE PROJECT NO. AZ096.014.00
TBE TRUCK NO. 55.334

Cardno TBE
2236 WEST SHANGRI LA ROAD, PHOENIX, AZ85029
www.cardnotbe.com - 602.749.8550

SUE CREW JB - MM
CITY/COUNTY GOODYEAR
MARICOPA
GENERAL LOCATION INTERSECTION OF
JACKRABBIT TR & VAN BUREN ST

LOCATION PLAN - NOT TO SCALE



ALL H & V MEASURMENTS ENGLISH

COORDINATE VALUES

TESTHOLE COORDINATES

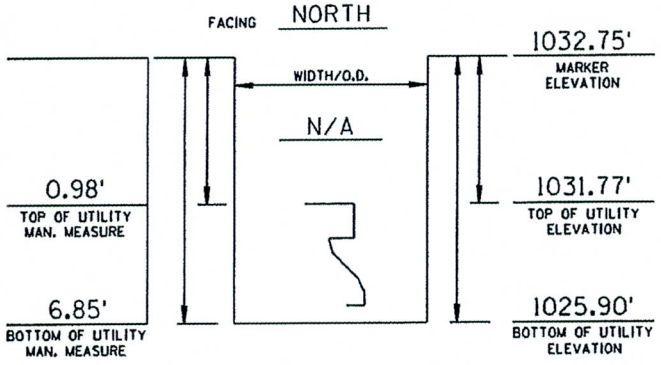
NORTHING 891980.12

EASTING 528669.68

SET AT ℄ UTILITY ___PK NAIL X STEEL PIN ___CHSLD "X"
___HUB ___OTHER

RIBBON COLOR PINK

CROSS SECTION - NOT TO SCALE



PAVING TYPE & THICKNESS OFF ROAD
SOIL CONDITION MODERATE

O.D. 70½"
MATERIAL CONCRETE
TYPE CAP/POUR

REMARKS: TESTHOLE IDENTIFIES LOCATION OF EAST EDGE OF CONCRETE CAP AND THICKNESS - BOTTOM OF FIRST LIP= 1.56' (ELEVATION=1031.44')

PREPARED BY: GST
CHECKED BY: TSB

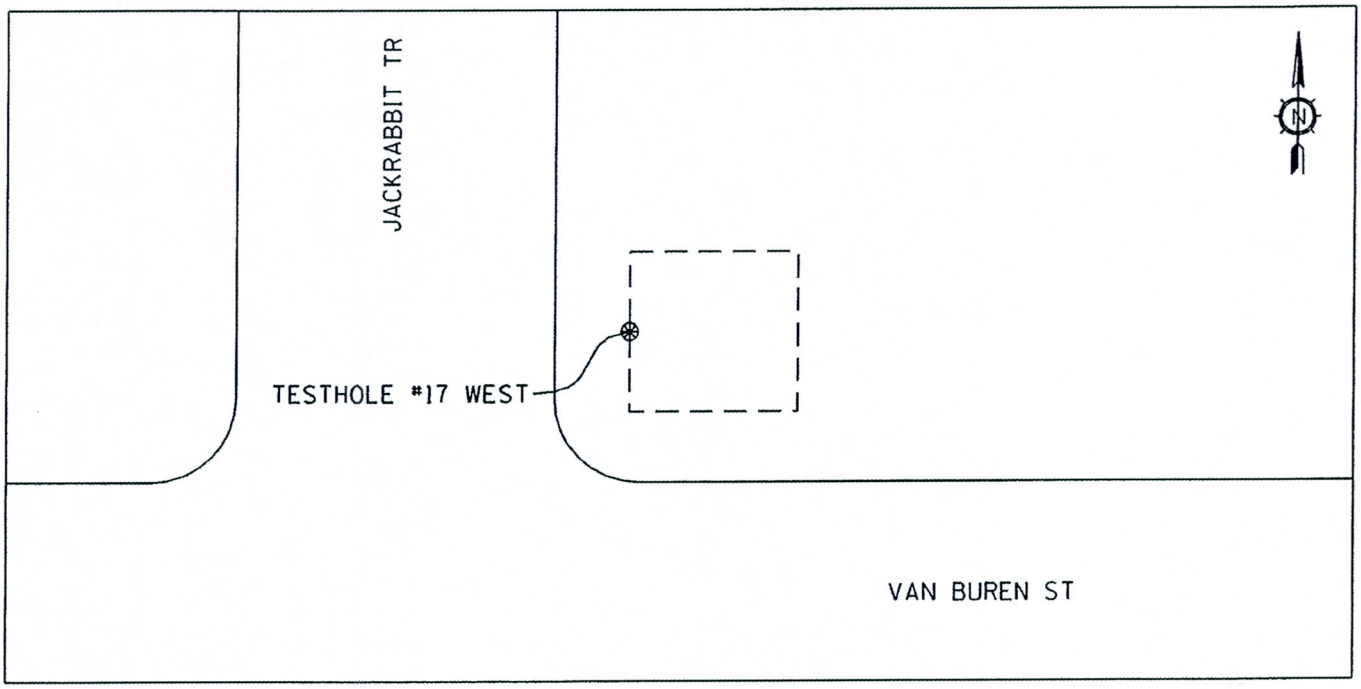
TESTHOLE DATA REPORT

TEST HOLE NO. 17 WEST
DATE DUG 5.16.2011
CLIENT PROJECT NO. 010-2309
TBE PROJECT NO. AZ096.014.00
TBE TRUCK NO. 55.334

Cardno TBE
2236 WEST SHANGRI LA ROAD, PHOENIX, AZ85029
www.cardnotbe.com - 602.749.8550

SUE CREW JB - MM
CITY/COUNTY GOODYEAR
MARICOPA
GENERAL LOCATION INTERSECTION OF
JACKRABBIT TR & VAN BUREN ST

LOCATION PLAN - NOT TO SCALE



ALL H & V MEASURMENTS ENGLISH

COORDINATE VALUES

TESTHOLE COORDINATES

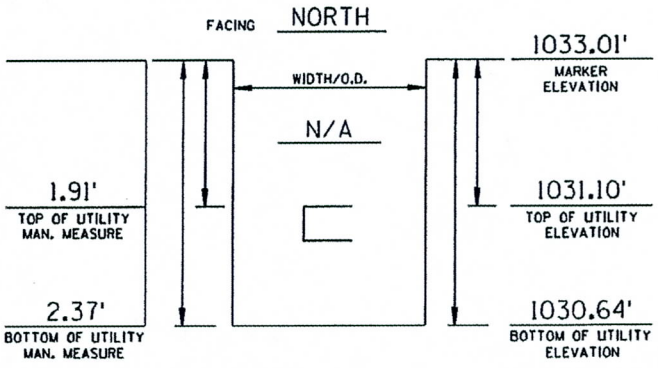
NORTHING 891980.12

EASTING 528655.12

SET AT ℄ UTILITY ___PK NAIL X STEEL PIN ___CHSLD "X" ___HUB ___OTHER

RIBBON COLOR PINK

CROSS SECTION - NOT TO SCALE



PAVING TYPE & THICKNESS OFF ROAD SOIL CONDITION MODERATE

O.D. 5½" MATERIAL CONCRETE TYPE CAP

REMARKS: TESTHOLE IDENTIFIES LOCATION OF WEST EDGE OF CONCRETE CAP AND THICKNESS

PREPARED BY: GST CHECKED BY: TSB

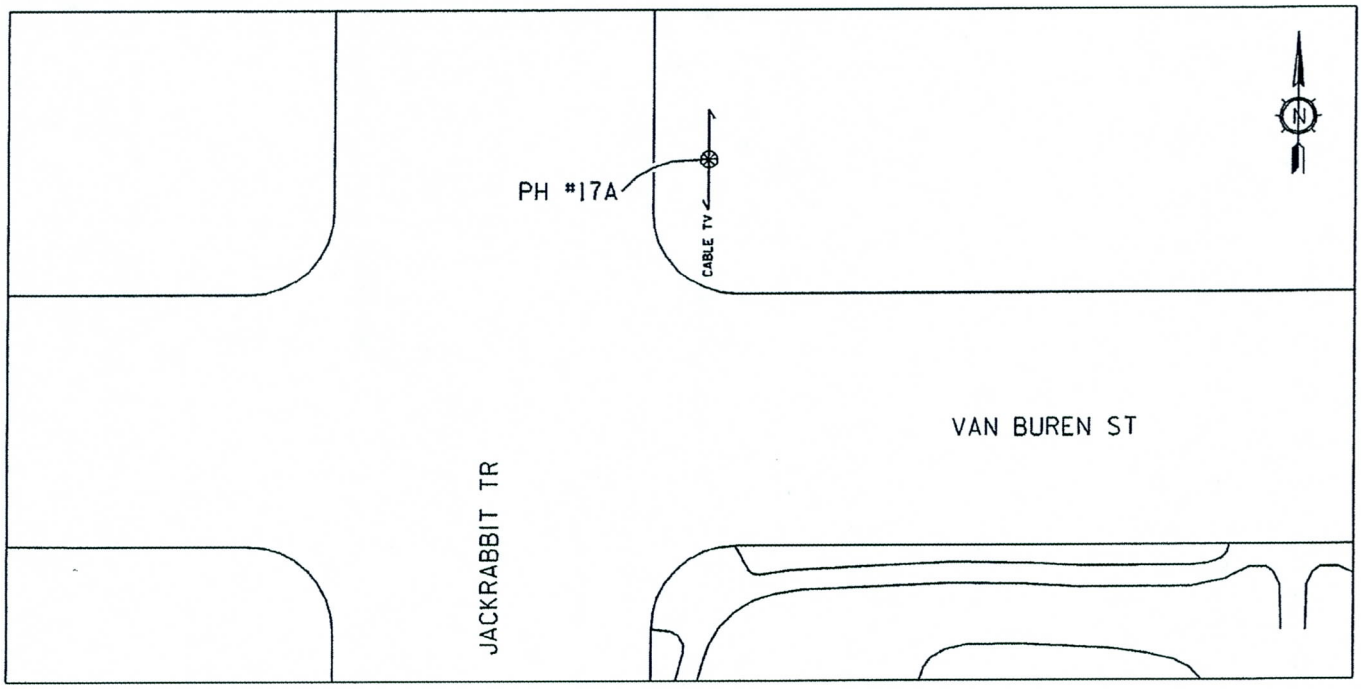
TESTHOLE DATA REPORT

TEST HOLE NO. 17A
DATE DUG 5.16.2011
CLIENT PROJECT NO. 010-2309
TBE PROJECT NO. AZ096.014.00
TBE TRUCK NO. 55.334

Cardno TBE
2236 WEST SHANGRI LA ROAD, PHOENIX, AZ85029
www.cardnotbe.com - 602.749.8550

SUE CREW JB - MM
CITY/COUNTY GOODYEAR
MARICOPA
GENERAL LOCATION INTERSECTION OF
JACKRABBIT TR & VAN BUREN ST

LOCATION PLAN - NOT TO SCALE



ALL H & V MEASURMENTS ENGLISH

COORDINATE VALUES

TESTHOLE COORDINATES

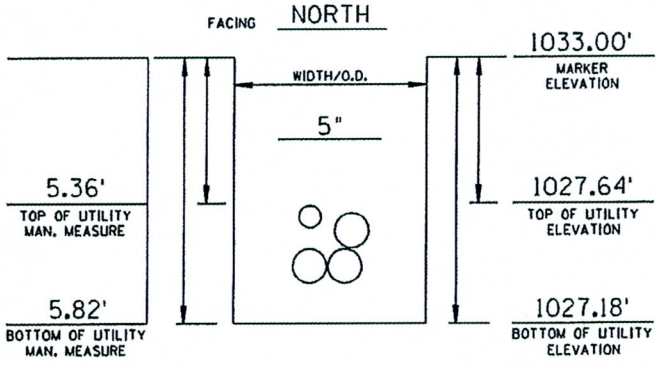
NORTHING 891980.12

EASTING 528655.96

SET AT ℄ UTILITY ___PK NAIL X STEEL PIN ___CHSLD "X" ___HUB ___OTHER

RIBBON COLOR ORANGE

CROSS SECTION - NOT TO SCALE



PAVING TYPE & THICKNESS OFF ROAD SOIL CONDITION MODERATE

O.D. 2" & (3)¾" MATERIAL PLASTIC CONDUITS TYPE CABLE TV

REMARKS:

PREPARED BY: GST CHECKED BY: TSB

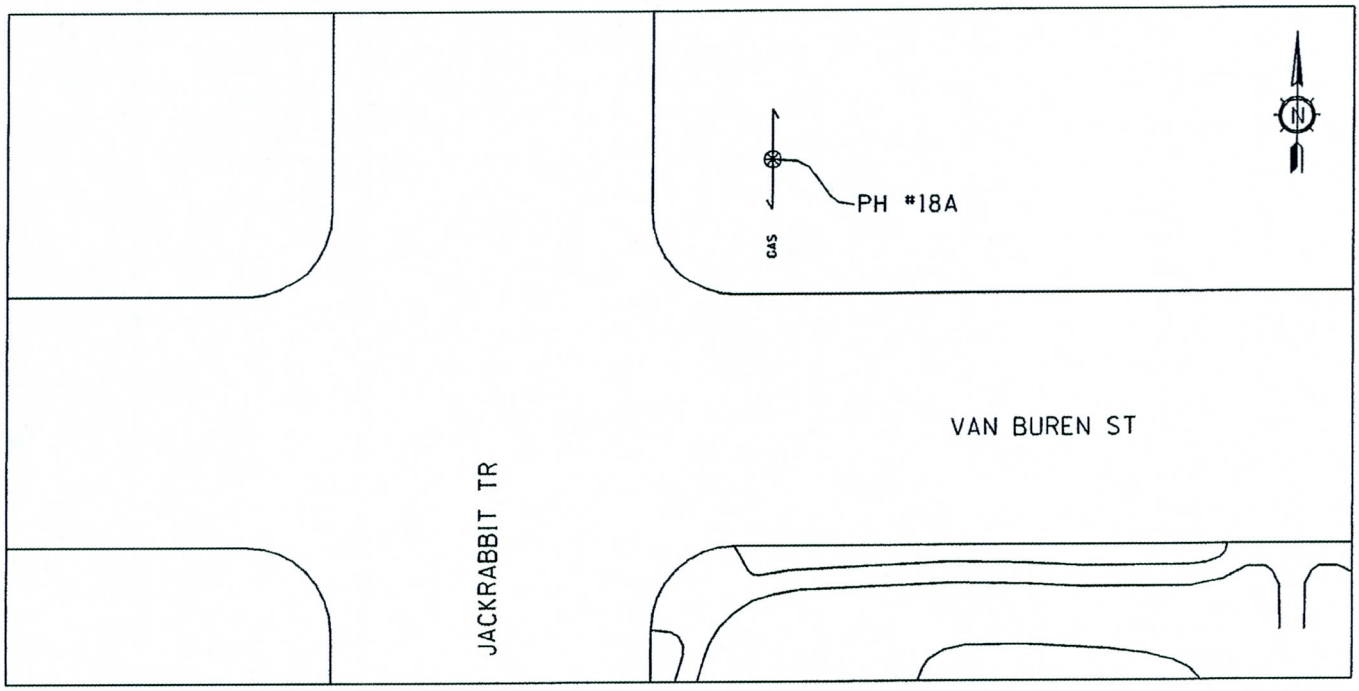
TESTHOLE DATA REPORT

TEST HOLE NO. 18A
DATE DUG 5.16.2011
CLIENT PROJECT NO. 010-2309
TBE PROJECT NO. AZ096.014.00
TBE TRUCK NO. 55.334

Cardno TBE
2236 WEST SHANGRI LA ROAD, PHOENIX, AZ85029
www.cardnotbe.com - 602.749.8550

SUE CREW JB - MM
CITY/COUNTY GOODYEAR
MARICOPA
GENERAL LOCATION INTERSECTION OF
JACKRABBIT TR & VAN BUREN ST

LOCATION PLAN - NOT TO SCALE



ALL H & V MEASURMENTS ENGLISH

COORDINATE VALUES

TESTHOLE COORDINATES

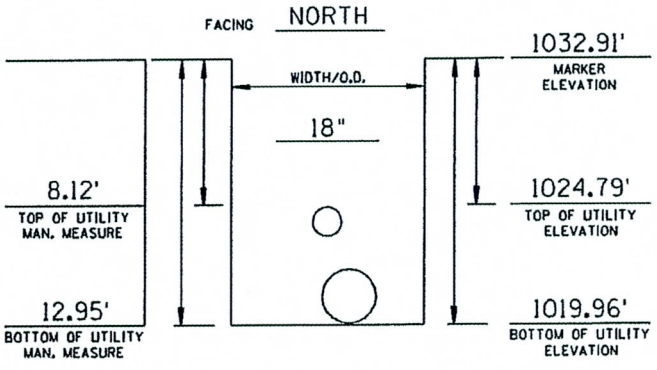
NORTHING 891975.00

EASTING 528664.16

SET AT ℄ UTILITY ___PK NAIL X STEEL PIN ___CHSLD "X" ___HUB ___OTHER

RIBBON COLOR YELLOW

CROSS SECTION - NOT TO SCALE



PAVING TYPE & THICKNESS OFF ROAD
SOIL CONDITION MODERATE

O.D. 4½" - 12½"
MATERIAL PLASTIC - STEEL
TYPE GAS

REMARKS: 4½" PLASTIC PIPE & 12½" STEEL PIPE

PREPARED BY: GST
CHECKED BY: TSB

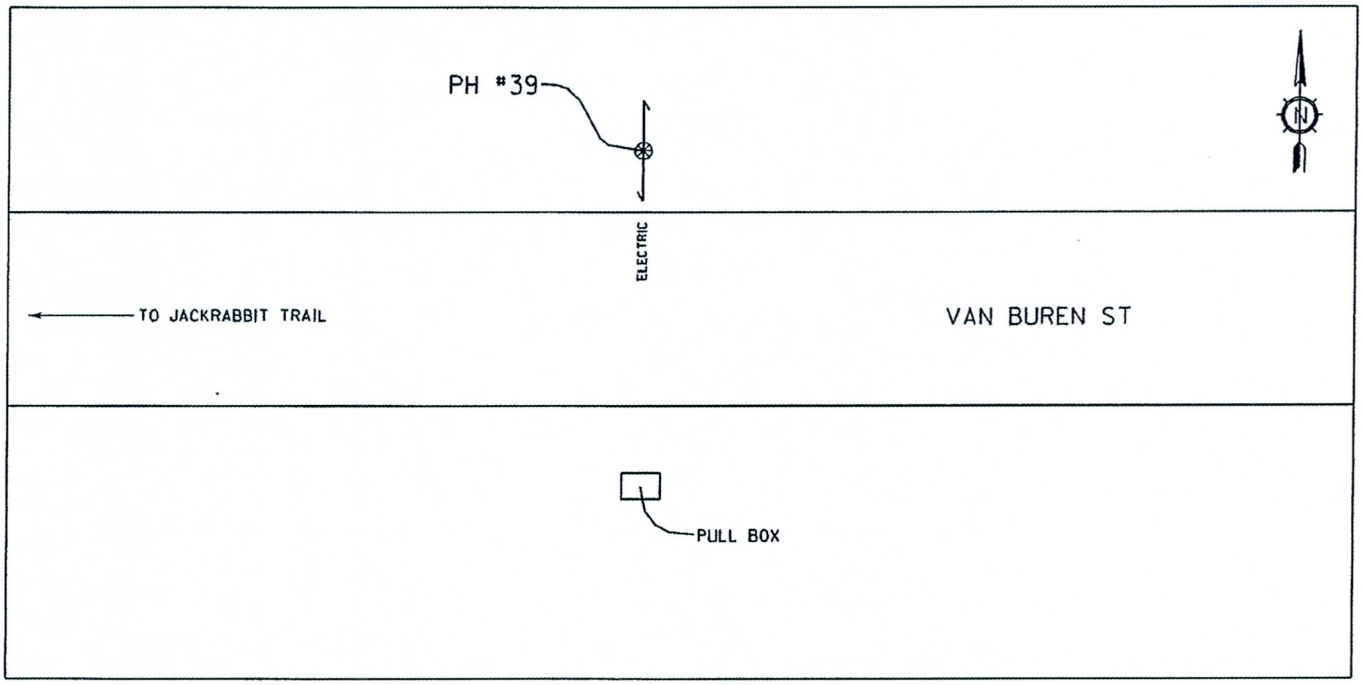
TESTHOLE DATA REPORT

TEST HOLE NO. 39
DATE DUG 5.16.2011
CLIENT PROJECT NO. 010-2309
TBE PROJECT NO. AZ096.014.00
TBE TRUCK NO. 55.334

Cardno TBE
2236 WEST SHANGRI LA ROAD, PHOENIX, AZ85029
www.cardnotbe.com - 602.749.8550

SUE CREW JB - MM
CITY/COUNTY GOODYEAR
MARICOPA
GENERAL LOCATION VAN BUREN ST
EAST OF JACKRABBIT TRAIL

LOCATION PLAN - NOT TO SCALE



ALL H & V MEASURMENTS ENGLISH

COORDINATE VALUES

TESTHOLE COORDINATES

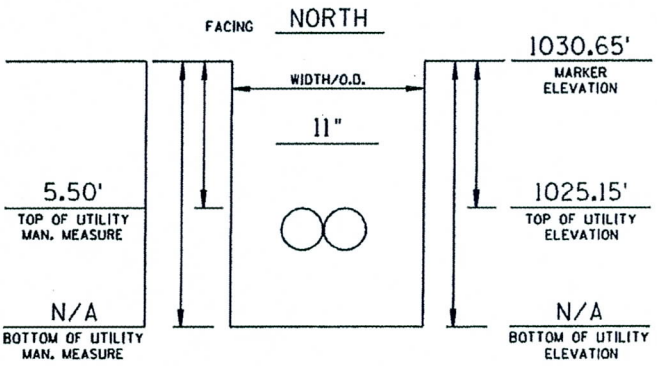
NORTHING 891972.84

EASTING 528843.61

SET AT ℄ UTILITY ___PK NAIL X STEEL PIN ___CHSLD "X"
___HUB ___OTHER

RIBBON COLOR RED

CROSS SECTION - NOT TO SCALE



PAVING TYPE & THICKNESS OFF ROAD SOIL CONDITION MODERATE

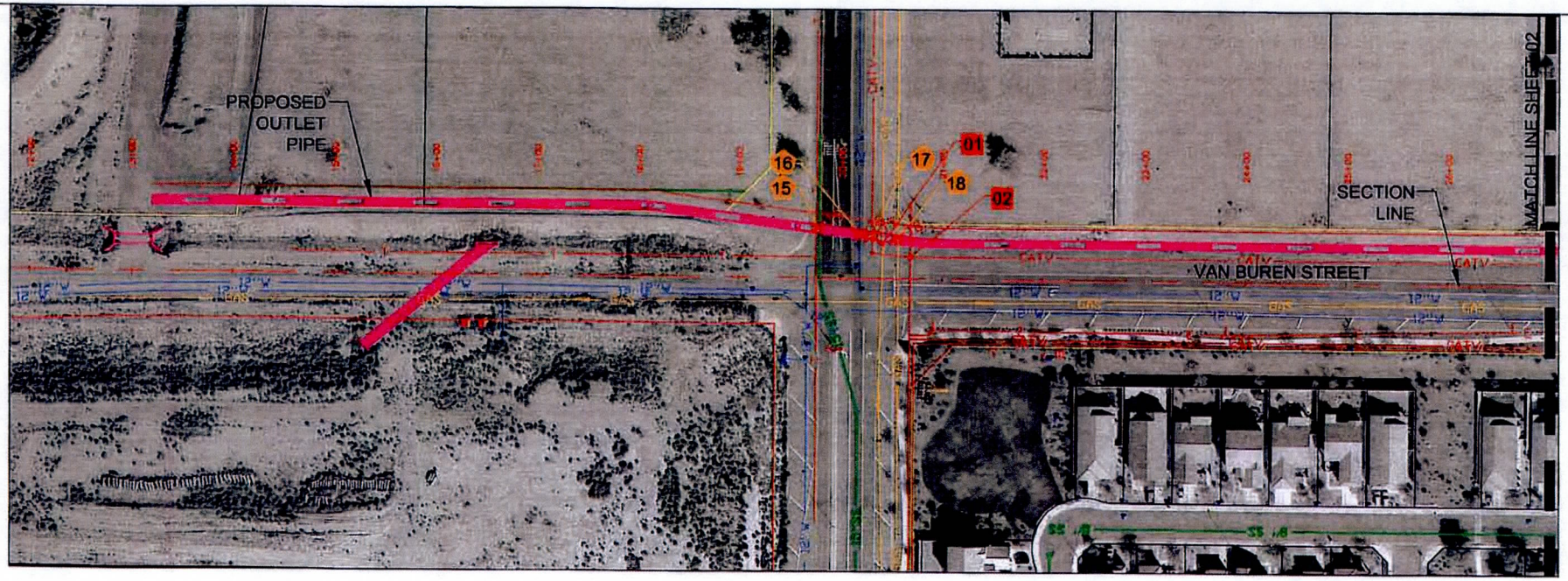
O.D. (2) 5½" MATERIAL PLASTIC CONDUITS TYPE ELECTRIC

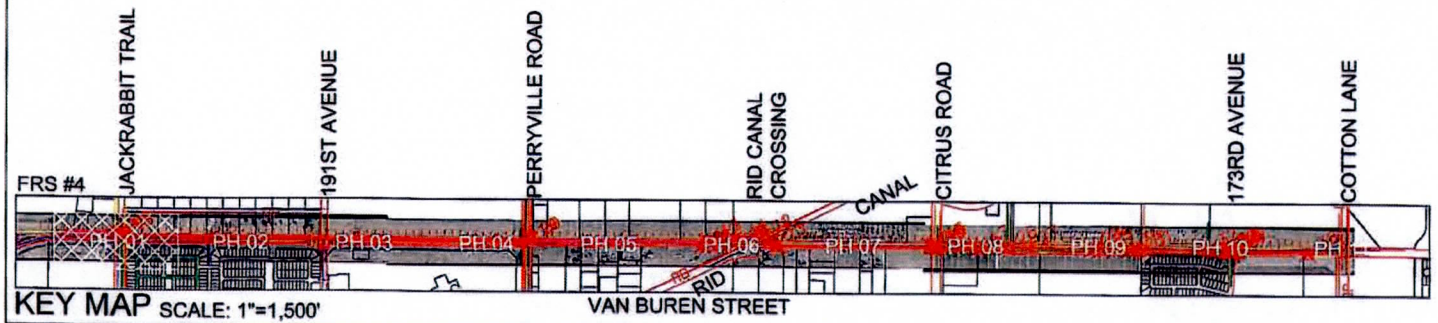
REMARKS:

PREPARED BY: GST CHECKED BY: TSB

WHITE TANKS FRS#4
VAN BUREN STREET
JACKRABBIT TRAIL TO COTTON LANE
FCD PROJECT NO. 2010 C029
POTHOLE REQUEST

PH#	Coordinates		Anticipated Utility	Comments	Plan Sheet No.
	Northing	Easting			
15	891987.3231	528602.2719	Qwest Local Networks		PH 01
16	891981.7963	528644.2519	AZ Water Company	12-inch DIP Water Main	PH 01
17	891980.1136	528657.0338	Cox Communications	Fiber Optic	PH 01
18	891976.9559	528681.0191	Southwest Gas	4-inch PE natural gas line	PH 01
19	891943.8076	533924.6204	Qwest Local Networks	2 Qwest Local Network Lines	PH 05
20	891943.7848	533928.2806	Southwest Gas	2-inch Steel natural gas line	PH 05
21	891990.9723	536928.1228	AT&T	(Five) 2-inch plastic conduits, Phoenix to Buckeye Lines	PH 07
22	891995.0154	536925.981	Qwest Local Networks		PH 07
23	891883.3292	537105.7891	Qwest Local Networks		PH 07
24	891871.9775	539144.3945	Qwest Local Networks	2 Qwest Local Network Lines	PH 08
25	891871.7551	539184.3373	Southwest Gas	1-1/4-inch Steel Natural Gas	PH 08
26	891867.0853	540107.3527	City of Goodyear	18-inch PVC Sanitary Sewer	PH 09
27	891865.6859	540384.3344	Southwest Gas		PH 09
28	891861.5267	541207.5571	Southwest Gas		PH 09
29	891860.8656	541338.3987	Qwest Local Networks		PH 10
30	891858.9572	541716.1286	City of Goodyear	8-inch PVC Sanitary Sewer	PH 10
31	891858.1246	541879.7291	Southwest Gas		PH 10
32	891853.7655	542716.6213	City of Goodyear	12-inch PVC Sanitary Sewer	PH 10
33	891851.4316	542961.8474	Conduit Duct Bank	COG Traffic, Qwest, APS Electric	PH 11
34	891851.0528	542991.4766	Southwest Gas		PH 11
35	891850.7743	543013.2635	City of Goodyear	18-inch PVC Sanitary Sewer	
36	891850.4685	543037.1772	City of Goodyear	12-inch DIP Water Main	
37	891849.6878	543098.2419	Conduit Duct Bank	COG Traffic, Qwest, APS Electric	
38	891819.7545	544017.3248	Qwest Local Networks		





KEY MAP SCALE: 1"=1,500'

LEGEND

PROPOSED POTHOLE SYMBOL — 15

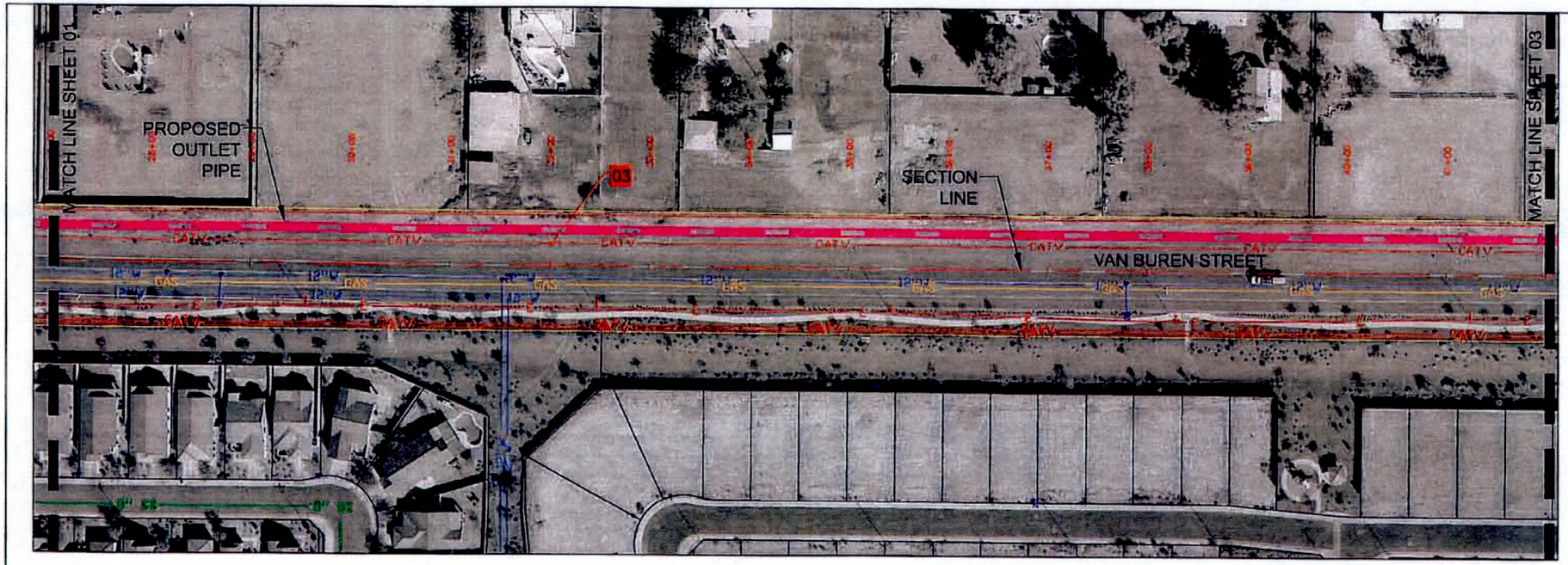
PREVIOUSLY COMPLETED POTHOLE SYMBOL — 01

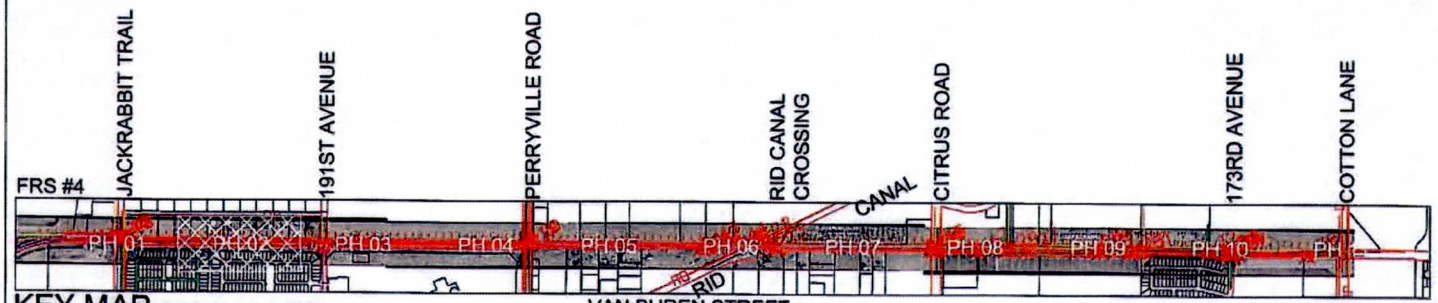
0 50 100 200

SCALE IN FEET

N

PROJECT NO: 010-2309 DRAWN BY: SRW DATE: 03-23-2011	WHITE TANKS FRS #4 OUTLET FACILITY FCD 2010 C029	POTHOLE REQUEST MAP VAN BUREN STREET	OLSSON ASSOCIATES	Figure PH 01





KEY MAP SCALE: 1"=1,500'

LEGEND

PROPOSED POTHOLE SYMBOL — 15

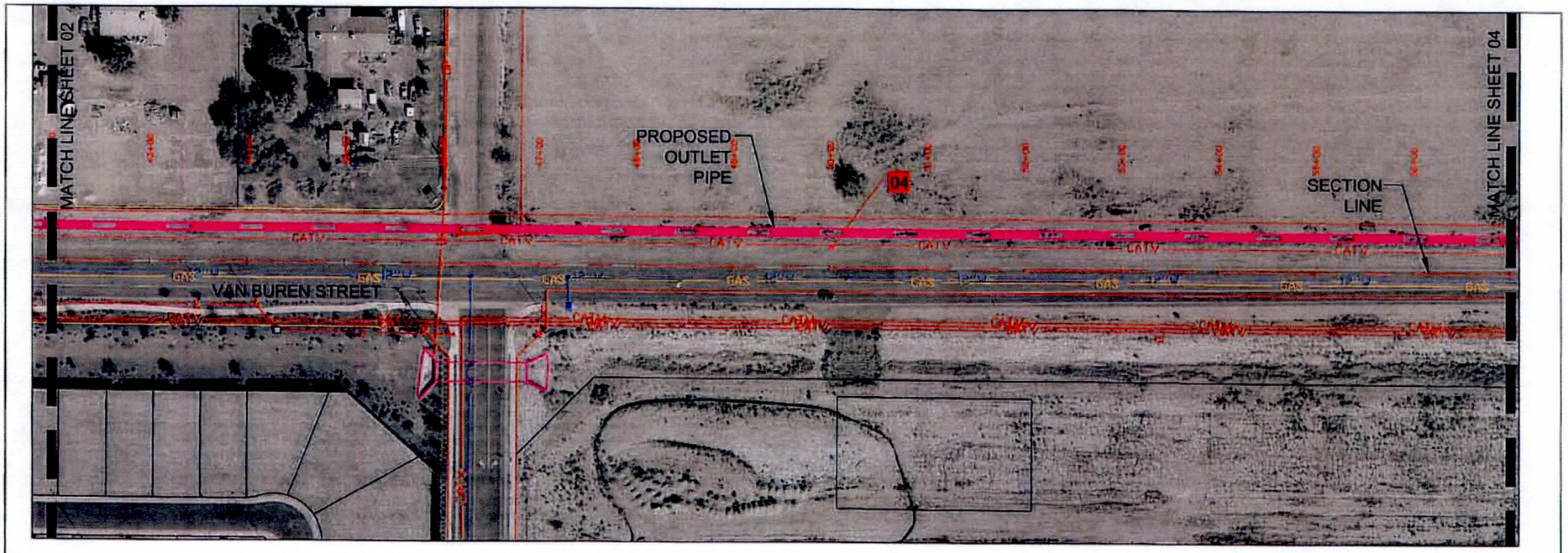
PREVIOUSLY COMPLETED POTHOLE SYMBOL — 01

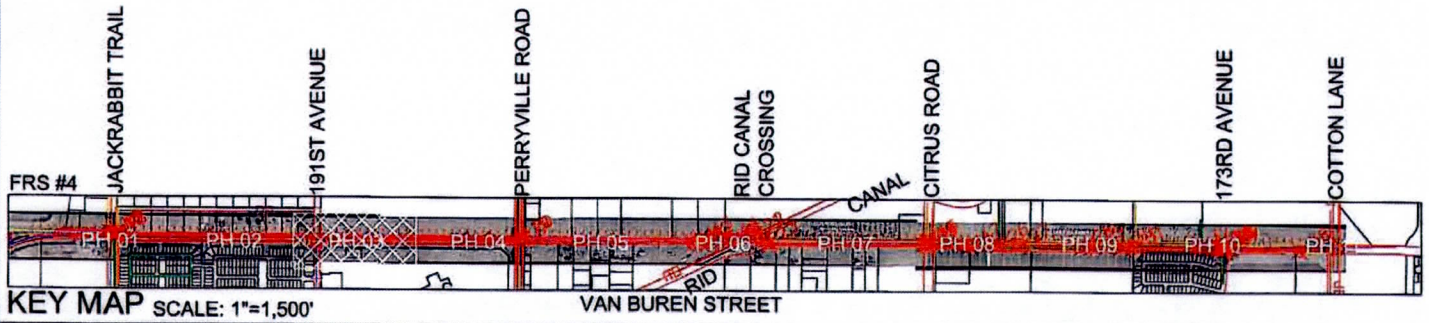
0 50 100 200

SCALE IN FEET

N

PROJECT NO: 010-2309 DRAWN BY: SRW DATE: 03-23-2011	WHITE TANKS FRS #4 OUTLET FACILITY FCD 2010 C029	POTHOLE REQUEST MAP VAN BUREN STREET	OLSSON ASSOCIATES	Figure PH 02





KEY MAP SCALE: 1"=1,500'

LEGEND

PROPOSED POTHOLE SYMBOL 15

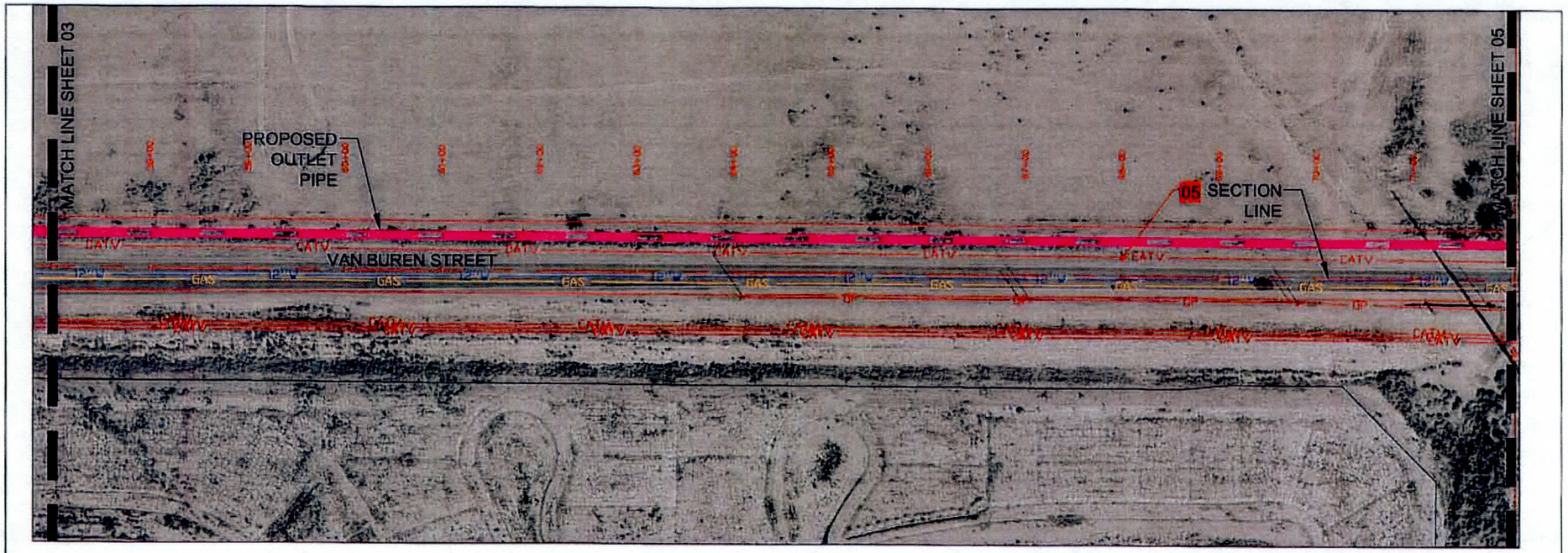
PREVIOUSLY COMPLETED POTHOLE SYMBOL 01

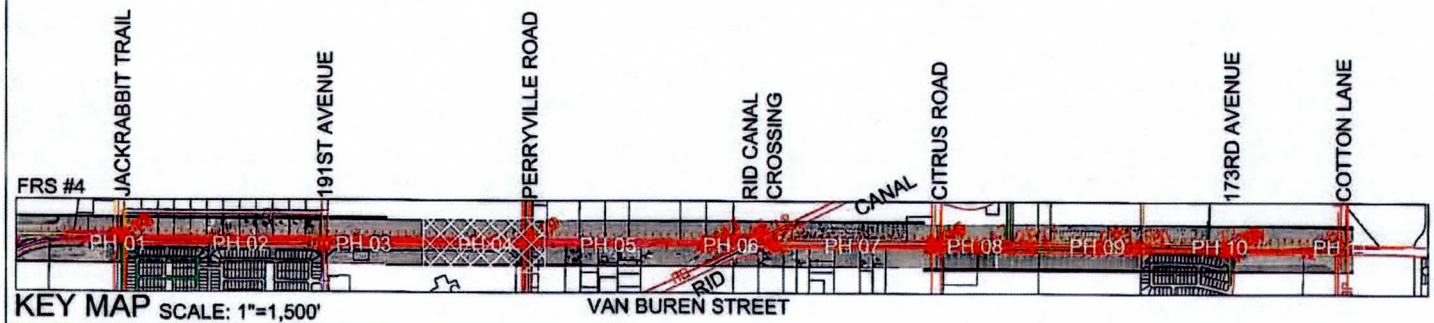
0 50 100 200

SCALE IN FEET

N

PROJECT NO: 010-2309 DRAWN BY: SRW DATE: 03-23-2011	WHITE TANKS FRS #4 OUTLET FACILITY FCD 2010 C029	POTHOLE REQUEST MAP VAN BUREN STREET	OLSSON ASSOCIATES	Figure PH 03





KEY MAP SCALE: 1"=1,500'

LEGEND

PROPOSED POTHOLE SYMBOL — 15

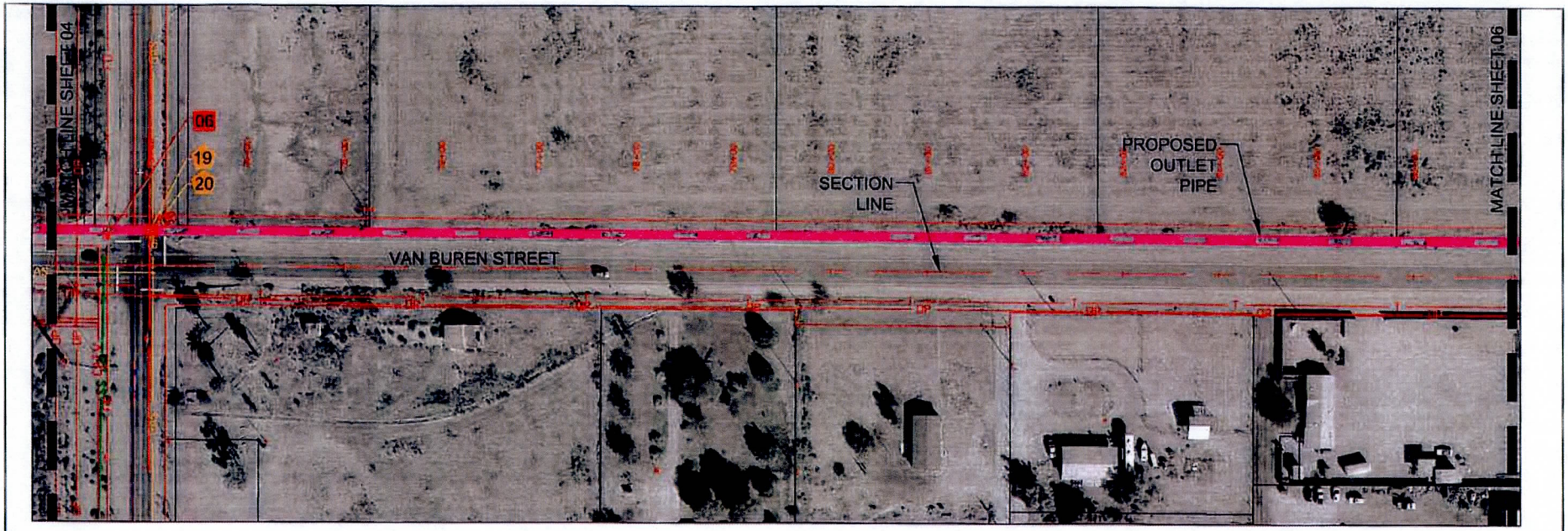
PREVIOUSLY COMPLETED POTHOLE SYMBOL — 01

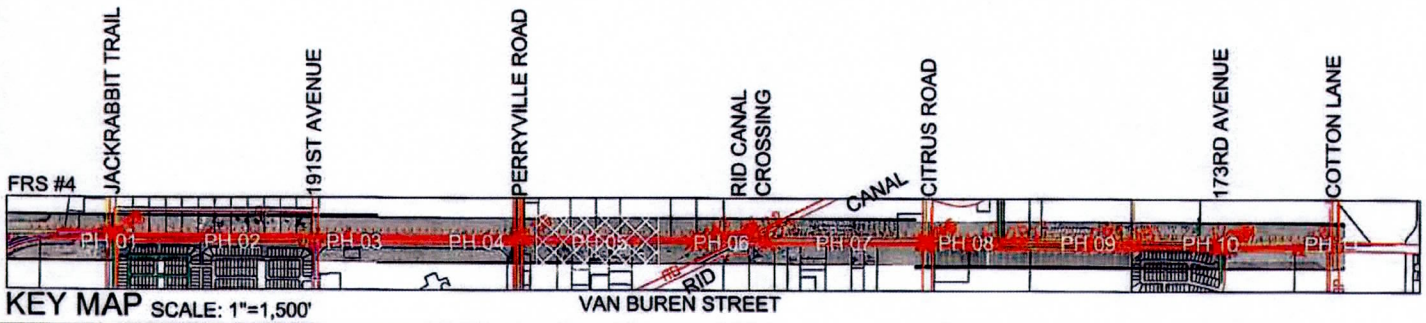
0 50 100 200

SCALE IN FEET

N

PROJECT NO: 010-2309 DRAWN BY: SRW DATE: 03-23-2011	WHITE TANKS FRS #4 OUTLET FACILITY FCD 2010 C029	POTHOLE REQUEST MAP VAN BUREN STREET	OLSSON ASSOCIATES	Figure PH 04





KEY MAP SCALE: 1"=1,500'

LEGEND

PROPOSED POTHOLE SYMBOL — 15

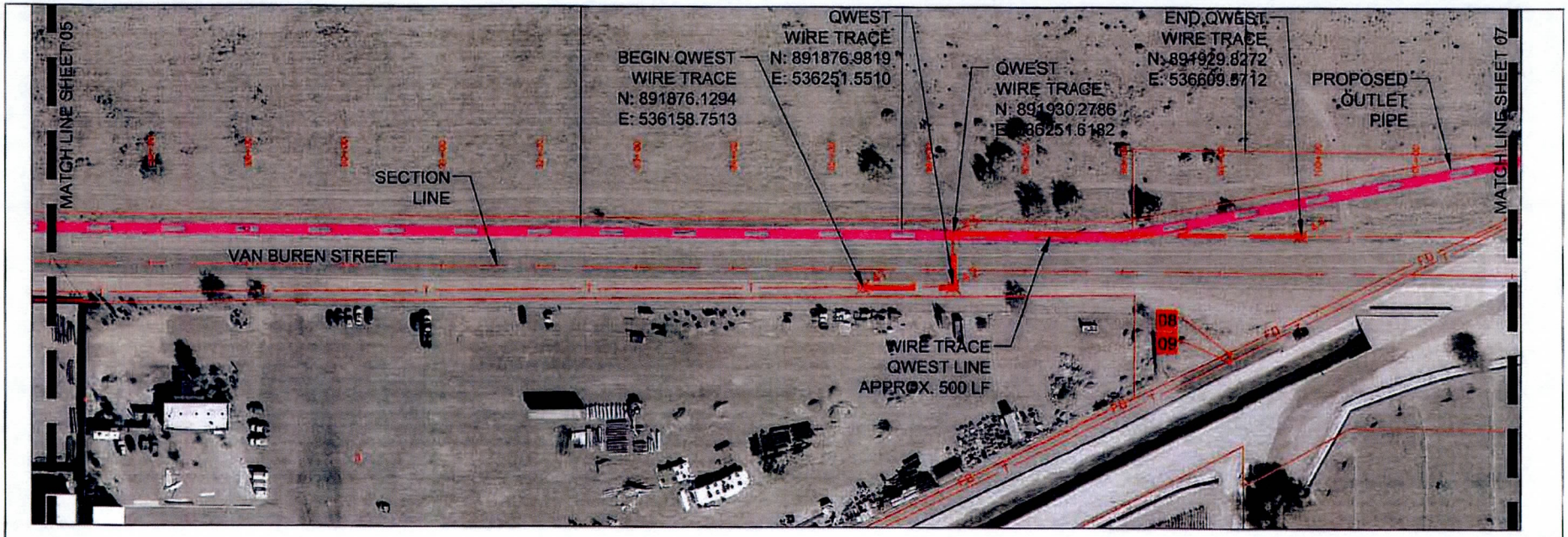
PREVIOUSLY COMPLETED POTHOLE SYMBOL — 01

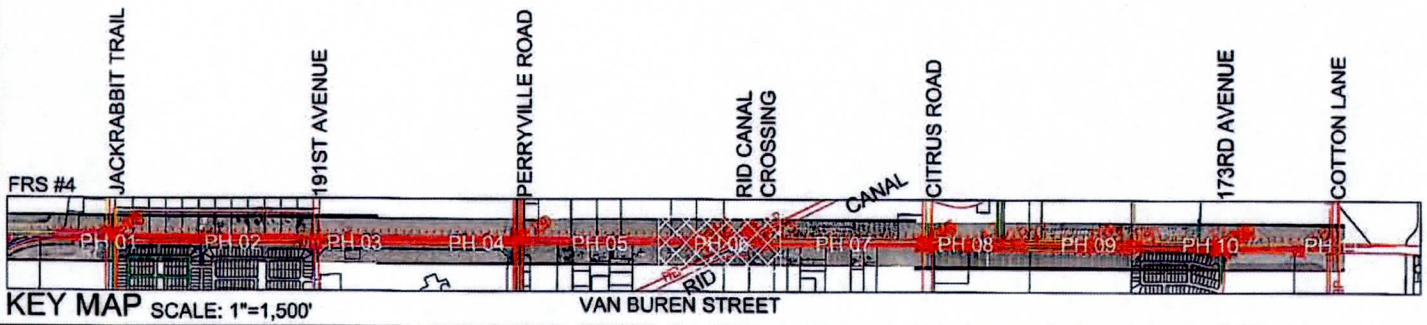
0 50 100 200

SCALE IN FEET

N

PROJECT NO: 010-2309 DRAWN BY: SRW DATE: 03-23-2011	WHITE TANKS FRS #4 OUTLET FACILITY FCD 2010 C029	POTHOLE REQUEST MAP VAN BUREN STREET	OLSSON ASSOCIATES	Figure PH 05





KEY MAP SCALE: 1"=1,500'

LEGEND

PROPOSED POTHOLE SYMBOL — 15

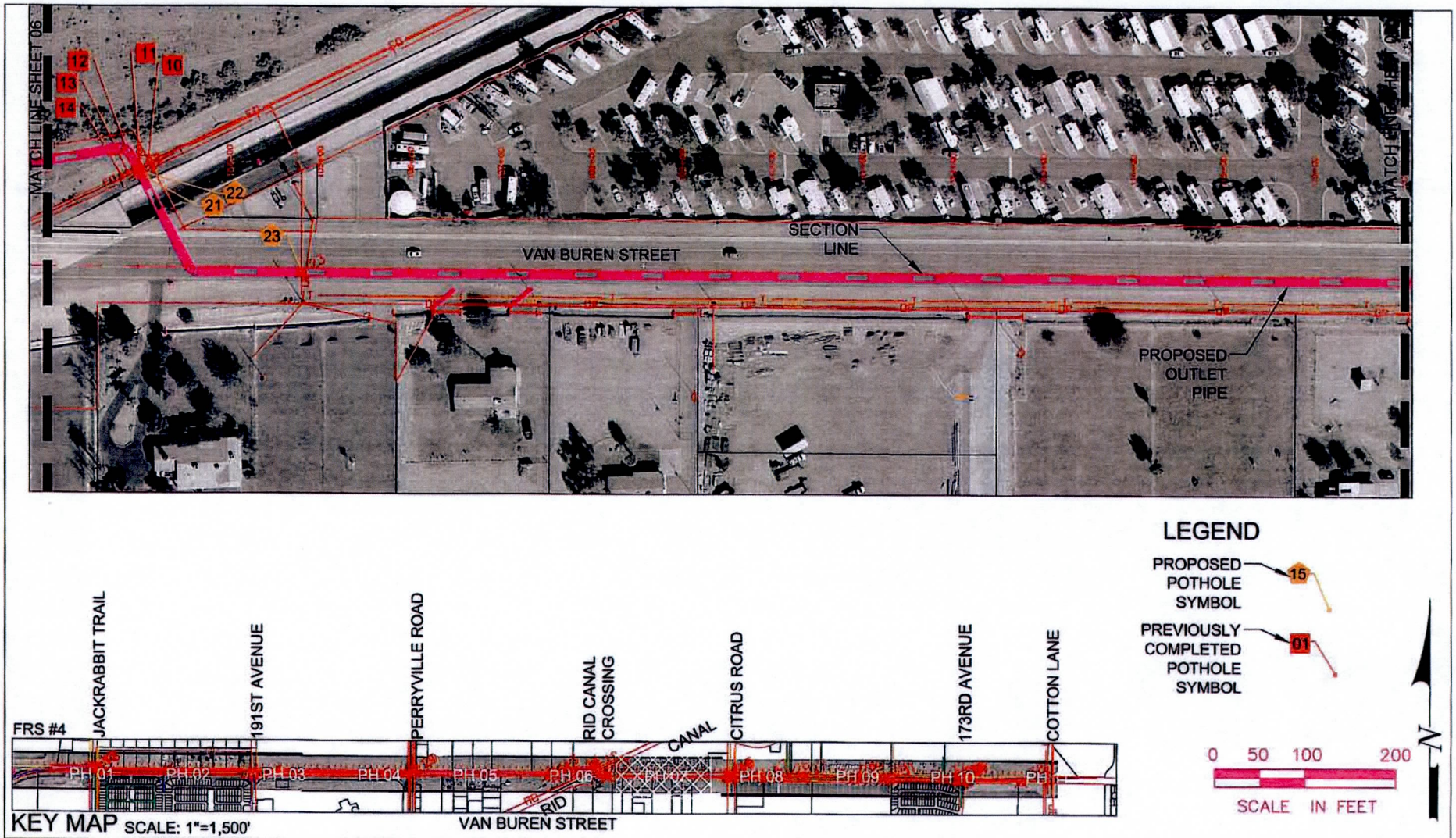
PREVIOUSLY COMPLETED POTHOLE SYMBOL — 01

0 50 100 200

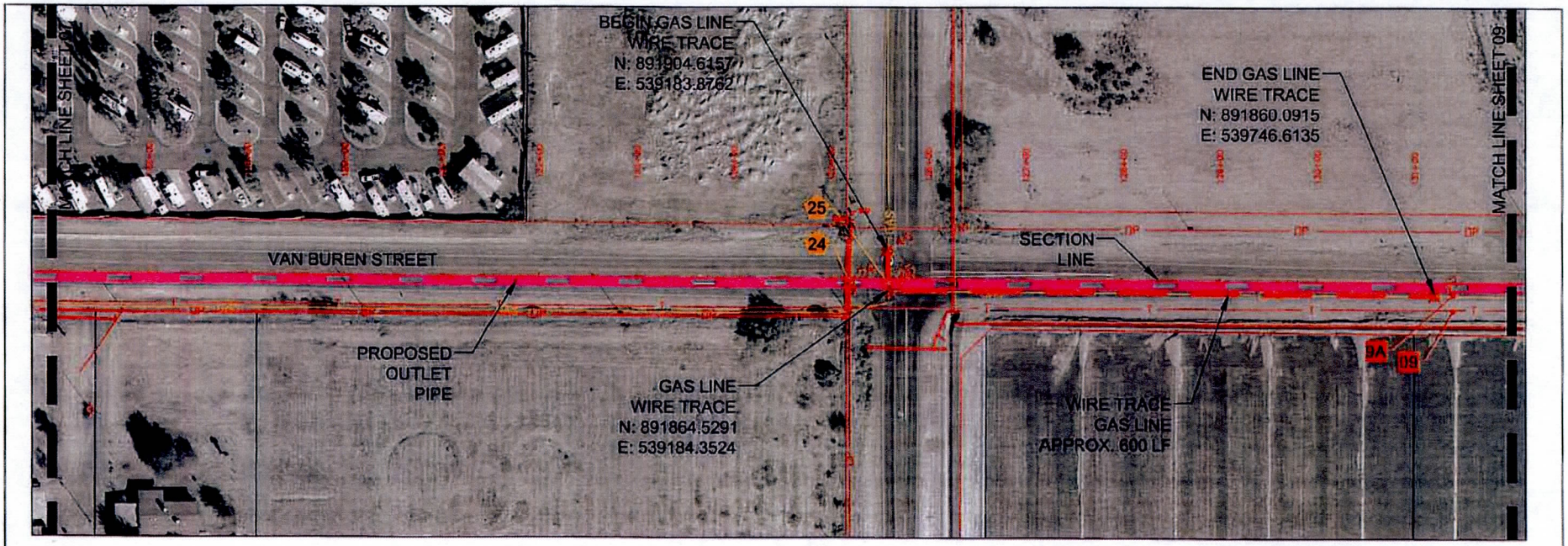
SCALE IN FEET

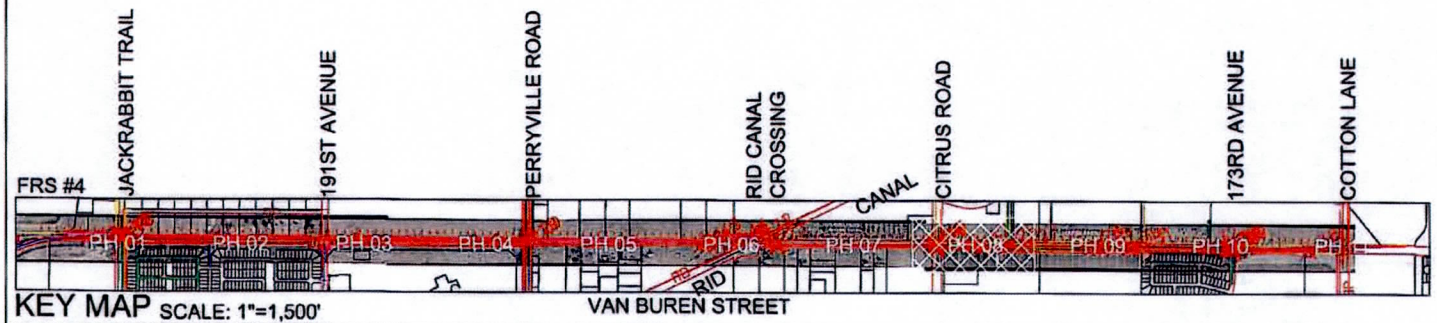
N

PROJECT NO: 010-2309 DRAWN BY: SRW DATE: 03-23-2011	WHITE TANKS FRS #4 OUTLET FACILITY FCD 2010 C029	POTHOLE REQUEST MAP VAN BUREN STREET	OLSSON ASSOCIATES	Figure PH 06



PROJECT NO: 010-2309 DRAWN BY: SRW DATE: 03-23-2011	WHITE TANKS FRS #4 OUTLET FACILITY FCD 2010 C029	POTHOLE REQUEST MAP VAN BUREN STREET	OLSSON ASSOCIATES	Figure PH 07





KEY MAP SCALE: 1"=1,500'

LEGEND

PROPOSED POTHOLE SYMBOL — 15

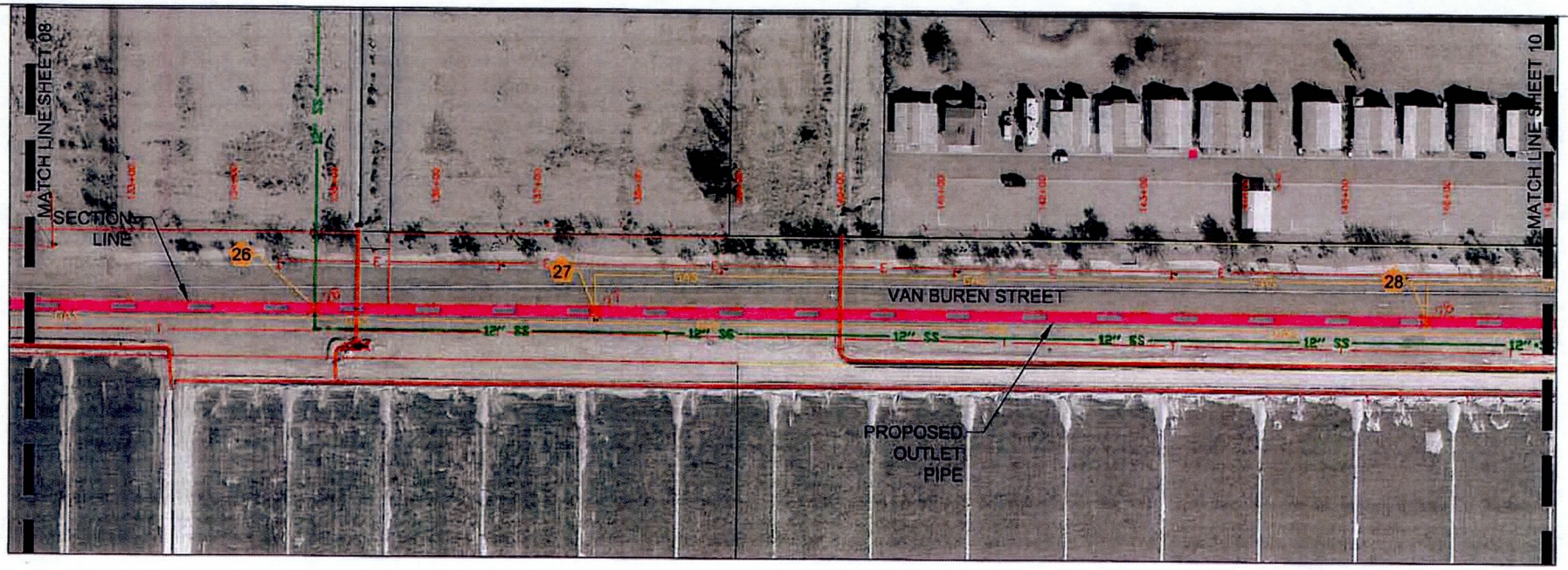
PREVIOUSLY COMPLETED POTHOLE SYMBOL — 01

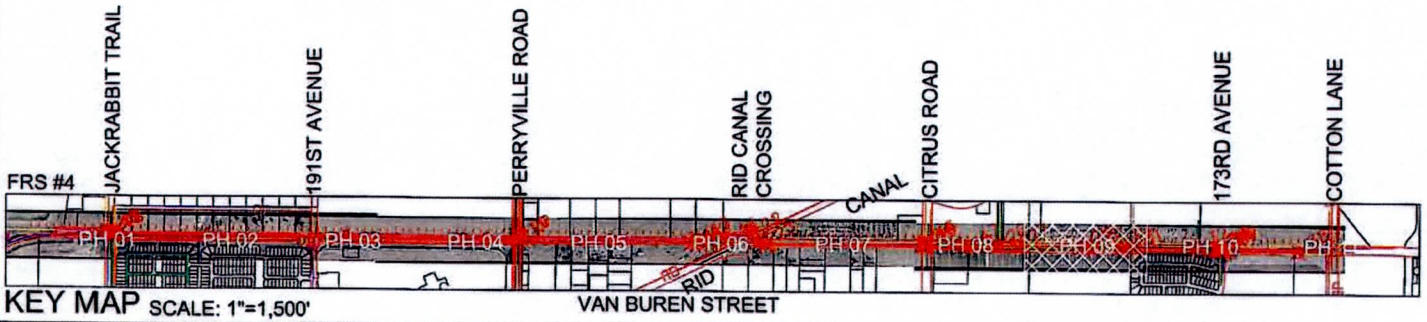
0 50 100 200

SCALE IN FEET

N

PROJECT NO: 010-2309 DRAWN BY: SRW DATE: 03-23-2011	WHITE TANKS FRS #4 OUTLET FACILITY FCD 2010 C029	POTHOLE REQUEST MAP VAN BUREN STREET	OLSSON ASSOCIATES	Figure PH 08





KEY MAP SCALE: 1"=1,500'

LEGEND

PROPOSED POTHOLE SYMBOL — 15

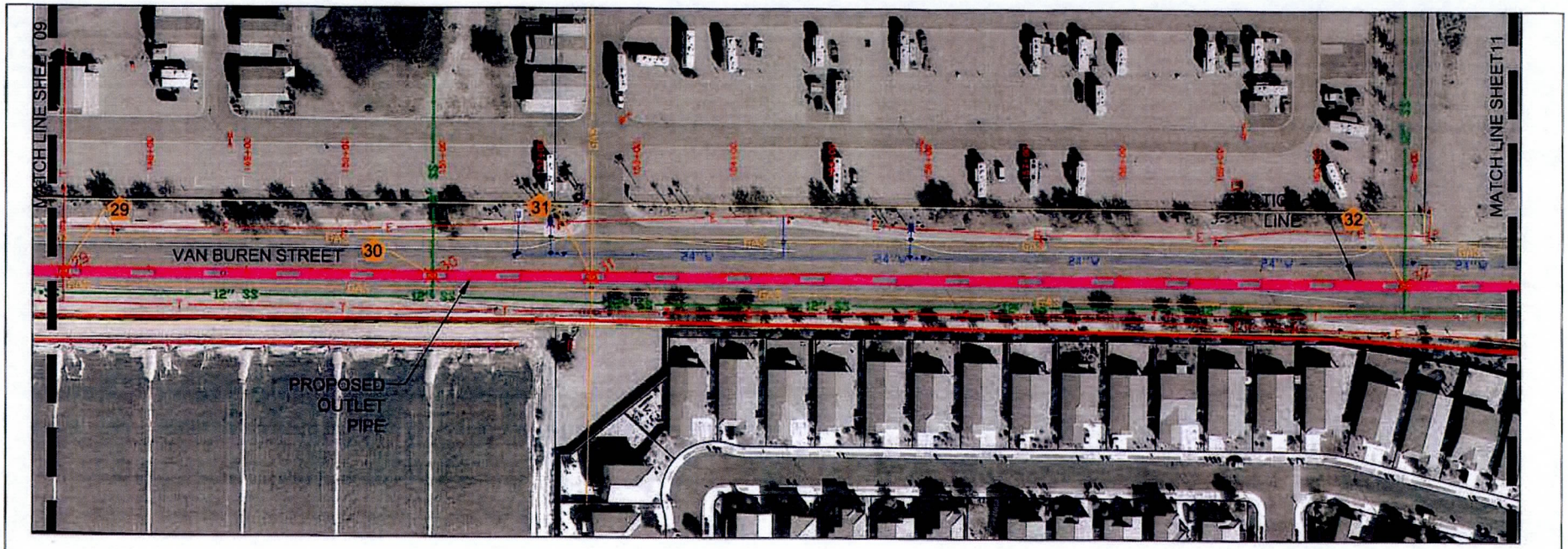
PREVIOUSLY COMPLETED POTHOLE SYMBOL — 01

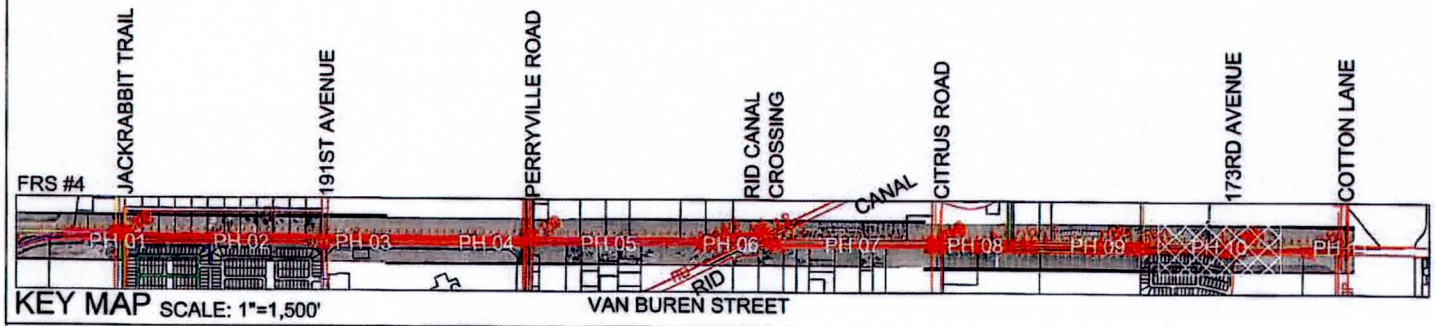
0 50 100 200

SCALE IN FEET

N

PROJECT NO: 010-2309 DRAWN BY: SRW DATE: 03-23-2011	WHITE TANKS FRS #4 OUTLET FACILITY FCD 2010 C029	POTHOLE REQUEST MAP VAN BUREN STREET	OLSSON ASSOCIATES	Figure PH 09





KEY MAP SCALE: 1"=1,500'

LEGEND

PROPOSED POTHOLE SYMBOL — 15

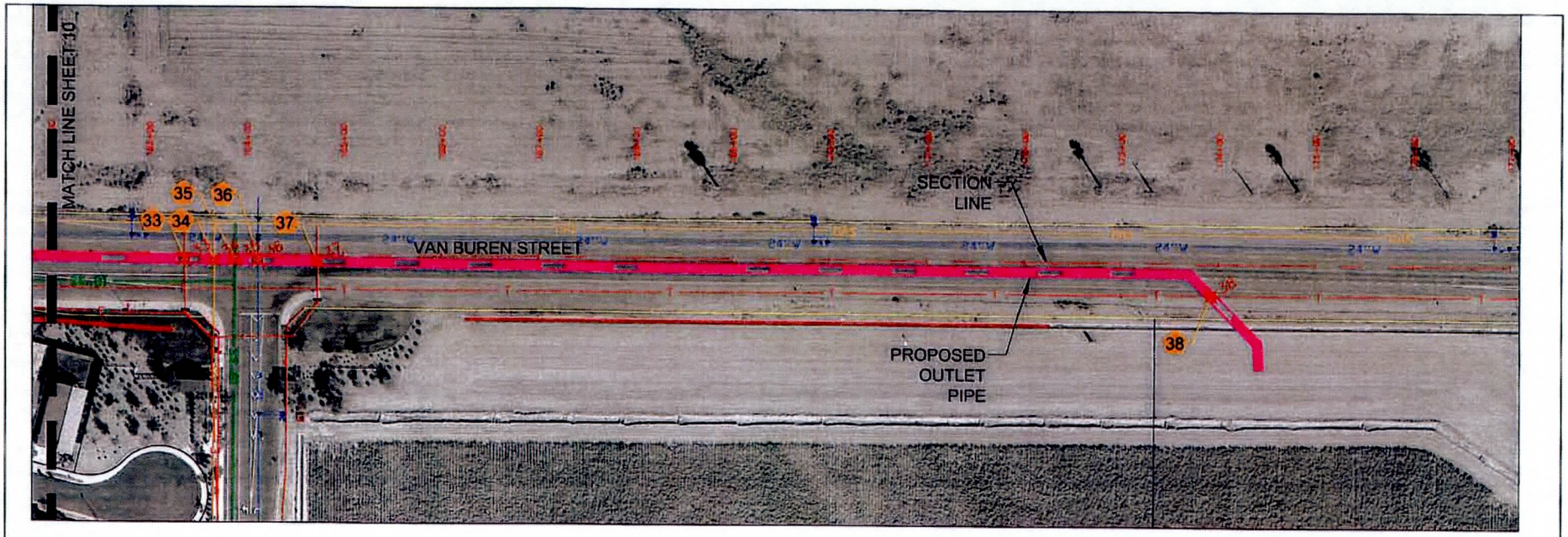
PREVIOUSLY COMPLETED POTHOLE SYMBOL — 01

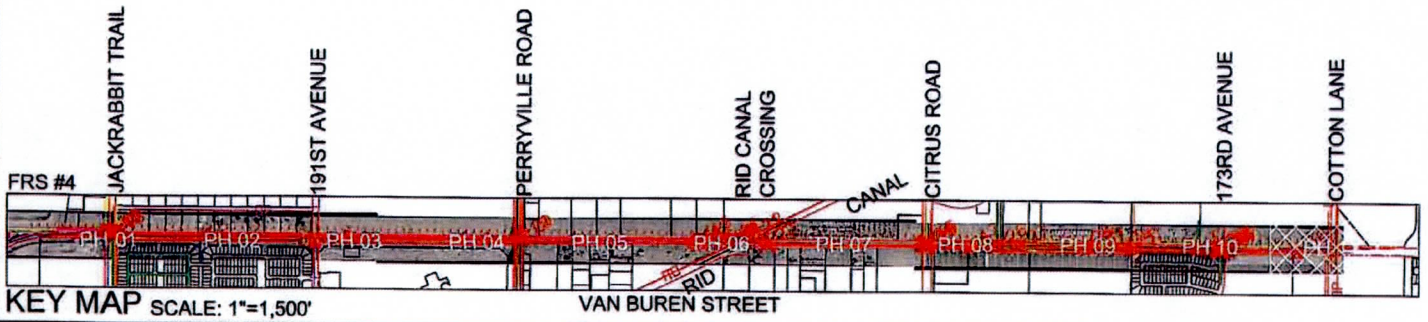
0 50 100 200

SCALE IN FEET

N

PROJECT NO: 010-2309 DRAWN BY: SRW DATE: 03-23-2011	WHITE TANKS FRS #4 OUTLET FACILITY FCD 2010 C029	POTHOLE REQUEST MAP VAN BUREN STREET	OLSSON ASSOCIATES	Figure PH 10





KEY MAP SCALE: 1"=1,500'

LEGEND

PROPOSED POTHOLE SYMBOL 15

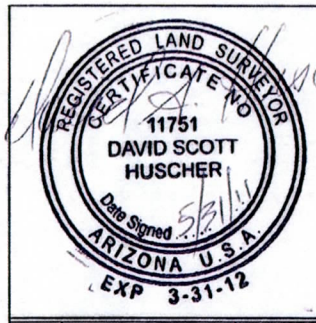
PREVIOUSLY COMPLETED POTHOLE SYMBOL 01

0 50 100 200

SCALE IN FEET

N

PROJECT NO: 010-2309 DRAWN BY: SRW DATE: 03-23-2011	WHITE TANKS FRS #4 OUTLET FACILITY FCD 2010 C029	POTHOLE REQUEST MAP VAN BUREN STREET	OLSSON ASSOCIATES	Figure PH 11



TESTHOLE DATA SUMMARY

PREPARED BY:
TBE Group, Inc.
2236 West Shangri-La Rd.
Phoenix, AZ 85029
(602) 749-8550

DATE: May 31, 2011
PROJECT NAME: White Tanks FRS #4
PROJECT NO: FCD 2010 C029

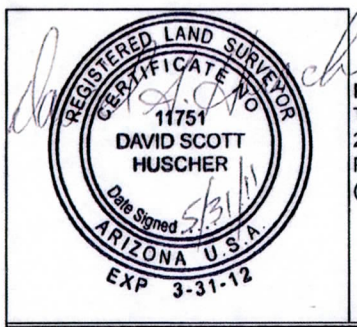
Cardno TBE

NOTE: The coordinate and elevation values provided below depict the actual utility location. Adjustments were made, as needed, to the surveyed request location.

All Data is English

TBE Project Number: AZ096-014-00

TH#	Street	Coordinates		Anticipated Utility	Date	Ground Elevation	Top Elevation	Bottom Elevation	Material Type, Outside Diameter and Comments	Depth of Cover
		Northing	Easting							
15	Van Buren St	891987.29	528602.25	Telephone	05/03/11	1033.54	--------	--------	No Telephone Per Raul Hernandez With ELM - No Signal - Not Dug	--------
16	Van Buren St.	891981.80	528643.27	Water	04/21/11	1033.41	1026.59	--------	13" Wrapped Ductile Iron Pipe N-S	6.82
17	Van Buren St.	891980.12	528657.00	CATV	04/15/11	1033.00	1032.13	1026.54	161" Wide X 67" High Concrete Encasement N-S	0.87
17A	Van Buren St.	891980.12	528655.96	CATV	05/16/11	1033.00	1027.64	1027.18	2" & (3) 1 3/4" Plastic Conduits N - S, Laid 5" Wide (Stacked 2 x 2)	5.36
17n	Van Buren St.	891988.99	528661.98	-------	05/16/11	1032.99	1032.20	1031.70	North Side Of Concrete Structure Covering Original Teshole #17 And #18	0.79
17s	Van Buren St.	891965.32	528665.84	-------	05/16/11	1032.77	1031.96	1031.37	South Side Of Concrete Structure Covering Original Teshole #17 And #18	0.81
17e	Van Buren St.	891980.12	528669.68	-------	05/16/11	1032.75	1031.77	1025.90	East Side Of Concrete Structure Covering Original Teshole #17 And #18; This Side Of The Structure Has A Lip At 1.56' Deep And A Recess Before Bottom	0.98
17w	Van Buren St.	891980.12	528655.12	-------	05/16/11	1033.01	1031.10	1030.64	West Side Of Concrete Structure Covering Original Teshole #17 And #18	1.91
18	Van Buren St.	891976.98	528665.97	Gas	04/15/11	1032.83	1031.01	1026.37	161" Wide X 67" High Concrete Encasement N-S	1.82
18A	Van Buren St.	891975.00	528664.16	Gas	05/16/11	1032.91	1024.79	1019.96	4 1/2" Plastic Pipe & 12 1/2" Steel Pipe N - S, Laid 18" Wide; Top= Top Of 4 1/2" Plastic Pipe; Bottom= Bottom Of 12 1/2" Steel Pipe	8.12
19	Van Buren St.	891943.78	533932.71	Telephone	04/21/11	1015.15	1012.94	--------	2 1/2" Direct Buried Cable N-S	2.21
20	Van Buren St.	891943.78	533930.05	Gas	04/21/11	1015.13	1009.68	--------	2 1/2" Steel Gas Line N-S	5.45
21	Van Buren St.	891990.96	536928.11	Telephone	04/19/11	1008.39	1003.63	1002.99	(6) 2" Plastic Conduits NE-SW Laid 10" Wide	4.76
22	Van Buren St.	891999.02	536925.96	Telephone	04/19/11	1008.03	1004.73	1003.34	11" Wide Concrete Encasement NE-SW	3.30
23	Van Buren St.	891883.40	537105.74	Telephone	05/03/11	1010.39	--------	--------	Marked "No Conflict" - No Signal - Not Dug	--------
24	Van Buren St.	891871.97	539144.42	Telephone	04/21/11	1001.63	--------	--------	Marked "No Conflict" - No Signal - Not Dug	--------
25	Van Buren St.	891871.79	539184.35	Gas	04/26/11	1001.72	993.81	--------	2 1/2" Coated Steel Gas Line N-S	7.91
26	Van Buren St.	891867.14	540105.92	Sewer	05/03/11	1004.43	989.05	1004.43	15" +/- PVC Pipe N-S ** Could Not Get Accurate O.D. Due to Depth	15.38
27	Van Buren St.	891854.17	540387.16	Gas	04/21/11	1003.65	1003.29	1000.33	44" Wide Concrete Encasement E-W	0.36
28	Van Buren St.	891849.67	541207.58	Gas	04/21/11	1000.89	997.11	--------	2 1/2" Steel Gas Line E-W	3.78



TESTHOLE DATA SUMMARY

PREPARED BY:
TBE Group, Inc.
2236 West Shangri-La Rd.
Phoenix, AZ 85029
(602) 749-8550

DATE: May 31, 2011
PROJECT NAME: White Tanks FRS #4
PROJECT NO: FCD 2010 C029

Cardno TBE

NOTE: The coordinate and elevation values provided below depict the actual utility location. Adjustments were made, as needed, to the surveyed request location.

All Data is English

TBE Project Number: AZ096-014-00

TH#	Street	Coordinates		Anticipated Utility	Date	Ground Elevation	Top Elevation	Bottom Elevation	Material Type, Outside Diameter and Comments	Depth of Cover
		Northing	Easting							
29	Van Buren St.	891860.89	541338.41	Telephone	04/26/11	1000.43	--------	--------	Marked "No Conflict" - No Signal - Not Dug	--------
30	Van Buren St.	891858.94	541715.22	Sewer	05/03/11	998.56	985.94	998.56	8 1/2" PVC Pipe N-S	12.62
31	Van Buren St.	891858.09	541879.72	Gas	04/30/11	997.95	--------	--------	Bluestake Marked "No Conflict" Could Not Get Signal Going North. E-W Only Not Dug	--------
32	Van Buren St.	891853.82	542714.91	Sewer	05/05/11	996.69	983.81	996.69	12" +/- PVC Pipe N-S ** Could Not Get Accurate O.D. Due to Depth	12.88
33	Van Buren St.	891851.45	542961.86	Electric/Tele	04/30/11	996.30	988.09	987.52	(4) 3 1/2" Conduits N-S Laid 10" Wide No Bluestake in Area	8.21
34	Van Buren St.	891851.07	542992.69	Gas	04/30/11	996.15	991.99	--------	4 1/2" Plastic Gas Line N-S	4.16
35	Van Buren St.	891850.78	543013.27	Sewer	05/06/11	996.12	990.92	--------	Found Concrete @ 5.20' Deep Dug Along Concrete 4.5' E & W - No Pipe Found	5.20
36	Van Buren St.	891850.48	543036.52	Water	04/30/11	996.11	991.78	--------	13" Ductile Iron Pipe N-S	4.33
37	Van Buren St.	891849.67	543098.22	Electric/Tele	04/30/11	996.03	987.89	987.00	(2) 3 1/2" & (1) 4 1/2" Conduits N-S Laid 9" Wide	8.14
38	Van Buren St.	891806.88	544017.34	Telephone	05/04/11	992.21	990.08	992.21	2" Direct Buried Cable E-W	2.13
39	Van Buren St.	891972.84	528843.61	Telephone	05/16/11	1030.65	1025.15	1030.65	(2) 5 1/2" Plastic Conduits N - S, Laid 11" Wide	5.50
40	Van Buren St.	891959.62	531230.95	Electric	05/23/11	1022.90	1015.98	1015.19	(4) 2 1/2" & (1) 5 1/2" Conduits N-S Laid 11" Wide	6.92
41	Van Buren St.	--------	--------	Electric	05/23/11	--------	--------	--------	No Bluestake At This Location - No Signal	--------
42	Van Buren St.	891883.27	537124.62	Gas	05/23/11	1010.30	1004.85	--------	1 1/2" Wrapped Steel Gas NW-SE	5.45
43	Van Buren St.	891882.27	537401.03	Electric	05/23/11	1007.51	999.53	--------	(2) 4 1/2" Conduits N-S Laid 12" Wide	7.98

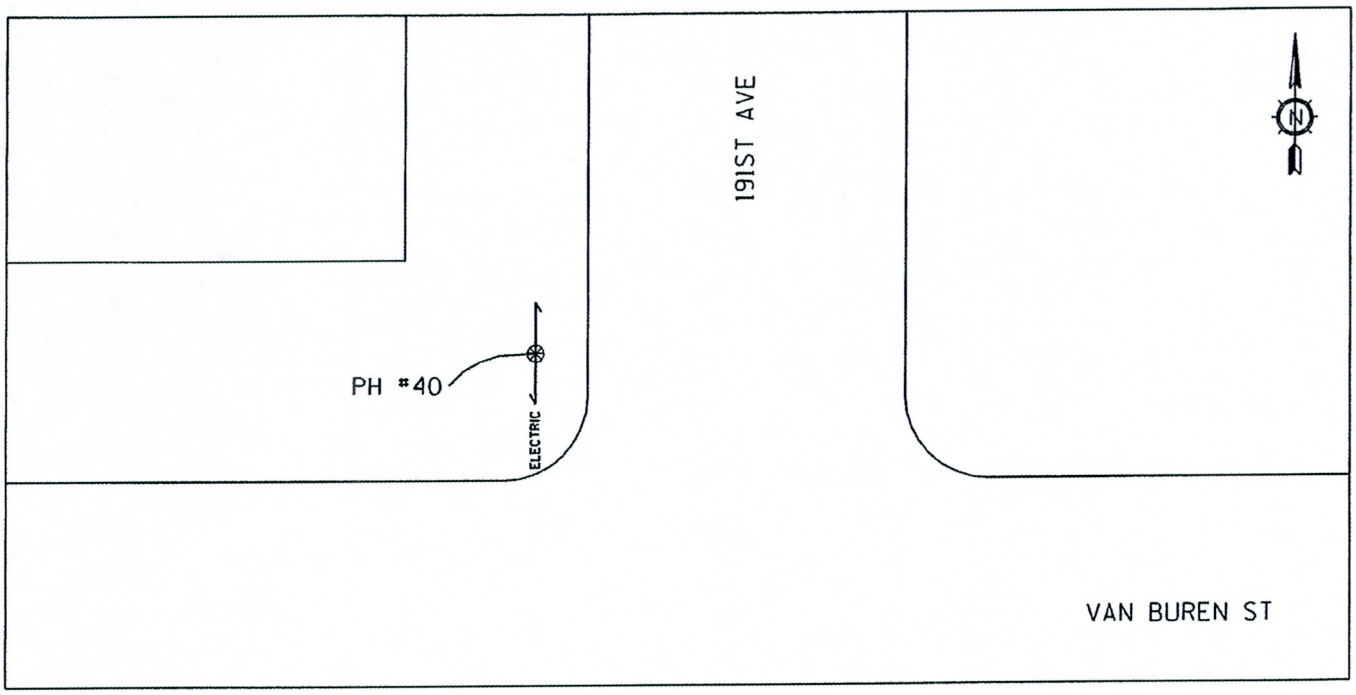
TESTHOLE DATA REPORT

TEST HOLE NO. 40
DATE DUG 5.23.2011
CLIENT PROJECT NO. 010-2309
TBE PROJECT NO. AZ096.014.00
TBE TRUCK NO. 55.334

Cardno TBE
2236 WEST SHANGRI LA ROAD, PHOENIX, AZ85029
www.cardnotbe.com - 602.749.8550

SUE CREW MM - SL
CITY/COUNTY GOODYEAR
MARICOPA
GENERAL LOCATION INTERSECTION OF
191ST AVE & VAN BUREN ST

LOCATION PLAN - NOT TO SCALE



ALL H & V MEASURMENTS ENGLISH

COORDINATE VALUES

TESTHOLE COORDINATES

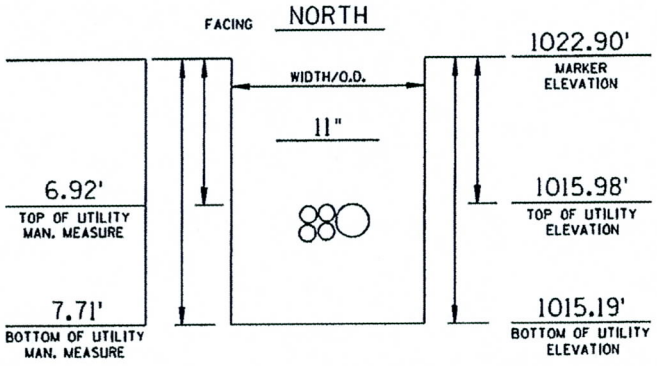
NORTHING 891959.62

EASTING 531230.95

SET AT ℄ UTILITY ___PK NAIL X STEEL PIN ___CHSLD "X"
___HUB ___OTHER

RIBBON COLOR RED

CROSS SECTION - NOT TO SCALE



PAVING TYPE & THICKNESS OFF ROAD SOIL CONDITION HARD - DRY

O.D. (4) 2½" & (1) 5½" MATERIAL PLASTIC CONDUITS TYPE ELECTRIC

REMARKS:

PREPARED BY: GST CHECKED BY: TSB

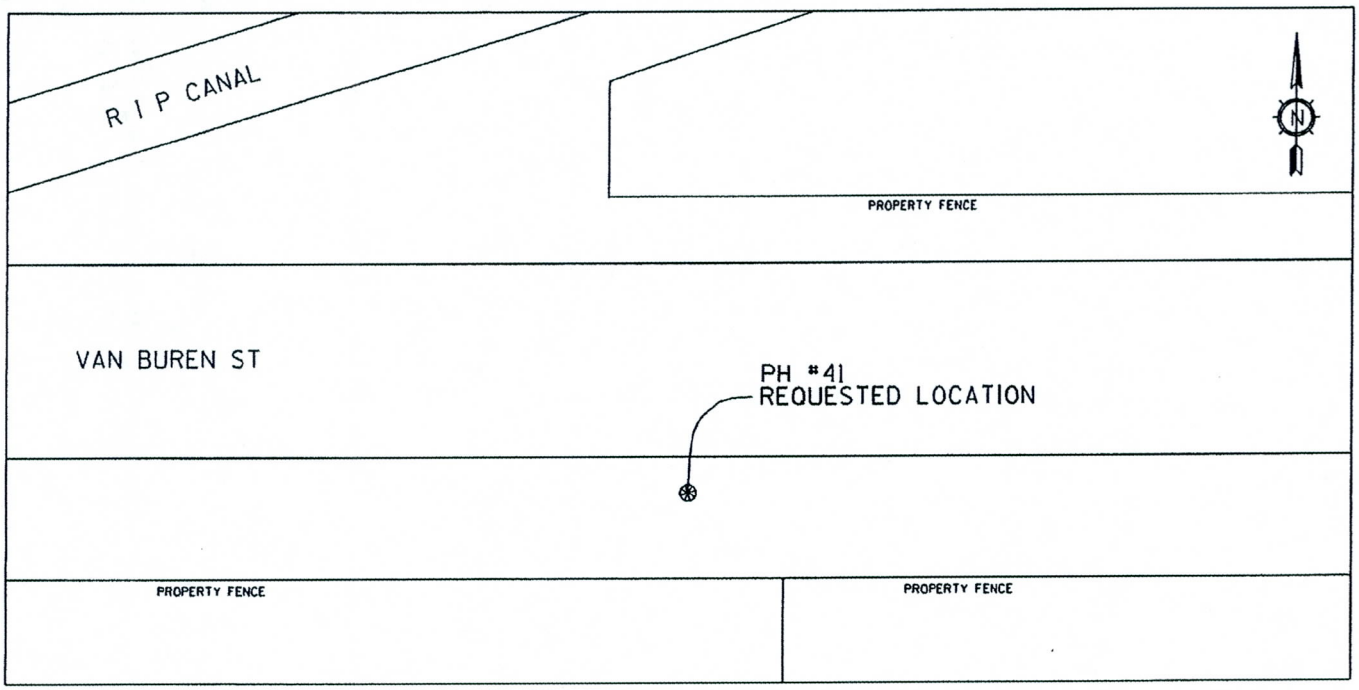
TESTHOLE DATA REPORT

TEST HOLE NO. 41
DATE DUG 5.23.2011
CLIENT PROJECT NO. 010-2309
TBE PROJECT NO. AZ096.014.00
TBE TRUCK NO. 55.334

Cardno TBE
2236 WEST SHANGRI LA ROAD, PHOENIX, AZ85029
www.cardnotbe.com - 602.749.8550

SUE CREW MM - SL
CITY/COUNTY GOODYEAR
MARICOPA
GENERAL LOCATION VAN BUREN ST
WEST OF CITRUS ROAD

LOCATION PLAN - NOT TO SCALE



ALL H & V MEASURMENTS ENGLISH

COORDINATE VALUES

TESTHOLE COORDINATES

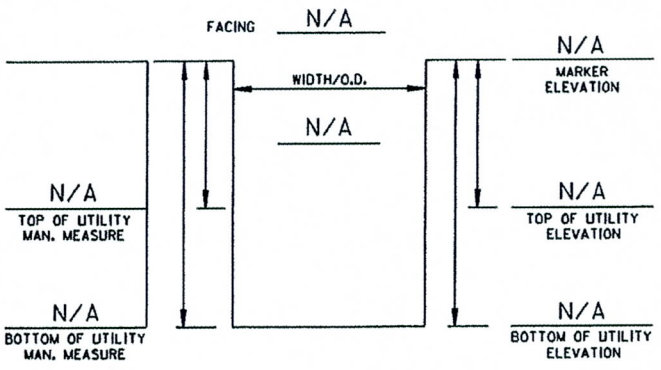
NORTHING N/A

EASTING N/A

SET AT ℄ UTILITY ___PK NAIL ___STEEL PIN ___CHSLD "X" ___HUB ___OTHER

RIBBON COLOR N/A

CROSS SECTION - NOT TO SCALE



PAVING TYPE & THICKNESS N/A SOIL CONDITION N/A

O.D. N/A MATERIAL N/A TYPE N/A

REMARKS: NO BLUE STAKE AT THIS LOCATION- TESTHOLE NOT DUG - SWEPT IMMEDIATE VICINITY WITH ELECTROMAGNETIC DETECTION EQUIPMENT - NO SIGNAL DETECTED

PREPARED BY: GST CHECKED BY: TSB

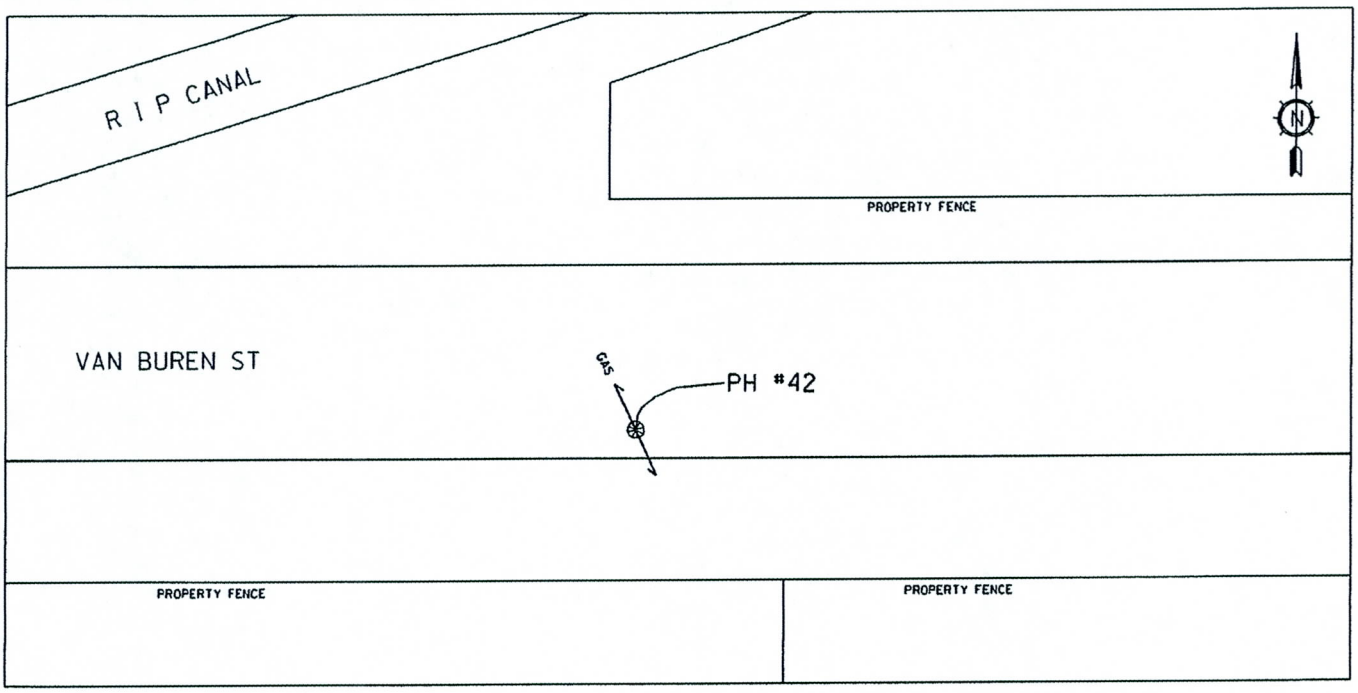
TESTHOLE DATA REPORT

TEST HOLE NO. 42
DATE DUG 5.23.2011
CLIENT PROJECT NO. 010-2309
TBE PROJECT NO. AZ096.014.00
TBE TRUCK NO. 55.334

Cardno TBE
2236 WEST SHANGRI LA ROAD, PHOENIX, AZ85029
www.cardnotbe.com - 602.749.8550

SUE CREW MM - SL
CITY/COUNTY GOODYEAR
MARICOPA
GENERAL LOCATION VAN BUREN ST
WEST OF CITRUS ROAD

LOCATION PLAN - NOT TO SCALE



ALL H & V MEASURMENTS ENGLISH

COORDINATE VALUES

TESTHOLE COORDINATES

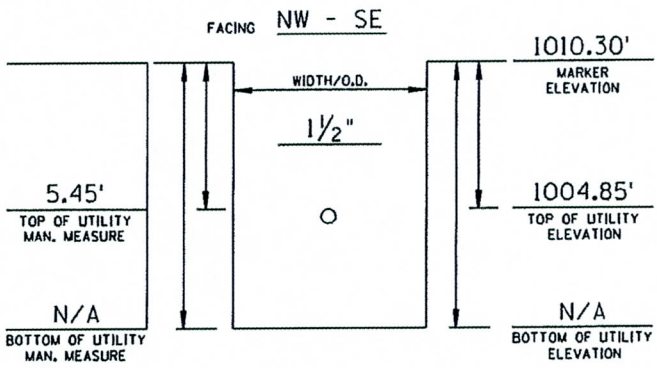
NORTHING 891883.27

EASTING 537124.62

SET AT ℄ UTILITY X PK NAIL ___ STEEL PIN ___ CHSLD "X" ___ HUB ___ OTHER

RIBBON COLOR YELLOW

CROSS SECTION - NOT TO SCALE



PAVING TYPE & THICKNESS ASPHALT - 5" SOIL CONDITION ROCKY - MODERATE

O.D. 1½" MATERIAL WRAPPED STEEL TYPE GAS

REMARKS:

PREPARED BY: GST CHECKED BY: TSB

TESTHOLE DATA REPORT

TEST HOLE NO. 43
DATE DUG 5.23.2011
CLIENT PROJECT NO. 010-2309
TBE PROJECT NO. AZ096.014.00
TBE TRUCK NO. 55.334

Cardno TBE
2236 WEST SHANGRI LA ROAD, PHOENIX, AZ85029
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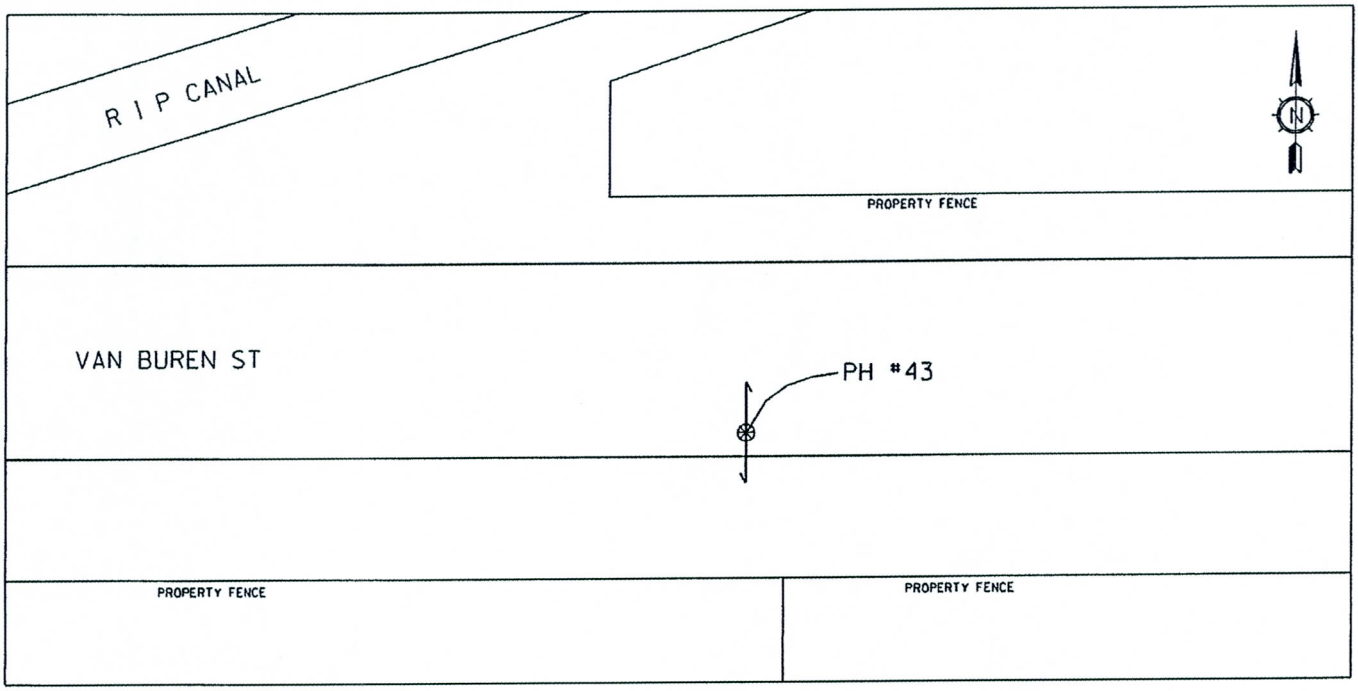
SUE CREW MM - SL
CITY/COUNTY GOODYEAR
MARICOPA
GENERAL LOCATION VAN BUREN ST
WEST OF CITRUS ROAD

LOCATION PLAN - NOT TO SCALE



ALL H & V MEASURMENTS ENGLISH

COORDINATE VALUES

TESTHOLE COORDINATES

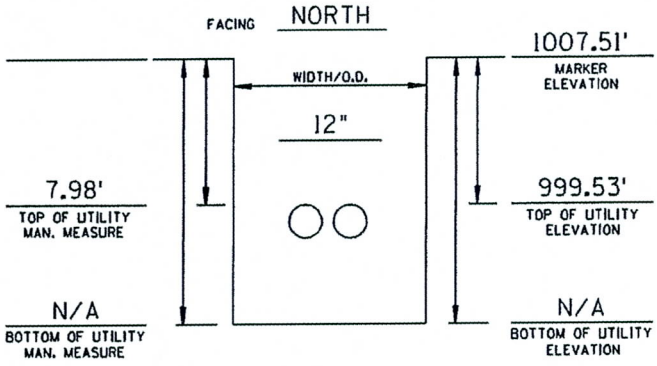
NORTHING 891882.27

EASTING 537401.03

SET AT ℄ UTILITY X PK NAIL ___ STEEL PIN ___ CHSLD "X"
___ HUB ___ OTHER

RIBBON COLOR RED

CROSS SECTION - NOT TO SCALE



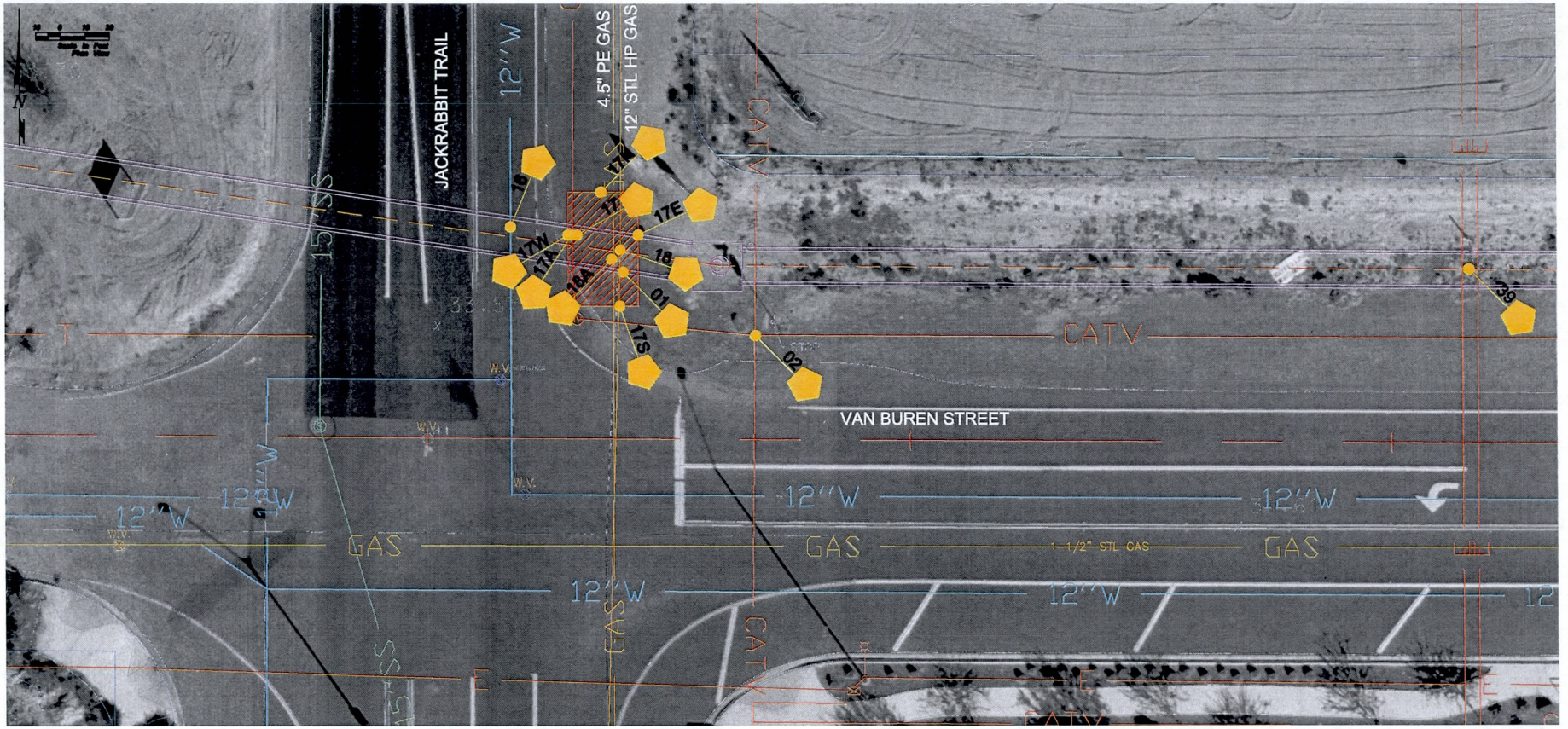
PAVING TYPE & THICKNESS ASPHALT - 5" SOIL CONDITION ROCKY - MODERATE

O.D. (2) 4½" MATERIAL PLASTIC CONDUITS TYPE ELECTRIC

REMARKS:

PREPARED BY: GST CHECKED BY: TSB

PH	Street	Coordinates		Utility	Company	Date	Ground Elevation	Top Elevation	Bottom Elevation	Material Type, Outside Diameter and Comments	Depth of Cover	Control	Project
		Northing	Easting										
1	Jackrabbit Trail	891829.50	528580.13	12-in Gas	SWG	3/18/2010	1030.01	1018.40	---	12-1/2 inch steel pipe N-S	11.61	NGVD 29	DCR
2	Van Buren St.	891816.39	528607.56	FO	COX	3/18/2010	1029.45	1029.45	1024.12	(2) 2-12" & (2) 2" Plastic Conduit E-W Laid 5" Wide Stacked 2x2	5.33	NGVD 29	DCR
										6-1/2" Plastic Pipe found below the 2 x 2 conduit stack			
										This pipe runs N-S. The Top = Top of 2-1/2" & 2" Conduit Stack			
										Bottom = bottom of 6-1/2" Plastic Pipe.			
16	Van Buren St.	891981.80	528643.27	WATER	AWC	4/21/2011	1033.41	1026.59	---	13" Wrapped Ductile Iron Pipe N-S	6.82	NGVD 88	CD
17	Van Buren St.	891980.12	528657.00	CATV	COX	4/15/2011	1033.00	1032.13	1026.54	161" Wide x 67" High Concrete Encasement	0.87	NGVD 88	CD
17A	Jackrabbit Trail	891980.12	528655.96	CATV	COX	5/16/2011	1033.00	1027.64	1027.18	2" & (3) 3/4" Plastic Conduit 2x2 Stack	5.36	NGVD 88	CD
17N	Jackrabbit Trail	891988.99	528661.98	Conc. Cap	unknown	5/16/2011	1032.99	1032.20	1031.70	North Edge of Concrete Cap	0.79	NGVD 88	CD
17S	Jackrabbit Trail	891965.32	528665.84	Conc. Cap	unknown	5/16/2011	1032.77	1031.96	1031.37	South Edge of Concrete Cap	0.81	NGVD 88	CD
17W	Jackrabbit Trail	891980.12	528655.12	Conc. Cap	unknown	5/16/2011	1033.01	1031.10	1030.64	West Edge of Concrete Cap	1.91	NGVD 88	CD
17E	Jackrabbit Trail	891980.12	528669.68	Conc. Cap	unknown	5/16/2011	1032.75	1031.77	1025.90	East Edge of Concrete Cap	0.98	NGVD 88	CD
18	Jackrabbit Trail	891976.98	528665.97	GAS	SWG	4/15/2011	1032.83	1031.01	1026.37	161" Wide x 67" High Concrete Encasement	1.82	NGVD 88	CD
18A	Jackrabbit Trail	891975.00	528664.16	GAS/HP G	SWG	5/16/2011	1032.91	1024.79	1019.96	4-1/2" PE Gas, 12-1/2" Stl HP Gas, Top Elev = 4-in PE	8.12	NGVD 88	CD
										Bot Elev = Bottom elevation of 12-1/2 Stl			



PH	Street	Coordinates		Utility	Company	Date	Ground Elevation	Top Elevation	Bottom Elevation	Material Type, Outside Diameter and Comments	Depth of Cover	Control	Project
		Northing	Easting										
1	Jackrabbit Trail	891829.50	528580.13	12-in Gas	SWG	3/18/2010	1030.01	1018.40	---	12-1/2 inch steel pipe N-S	11.61	NGVD 29	DCR
2	Van Buren St.	891816.39	528607.56	FO	COX	3/18/2010	1029.45	1029.45	1024.12	(2) 2-12" & (2) 2" Plastic Conduit E-W Laid 5" Wide Stacked 2x2	5.33	NGVD 29	DCR
										6-1/2" Plastic Pipe found below the 2 x 2 conduit stack			
										This pipe runs N-S. The Top = Top of 2-1/2" & 2" Conduit Stack			
										Bottom = bottom of 6-1/2" Plastic Pipe.			
16	Van Buren St.	891981.80	528643.27	WATER	AWC	4/21/2011	1033.41	1026.59	---	13" Wrapped Ductile Iron Pipe N-S	6.82	NGVD 88	CD
17	Van Buren St.	891980.12	528657.00	CATV	COX	4/15/2011	1033.00	1032.13	1026.54	161" Wide x 67" High Concrete Encasement	0.87	NGVD 88	CD
17A	Jackrabbit Trail	891980.17	528655.96	CATV	COX	5/16/2011	1033.00	1027.64	1027.18	2" & (3) 3/4" Plastic Conduit 2x2 Stack	5.36	NGVD 88	CD
17N	Jackrabbit Trail	891988.99	528661.98	Conc. Cap	unknown	5/16/2011	1032.99	1032.29	1031.70	North Edge of Concrete Cap	0.79	NGVD 88	CD
17S	Jackrabbit Trail	891965.32	528665.84	Conc. Cap	unknown	5/16/2011	1032.77	1031.96	1031.37	South Edge of Concrete Cap	0.81	NGVD 88	CD
17W	Jackrabbit Trail	891980.12	528655.12	Conc. Cap	unknown	5/16/2011	1033.01	1031.10	1030.64	West Edge of Concrete Cap	1.91	NGVD 88	CD
17E	Jackrabbit Trail	891980.12	528669.68	Conc. Cap	unknown	5/16/2011	1032.75	1031.77	1025.90	East Edge of Concrete Cap	0.98	NGVD 88	CD
18	Jackrabbit Trail	891976.98	528665.97	GAS	SWG	4/15/2011	1032.83	1031.01	1026.37	161" Wide x 67" High Concrete Encasement	1.82	NGVD 88	CD
18A	Jackrabbit Trail	891975.00	528664.18	GAS/HP G	SWG	5/16/2011	1032.91	1024.79	1019.96	4-1/2" PE Gas, 12-1/2" STl HP Gas, Top Elev = 4-in PE	8.12	NGVD 88	CD
										Bot Elev = Bottom elevation of 12-1/2 Stl			

BLUE STAKE 263-1100

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS4 OUTLET FACILITY

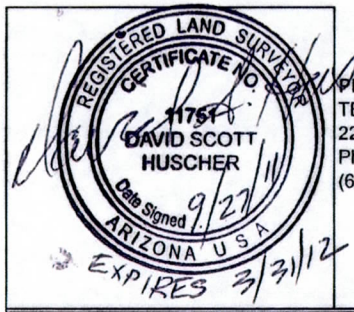
FCD CONTRACT NO. 2010 C029

	BY	DATE
DESIGNED	SW	4/2011
DRAWN	EW	4/2011
CHECKED	JCF	4/2011

OLSSON ASSOCIATES

DRAWING NO. | CONSTRUCTION SECTIONS | SHEET OF

TESTHOLE DATA SUMMARY



PREPARED BY:
TBE Group, Inc.
2236 West Shangri-La Rd.
Phoenix, AZ 85029
(602) 749-8550

DATE: September 27, 2011
PROJECT NAME: White Tanks FRS #4
PROJECT NO: FCD 2010 C029

Cardno TBE

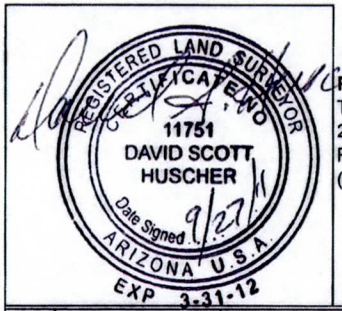
NOTE: The coordinate and elevation values provided below depict the actual utility location. Adjustments were made, as needed, to the surveyed request location.

All Data is English

TBE Project Number: AZ096-014-00

TH#	Street	Coordinates		Anticipated Utility	Date	Ground Elevation	Top Elevation	Bottom Elevation	Material Type, Outside Diameter and Comments	Depth of Cover
		Northing	Easting							
15	Van Buren St	891987.29	528602.25	Telephone	05/03/11	1033.54	--------	--------	No Telephone Per Raul Hernandez With ELM - No Signal - Not Dug	--------
16	Van Buren St.	891981.80	528643.27	Water	04/21/11	1033.41	1026.59	--------	13" Wrapped Ductile Iron Pipe N-S	6.82
17	Van Buren St.	891980.12	528657.00	CATV	04/15/11	1033.00	1032.13	1026.54	161" Wide X 67" High Concrete Encasement N-S	0.87
17A	Van Buren St.	891980.12	528655.96	CATV	05/16/11	1033.00	1027.64	1027.18	2" & (3) 1 3/4" Plastic Conduits N - S, Laid 5" Wide (Stacked 2 x 2)	5.36
17n	Van Buren St.	891988.99	528661.98	-------	05/16/11	1032.99	1032.20	1031.70	North Side Of Concrete Structure Covering Original Teshole #17 And #18	0.79
17s	Van Buren St.	891965.32	528665.84	-------	05/16/11	1032.77	1031.96	1031.37	South Side Of Concrete Structure Covering Original Teshole #17 And #18	0.81
17e	Van Buren St.	891980.12	528669.68	-------	05/16/11	1032.75	1031.77	1025.90	East Side Of Concrete Structure Covering Original Teshole #17 And #18; This Side Of The Structure Has A Lip At 1.56' Deep And A Recess Before Bottom	0.98
17w	Van Buren St.	891980.12	528655.12	-------	05/16/11	1033.01	1031.10	1030.64	West Side Of Concrete Structure Covering Original Teshole #17 And #18	1.91
18	Van Buren St.	891976.98	528665.97	Gas	04/15/11	1032.83	1031.01	1026.37	161" Wide X 67" High Concrete Encasement N-S	1.82
18A	Van Buren St.	891975.00	528664.16	Gas	05/16/11	1032.91	1024.79	1019.96	4 1/2" Plastic Pipe & 12 1/2" Steel Pipe N - S, Laid 18" Wide; Top= Top Of 4 1/2" Plastic Pipe; Bottom= Bottom Of 12 1/2" Steel Pipe	8.12
19	Van Buren St.	891943.78	533932.71	Telephone	04/21/11	1015.15	1012.94	--------	2 1/2" Direct Buried Cable N-S	2.21
20	Van Buren St.	891943.78	533930.05	Gas	04/21/11	1015.13	1009.68	--------	2 1/2" Steel Gas Line N-S	5.45
21	Van Buren St.	891990.96	536928.11	Telephone	04/19/11	1008.39	1003.63	1002.99	(6) 2" Plastic Conduits NE-SW Laid 10" Wide	4.76
22	Van Buren St.	891999.02	536925.96	Telephone	04/19/11	1008.03	1004.73	1003.34	11" Wide Concrete Encasement NE-SW	3.30
23	Van Buren St.	891883.40	537105.74	Telephone	05/03/11	1010.39	--------	--------	Marked "No Conflict" - No Signal - Not Dug	--------
24	Van Buren St.	891871.97	539144.42	Telephone	04/21/11	1001.63	--------	--------	Marked "No Conflict" - No Signal - Not Dug	--------
25	Van Buren St.	891871.79	539184.35	Gas	04/26/11	1001.72	993.81	--------	2 1/2" Coated Steel Gas Line N-S	7.91
26	Van Buren St.	891867.14	540105.92	Sewer	05/03/11	1004.43	989.05	1004.43	15" +/- PVC Pipe N-S ** Could Not Get Accurate O.D. Due to Depth	15.38
27	Van Buren St.	891854.17	540387.16	Gas	04/21/11	1003.65	1003.29	1000.33	44" Wide Concrete Encasement E-W	0.36
28	Van Buren St.	891849.67	541207.58	Gas	04/21/11	1000.89	997.11	--------	2 1/2" Steel Gas Line E-W	3.78
29	Van Buren St.	891860.89	541338.41	Telephone	04/26/11	1000.43	--------	--------	Marked "No Conflict" - No Signal - Not Dug	--------

TESTHOLE DATA SUMMARY



PREPARED BY:
TBE Group, Inc.
2236 West Shangri-La Rd.
Phoenix, AZ 85029
(602) 749-8550

DATE: September 27, 2011
PROJECT NAME: White Tanks FRS #4
PROJECT NO: FCD 2010 C029

Cardno TBE

NOTE: The coordinate and elevation values provided below depict the actual utility location. Adjustments were made, as needed, to the surveyed request location.

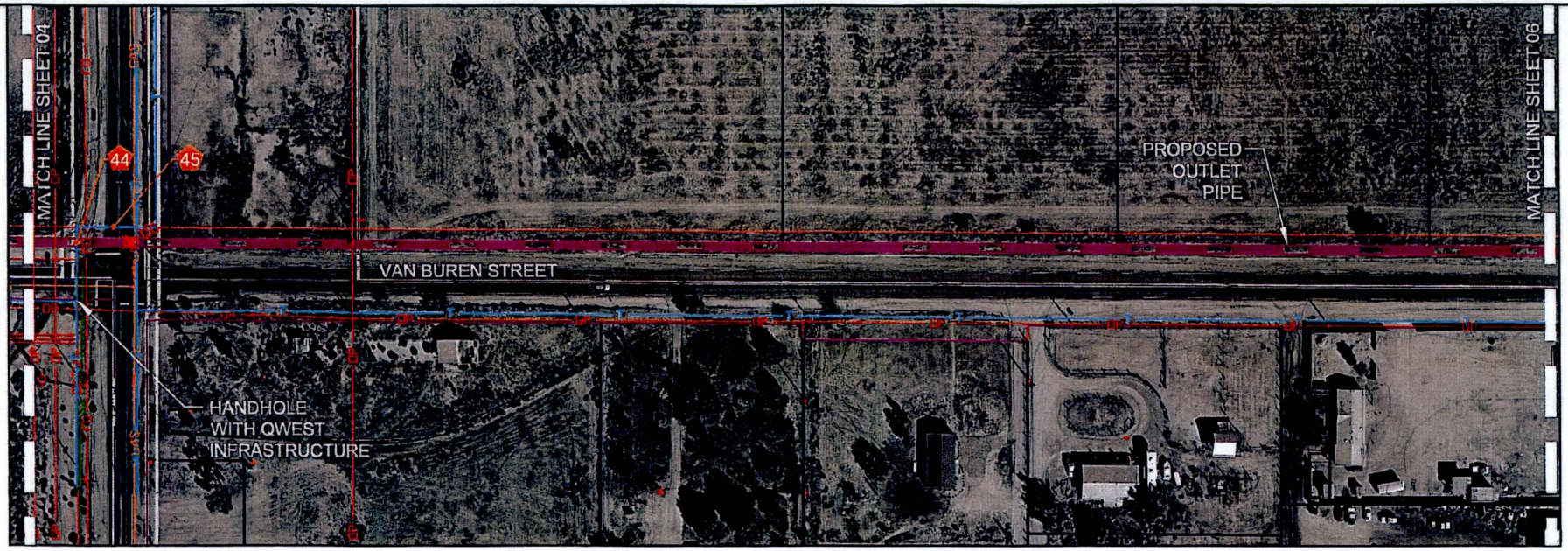
All Data is English

TBE Project Number: AZ096-014-00

TH#	Street	Coordinates		Anticipated Utility	Date	Ground Elevation	Top Elevation	Bottom Elevation	Material Type, Outside Diameter and Comments	Depth of Cover
		Northing	Easting							
30	Van Buren St.	891858.94	541715.22	Sewer	05/03/11	998.56	985.94	998.56	8 1/2" PVC Pipe N-S	12.62
31	Van Buren St.	891858.09	541879.72	Gas	04/30/11	997.95	--------	--------	Bluestake Marked "No Conflict" Could Not Get Signal Going North. E-W Only Not Dug	--------
32	Van Buren St.	891853.82	542714.91	Sewer	05/05/11	996.69	983.81	996.69	12" +/- PVC Pipe N-S ** Could Not Get Accurate O.D. Due to Depth	12.88
33	Van Buren St.	891851.45	542961.86	Electric/Tele	04/30/11	996.30	988.09	987.52	(4) 3 1/2" Conduits N-S Laid 10" Wide No Bluestake in Area	8.21
34	Van Buren St.	891851.07	542992.69	Gas	04/30/11	996.15	991.99	--------	4 1/2" Plastic Gas Line N-S	4.16
35	Van Buren St.	891850.78	543013.27	Sewer	05/06/11	996.12	990.92	--------	Found Concrete @ 5.20' Deep Dug Along Concrete 4.5' E & W - No Pipe Found	5.20
36	Van Buren St.	891850.48	543036.52	Water	04/30/11	996.11	991.78	--------	13" Ductile Iron Pipe N-S	4.33
37	Van Buren St.	891849.67	543098.22	Electric/Tele	04/30/11	996.03	987.89	987.00	(2) 3 1/2" & (1) 4 1/2" Conduits N-S Laid 9" Wide	8.14
38	Van Buren St.	891806.88	544017.34	Telephone	05/04/11	992.21	990.08	992.21	2" Direct Buried Cable E-W	2.13
39	Van Buren St.	891972.84	528843.61	Telephone	05/16/11	1030.65	1025.15	1030.65	(2) 5 1/2" Plastic Conduits N - S, Laid 11" Wide	5.50
40	Van Buren St.	891959.62	531230.95	Electric	05/23/11	1022.90	1015.98	1015.19	(4) 2 1/2" & (1) 5 1/2" Conduits N-S Laid 11" Wide	6.92
41	Van Buren St.	--------	--------	Electric	05/23/11	--------	--------	--------	No Bluestake At This Location - No Signal	--------
42	Van Buren St.	891883.27	537124.62	Gas	05/23/11	1010.30	1004.85	--------	1 1/2" Wrapped Steel Gas NW-SE	5.45
43	Van Buren St.	891882.27	537401.03	Electric	05/23/11	1007.51	999.53	--------	(2) 4 1/2" Conduits N-S Laid 12" Wide	7.98
44	Van Buren St.	891942.93	533884.43	Telephone	09/23/11	1015.11	1012.10	--------	(2) 1 1/4" PVC Conduits N-S Laid 3" Wide	3.01
45	Van Buren St.	891942.72	533909.38	Telephone	09/23/11	1015.35	1012.32	1011.95	(3) 1 1/4" PVC Conduits E-W Laid 4" Wide (Stacked)	3.03
46	Van Buren St.	891872.18	539090.68	Telephone	09/23/11	1001.65	997.25	--------	(1) 2 1/4" & (1) 1 3/4" Direct Buried Cables N-S Laid 5" Wide	4.40
47	Van Buren St.	891845.54	539160.88	Telephone	09/23/11	1000.79	996.51	--------	1 1/2" Direct Buried Cable E-W	4.28

WHITE TANKS FRS#4
VAN BUREN STREET
JACKRABBIT TRAIL TO COTTON LANE
FCD PROJECT NO. 2010 C029
POTHOLE REQUEST

PH#	Coordinates		Anticipated Utility	Comments	Plan Sheet No.
	Northing	Easting			
44	891943.5391	533872.8389	QWEST TELEPHONE	(2) 1-1/4" PLASTIC CONDUITS	PH 05
45	891969.0119	533909.4696	QWEST TELEPHONE	(2) 1-1/4" PLASTIC CONDUITS	PH 05
			TELEPHONE	WIRE TRACING TO LOCATE TELEPHONE LINE - QWEST CLAIMS IT IS NOT THEIR LINE. NEED TO LOCATE TELEPHONE LINE.	PH 06
46	891872.2347	539149.9900	QWEST TELEPHONE	2 DIRECT BURY CABLES - 400 PAIR AND 600 PAIR DIRECT BURY CABLE	PH 08
47	891845.4835	539160.8654	QWEST TELEPHONE	1 CONDUIT UNKNOWN SIZE	PH 08

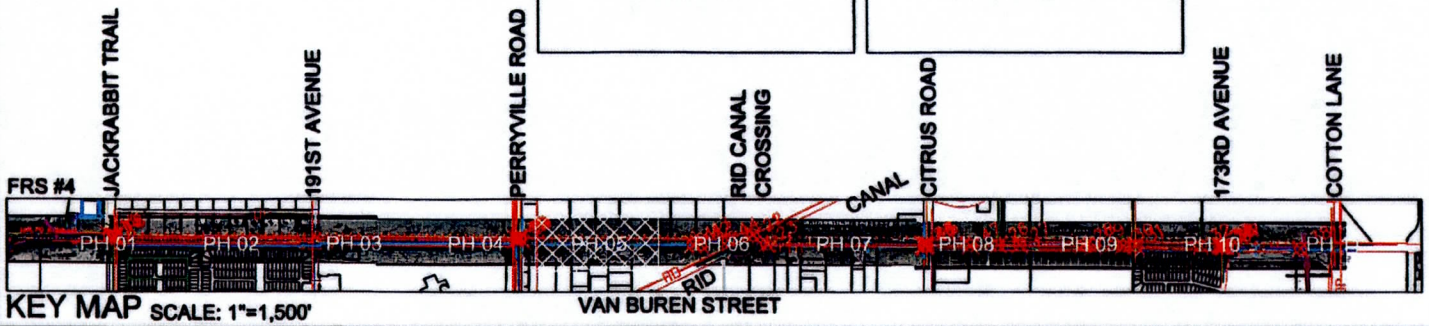


PH 44 QWEST TELEPHONE
(2) 1-1/4" PLASTIC CONDUITS
N: 891943.5391
E: 533872.8369

PH 45 QWEST TELEPHONE
(2) 1-1/4" PLASTIC CONDUITS
N: 891959.0119
E: 533909.4696

LEGEND

PROPOSED POTHOLE SYMBOL — 43



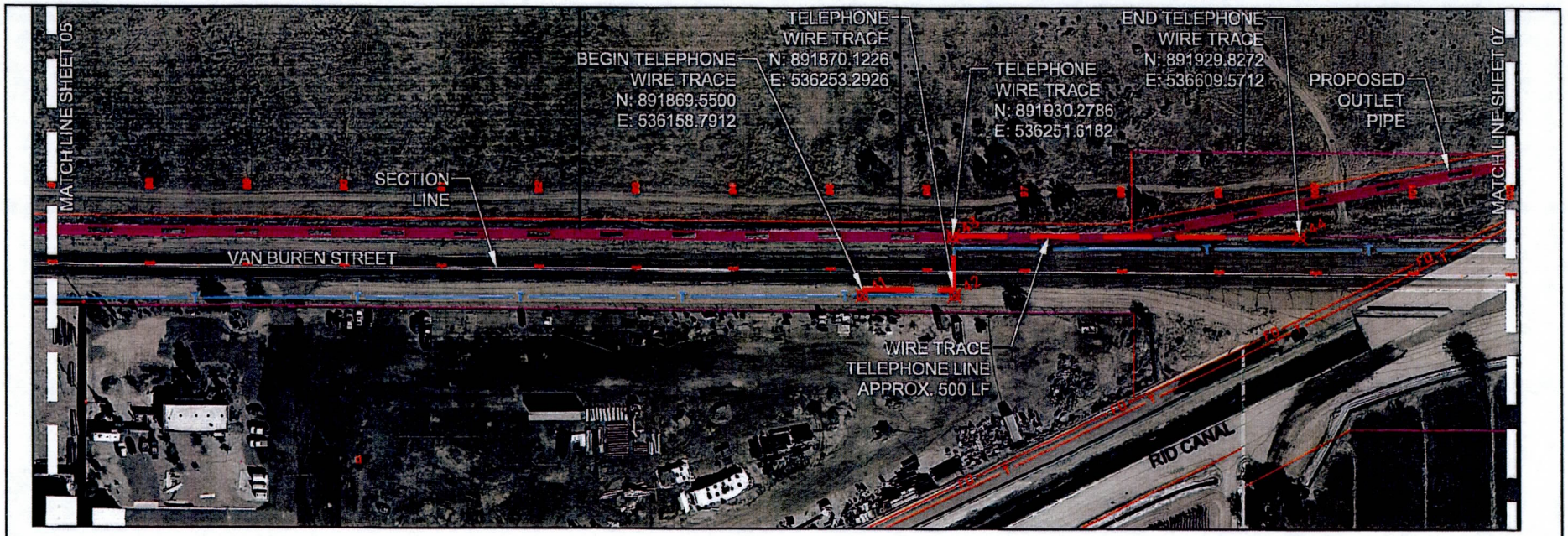
KEY MAP SCALE: 1"=1,500'

0 50 100 200

SCALE IN FEET

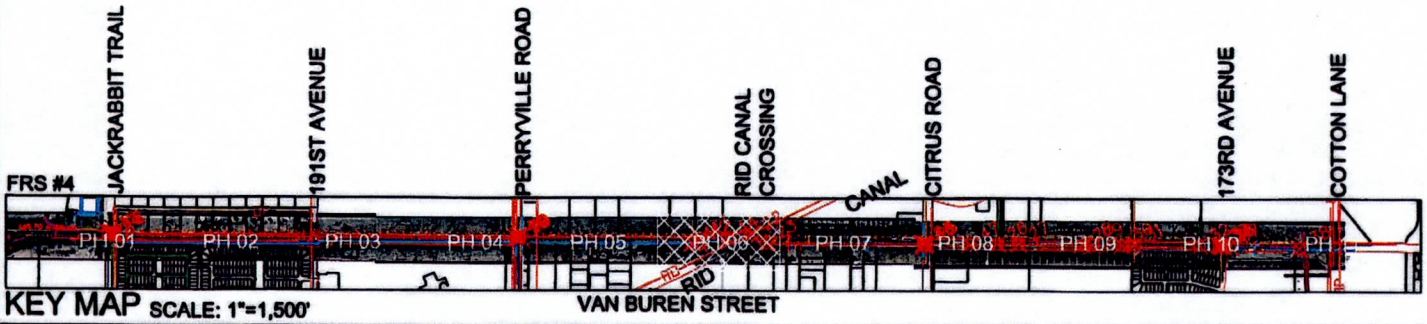
N

PROJECT NO: 010-2309 DRAWN BY: SRW DATE: 09-13-2011	WHITE TANKS FRS #4 OUTLET FACILITY FCD 2010 C029	POTHOLE REQUEST MAP VAN BUREN STREET	OLSSON ASSOCIATES	Figure PH 05



LEGEND

PROPOSED POTHOLE SYMBOL 43



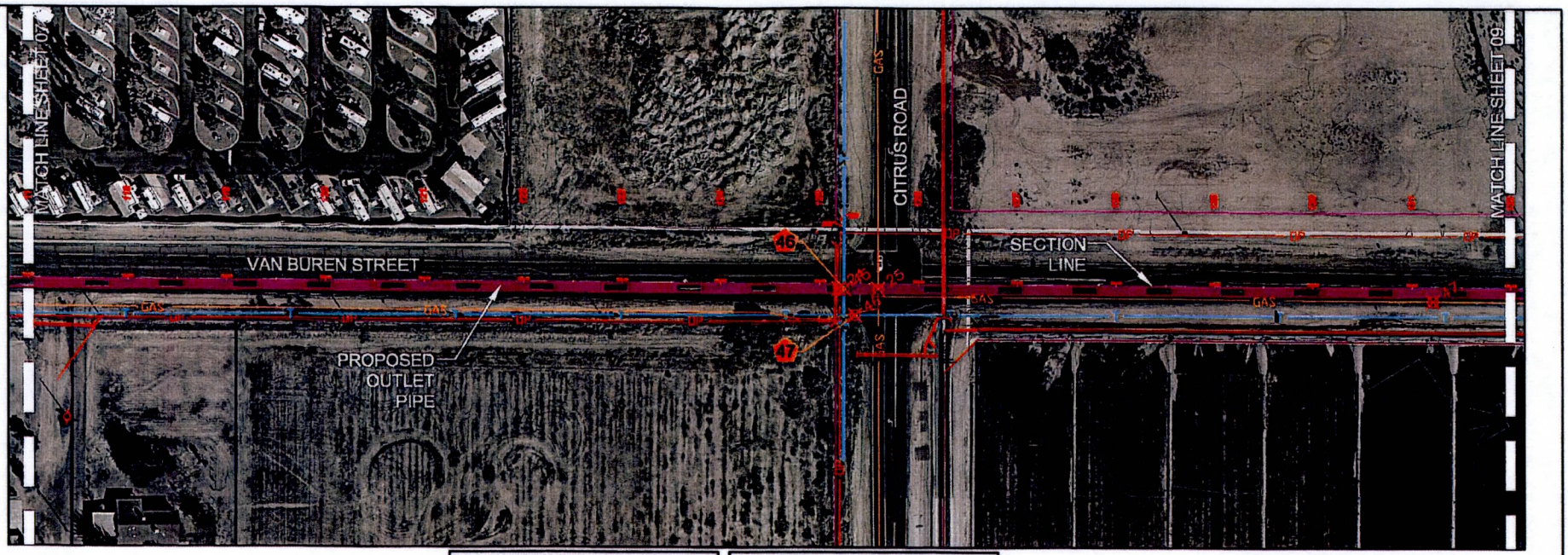
KEY MAP SCALE: 1"=1,500'

0 50 100 200

SCALE IN FEET

N

PROJECT NO: 010-2309 DRAWN BY: SRW DATE: 9-13-2011	WHITE TANKS FRS #4 OUTLET FACILITY FCD 2010 C029	POTHOLE REQUEST MAP VAN BUREN STREET	OLSSON ASSOCIATES	Figure PH 06



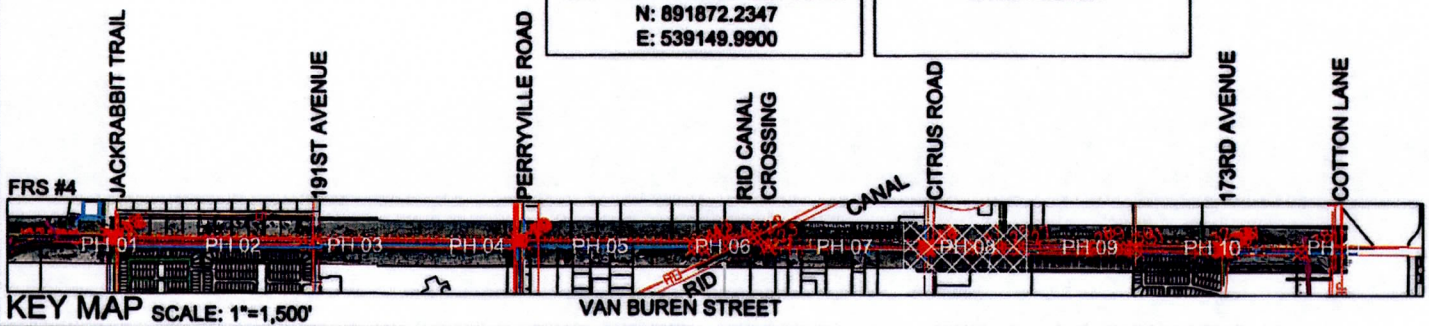
PH 46 QWEST TELEPHONE
(2) DIRECT BURY CABLES
1ST - 400 PAIR DIRECT BURY
2ND - 600 PAIR DIRECT BURY
N: 891872.2347
E: 539149.9900

PH 47 QWEST TELEPHONE
(1) CONDUIT, UNKNOWN SIZE
N: 891845.4835
E: 539160.8654

LEGEND

PROPOSED POTHOLE SYMBOL — 43

PREVIOUSLY COMPLETED POTHOLE SYMBOL



KEY MAP SCALE: 1"=1,500'

0 50 100 200

SCALE IN FEET

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PROJECT NO: 010-2309 DRAWN BY: SRW DATE: 09-13-2011	WHITE TANKS FRS #4 OUTLET FACILITY FCD 2010 C029	POTHOLE REQUEST MAP VAN BUREN STREET	OLSSON ASSOCIATES	Figure PH 08

TESTHOLE DATA SUMMARY

Expires 12/31/11

PREPARED BY:
Cardno TBE
2236 West Shangri-La Rd.
Phoenix, AZ 85029
(602) 749-8550

DATE: November 2, 2011
PROJECT NAME: White Tanks FRS #4
PROJECT NO: FCD 2010 C029

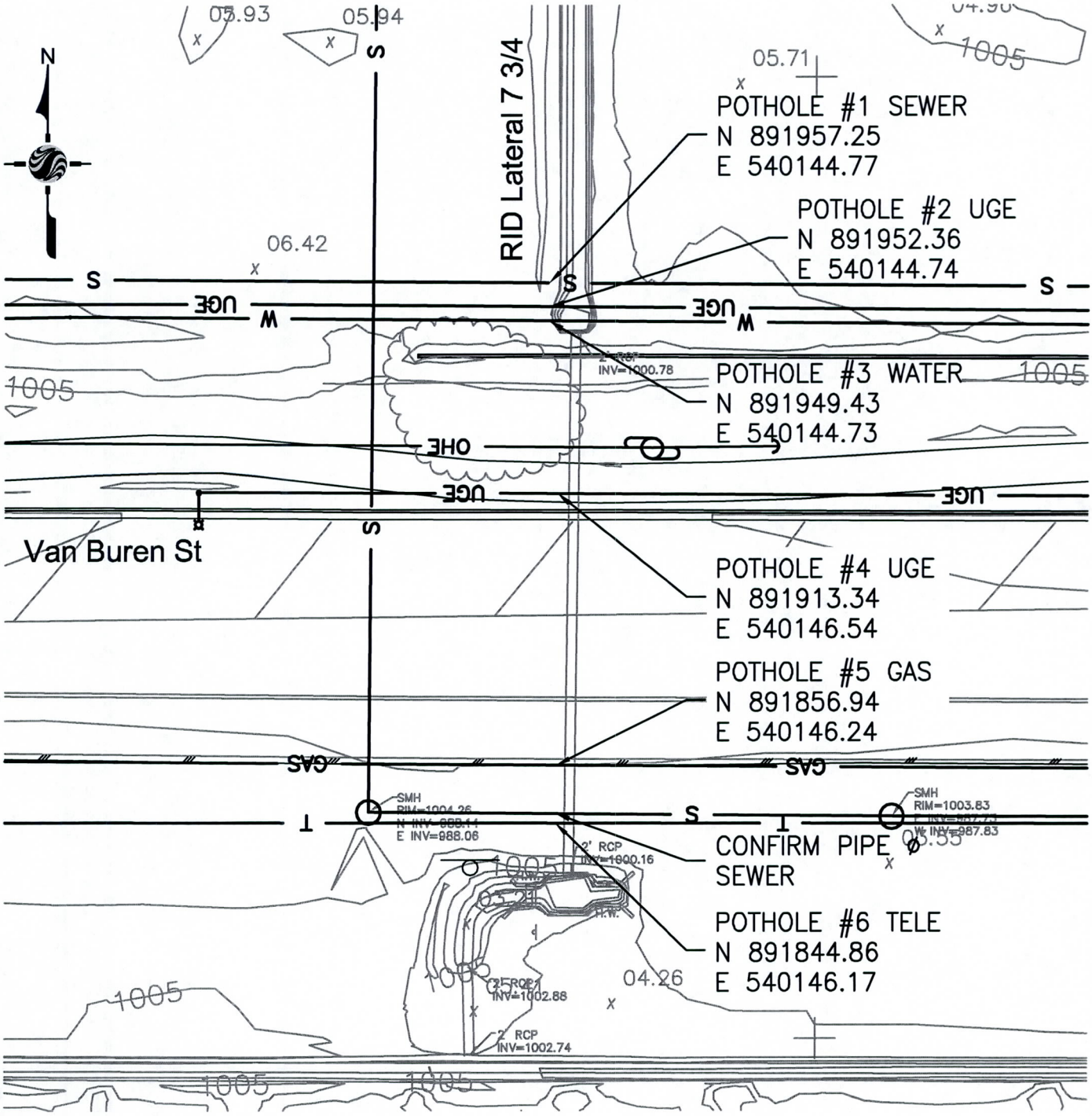
Cardno TBE

NOTE: The coordinate and elevation values provided below depict the actual utility location. Adjustments were made, as needed, to the surveyed request location.

All Data is English

CTBE Project Number: AZ096-014-00

TH#	Street	Coordinates		Anticipated Utility	Date	Ground Elevation	Top Elevation	Bottom Elevation	Material Type, Approximate Outside Diameter or Width, Orientation and Comments	Depth of Cover
		Northing	Easting							
1	Van Buren St.	891957.30	540144.78	Sewer	10/24/11	1006.99	——	——	Dug at Requested Location 10' Deep and 5' Wide - No Sewer Found	——
1A	Van Buren St.	891971.70	540259.23	Sewer	10/24/11	1005.91	1003.35	——	6" PVC Pipe Found at Stub Out - Line Heads East Only	2.56
1B	Van Buren St.	891971.70	540080.18	Sewer	10/24/11	1006.77	1005.19	——	6" PVC Pipe Found at Stub Out - Line Heads West Only	1.58
2	Van Buren St.	891951.93	540144.76	Electric	10/24/11	1006.29	1001.51	1001.19	(2) 2 1/2" Conduits E-W Laid 5" Wide	4.78
3	Van Buren St.	891947.84	540141.75	Water	10/24/11	1006.68	1002.30	——	6 1/2" PVC Pipe Found at Stub Out - Line Heads West Only	4.38
4	Van Buren St.	891914.00	540146.60	Electric	10/25/11	1004.99	1003.57	——	2 1/2 Conduit E-W	1.42
5	Van Buren St.	891856.97	540146.26	Gas	10/25/11	1004.06	1000.64	——	1 3/4" Wrapped Steel Pipe E-W	3.42
6	Van Buren St.	891841.05	540146.14	Telephone	10/25/11	1004.02	999.82	——	1 1/2" Direct Buried Cable E-W	4.20
7	Van Buren St.	891953.37	540648.62	Sewer	10/24/11	1004.00	——	——	Dug at Requested Location 5' Deep and 4' Wide - No Sewer Found	——
7A	Van Buren St.	891953.37	540660.07	Sewer	10/24/11	1003.87	1003.12	——	6" PVC Pipe Found at Stub Out - Line Heads East Only	0.75
8	Van Buren St.	891947.90	540648.53	Electric	10/24/11	1004.17	999.02	998.33	(2) 2 1/2" Conduits E-W Laid 8" Wide	5.15
9	Van Buren St.	891944.52	540648.48	Water	10/24/11	1004.22	——	——	Dug at Requested Location 9' Deep and 4' Wide - No Water Line Found	——
9A	Van Buren St.	891944.52	540654.58	Water	10/24/11	1003.62	1000.66	——	5" PVC Pipe Found at Stub Out - Line Heads East Only	2.96
10	Van Buren St.	891912.34	540648.39	Electric	10/25/11	1002.88	1001.36	——	2 1/2 Conduit E-W	1.52
11	Van Buren St.	891901.08	540648.31	Gas	10/25/11	1002.45	——	——	Per SWG, No Gas Line at This Location - Cardno Could Not Obtain Signal	——
12	Van Buren St.	891852.37	540648.09	Gas	10/25/11	1002.79	999.69	——	1 3/4" Steel Pipe E-W	3.10
13	Van Buren St.	891838.53	540648.04	Telephone	10/25/11	1002.78	997.42	——	1 1/2" Direct Buried Cable E-W	5.36



SCALE 1" = 40'

Client/Project
ROOSEVELT IRRIGATION DISTRICT
FCDMC FRS #4
RID Lateral 7 3/4

Figure No.
1

Title
POTHOLE REQUEST

October 2011 181300236

Stantec Consulting Services Inc.
8211 South 48th Street
Phoenix AZ 85044 U.S.A.
Tel. 602.438.2200
Fax. 602.431.9562
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Stantec

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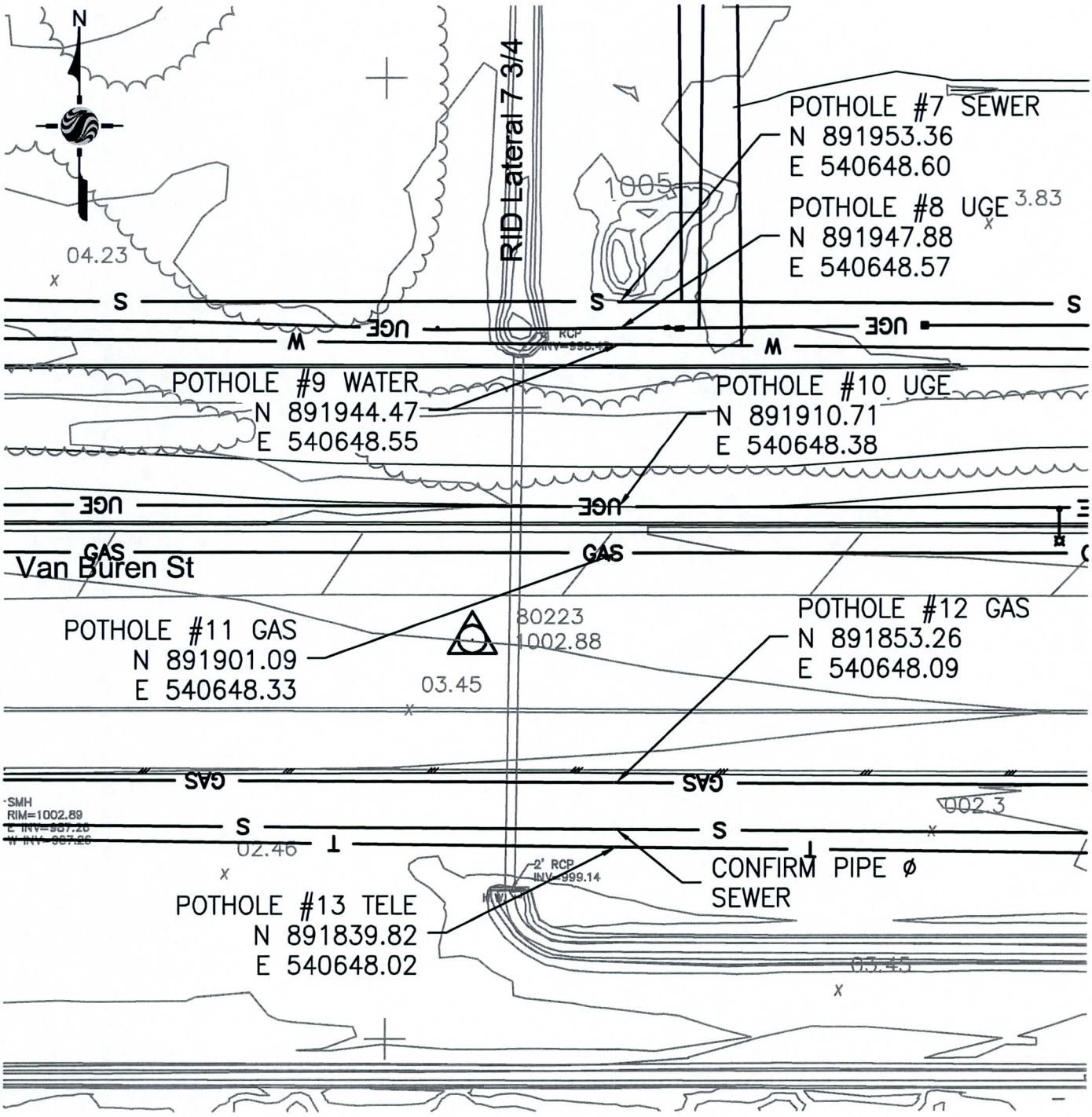

SCALE 1" = 40'

Client/Project
ROOSEVELT IRRIGATION DISTRICT
FCDMC FRS #4
RID Lateral 7 2/3

Figure No.
2

Title
POTHOLE REQUEST

October 2011 181300236

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Stantec Consulting Services Inc.
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www.stantec.com

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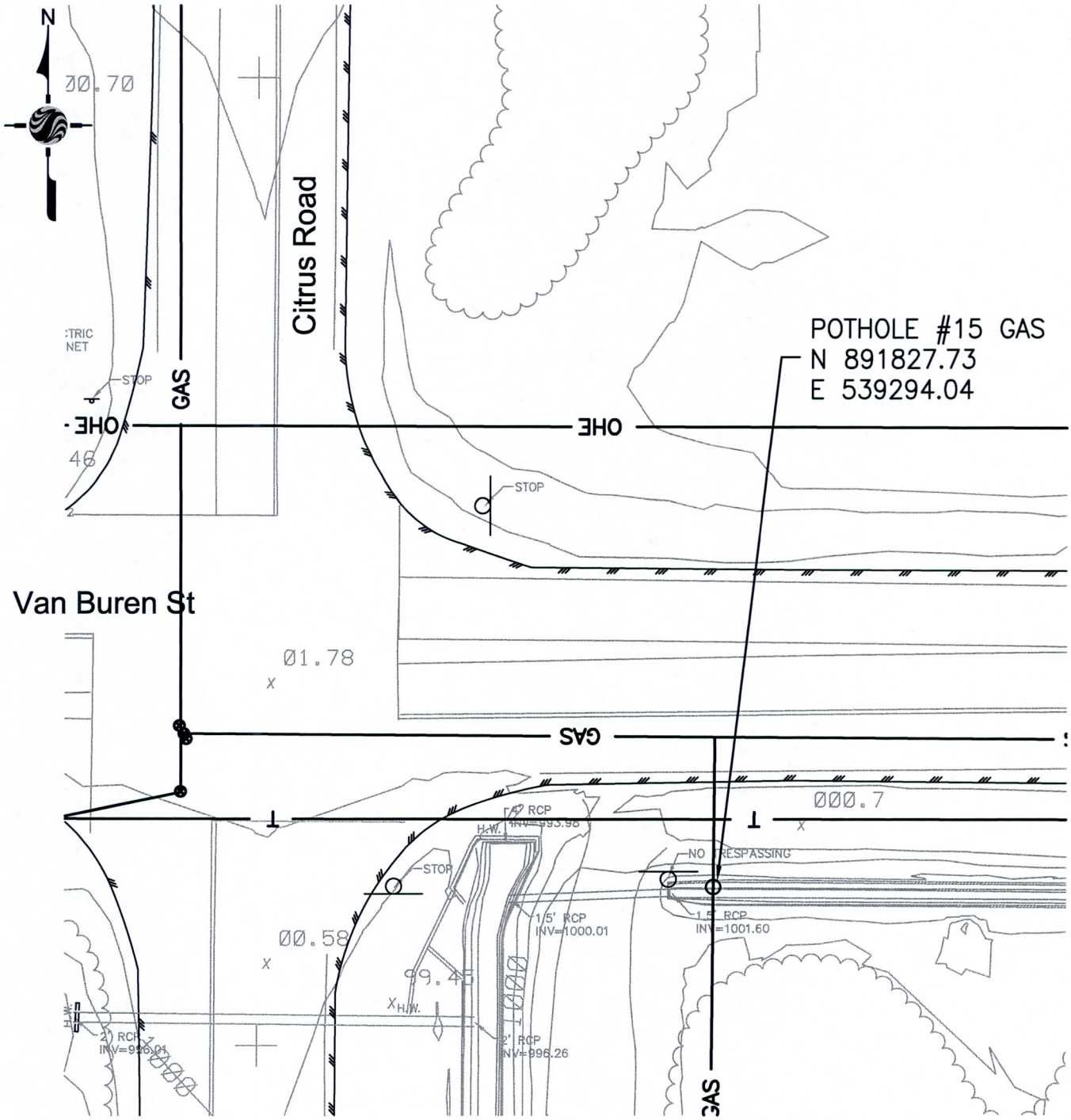

SCALE: NTS

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Client/Project
ROOSEVELT IRRIGATION DISTRICT
FCDMC FRS #4
RID Lateral 8

Figure No.
3

Title
POTHOLE REQUEST

October 2011 181300236

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10/24/2011 8:41:43 AM By: Reid, Heather

Appendix D

Geotechnical Report

GEOTECHNICAL EVALUATION
WHITE TANKS NO. 4 OUTLET FACILITY
VAN BUREN STREET FROM
JACKRABBIT TRAIL TO COTTON LANE
MARICOPA COUNTY, ARIZONA

PREPARED FOR:
OLSSON Associates
7250 North 16th Street, Suite 210
Phoenix, Arizona 85020

PREPARED BY:
Ninyo & Moore
Geotechnical and Environmental Sciences Consultants
3202 East Harbour Drive
Phoenix, Arizona 85034

November 11, 2011
Project No. 603248001

November 11, 2011
Project No. 603248001

Mr. Jeff Ford, P.E.
OLSSON Associates
7250 North 16th Street, Suite 210
Phoenix, Arizona 85020

Subject: Geotechnical Evaluation
White Tanks No. 4 Outlet Facility
Van Buren Street from Jackrabbit Trail to Cotton Lane
Buckeye, Arizona

Dear Mr. Ford:

In accordance with our proposal dated October 7, 2010, and your authorization, Ninyo & Moore is pleased to submit this geotechnical evaluation report for the White Tanks No. 4 Outlet Facility project in Buckeye, Arizona. This report presents our findings, conclusions, and geotechnical recommendations for this project.

We appreciate the opportunity to be of service to you during this phase of the project.

Sincerely,
NINYO & MOORE

Jeffrey S. Rodgers, R.G.
Project Geologist

EXPIRES 3/31/12

Steven D. Nowaczyk, P.E.
Principal Engineer

EXPIRES: 06/30/12

JSR/SAH/SDN/clj

Distribution: (1) Addressee (via email)

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1. INTRODUCTION

In accordance with our proposal dated October 7, 2010, and your authorization, we have performed a geotechnical evaluation for the White Tanks No. 4 Outfall Facility project in Maricopa County, Arizona. The purpose of our evaluation was to assess the subsurface conditions at the project site in order to formulate geotechnical recommendations for design and construction of the new outfall facility. This report presents the results of our evaluation and our geotechnical conclusions and recommendations regarding the proposed construction.

2. SCOPE OF SERVICES

Our scope of services for this project generally included:

- Reviewing readily available aerial photographs and published geologic literature, including maps and reports pertaining to the project site and vicinity.
- Conducting a visual geologic reconnaissance of the project area.
- Establishing the boring locations in the field and locating nearby underground utilities through Arizona Blue Stake prior to drilling.
- Drilling, logging, and sampling 18 exploratory soil borings to depths ranging from approximately 20 to 25 feet below ground surface (bgs). The borings were logged in general accordance with ASTM D 2488. Descriptions of the soils encountered are presented on the boring logs in Appendix A.
- Conducting geotechnical laboratory testing of representative samples obtained from the borings that consisted of, in-situ moisture content and dry density, particle-size gradation analyses, Atterberg limits, consolidation (response-to-wetting), and corrosivity characteristics (including pH, minimum electrical resistivity, soluble sulfates, and chlorides). The results of the laboratory tests are presented on the boring logs in Appendix A and/or in Appendix B.
- An agronomic test was conducted on a selected sample from our borings. The results are presented in Appendix C.
- Boring logs from a previous nearby geotechnical evaluation is presented in Appendix D.
- Coring the existing pavement at four locations along Van Buren Street to evaluate the existing pavement section. Photographic documentation of the pavement cores are presented in Appendix E.

- Preparation of this report presenting our findings, conclusions, and geotechnical recommendations.

3. SITE DESCRIPTION

The project alignment extends along Van Buren Street from the White Tanks Flood Retarding Structure (FRS) No. 4 Dam (situated near the northwest corner of the intersection of Van Buren Street and Jackrabbit Trail) to Cotton Lane (Figure 1). The alignment is situated within Township 1 North, Range 2 West, and follows the southern boundaries of Sections 1 through 5, and the northern boundaries of Sections 8 through 12. The Gila River was situated approximately 4 miles to the south of the site.

At the time of our evaluation, Van Buren Street generally consisted of a two-lane, asphalt paved roadway with a center turning lane. Van Buren Street crossed over the Roosevelt Irrigation District (RID) Canal approximately one-half mile west of Citrus Road. Agricultural land and residential development was observed along the north and south sides of the project alignment.

Based on the Perryville, Arizona United States Geologic Survey (USGS) Topographic Quadrangle Map (1982), the elevation of the project site generally ranges from approximately 1,030 feet relative to mean sea level (MSL) at the western limits, to approximately 990 feet MSL at the eastern limits, with approximately 40 feet of topographic relief over a horizontal distance of approximately 3 miles along the project alignment. Based on this topographic map, the regional topography at the project site generally slopes from the northwest down to the southeast.

Several aerial photographs of the project site were reviewed for this project. A 1937 Flood Control District of Maricopa County (FCDMC) aerial photograph depicted the site as undeveloped desert land to the west of the RID Canal. East of the RID Canal was depicted as agricultural land. A 1949 FCDMC aerial photograph depicted agricultural land along the north and south sides of Van Buren Street on both sides of the RID Canal. A 1958 photograph from Historicaerials.com and a 1959 FCDMC photograph depicted White Tanks FRS No. 4 constructed near the northwest corner of Van Buren Street and Jackrabbit Trail. A 1993 aerial

photograph depicted the site as being similar to its current condition, with scattered residential structures and agricultural land adjacent to the north and south sides of Van Buren Street.

4. PROPOSED CONSTRUCTION

This project consists of the design and construction of a new outlet facility structure that will extend from the White Tanks FRS No. 4 and connect to the proposed outfall structure to be constructed along Cotton Lane. The new pipe will be 84 inches in diameter, and have invert depths ranging from approximately 10 to 15 feet bgs. The installation of the trench will be done using traditional cut-and-cover techniques, with the exception of where the alignment crosses the RID Canal. Trenchless technologies will be utilized at this crossing. In areas that are affected by the construction of this project, the roadway will be restored.

5. FIELD EXPLORATION AND LABORATORY TESTING

On February 11, 2011 through February 15, 2011, Ninyo & Moore conducted a subsurface evaluation at the site in order to evaluate the existing subsurface conditions and to collect soil samples for laboratory testing. Our evaluation consisted of drilling, logging, and sampling of 18 small-diameter borings, denoted as B-1 through B-18. The borings were advanced using a Diedrich D-120 truck-mounted drill rig equipped with hollow-stem augers. The borings extended to approximately 20 feet bgs, with the exception of borings B-9 and B-10, which extended to approximately 25 feet bgs. The approximate location of the borings are depicted on Figure 2.

Ninyo & Moore personnel logged the borings in general accordance with the Unified Soil Classification System (USCS) and American Society for Testing and Materials (ASTM D 2488) by observing cuttings and drive samples. Collected ring samples were trimmed in the field, wrapped in plastic bags, and placed in cylindrical plastic containers to retain in-place moisture conditions. Similarly, the Standard Penetration Test (SPT) and bulk samples were sealed in plastic bags to retain their approximate in-place moisture.

The soil samples collected from our drilling activities were transported to the Ninyo & Moore laboratory in Phoenix, Arizona for geotechnical laboratory testing. The testing included in-situ moisture content and dry density, particle-size gradation analysis, Atterberg limits, consolidation (response-to-wetting), corrosivity characteristics (including pH, minimum electrical resistivity, soluble sulfates, and chlorides), and agronomic testing. The results of the in-situ moisture content and dry density testing are presented on the boring logs in Appendix A. A description of each laboratory test method and the remainder of the test results are presented in Appendix B. The results of the agronomic testing are presented in Appendix C.

In addition to the boring exploration, Ninyo & Moore cored the existing pavement at four locations, denoted as C-1 through C-4 along Van Buren Street to evaluate the pavement thickness and underlying aggregate base (AB) thickness along the roadway. The pavement section observations are further described in Section 6.2.1. Photographs of the pavement cores are presented in Appendix E. Approximate locations of the cores are depicted on Figure 2.

In addition, soil borings and laboratory data from a previous Ninyo & Moore geotechnical evaluation near the northwest corner of Jackrabbit Trail and Van Buren Street were reviewed for additional data for this report. Additional geotechnical borings and laboratory testing from a previous evaluation is presented in Appendix D.

6. GEOLOGY AND SUBSURFACE CONDITIONS

The geology and subsurface conditions at the site are described in the following sections.

6.1. Geologic Setting

The project site is located in the Basin and Range physiographic province. The Basin and Range physiographic province is typified by broad alluvial valleys separated by steep, discontinuous, and subparallel mountain ranges. The mountain ranges generally trend north-south and northwest-southeast. The basin floors consist of alluvium with thickness extending to several thousands of feet.

The basins and surrounding mountains were formed approximately 10 to 18 million years ago during the Mid- to Late-Tertiary. Extensional tectonics resulted in the formation of horsts (mountains) and grabens (basins) with vertical displacement along high-angle normal faults. Intermittent volcanic activity also occurred during this time. The surrounding basins filled with alluvium from the erosion of the surrounding mountains as well as from river deposition. Coarser-grained alluvial material was deposited at the margins of the basins near the mountains.

The surficial geology of the site is described as Holocene to Early Pleistocene (10,000 years to 1,000,000 years) age alluvial deposits. These deposits are generally deposited by channel and sheet-flood deposits. They are described as being silt, sand, gravel and cobbles. Calcic horizons ranging from Stage I (grains somewhat coated) to Stage II (grains coated) in younger deposits, and Stage III (caliche cementation) to IV (caliche layers) in the older units (Pearthree, 1991).

6.2. Subsurface Conditions

Our knowledge of the subsurface conditions at the project site is based on our review of background documents, field exploration, laboratory testing, and general experience in the area. The following sections provide a generalized description of the materials encountered. More detailed descriptions are presented on the boring logs in Appendix A.

6.2.1. Asphalt Concrete and Aggregate Base

Asphalt concrete (AC) was encountered at the surface of Boring B-16, and was approximately 5 inches thick. AB was encountered underlying the AC in this boring, and was approximately 10 inches thick. The AB generally consisted of poorly graded gravel with sand in our boring. In our pavement cores, AC was encountered at the surface and generally ranged in thickness from approximately 3 to 5 inches. Underlying the AC in cores C-1 and C-2, AB was encountered and ranged in thickness from approximately 4 to 8 inches. In cores C-3 and C-4, AB was not encountered underlying the AC.

6.2.2. Fill

Fill was encountered at the surface of each of our borings, except Boring B-16, where it was encountered underlying the pavement section described above. The fill ranged in thickness from approximately 3 to 8 feet in our borings. The fill material encountered in our borings generally consisted of clayey sand, and silty sand in our borings. Varying amounts of gravel were observed in the fill material, as well as re-worked caliche filaments and nodules.

6.2.3. Alluvium

Alluvium was encountered underlying the fill in each of our borings, and extended to the total explored depth of our borings. The alluvium was heterogeneous in stratigraphy, and generally consisted of sandy clay, sandy silt, clayey sand, silty sand, well graded sand with silt and gravel, clayey gravel with sand, and silty gravel with sand. Zones of variable weak to strong cementation were encountered in the alluvium in our borings, as well as cobbles and possible boulders.

6.2.4. Groundwater

Groundwater was not encountered in any of our borings during drilling. Well data provided by the Arizona Department of Water Resources (ADWR) indicates groundwater has been historically encountered and/or perched saturated soil zones at approximately 200 feet bgs. However, it should be noted that groundwater levels could fluctuate due to seasonal variations, the project site's close proximity to RID Canal and Gila River, irrigation, groundwater withdrawal or recharge, surface run-off, perched groundwater zones, and areas adjacent to and in ephemeral streams, and other factors not apparent at the time of our field work.

Based on Federal Emergency Management Agency published Flood Hazard Maps, the project site is mapped in an area that has a 0.2 percent chance annually of flooding, except in the areas adjacent to the RID Canal, which has been mapped as having a 1 percent annual chance of shallow flooding on the order of 1 to 3 feet.

In general, shallow flooding may be encountered during construction following a heavy precipitation event, which may need to be mitigated during construction.

7. GEOLOGIC HAZARDS

The following section provides a discussion regarding potential geologic hazards such as land subsidence and earth fissures, faulting and seismicity, and liquefaction potential.

7.1. Land Subsidence and Earth Fissures

Groundwater depletion, due to groundwater pumping, has caused land subsidence and earth fissures in numerous alluvial basins in Arizona. It has been estimated that subsidence has affected more than 3,000 square miles and has caused damage to a variety of engineered structures and agricultural land (Schumann and Genualdi, 1986). From 1948 to 1983, excessive groundwater withdrawal has been documented in several alluvial valleys where groundwater levels have been reportedly lowered by up to 500 feet. With such large depletions of groundwater, the alluvium has undergone consolidation resulting in large areas of land subsidence.

In Arizona, earth fissures are generally associated with land subsidence and pose an on-going geologic hazard. Earth fissures generally form near the margins of geomorphic basins where significant amounts of groundwater depletion have occurred. Reportedly, earth fissures have also formed due to tensional stress caused by differential subsidence of the unconsolidated alluvial materials over buried bedrock ridges and irregular bedrock surfaces (Schumann and Genualdi, 1986).

Based on our field reconnaissance and review of the referenced material, there are no known earth-fissures present at the surface of the subject site. The closest documented earth fissure to this site is approximately 3 miles to the north of the site. Continued groundwater withdrawal in the area may result in subsidence of the valley and the formation of new fissures or the extension of existing fissures. The occurrence of earth fissures cannot accurately be predicted. Due to this unpredictable nature of earth fissures, a future occurrence along the

project alignment cannot be accurately predicted. In general, land subsidence and earth fissures are not expected to be a constraint to the construction of the project.

7.2. Faulting and Seismicity

The site lies within the Sonoran zone, which is a relatively stable tectonic region located in southwestern Arizona, southeastern California, southern Nevada, and northern Mexico (Euge et al., 1992). This zone is characterized by sparse seismicity and few Quaternary faults. Based on our field observations, review of pertinent geologic data, and analysis of aerial photographs, faults are not located on or adjacent to the property. The closest fault to the site is the Sand Tank Fault, located about 40 miles to the south of the site. The Sand Tank Fault is situated along the western piedmont of the Sand Tank Mountains, to the southeast of Gila Bend. The fault is a northeast striking normal fault that dips to the northwest. Recent movement along this fault was documented as being approximately 70,000 years ago during the Late Pleistocene epoch. The slip-rate category of this fault is less than 0.2 millimeters per year (Pearthree, 1998).

7.3. Liquefaction Potential

Based on the SPT values at the site and the low ground motion hazard (relatively low ground accelerations), the likelihood or potential for liquefaction is considered to be negligible and is therefore not a design concern for this project.

8. CONCLUSIONS

Based on the results of our subsurface evaluation, laboratory testing, and data analysis, it is our opinion that the proposed construction is feasible from a geotechnical standpoint, provided that the recommendations of this report are incorporated into design and construction of the proposed project, as appropriate. Geotechnical considerations include the following:

- The on-site soils should generally be excavatable to the anticipated earthwork depths with heavy-duty earth moving construction equipment in good working condition. However,

cemented soils, cobbles and possible boulders were encountered at various locations in our borings. These soils or dense granular soils may result in slower excavation rates.

- We estimate an earthwork (shrinkage) factor of 10 to 20 percent if the on-site soils are re-used as fill.
- Based on the results of the field and laboratory evaluations, it is our opinion that new pavement should be founded on a zone of adequately moisture-conditioned and compacted engineered fill.
- Imported soils and soils generated from on-site excavation activities that exhibit a very low to low swell potential can generally be used as engineered fill, provided any oversized or heavily cemented materials are either broken down or wasted. Many of the on-site soils observed may meet this criterion; however, fine-grained sand silts were encountered in our borings, which are not acceptable for use as engineered fill.
- Temporary side slopes of 1.5:1 (horizontal:vertical) can be used for much of the project alignment.
- Excavations near existing utilities may encounter backfill that will differ from native materials.
- Cohesionless soils were encountered during our field exploration. These soils may cause potential for trench wall stability by not keeping the trench open long enough for trench box placement.
- Backfill should be compacted in a manner that discourages surface water infiltration.
- Groundwater was not observed in our borings. However, perched groundwater might be encountered in the excavations. Groundwater should be monitored up to and during construction, including the jack-and-bore locations.
- Corrosivity test results indicate that subgrade soils at the site may be corrosive to ferrous metals, and the sulfate content of the soils present a negligible sulfate exposure to concrete.

9. RECOMMENDATIONS

The following sections present our geotechnical recommendations for the proposed design and construction. If the proposed construction is changed from that discussed in this report, Ninyo & Moore should be contacted for additional recommendations.

9.1. General Earthwork

The following sections provide our earthwork recommendations for this project. In general, the earthwork specifications contained in Maricopa Association of Governments (MAG), *Uniform Standard Specifications and Details for Public Works Construction* are expected to apply unless specifically noted.

9.1.1. Excavations

Our evaluation of the excavation characteristics of the subsurface materials along the project alignment is based on the results of 18 exploratory soil borings, site observations, and our experience with similar materials and nearby projects. In our opinion, excavation of the site materials can generally be accomplished using heavy-duty earthmoving equipment that is in good operating condition. During our field exploration, we encountered varying degrees of calcic cementation as well as cobbles and possible boulders. These materials could be difficult to excavate during construction depending on the actual degree of cementation and size of the materials encountered. Excavation rates may slow down in this material. Depending on the excavation conditions during construction, more aggressive excavation techniques may be needed.

Any debris encountered during excavation should be removed from the site and disposed of at a legal dumpsite.

Following excavation activates, and prior to the placement of engineered fill or other construction, the geotechnical consultant should carefully evaluate the exposed surfaces of the trench. Evaluation techniques may include soil probing, density testing, etc. Based on the evaluation, additional earthwork may be needed. In areas of soft or wet soils, drying, scarifying, or overexcavation may be appropriate for the trench bottoms. In areas where materials that are not suitable for re-use (e.g., organics, plastic clays, etc.) are observed, additional overexcavation may be needed.

9.1.2. Temporary Slope Stability

Excavations that are 20 feet deep or less could be constructed using a sloped excavation in accordance with Occupational Safety and Health Administration (OSHA) Standards. OSHA standards provide trench sloping and shoring design parameters for trenches as deep as 20 feet, based on the soil types encountered.

Soils of low cohesion were encountered during our field exploration. Because of these soils, we recommend that the OSHA soil "*Type C*" be used for the fill and alluvial soils along the alignment. Based on OSHA standards, this corresponds to a temporary side slope of 1.5:1 (horizontal to vertical), or flatter, in sloped excavations that are less than 20 feet.

Temporary excavations that encounter surface or groundwater seepage may need shoring and/or stabilization, by placing sandbags or gravel along the base of the seepage zone. Excavations encountering seepage should be evaluated on a case-by-case basis. Slope stability for trenches deeper than 20 feet should be designed by the contractor's engineer based on alignment-specific soil properties and settlement-sensitive features.

9.1.3. Temporary Shoring

Because of the adjacent parallel adjacent utilities, temporary shoring may be needed during construction to prohibit the undermining of the nearby utlities and to also help stabilize their backfill soils. Also, temporary earth retention systems can be used for this project if an excavation of a 1.5:1 (horizontal:vertical) or flatter slope is undesirable. Temporary earth retention systems may include braced systems, such as trench boxes or shields with internal supports or cantilever systems (e.g. soldier piles and lagging).It should be noted that due to the cohesionless nature of the site soils, the trench sidewalls may not stay open long enough for the placement of trench boxes.

We recommend the lateral earth pressures for braced temporary earth retention systems that presented on Figure 3. These earth pressures are based on the assumptions that the shoring system will be constructed without raising the ground surface elevation behind

shoring system, and that there are no surcharge loads, such as soil stockpiles and/or construction materials or any other loads acting above a 1:1 (horizontal to vertical) plane that extends up and back from the dredge line. For earth retention systems subjected to the above-mentioned surcharge loads, the contractor should include the effect of these loads on the design lateral earth pressures.

We anticipate that settlement of the ground surface will occur behind shoring systems during excavation. The amount of settlement generally depends on the type of shoring system used, the contractor's workmanship, and soil conditions. We recommend that roadways, any utilities, and any structures in the vicinity of the planned shoring installation be reviewed with regard to foundation support and tolerance to settlement. To reduce the potential for distress to adjacent structures, we recommend that the retaining system be designed to limit the ground settlement behind the shoring system to ½-inch or less. Possible causes of settlement that should be addressed generally include:

- Settlement during excavation for structure construction;
- Construction vibrations; and
- Removal of the support system.

We recommend that the shoring installation be evaluated carefully by the contractor prior to construction and that ground vibration and settlement monitoring be performed during construction.

The contractor should retain a qualified and experienced engineer to design the shoring system. The contractor should evaluate the adequacy of the shoring parameters presented in this report, and make the appropriate modifications for their design. We recommend that the contractor take appropriate measures to protect the workers. OSHA requirements pertaining to workers safety should be observed.

9.1.4. Bottom Stability and Construction Dewatering

The proposed excavations are not anticipated to encounter significant groundwater (with the possible exception of surface run-off or perched zones) during construction. Therefore, trench bottom stability problems during construction generally not anticipated at this site. However, since excavations will be placed near the RID Canal, due to possible perched groundwater near irrigated agricultural land, or if excavations are located near drainage ditches, or near a known wash, arroyo, or drainage area that are open during a heavy rain event, the trench material(s) might become saturated and unstable and a dewatering system may be needed for these conditions. Groundwater should be monitored at this site prior to, and during construction.

In addition, cohesionless soils (silts and fine sand) were encountered in our borings, which may result in instability of the trench bottom. Stabilization of these soils, if encountered, may be needed.

9.1.5. Pipe Bedding

We recommend that the pipeline be supported on 7 inches, or more, (or 1/12 of the outside diameter of the pipe, whichever is more) of granular material that has particle sizes no more than 1-1/2 inches in diameter, and has 3 to 15 percent passing the No. 200 sieve. This bedding/pipe-zone backfill should extend 1 foot above the pipe crown. Care should be taken not to allow voids to form beneath the pipe (i.e., the pipe haunches should be supported) to avoid damaging the pipeline. This may involve fill placement by hand or small compaction equipment. The bedding/pipe zone should be placed in horizontal lifts no more than approximately 8 inches in loose thickness and compacted by appropriate mechanical methods, to a relative compaction of 95 percent (as evaluated by ASTM D 698) and at a moisture content slightly above laboratory optimum. Pipe Bedding Guidelines are presented on Figure 4.

The modulus of soil reaction (E′) is used to characterize the stiffness of soil backfill placed on the sides of buried pipelines for the purpose of evaluating deflection caused

by the weight of the backfill over the pipe. We anticipate that the invert depth of the water main will generally be on the order of 10 to 14 feet bgs, with a cover of 4 feet, or more above the pipe. For granular backfill bedding soils for pipes, we recommend using an E′ value of 1,500 pounds per square inch (psi).

9.1.6. Trenchless Installation

As indicated earlier, trenchless technologies (i.e. jack-and-bore operations) may be needed to cross under the RID Canal. Based on the information from our borings in this area, trenchless techniques may be utilized. However, the presence of cementation, cobbles, and/or boulders observed along the project alignment could slow the rate of construction depending on the actual grain size of the material and/or the strength of the rock/clasts encountered during construction. In addition, cohesionless, soft, wet, and/or saturated soils may be present in the base of the pit, and may need stabilization. Groundwater should be monitored up to the time of construction and during construction at the jack-and-bore locations.

Caving of the pipe shaft may occur, particularly where relatively loose surface soils are present. For stability and safety purposes, and to reduce ground movement, a perimeter shaft support system (carrier casing) should be installed as the excavation progresses.

Following the installation of the utility inside the carrier casing, the annulus space should be in-filled with fine gravel or sand that is blown in with air from the ends. A portion of the gravel or sand could be blown in first (so as to fill under the haunches of the utility) to reduce the potential for future movement of the pipe.

We recommend that the contractor be responsible for the design of access shaft shapes, dimensions and ground support systems for the launching and receiving pit excavations so that such design can be compatible with his construction equipment and methods. Soldier piles with lagging or other types of shored excavations may serve as a suitable system for this project. Driven sheeting may be difficult to install because of hard ground conditions and the possibility of encountering buried gravel, bedrock, or caliche

cemented soils. In addition, driven sheeting may cause real and perceived damage by vibrations to nearby structures.

Jacking reaction force is developed by passive soil pressure resistance to the jacking operation against the surface of the opposite wall of the jacking pit. For the case of a jacking pit geometry which consists of a vertical face extending to the horizontal ground surface, an ultimate passive resistance of 360 pounds per square foot (psf) per foot of depth may be used. This value assumes no groundwater conditions. For a different jacking pit geometry, we should be contacted for supplemental recommendations. A factor of safety of 1.5 to 2.0 should be used to calculate the allowable jacking pit resistance.

Surface subsidence associated with these operations was not evaluated as part of our analysis. Nevertheless, the contractor should implement a monitoring program during these operations to observe any ground movement above and adjacent to the pipe being installed. If signs of subsidence or disturbance are noted, construction operations should be stopped to address the ground movement. The integrity of nearby utilities, roadways and canal lining will need to be protected during these operations.

9.1.7. Grading

Vegetation, and construction debris should be removed prior to the start of construction. Voids caused by the removal of debris or oversized particles, if any, should be filled with moisture-conditioned and compacted fill. We understand that sections of the roadway may be removed for this project. The pavement should also be removed and either recycled or disposed of in a legal dump site. Prior to placement of new fill, the geotechnical engineer should evaluate the exposed surface for any areas of soft or wet soils by methods such as proofrolling, probing, etc. If encountered, these areas may call for overexcavation or scarification of the surface.

9.1.8. Fill Placement and Compaction

Because of the nature of the site soils, we recommend that the lower 6 inches of the trench bottom be scarified, moisture-conditioned, and recompacted to 95 percent relative compaction per ASTM D 698 at a moisture content within 2 percent of its optimum.

Trench backfill zone, as discussed in this report, refers to the zone above the pipe zone/bedding backfill material in the trench. Backfill material in this zone should be moisture-conditioned to 2 percent of its laboratory optimum and mechanically compacted to a relative compaction of 95 percent as evaluated by ASTM D 698. Lift thickness for backfill will be dependent upon the type of compaction equipment utilized, but should generally be placed in lifts not exceeding 8 inches in loose thickness. Special care should be exercised to avoid damaging the pipe or other structures during the compaction of the backfill. The backfill should be done in a manner that discourages surface water infiltration.

The upper 2-foot zone, located below existing or proposed pavement/flatwork sections, should also be moisture-conditioned to slightly above its laboratory optimum; however, in this zone the material should be mechanically compacted to a relative compaction of 100 percent, for granular backfill, and 95 percent for clayey backfill, as evaluated by ASTM D 698.

Backfilling should be accomplished by mechanical methods; however compaction by flooding or jetting should not be permitted. The content of gravel in this backfill zone that is more than 1-1/2 inches in diameter should not exceed 40 percent of the backfill weight. In addition, particle sizes should not exceed 4 inches in diameter. Generated excavation materials that contain this oversize fraction shall not be used as backfill unless the material meets the criteria given above and/or the oversize fraction has been processed and removed from the material. Imported backfill material, if utilized, should meet the criteria for imported fill as presented in Section 9.1.7 of this report.

We recommend that new pavement sections be founded on a 6-inch zone of moisture-conditioned and compacted engineered fill to 95 percent relative compaction at a moisture content generally within 2 percent of its laboratory optimum. This can be achieved by either overexcavation or scarification. If new fill is used, it should be placed in horizontal lifts no more than approximately 8 inches in loose thickness. This improved zone should extend 2 feet horizontally beyond the edge of the pavement. To deter accumulation of water below the new pavement sections, the bottom of the overexcavated zone below the new pavement should be sloped toward the edges of the roadway.

Because of areas with relatively low density soils, an earthwork (shrinkage) factor ranging from 10 to 20 percent is estimated if the on-site soils are re-used as fill.

Thrust blocks that are installed in the trenches can be designed for a lateral earth pressure up to 3,000 pounds per square foot (psf).

9.1.9. T-Top Pavement Replacement

In asphalt concrete paved areas over trench excavations, we recommend the use of MAG "T-Top" Type Trench Backfill (MAG detail 200-1) with respect to the asphalt and aggregate replacement at the surface of the trench excavations, in order to reduce the potential for differential settlement and water infiltration into the subsurface. This includes the removal of asphalt and aggregate base to 1 foot or more beyond the extent of each side of the installation trench, extending to 1 foot or more below the bottom of the asphalt layer. In the T-Top, the thickness of AB should be 12 inches or match either existing or design thickness, whichever is deeper.

9.1.10. Suitable Fill and Borrow Material

Suitable engineered fill should not include deleterious or organic material, clay lumps, construction debris, rock particles, and other non-soil fill materials (including cobbles and possible boulders) larger than 4 inches in dimension. This material should be disposed of off-site.

In addition, suitable fill material should exhibit very low to low expansive potential, and not consist of sandy silts or fine sands. Very low to low expansive potential soils are defined as having an Expansion Index ([EI] by ASTM D 4829) of 50 or less, and a Plasticity Index ([PI] by ASTM D 4318) of 20 or less. Atterberg limits tests performed on selected soil samples from our borings resulted in PI values ranging from 0 (non-plastic) to 21. As such, many of the on-site soils will be suitable for re-use as engineered fill, provided that any oversized or cemented materials are broken down or wasted; however, some of the site soils are not acceptable for re-use as engineered fill. We recommend that additional observation, soil sampling, and possible laboratory testing be conducted during construction to better evaluate the presence of these unsuitable soils.

Imported fill, if utilized, should consist of granular material with a very low or low expansion potential. Import material in contact with ferrous metals should preferably have low corrosion potential (minimum resistivity more than 2,000 ohm-cm, chloride content less than 25 parts per million [ppm]). Import material in contact with concrete should have a soluble sulfate content of less than 0.1 percent. The geotechnical consultant should evaluate such materials and details of their placement prior to importation.

9.1.11. Controlled Low Strength Material

If desired, a Controlled Low Strength Material (CLSM) may be used as pipe or trench zone bedding or backfill material. This is recommended for the pipe support at the jack-and-bore location. CLSM, also known as Controlled Density Fill or "Slurry Cement Backfill," should be considered as an alternative pipe embedment and trench backfill material. CLSM consists of a fluid, workable mixture of aggregate, Portland cement, and water. The use of CLSM has some advantages:

- A narrower trench can be used, thereby minimizing the quantity of soil to be excavated and possibly reducing disturbance to the near-by traffic;

- The support given to the pipe is generally better, and higher values of modulus of soil reaction (E' = 3,000 psi) can be used to design the pipe;
- Compaction requirements do not apply;
- There is less risk of damaging the pipe, since little or no compaction is needed to place CLSM;
- If native soils are used to formulate the CLSM, less imported material will be needed;
- CLSM can be batched to flow into irregularities in the trench bottom and walls; and
- The number of workers needed inside the trench excavation is reduced.

The CLSM design mix should be in accordance with the MAG (2011) or Standard Specifications for Public Works Construction (American Public Works Association, 1991). Additional mix design information can be provided upon request. The 28-day strength of the material should be no less than 50 psi and no more than 120 psi. If on-site materials are used for the aggregate mixture, test batches may be needed to observe conformity with strength requirements.

Buoyant or uplift forces on the piping should be considered if a CLSM is used and prudent construction techniques may need multiple pours to avoid inducing excessive uplift forces. The construction methods should not allow for the pipeline to displace laterally or vertically during placement of CLSM. Sufficient time should be provided to allow the CLSM to cure before placing additional lifts of CLSM.

9.2. Seismic Design Considerations

Based on a Probabilistic Seismic Hazard Assessment for the conterminous United States, issued by the USGS (2002 data), the site is located in a zone where the peak ground accelerations having 10, 5, and 2 percent probability of being exceeded in 50 years are 0.04g, 0.05g, and 0.07g, respectively. These ground motion values are calculated for "firm rock" sites, which correspond to a shear-wave velocity of approximately 2,500 feet per second in approximately the top 100 feet bgs. Different soil or rock types may amplify or

de-amplify these values. The proposed improvements should be designed in accordance with the requirements of governing jurisdictions and applicable building codes. Table 1 presents the seismic design parameters for the site in accordance with International Building Code (IBC, 2009) guidelines and mapped spectral acceleration parameters (USGS, 2011).

Table 1 – 2009 International Building Code Seismic Design Criteria

Seismic Design Factors	Value
Site Class	D
Site Coefficient, F_a	1.6
Site Coefficient, F_v	2.4
Mapped Spectral Acceleration at 0.2-second Period, S_s	0.167 g
Mapped Spectral Acceleration at 1.0-second Period, S_1	0.059 g
Spectral Acceleration at 0.2-second Period Adjusted for Site Class, S_{MS}	0.267 g
Spectral Acceleration at 1.0-second Period Adjusted for Site Class, S_{M1}	0.141 g
Design Spectral Response Acceleration at 0.2-second Period, S_{DS}	0.178 g
Design Spectral Response Acceleration at 1.0-second Period, S_{D1}	0.094 g

9.3. Pavements

The following sections present our recommendations for the pavement repair along Van Buren Street.

9.3.1. Existing Pavement

As previously described, the existing AC encountered during our exploration generally ranged in thickness from approximately 3 inches to 5 inches thick. The AB, where encountered, ranged in thickness from approximately 4 to 8 inches in our pavement core and boring locations. Also as previously mentioned, AB was not encountered in our pavement core locations C-3 and C-4.

9.3.2. Pavement Restoration

We recommend that the pavements be supported on a zone of moisture-conditioned and compacted fill as described in Section 9.1.6. A pavement design was not a part of our scope of work for this project; however, based on our observations of the existing pavement sections, we recommend that the restored pavement section consist of 5

inches of AC over 8 inches of AB. This section will meet the Structural Number provided by Maricopa County Department of Transportation. We recommend that the asphalt pavement be in accordance with MAG Section 710, and the AB be in accordance with MAG Section 702 as shown in Table 2.

Table 2 – Recommended AB Gradation

Sieve Size (per ASTM D422-63)	Percent Passing by Weight
1 1/4 inch	100
No. 4	38-65
No. 8	25-60
No. 30	10-40
No. 200	3-12
P.I. Max.	5

9.4. Corrosion

The corrosion potential of the on-site materials was analyzed to evaluate its potential effect on the associated utilities and concrete. Corrosion potential was evaluated using the results of laboratory testing of a near-surface soil sample obtained during our subsurface evaluation that was considered representative of soils along the project alignment.

Laboratory testing consisted of pH, minimum electrical resistivity, and chloride and soluble sulfate contents. The pH and minimum electrical resistivity tests were performed in general accordance with Arizona Test 236b, while sulfate and chloride tests were performed in accordance with Arizona Test 733 and 736, respectively. The results of the corrosivity tests are presented in Appendix B.

The pH test results from selected representative samples at the ranged from 7.7 to 7.9, which represents a basic environment. The minimum electrical resistivity measured in the laboratory ranged from 3,283 ohm-cm to 4,036 ohm-cm which is not considered corrosive to ferrous metals; however, the chloride content measured ranged from 21 ppm to 62 ppm, which indicates that the soil may be corrosive to ferrous metals. The soluble sulfate content

of the soil samples tested ranged from 0.007 to 0.008 percent, which is considered to represent negligible sulfate content for concrete attack.

Based on this information, the site is considered to be corrosive to ferrous materials and represent a negligible exposure of sulfates to concrete. Therefore, we recommend a corrosion specialist be consulted for further recommendations pertaining to corrosion protection (such as pipe wrapping, cathodic protection, etc.) of any ferrous materials.

9.5. Concrete

Laboratory chemical tests performed on selected samples of on-site soils indicated sulfate contents ranging from 0.007 to 0.008 percent by weight. Based on the following American Concrete Institute (ACI) table, the on-site soils should be considered to have a negligible sulfate exposure to concrete.

Table 3 – ACI Requirements for Concrete Exposed to Sulfate-Containing Soil

Sulfate Exposure	Water-Soluble Sulfate (SO_4) in Soil, Percentage by Weight	Cement Type	Water-Cementitious Materials Ratio, by Weight, Normal-Weight Aggregate Concrete[1]	f'_c, Normal-Weight and Lightweight Aggregate Concrete, psi x 0.00689 for MPa
Negligible	0.00 - 0.10	--	--	--
Moderate[2]	0.10 - 0.20	II, IP(MS), IS (MS)	0.50, or less.	4,000, or more.
Severe	0.20 - 2.00	V	0.45, or less.	4,500, or more.
Very severe	Over 2.00	V plus pozzolan[3]	0.45, or less.	4,500, or more.

[1] A lower water-cementitious materials ratio or higher strength may be needed for low permeability or for protection against corrosion of embedded items or freezing and thawing (Table 4.2.2).
[2] Seawater.
[3] Pozzolan that has been evaluated by test or service record to improve sulfate resistance when used in concrete containing Type V cement.

Notwithstanding the sulfate test results, and due to the limited number of chemical tests performed, as well as our experience with similar soil conditions, we recommend the use of Type II cement for construction of concrete structures at this site. Due to potential uncertainties as to the use of reclaimed irrigation water, or topsoil that may contain higher sulfate contents, pozzolan or admixtures designed to increase sulfate resistance may be considered.

The concrete should have a water-cementitious materials ratio no more than 0.50 by weight for normal weight aggregate concrete. The structural engineer should ultimately select the concrete design strength based on the project specific loading conditions. Higher strength concrete may be selected for increased durability and resistance to slab curling and shrinkage cracking. Air entrainment should be used for exposed concrete for this project.

In order to reduce the potential for shrinkage cracks in the concrete during curing, we recommend that the concrete be placed with a slump in accordance with Table 5.2.1 of Section 302.1R of "Guidelines for Floor and Slab Construction," or Table 2.2 of Section 332R in "Guidelines for Residential Cast-in-Place Concrete Construction." If a higher slump is needed for screeding and leveling, a super plasticizer is recommended to achieve the higher slump without changing the recommended water to cement ratio. The slump should be checked periodically at the site prior to concrete placement. We also recommend that crack control joints be provided in slabs in accordance with the recommendations of the structural engineer to reduce the potential for distress due to minor soil movement and concrete shrinkage. We further recommend that concrete cover over reinforcing steel for slabs on grade and foundations be in accordance with IBC 1907.7.1. The structural engineer should be consulted for additional concrete specifications.

9.6. Concrete Flatwork

To reduce the potential manifestation of distress to any concrete flatwork (such as curbs and sidewalks) due to movement of the underlying soil, we recommend that such flatwork (if utilized for this project) be installed with crack-control joints at appropriate spacing as

designed by the structural engineer. We recommend that concrete flatwork be supported on 6 or more inches of adequately moisture-conditioned and compacted engineered fill as described in Section 9.1.6 of this report. Positive drainage should be established and maintained adjacent to flatwork.

9.7. Site Drainage

Surface drainage in areas not containing underground drainage (e.g. curb and gutter sections) should be provided to divert water away from the paved surfaces. Surface water should also not be permitted to pond on or below pavement areas. Positive drainage for this project is defined as a slope of 2 percent or more for a distance of 5 feet or more away from the pavements. To deter accumulation of water below the new pavement sections, the bottom of the overexcavated zone below the new pavement should be sloped toward the edges of the roadway.

9.8. Pre-Construction Conference

We recommend that a pre-construction conference be held. Representatives of the owner, the civil engineer, the geotechnical consultant, and the contractor should be in attendance to discuss the project plans and schedule. Our office should be notified if the project description included herein is incorrect or if the project characteristics are significantly changed.

9.9. Construction Observation and Testing

During construction operations, we recommend that a qualified geotechnical consultant perform observation and testing services for the project. These services should be performed to evaluate exposed subgrade conditions, including the extent and depth of overexcavation, to evaluate the suitability of proposed borrow materials for use as fill and to observe placement and test compaction of fill soils. Qualified subcontractors utilizing appropriate techniques and construction materials should perform construction of the proposed improvements.

10. LIMITATIONS

The field evaluation, laboratory testing, and geotechnical analyses presented in this geotechnical report have been conducted in general accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in the project area. No warranty, expressed or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be encountered during construction. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluation will be performed upon request. Please also note that our evaluation was limited to assessment of the geotechnical aspects of the project, and did not include evaluation of structural issues, environmental concerns, or the presence of hazardous materials.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ninyo & Moore should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document.

This report is intended for design purposes only. It does not provide sufficient data to prepare an accurate bid by contractors. It is suggested that the bidders and their geotechnical consultant perform an independent evaluation of the subsurface conditions in the project areas. The independent evaluations may include, but not be limited to, review of other geotechnical reports prepared for the adjacent areas, site reconnaissance, and additional exploration and laboratory testing.

Our conclusions, recommendations, and opinions are based on an analysis of the observed site conditions. If geotechnical conditions different from those described in this report are encountered, our office should be notified and additional recommendations, if warranted, will be provided upon request. It should be understood that the conditions of a site could change with time as a result of natural processes or the activities of man at the subject site or nearby sites. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur

due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Ninyo & Moore has no control.

This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

11. REFERENCES

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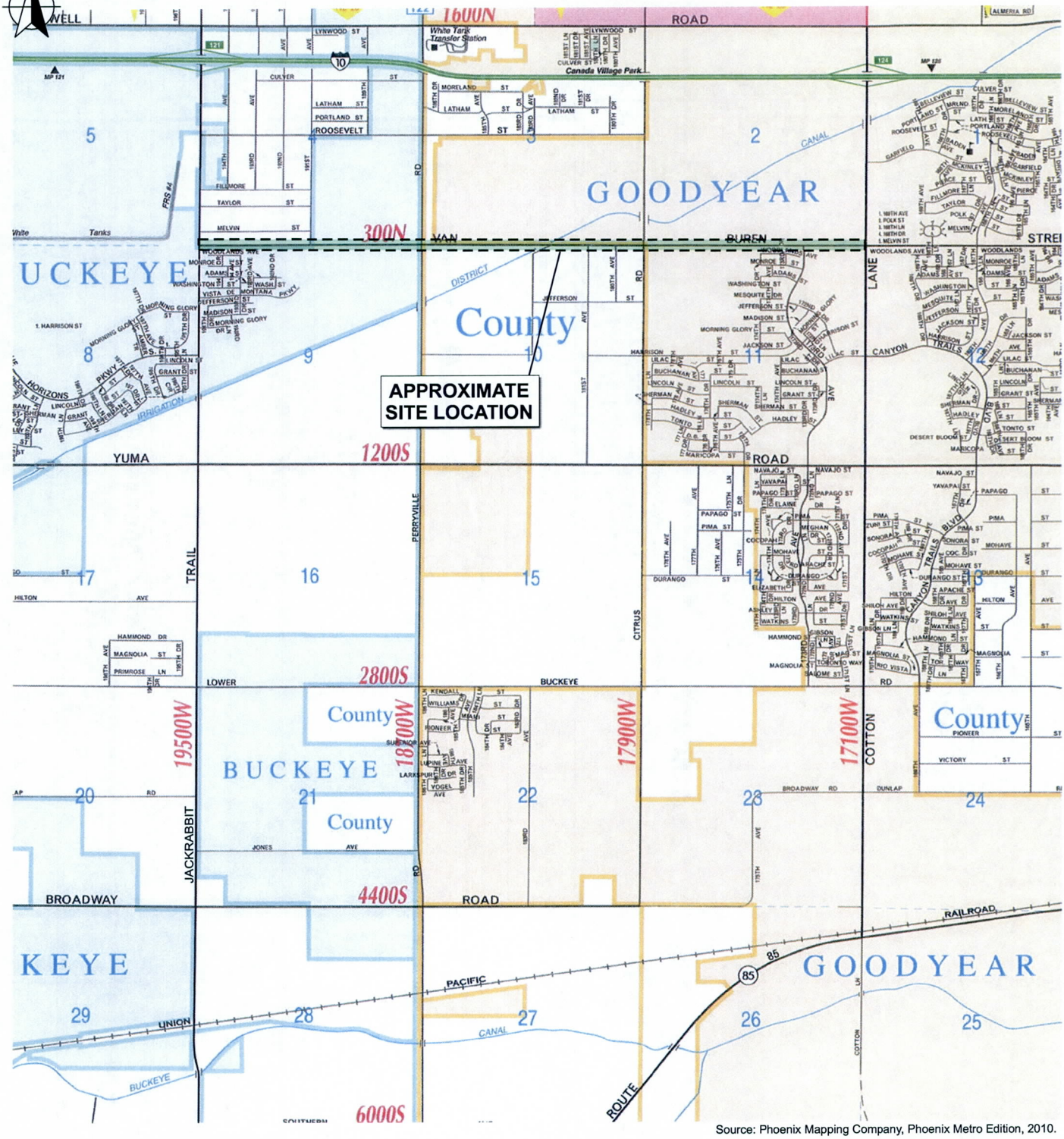
Aerial Photographs Reviewed

Source	Photo Dates	Flight Line
Flood Control District of Maricopa County	1937, 1949, 1959, 1993	N/A
Historic Aerials.com	1958	N/A



Source: Phoenix Mapping Company, Phoenix Metro Edition, 2010.

0 3300

Approximate Scale:
1 inch = 3300 feet

Note: All dimensions, directions and locations are approximate.

Ninyo & Moore		SITE LOCATION	FIGURE 1
PROJECT NO: 603248001	DATE: 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	

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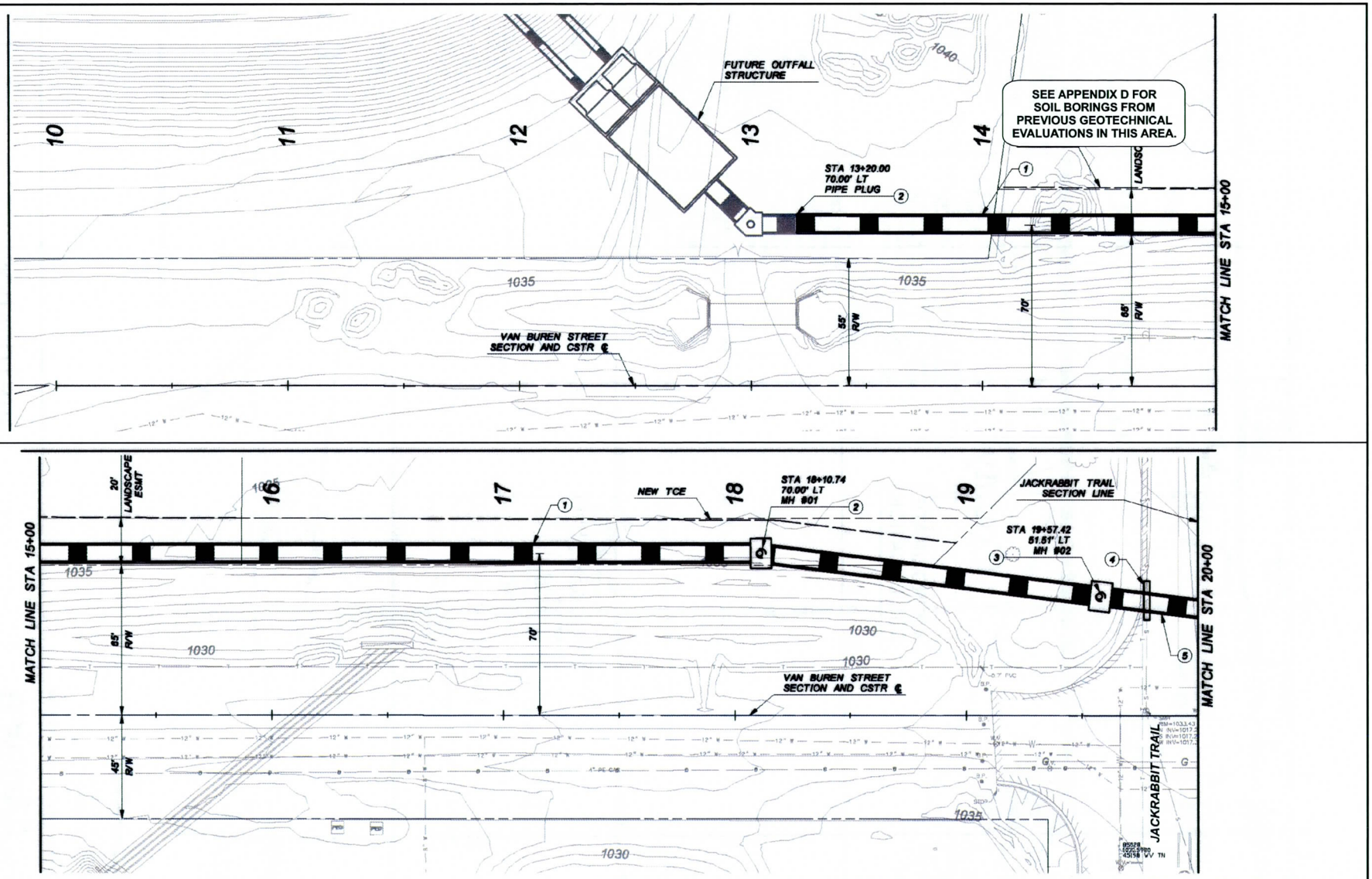

0 40

Approximate Scale:
1 inch = 40 feet

Note: Dimensions, directions, and locations are approximate.
Source: Basemap modified after Flood Control District of Maricopa County, 3/2011.

Ninyo & Moore	BORING LOCATION MAP	FIGURE
PROJECT NO: 603248001	DATE: 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	2A

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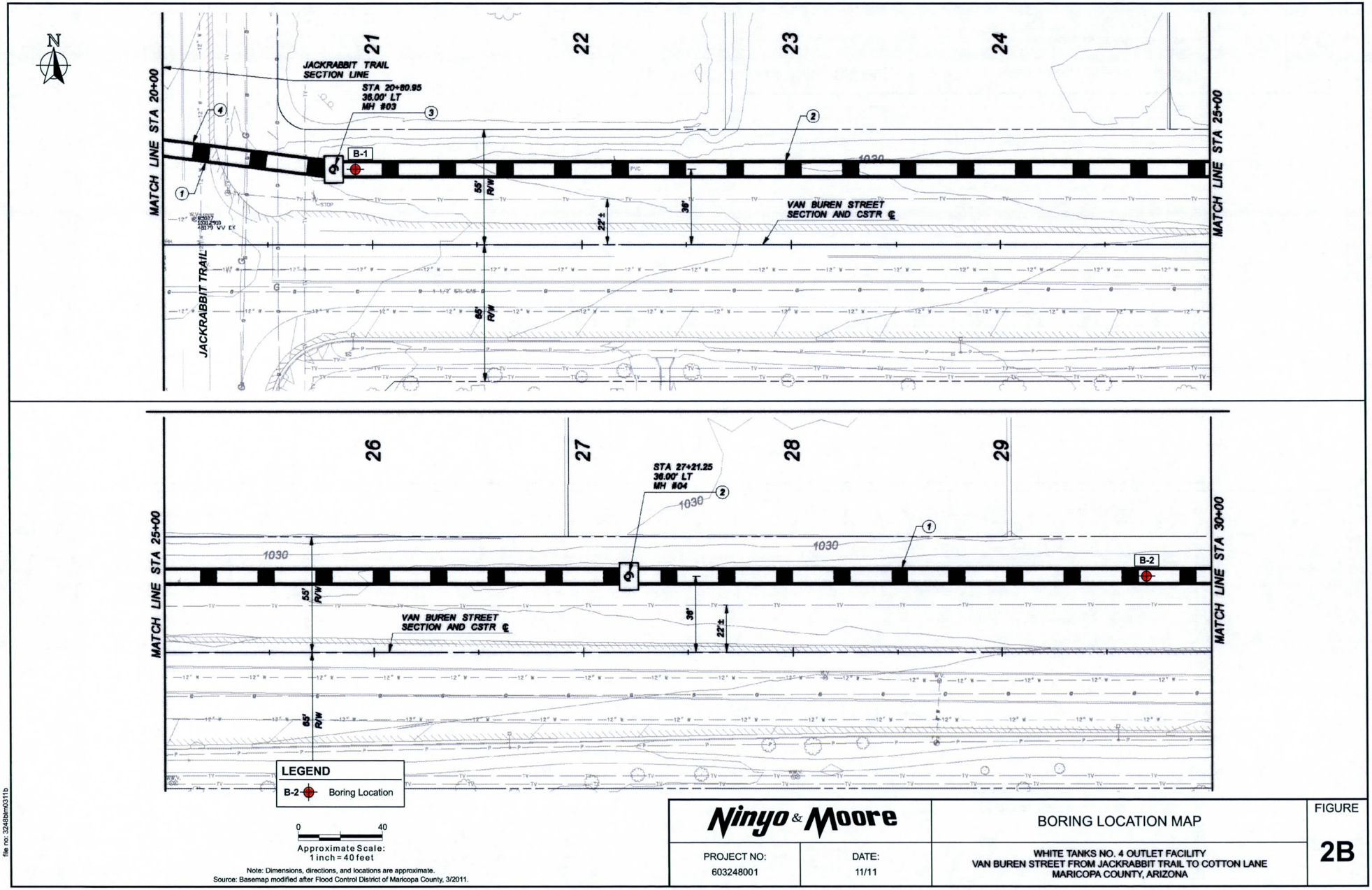

Note: Dimensions, directions, and locations are approximate.
Source: Basemap modified after Flood Control District of Maricopa County, 3/2011.

Ninyo & Moore	BORING LOCATION MAP	FIGURE
PROJECT NO: 603248001 / DATE: 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	2B

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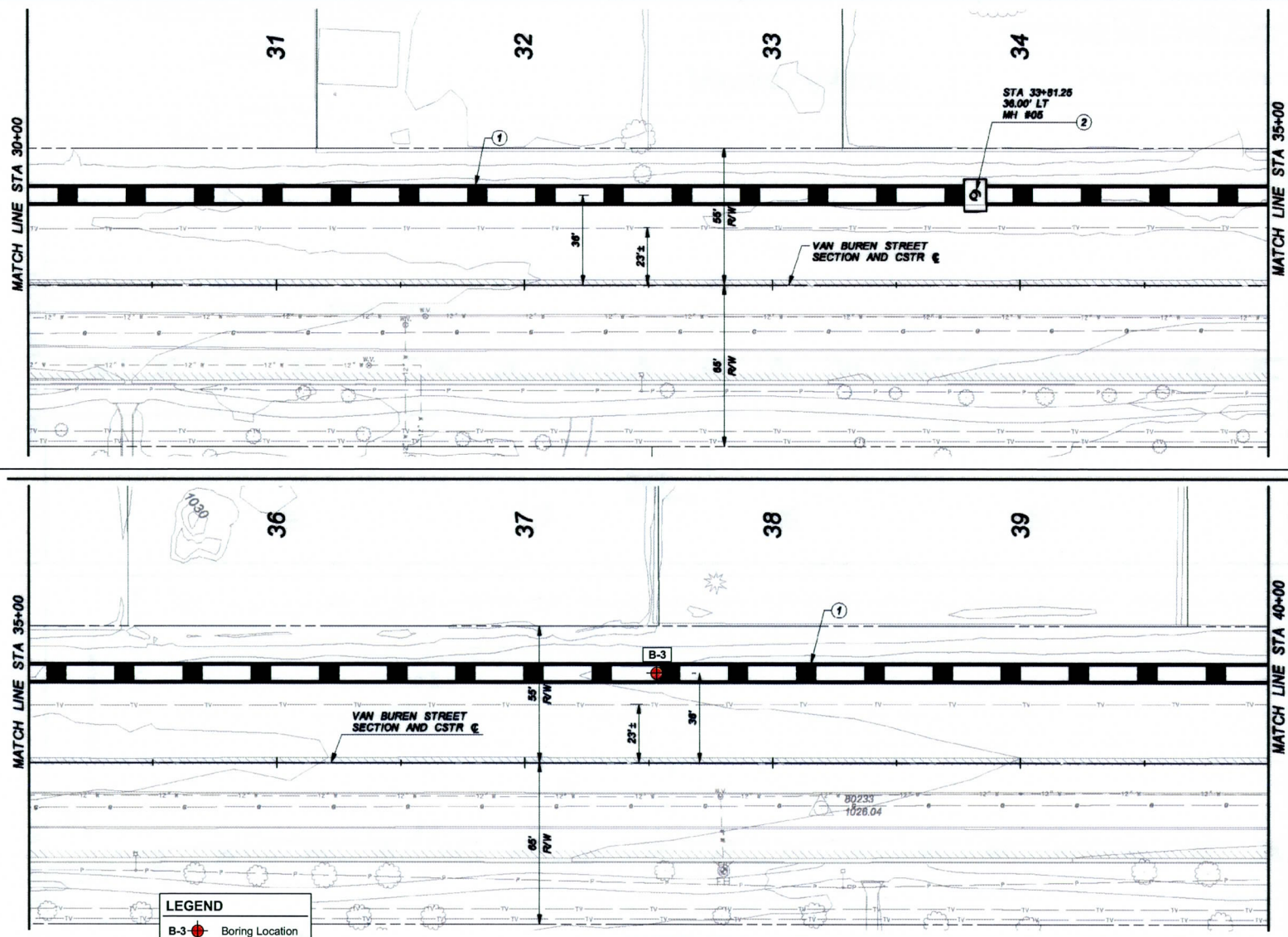
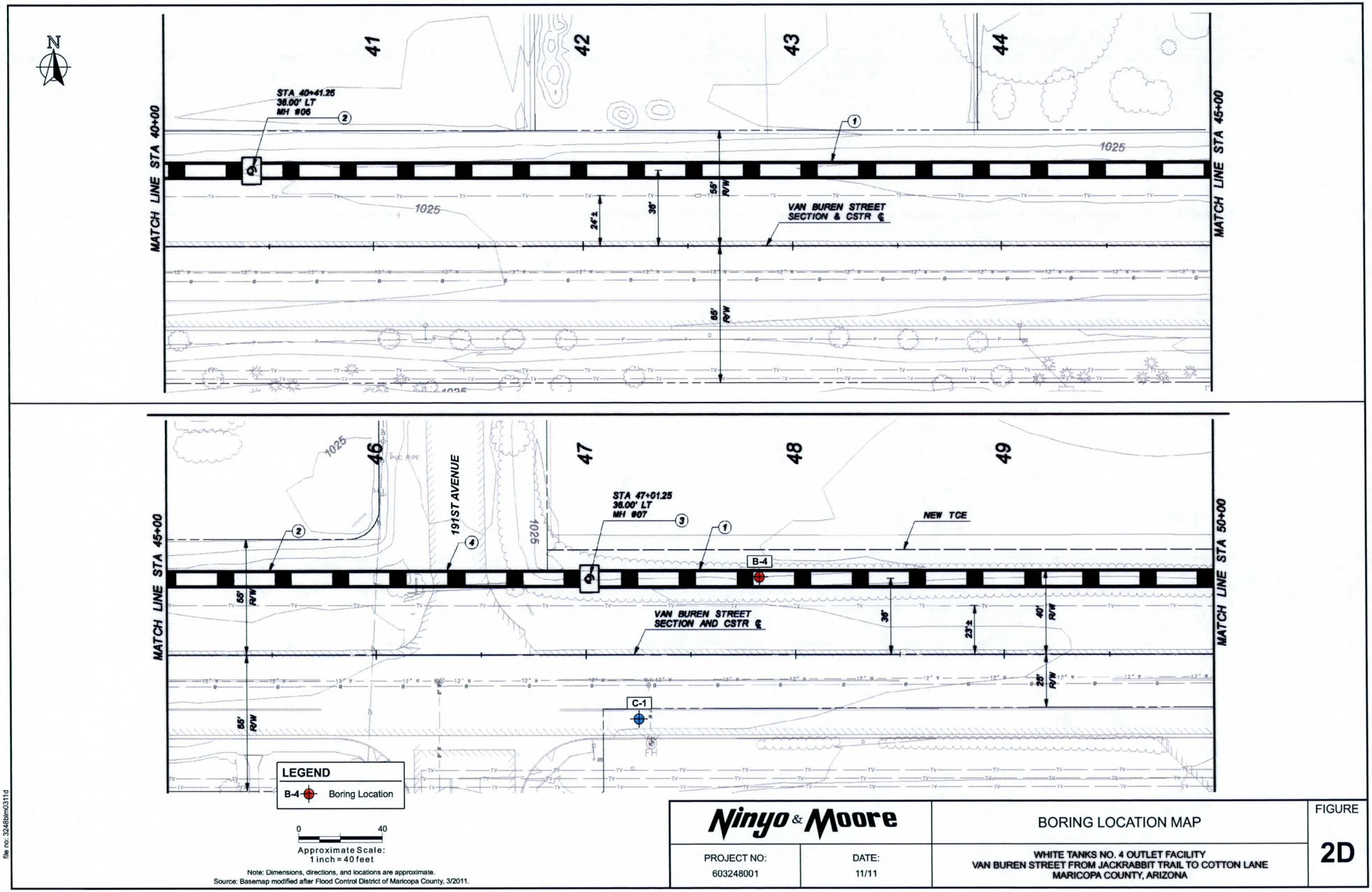


Note: Dimensions, directions, and locations are approximate.
Source: Basemap modified after Flood Control District of Maricopa County, 3/2011.

Ninyo & Moore	BORING LOCATION MAP	FIGURE
PROJECT NO: 603248001 / DATE: 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	2C

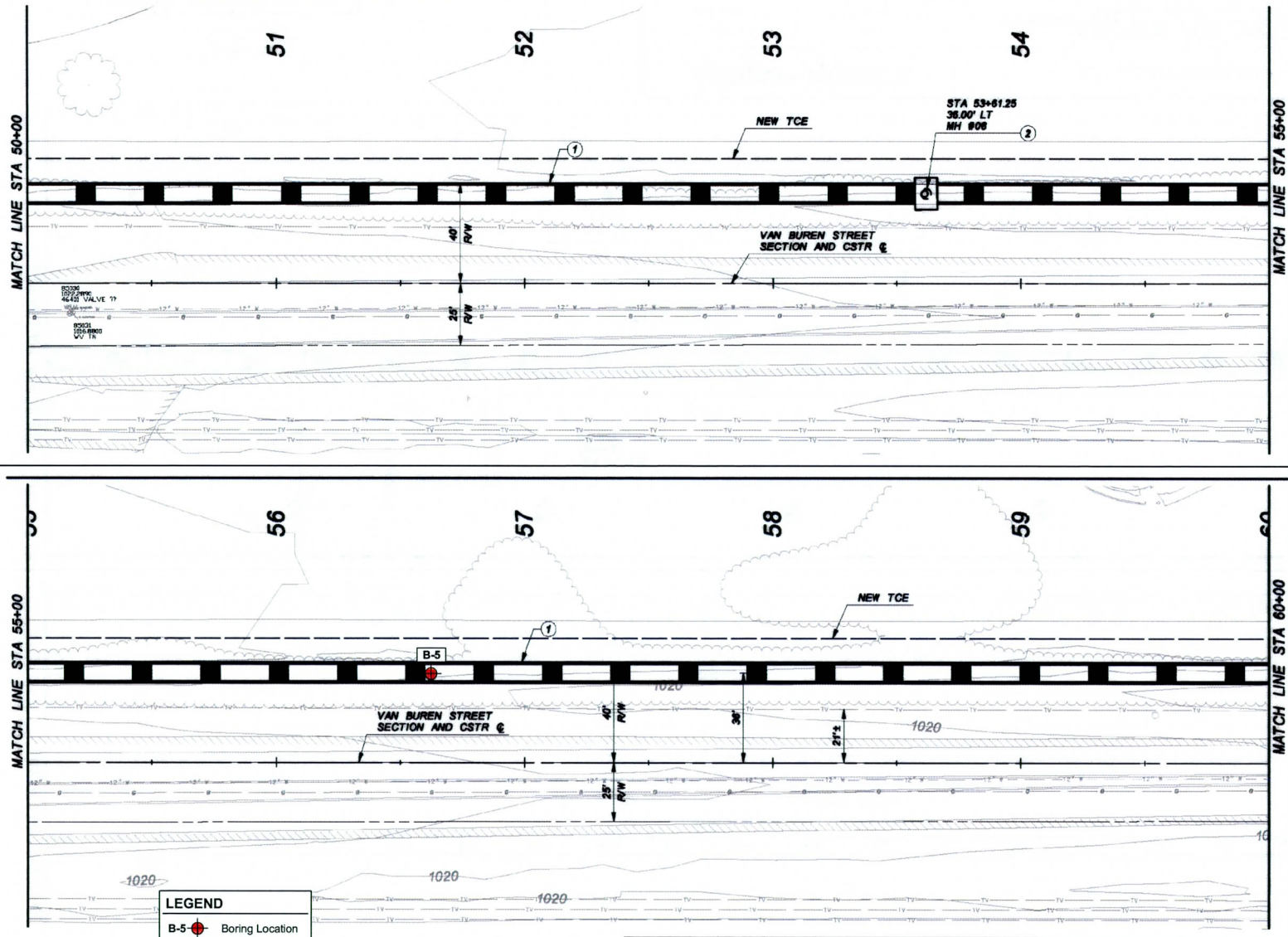
file no: 3248blm0311c



Note: Dimensions, directions, and locations are approximate.
Source: Basemap modified after Flood Control District of Maricopa County, 3/2011.

file no: 3248blm0311d

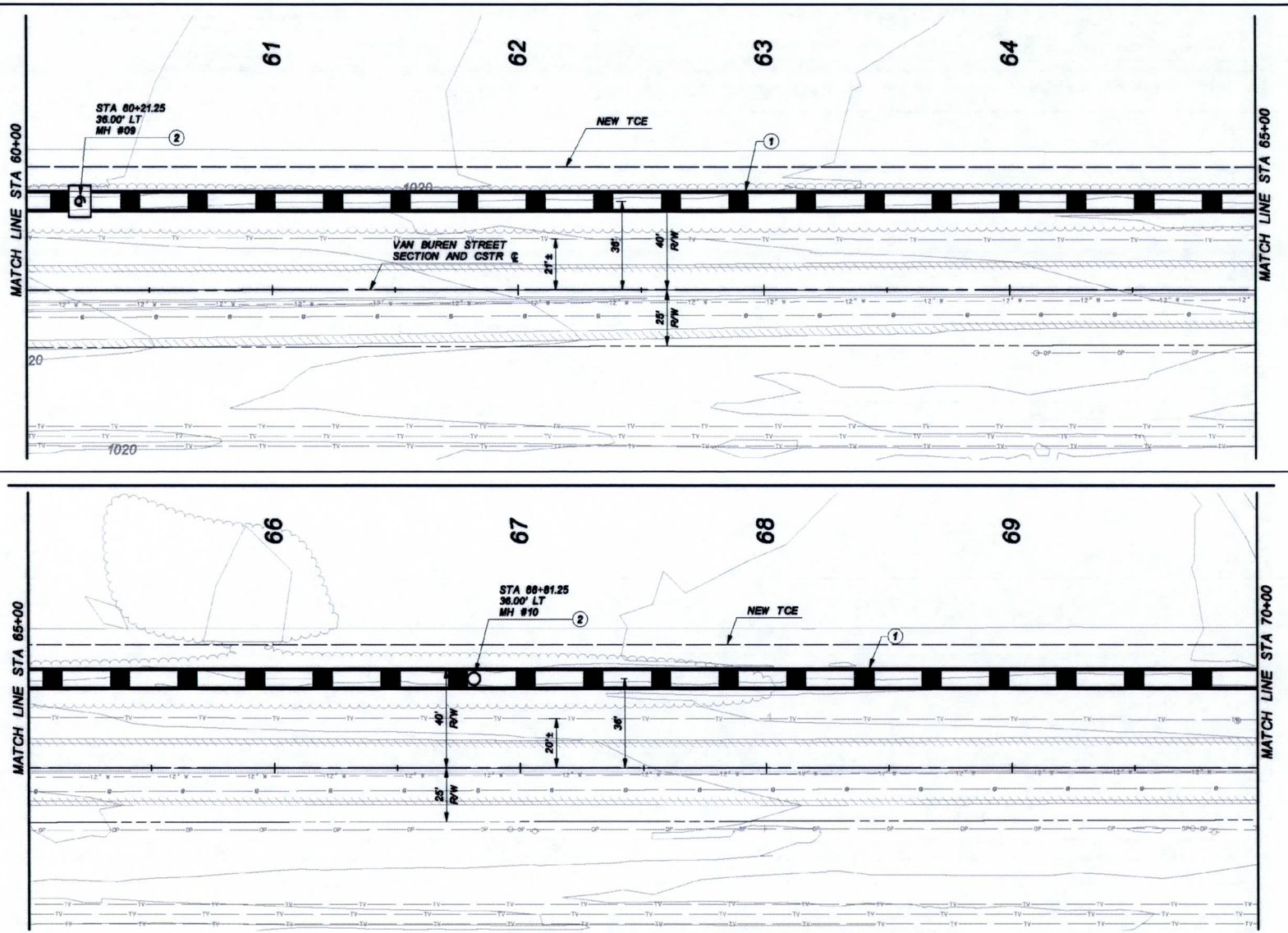
Ninyo & Moore	BORING LOCATION MAP	FIGURE
PROJECT NO: 603248001 / DATE: 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	2D



Note: Dimensions, directions, and locations are approximate.
Source: Basemap modified after Flood Control District of Maricopa County, 3/2011.

file no: 3248blm0311e

Ninyo & Moore	BORING LOCATION MAP	FIGURE
PROJECT NO: 603248001 / DATE: 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	2E



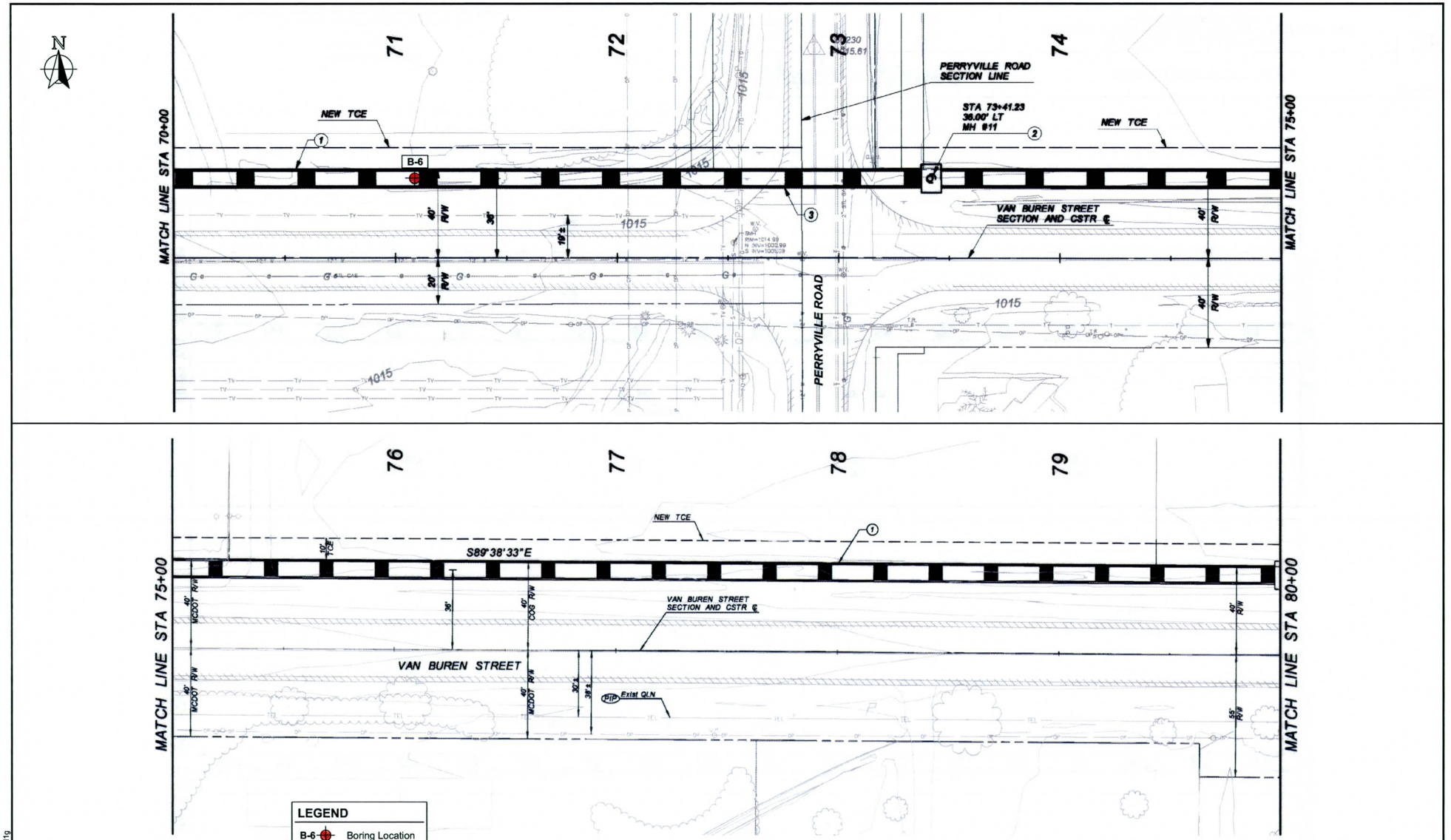
0 40

Approximate Scale:
1 inch = 40 feet

Note: Dimensions, directions, and locations are approximate.
Source: Basemap modified after Flood Control District of Maricopa County, 3/2011.

file no: 3248bim03111

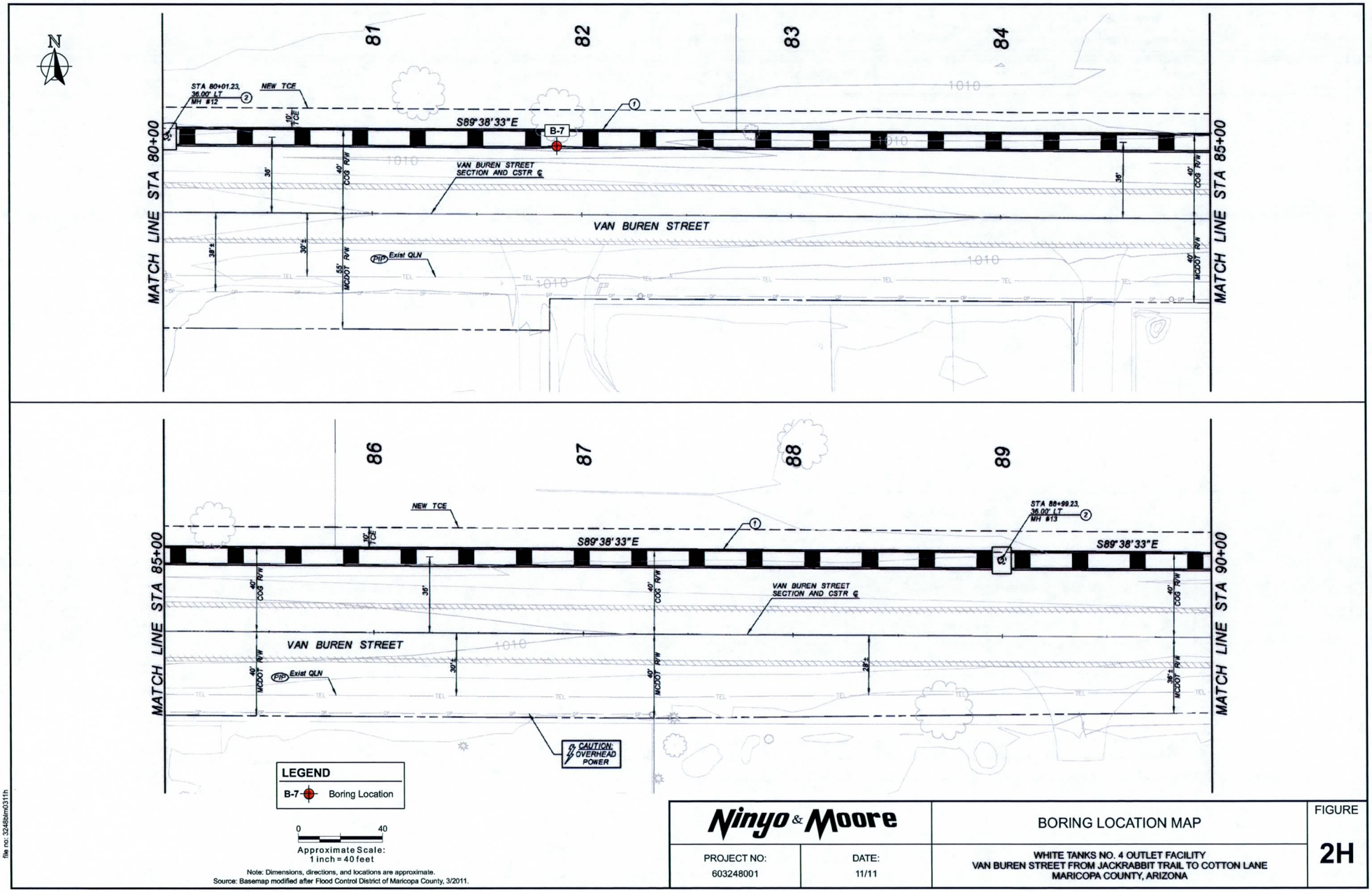
Ninyo & Moore	BORING LOCATION MAP	FIGURE
PROJECT NO: 603248001 / DATE: 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	2F



Note: Dimensions, directions, and locations are approximate.
Source: Basemap modified after Flood Control District of Maricopa County, 3/2011.

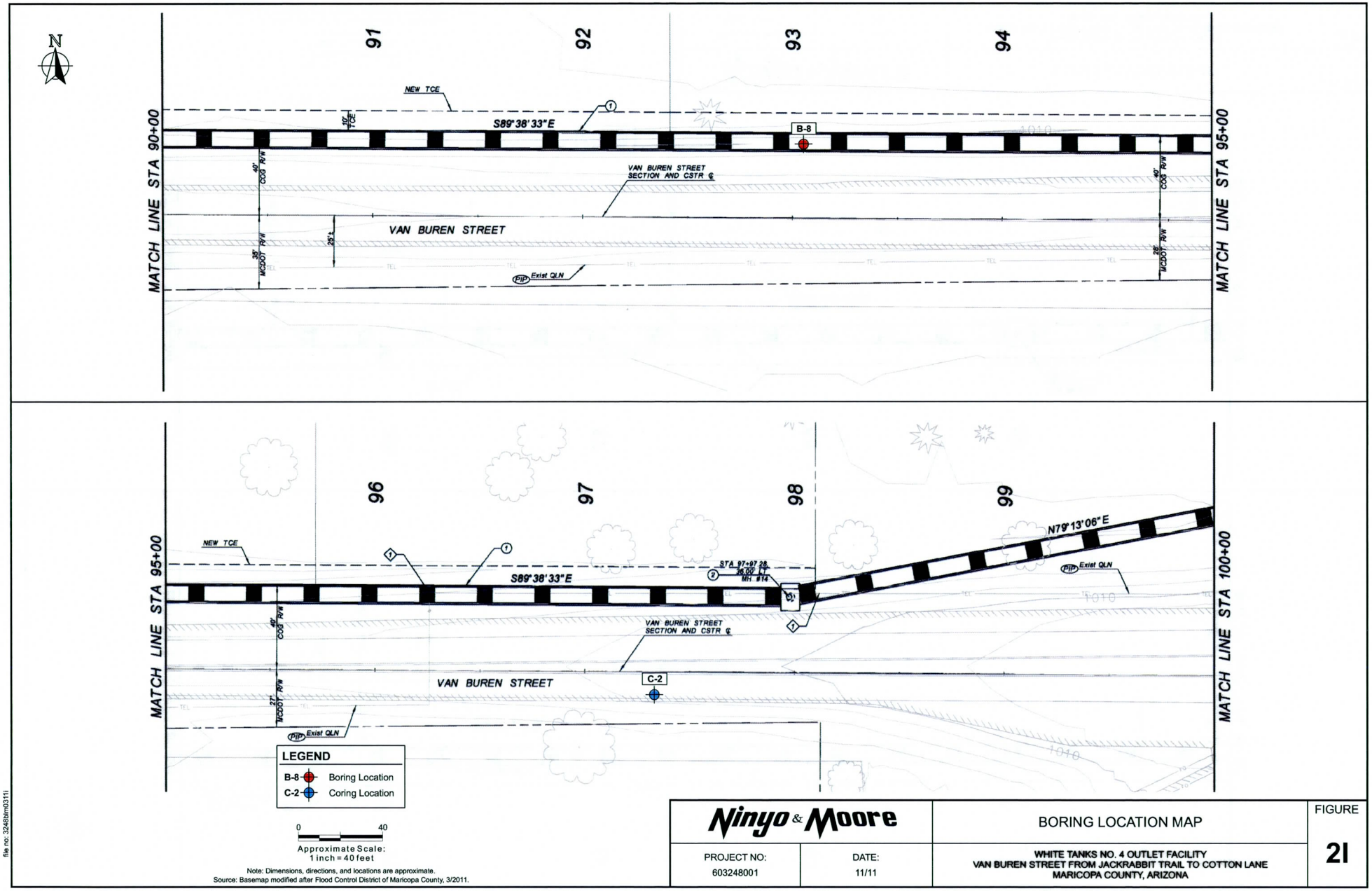
file no: 3248bim0311g

Ninyo & Moore	BORING LOCATION MAP	FIGURE
PROJECT NO: 603248001 / DATE: 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	2G



file no: 3248bim0311h

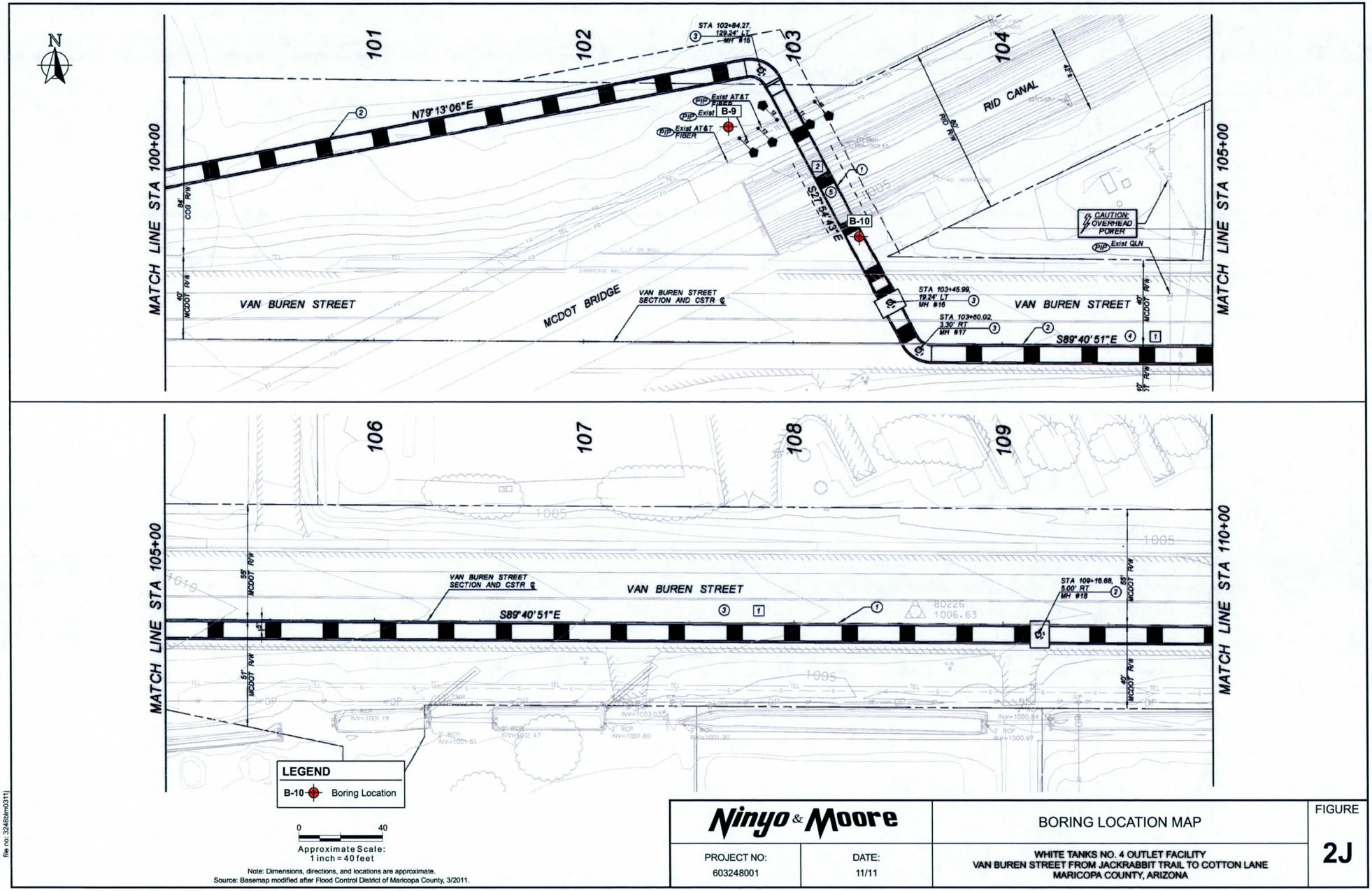
Ninyo & Moore	BORING LOCATION MAP	FIGURE
PROJECT NO: 603248001 / DATE: 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	2H



Note: Dimensions, directions, and locations are approximate.
Source: Basemap modified after Flood Control District of Maricopa County, 3/2011.

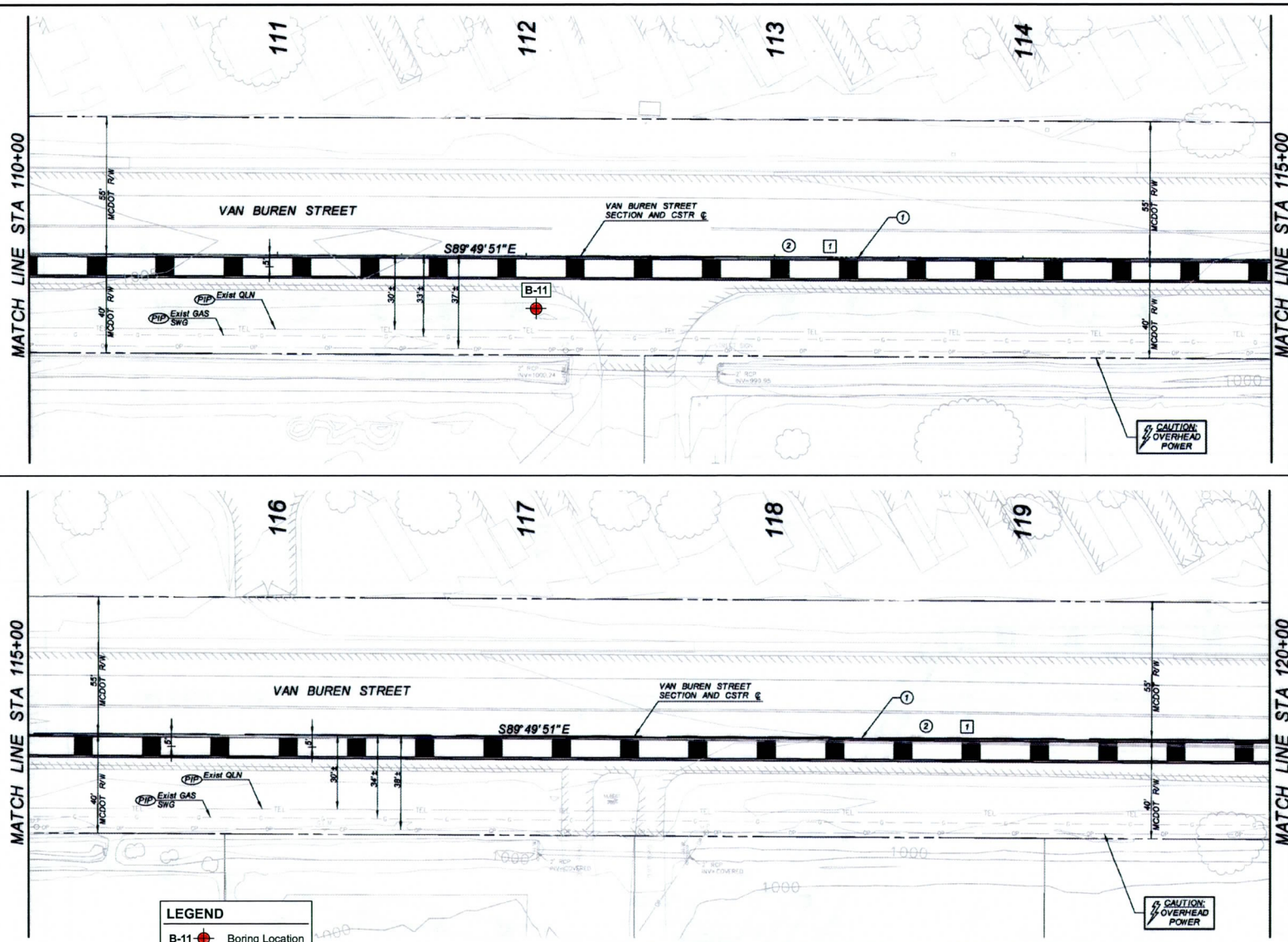
Ninyo & Moore	BORING LOCATION MAP	FIGURE
PROJECT NO: 603248001 / DATE: 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	2I

file no: 3248blm0311i



Ninyo & Moore	BORING LOCATION MAP	FIGURE
PROJECT NO: 603248001 / DATE: 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	2J

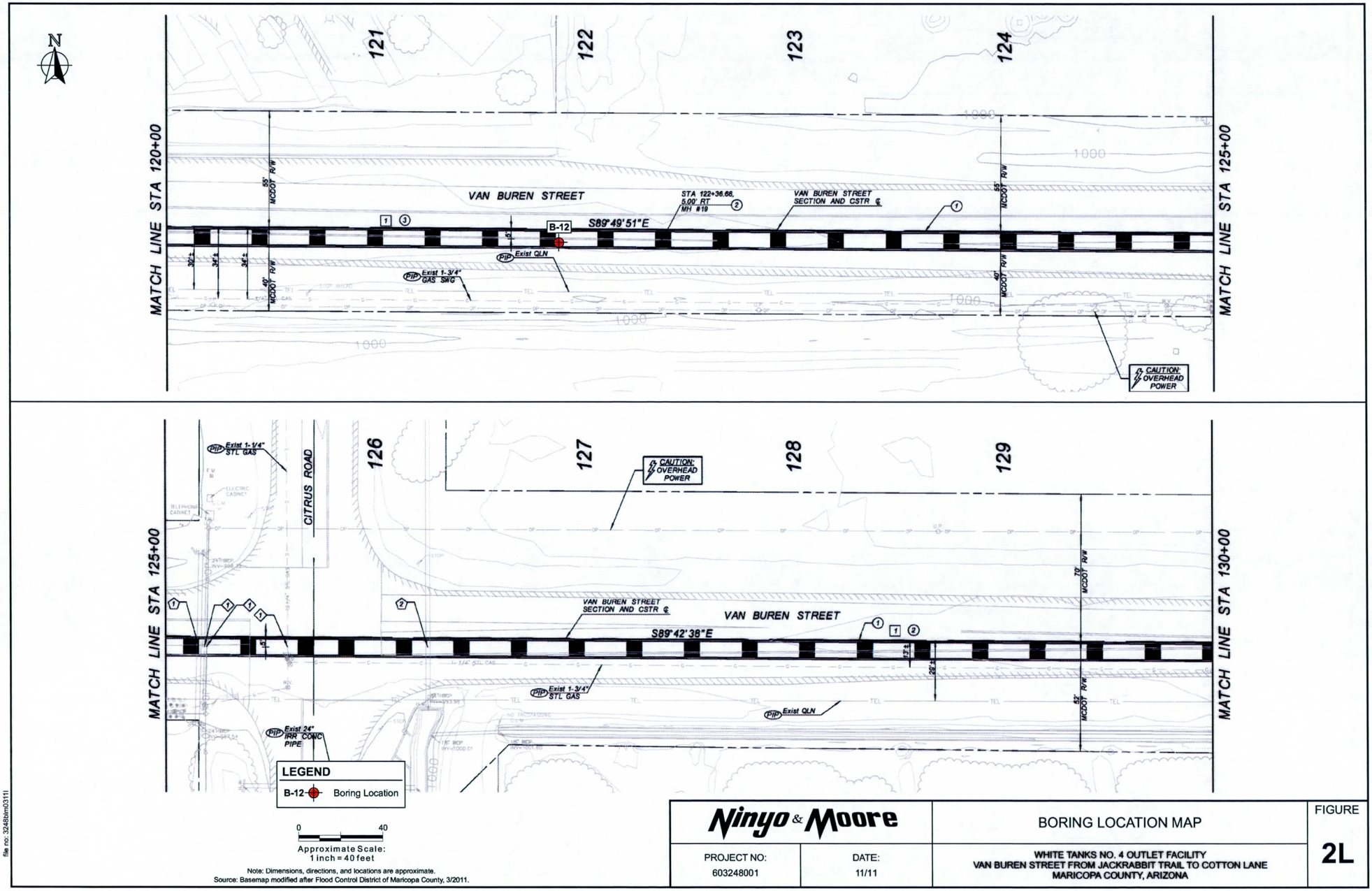
file no: 3248bim0311



Note: Dimensions, directions, and locations are approximate.
Source: Basemap modified after Flood Control District of Maricopa County, 3/2011.

file no: 3248blm0311k

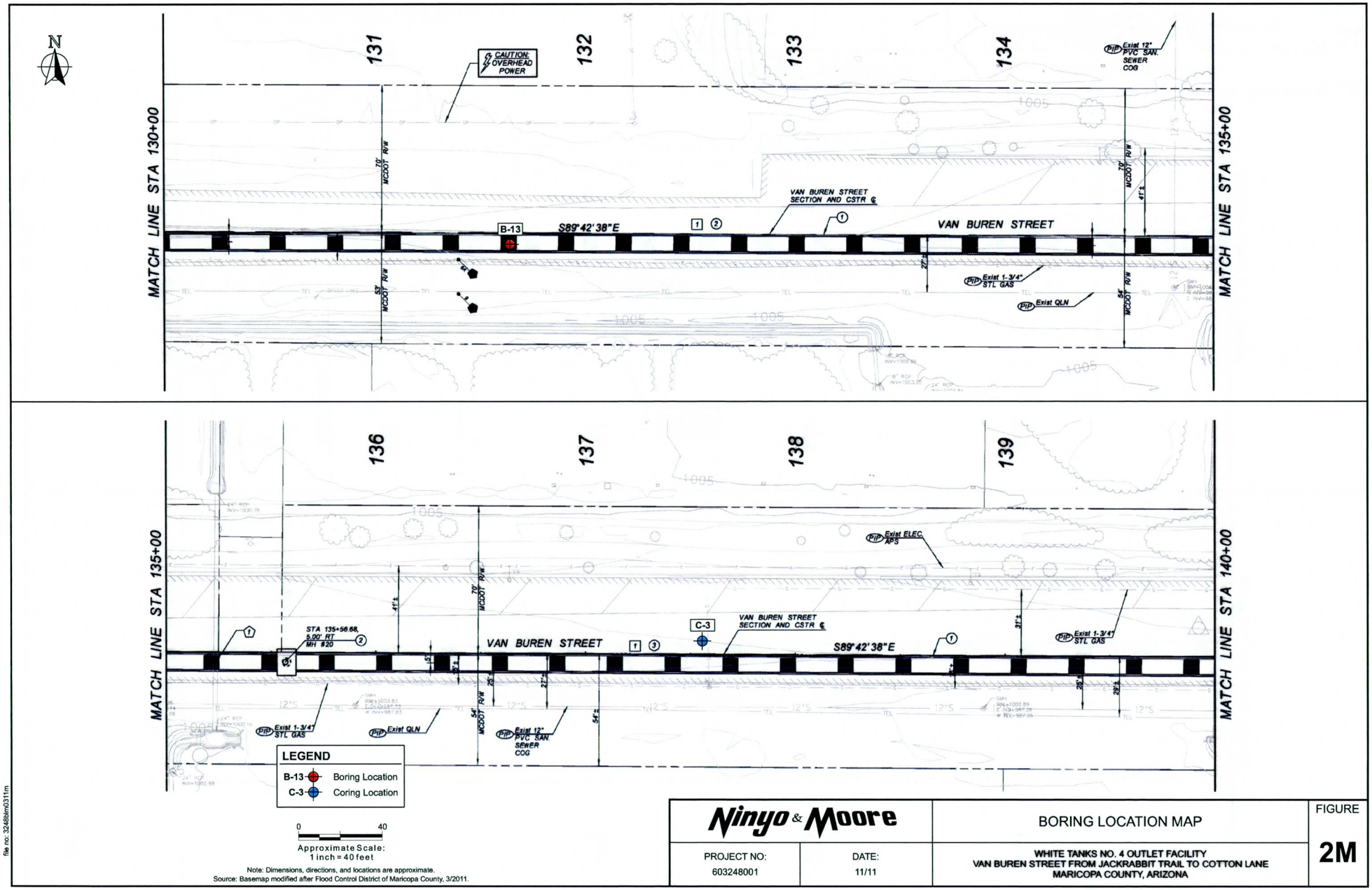
Ninyo & Moore	BORING LOCATION MAP	FIGURE
PROJECT NO: 603248001 / DATE: 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	2K



Note: Dimensions, directions, and locations are approximate.
Source: Basemap modified after Flood Control District of Maricopa County, 3/2011.

file no: 3248wm03111

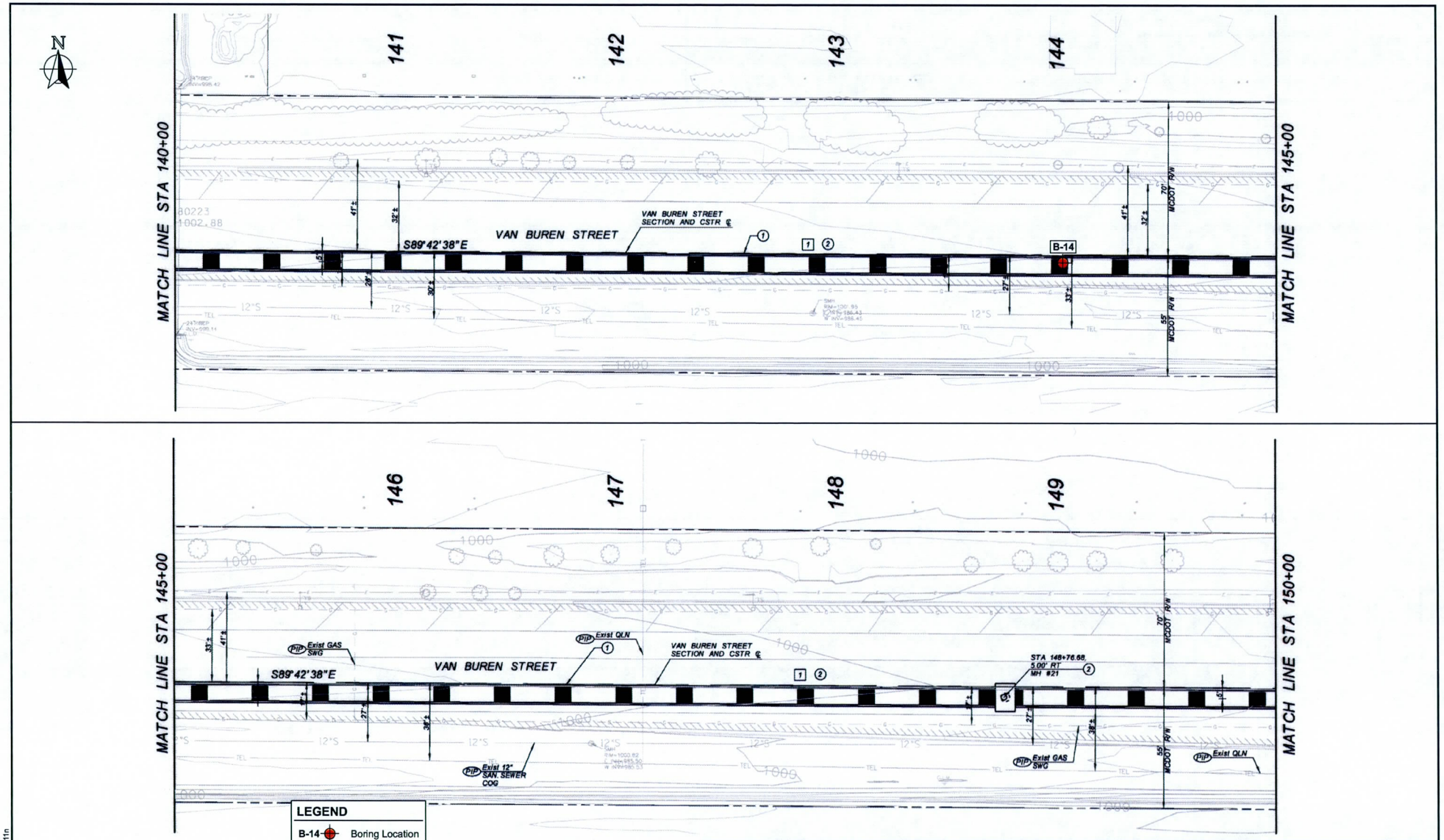
Ninyo & Moore	BORING LOCATION MAP	FIGURE
PROJECT NO: 603248001 / DATE: 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	2L



Note: Dimensions, directions, and locations are approximate.
Source: Basemap modified after Flood Control District of Maricopa County, 3/2011.

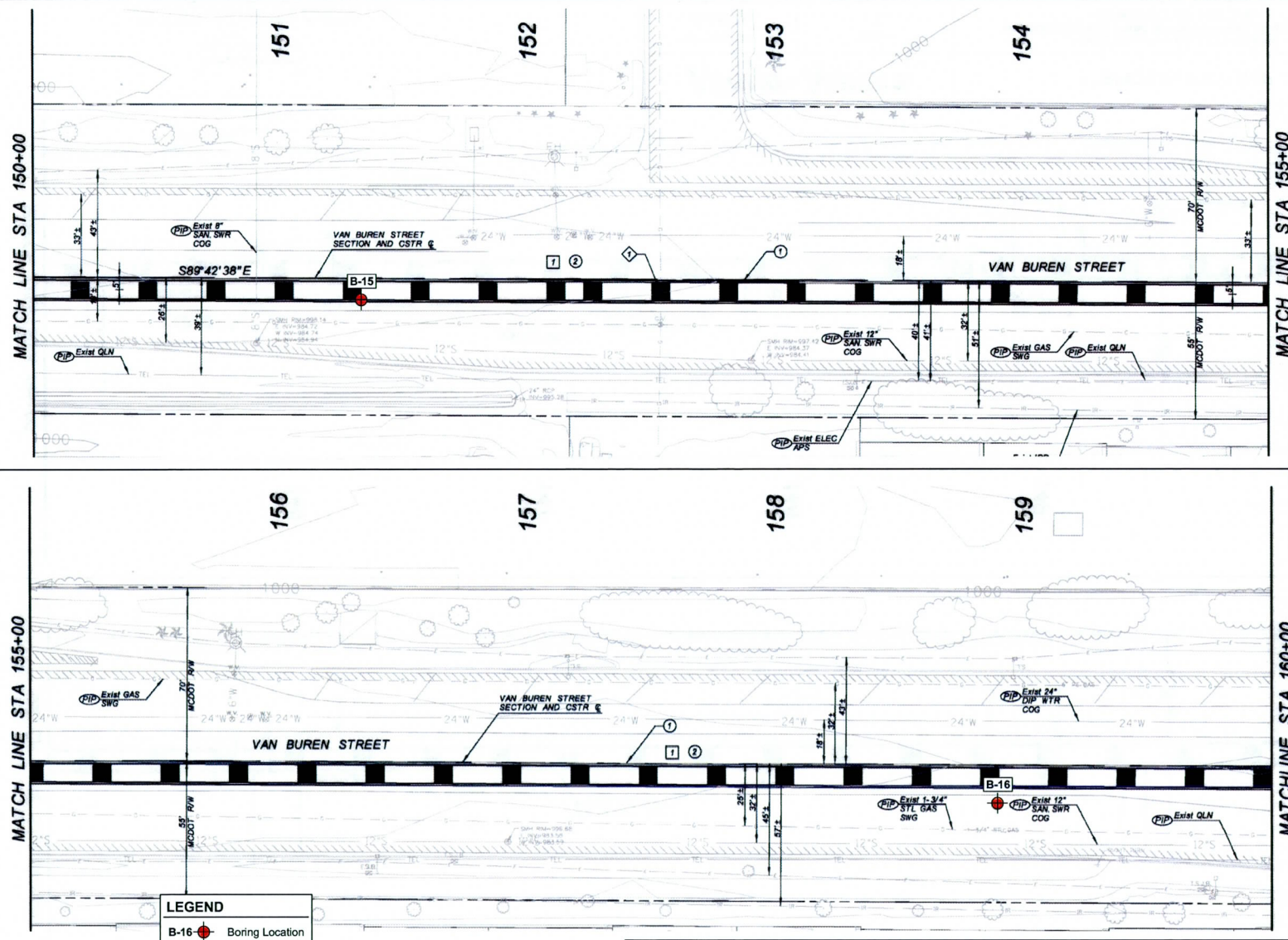
file no: 3248lm0311m

Ninyo & Moore	BORING LOCATION MAP	FIGURE
PROJECT NO: 603248001 / DATE: 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	2M



Ninyo & Moore	BORING LOCATION MAP	FIGURE
PROJECT NO: 603248001 / DATE: 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	2N

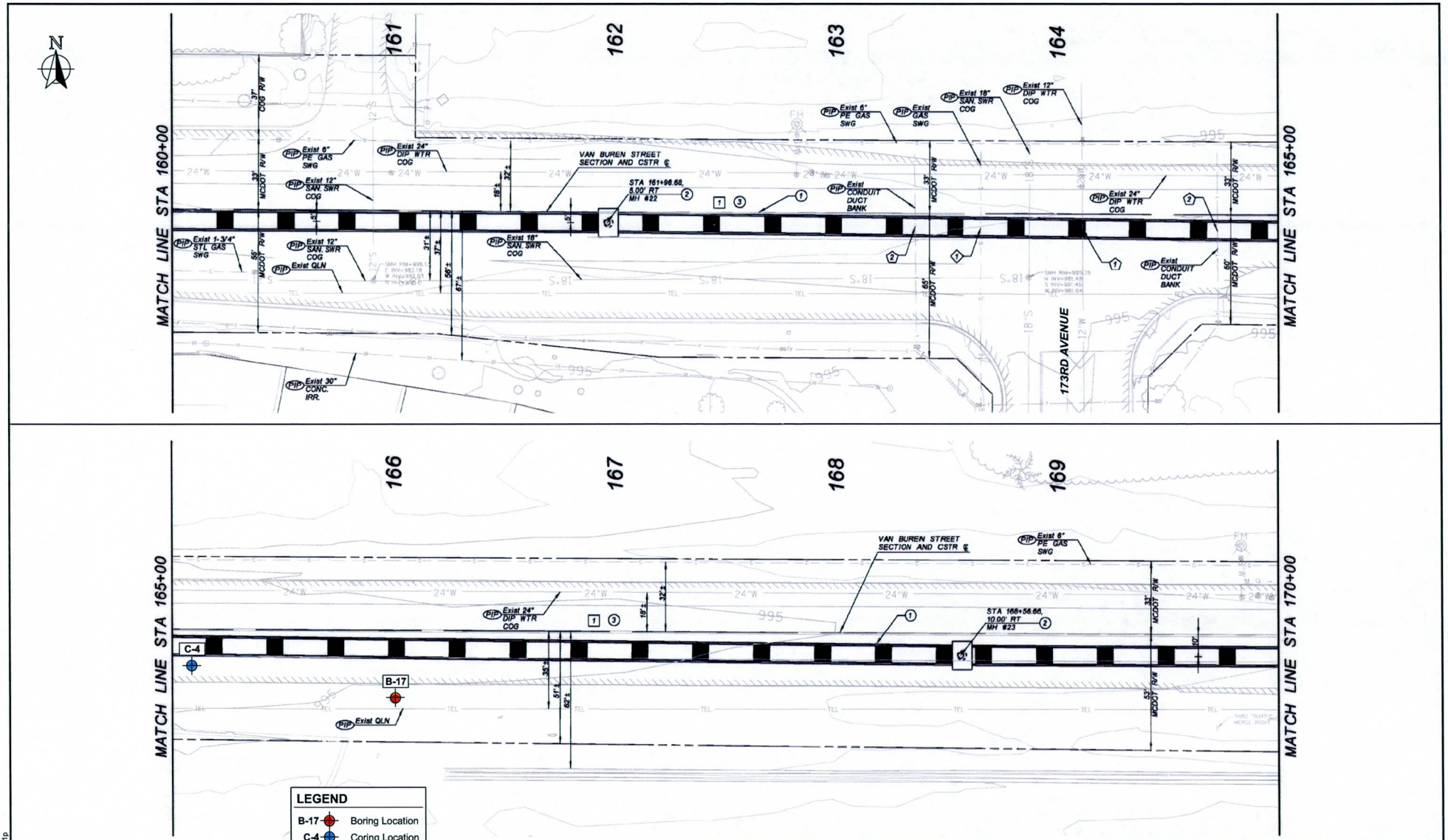
file no: 3248blm0311n



Note: Dimensions, directions, and locations are approximate.
Source: Basemap modified after Flood Control District of Maricopa County, 3/2011.

file no: 3248blm0311o

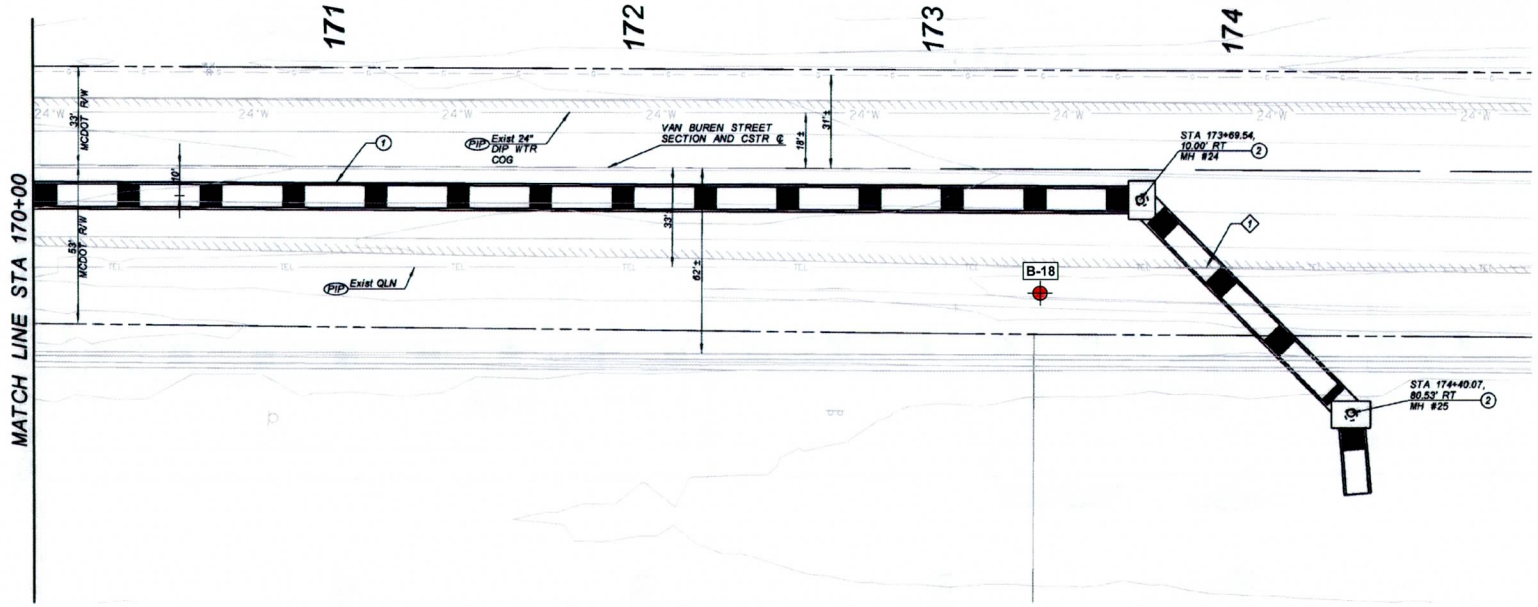
Ninyo & Moore	BORING LOCATION MAP	FIGURE
PROJECT NO: 603248001 / DATE: 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	20



Note: Dimensions, directions, and locations are approximate.
Source: Basemap modified after Flood Control District of Maricopa County, 3/2011.

file no: 3248bim0311p

Ninyo & Moore	BORING LOCATION MAP	FIGURE
PROJECT NO: 603248001 / DATE: 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	2P



LEGEND

B-18 ⊕ Boring Location

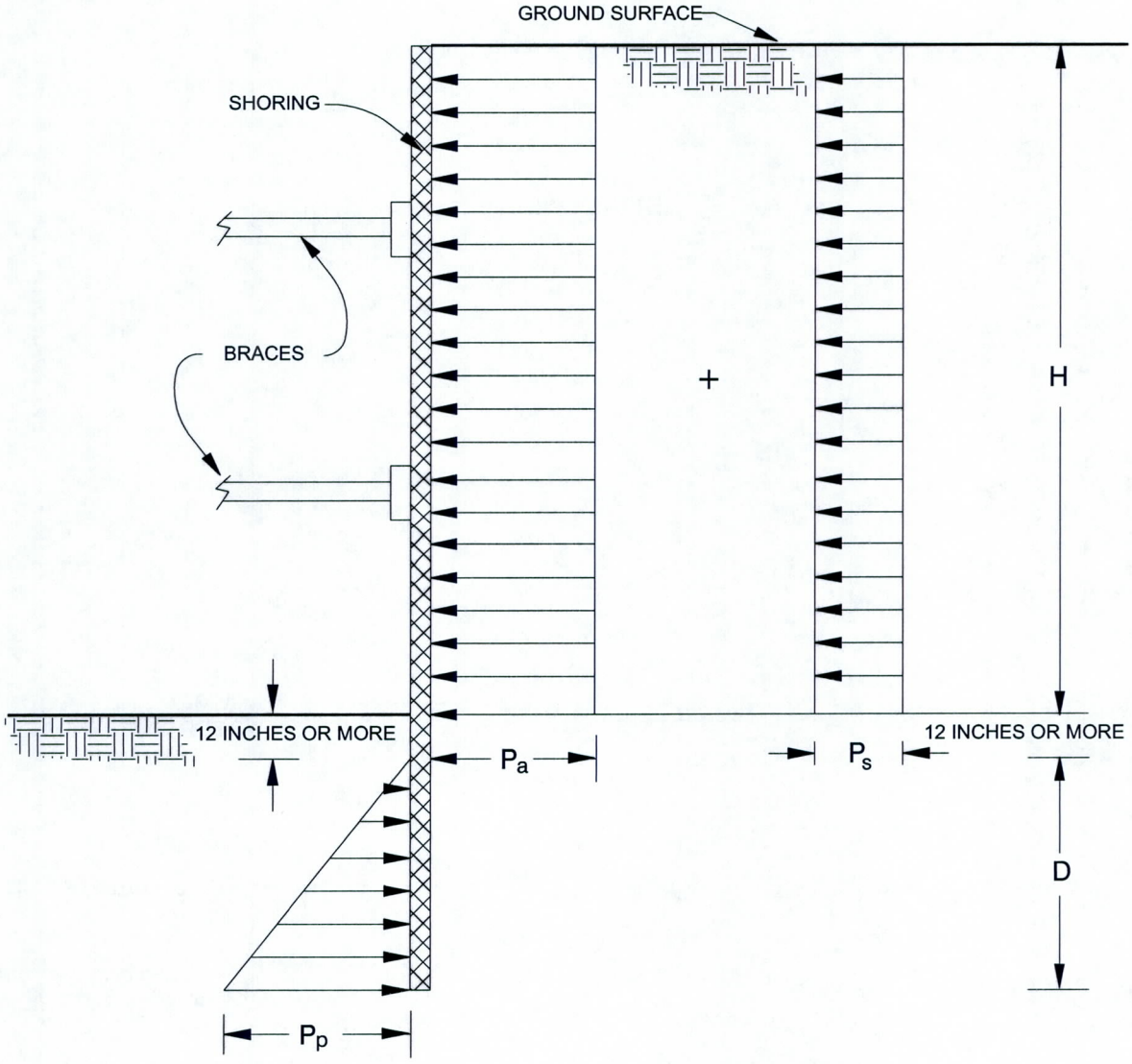
0 40

Approximate Scale:
1 inch = 40 feet

Note: Dimensions, directions, and locations are approximate.
Source: Basemap modified after Flood Control District of Maricopa County, 3/2011.

Ninyo & Moore	BORING LOCATION MAP	FIGURE
PROJECT NO: 603248001 / DATE: 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	2Q

file no: 3248bm0311q



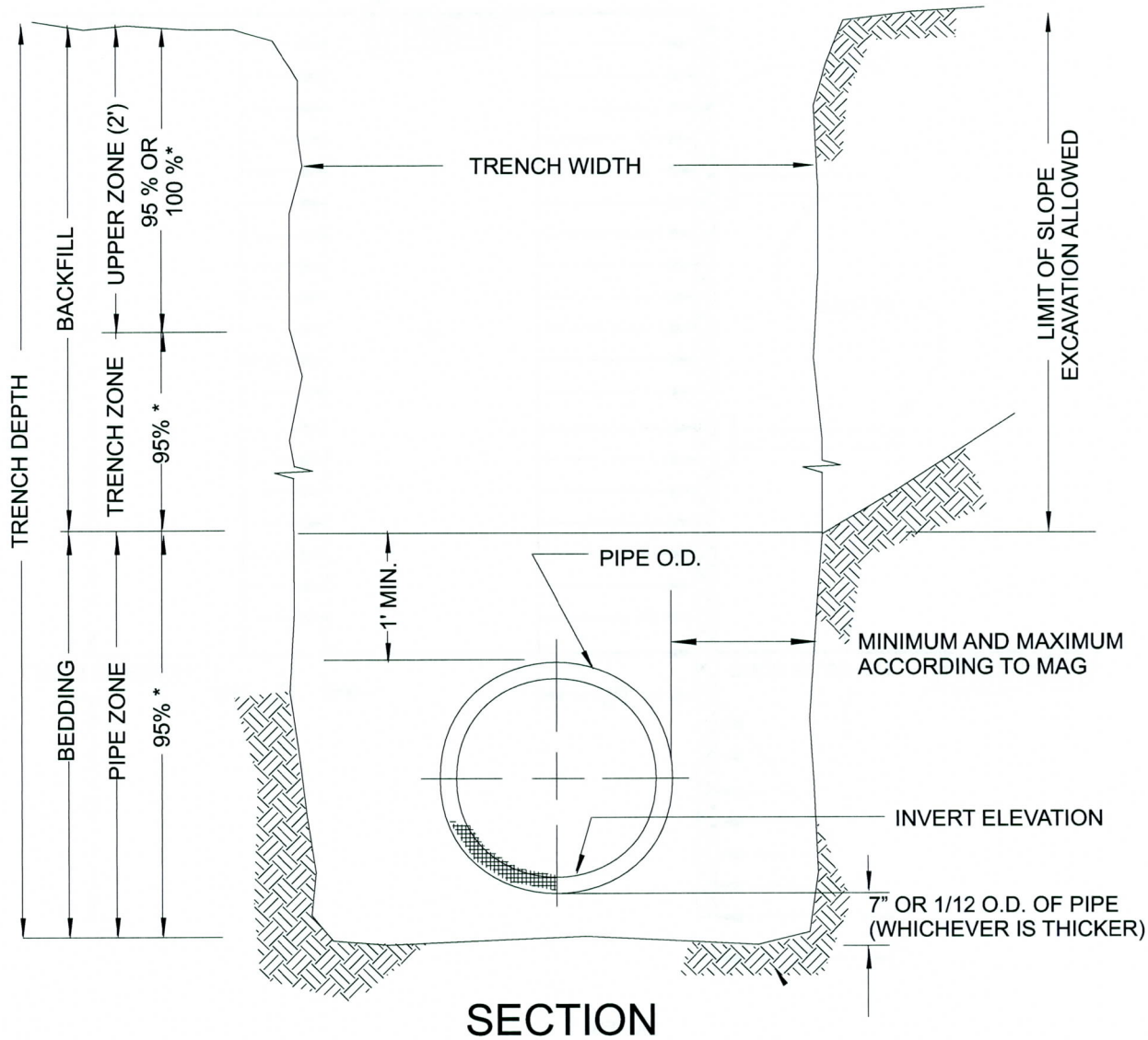
NOTES:

1. APPARENT LATERAL EARTH PRESSURE, P_a
   P_a = 22 H psf
2. CONSTRUCTION TRAFFIC INDUCED SURCHARGE PRESSURE, P_s
   P_s = 120 psf
3. PASSIVE LATERAL EARTH PRESSURE, P_p
   P_p = 360 D psf
4. ASSUMES GROUNDWATER IS NOT PRESENT
5. SURCHARGES FROM EXCAVATED SOIL OR CONSTRUCTION MATERIALS ARE NOT INCLUDED
6. H AND D ARE IN FEET

NOT TO SCALE

Ninyo & Moore	LATERAL EARTH PRESSURES FOR BRACED EXCAVATION	FIGURE 3
PROJECT NO: 603248001 / DATE: 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	

file no: 3248lep0311



SECTION

NOTE

1. In AC pavement areas, we recommend the use of a "T-top" trench repair as detailed in MAG Detail 200-1. Per this detail, the AC pavement patch and an underlying AB section is placed to a width of 2 feet wider, or more, than the trench backfill width. See report for details.

* Indicates minimum relative compaction (see report for details).

Upper zone required for pavement areas only.

Diagram not drawn to scale.

Ninyo & Moore	PIPE BEDDING GUIDELINES	FIGURE
PROJECT NO: 603248001 / DATE: 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	4

file no: 3248pbg0311

APPENDIX A

BORING LOGS

Field Procedure for the Collection of Disturbed Samples

Disturbed soil samples were obtained in the field using the following methods.

Bulk Samples

Bulk samples of representative earth materials were obtained from the exploratory excavations. The samples were bagged and transported to the laboratory for testing.

The Standard Penetration Test (SPT) Spoon

Disturbed drive samples of earth materials were obtained by means of a Standard Penetration Test spoon sampler. The sampler is composed of a split barrel with an external diameter of 2 inches and an unlined internal diameter of 1-3/8 inches. The spoon was driven into the ground 12 to 18 inches with a 140-pound hammer free-falling from a height of 30 inches in general accordance with ASTM D 1586. The blow counts were recorded for every 6 inches of penetration; the blow counts reported on the logs are those for the last 12 inches of penetration. Soil samples were observed and removed from the spoon, bagged, sealed and transported to the laboratory for testing.

Field Procedure for the Collection of Relatively Undisturbed Samples

Relatively undisturbed soil samples were obtained in the field using the following methods.

The Modified Split-Barrel Drive Sampler

The sampler, with an external diameter of 3.0 inches, was lined with 1-inch long, thin brass rings with inside diameters of approximately 2.4 inches. The sample barrel was driven into the ground with the weight of a hammer or the kelly bar of the drill rig in general accordance with ASTM D 1586. The driving weight was permitted to fall freely. The approximate length of the fall, the weight of the hammer or bar, and the number of blows per foot of driving are presented on the boring logs as an index to the relative resistance of the materials sampled. The samples were removed from the sample barrel in the brass rings, sealed, and transported to the laboratory for testing.

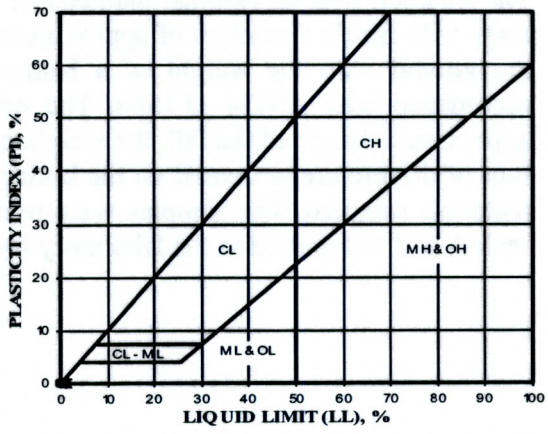
U.S.C.S. METHOD OF SOIL CLASSIFICATION

MAJOR DIVISIONS		SYMBOL	TYPICAL NAMES
COARSE-GRAINED SOILS (More than 1/2 of soil >No. 200 sieve size)	GRAVELS (More than 1/2 of coarse fraction > No. 4 sieve size)	GW	Well graded gravels or gravel-sand mixtures, little or no fines
		GP	Poorly graded gravels or gravel-sand mixtures, little or no fines
		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS (More than 1/2 of coarse fraction <No. 4 sieve size)	SW	Well graded sands or gravelly sands, little or no fines
		SP	Poorly graded sands or gravelly sands, little or no fines
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (More than 1/2 of soil <No. 200 sieve size)	SILTS & CLAYS Liquid Limit <50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean
		OL	Organic silts and organic silty clays of low plasticity
	SILTS & CLAYS Liquid Limit >50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silty clays, organic silts
HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils

GRAIN SIZE CHART

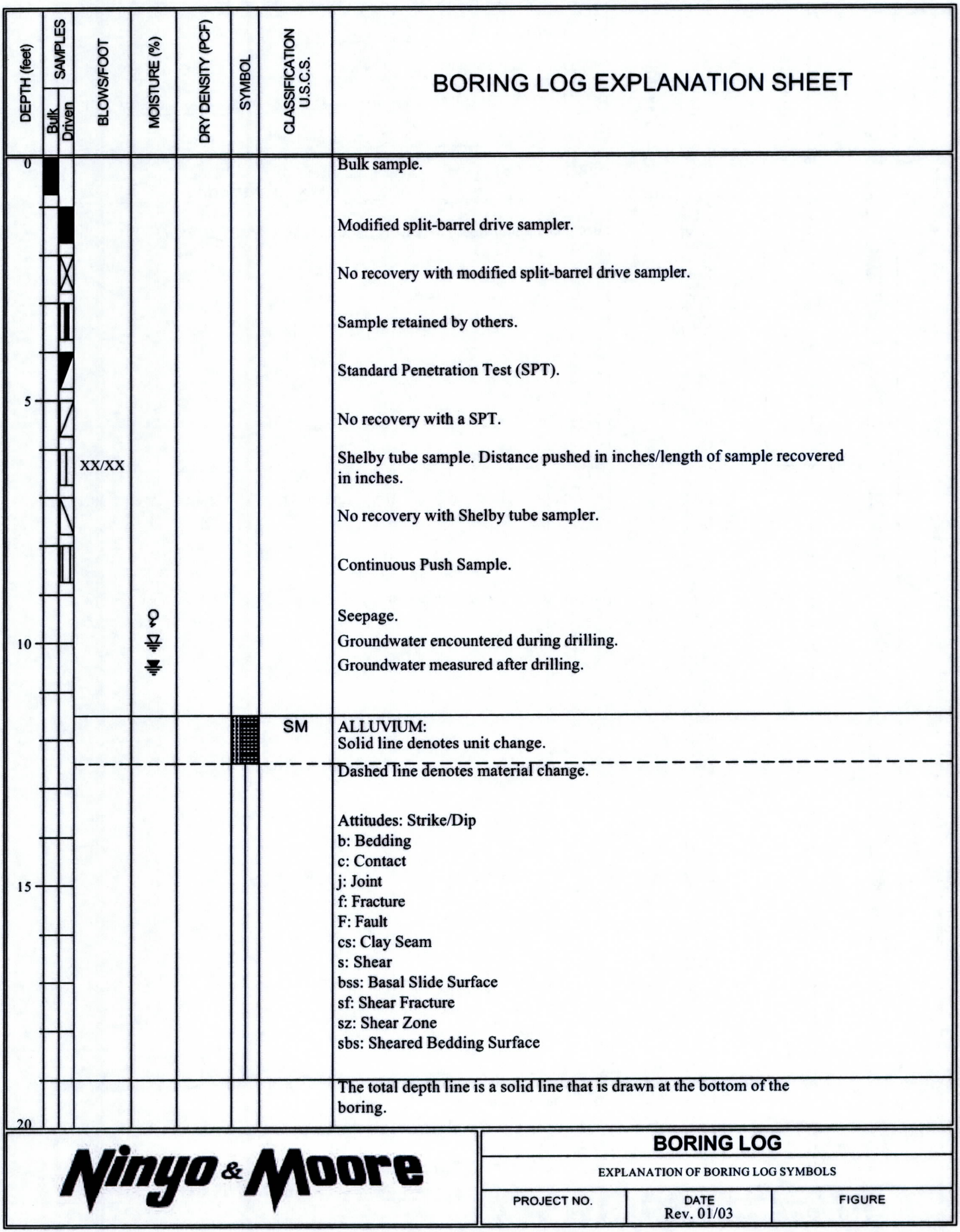
CLASSIFICATION	RANGE OF GRAIN SIZE	
	U.S. Standard Sieve Size	Grain Size in Millimeters
BOULDERS	Above 12"	Above 305
COBBLES	12" to 3"	305 to 76.2
GRAVEL	3" to No. 4	76.2 to 4.76
Coarse	3" to 3/4"	76.2 to 19.1
Fine	3/4" to No. 4	19.1 to 4.76
SAND	No. 4 to No. 200	4.76 to 0.075
Coarse	No. 4 to No. 10	4.76 to 2.00
Medium	No. 10 to No. 40	2.00 to 0.420
Fine	No. 40 to No. 200	0.420 to 0.075
SILT & CLAY	Below No. 200	Below 0.075

PLASTICITY CHART



Ninyo & Moore

U.S.C.S. METHOD OF SOIL CLASSIFICATION


DEPTH (feet)
SAMPLES
Bulk
Driven
BLOWS/FOOT
MOISTURE (%)
DRY DENSITY (PCF)
SYMBOL
CLASSIFICATION U.S.C.S.
BORING LOG EXPLANATION SHEET
0
5
10
15
20
XX/XX
SM
Bulk sample.
Modified split-barrel drive sampler.
No recovery with modified split-barrel drive sampler.
Sample retained by others.
Standard Penetration Test (SPT).
No recovery with a SPT.
Shelby tube sample. Distance pushed in inches/length of sample recovered in inches.
No recovery with Shelby tube sampler.
Continuous Push Sample.
Seepage.
Groundwater encountered during drilling.
Groundwater measured after drilling.
ALLUVIUM:
Solid line denotes unit change.
Dashed line denotes material change.
Attitudes: Strike/Dip
b: Bedding
c: Contact
j: Joint
f: Fracture
F: Fault
cs: Clay Seam
s: Shear
bss: Basal Slide Surface
sf: Shear Fracture
sz: Shear Zone
sbs: Sheared Bedding Surface
The total depth line is a solid line that is drawn at the bottom of the boring.
Ninyo & Moore
BORING LOG
EXPLANATION OF BORING LOG SYMBOLS
PROJECT NO.
DATE
Rev. 01/03
FIGURE

DATE DRILLED 2/11/11 BORING NO. B-1

GROUND ELEVATION 1,031' ± MSL SHEET 1 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SM	FILL: Brown, damp, medium dense, silty fine to coarse SAND; trace gravel.
		16	11.7	101.7			
5		15					
		39				SC	ALLUVIUM: Brown, damp, medium dense, clayey fine to coarse SAND with gravel; scattered caliche nodules; weak cementation.
						SM	Brown, damp, medium dense, silty fine to coarse SAND; trace gravel.
10		18					
		35					
15							
						SC	Brown, damp, dense, clayey fine to coarse SAND; scattered caliche nodules; weak to moderate cementation.
		32					
20							

Ninyo & Moore

BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-1

DATE DRILLED 2/11/11 BORING NO. B-1

GROUND ELEVATION 1,031' ± MSL SHEET 2 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20							Total Depth = 20 feet. Groundwater not encountered during drilling. Backfilled on 2/11/11 promptly after completion of drilling. Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
25							
30							
35							
40							

Ninyo & Moore

BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-2

DATE DRILLED 2/11/11 BORING NO. B-2

GROUND ELEVATION 1,028' ± MSL SHEET 1 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SC	FILL: Brown, damp, medium dense, clayey fine to medium SAND; scattered reworked caliche nodules; weak cementation.
		8					
		16					Fine-to coarse grained; trace gravel.
5						SC	ALLUVIUM: Brown, damp, medium dense, clayey fine to medium SAND; scattered caliche nodules.
		13					
		27					
10						SM	Brown, damp, medium dense, silty fine to coarse SAND; trace gravel; scattered caliche nodules.
		18					
15						SC	Brown, damp, medium dense, clayey fine to coarse SAND.
		28					
20							

Ninyo & Moore

BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-3

DATE DRILLED 2/11/11 BORING NO. B-2

GROUND ELEVATION 1,028' ± MSL SHEET 2 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES: Bulk	SAMPLES: Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20								Total Depth = 20 feet. Groundwater not encountered during drilling. Backfilled on 2/11/11 promptly after completion of drilling. Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
25								
30								
35								
40								

Ninyo & Moore

BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-4

DATE DRILLED 2/11/11 BORING NO. B-3

GROUND ELEVATION 1,026' ± MSL SHEET 1 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SM	FILL: Brown, damp, medium dense, silty fine to medium SAND.
		20					
						SC	Brown, damp, medium dense, clayey fine to coarse SAND; trace gravel; scattered reworked caliche nodules.
						SC	ALLUVIUM: Brown, damp, medium dense to dense, clayey fine to coarse SAND; trace gravel; scattered caliche nodules; moderate cementation.
		20					
5							
		50/5"	14.2	100.1			Very dense; strong cementation.
		23					Dense.
10							
		33					Medium dense; moderate cementation.
15							
		31					Dense.
20							

Ninyo & Moore

BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-5

DATE DRILLED 2/11/11 BORING NO. B-3

GROUND ELEVATION 1,026' ± MSL SHEET 2 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES: Bulk	SAMPLES: Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20								Total Depth = 20 feet. Groundwater not encountered during drilling. Backfilled on 2/11/11 promptly after completion of drilling. Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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Ninyo & Moore

BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-6

DATE DRILLED 2/11/11 BORING NO. B-4

GROUND ELEVATION 1,024' ± MSL SHEET 1 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0		6				SM	FILL: Brown, damp, loose, silty fine to medium SAND.
5		19				SC	Brown, damp, medium dense, clayey fine to coarse SAND; few gravel; scattered reworked caliche nodules and asphalt fragments.
		10				SC	ALLUVIUM: Brown, damp, medium dense, clayey fine to coarse SAND; trace gravel; scattered caliche filaments and nodules; weak cementation.
10		38	13.7	97.7			
15		30					Dense; moderate cementation.
20		62					

Ninyo & Moore

BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-7

DATE DRILLED 2/11/11 BORING NO. B-4

GROUND ELEVATION 1,024' ± MSL SHEET 2 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES: Bulk	SAMPLES: Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20								Total Depth = 20 feet. Groundwater not encountered during drilling. Backfilled on 2/11/11 promptly after completion of drilling. Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-8

DATE DRILLED 2/11/11 BORING NO. B-5

GROUND ELEVATION 1,021' ± MSL SHEET 1 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SC	FILL: Brown, damp, medium dense, clayey fine to coarse SAND; scattered reworked caliche nodules.
	Driven	21					
	Driven	11					Trace gravel.
5						SC	ALLUVIUM: Brown, damp, medium dense, clayey fine to coarse SAND; trace gravel; scattered caliche nodules; weak cementation.
	Driven	32					
	Driven	17					
10							
	Driven	20					
15							
	Driven	13					
20							

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BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-9

DATE DRILLED 2/11/11 BORING NO. B-5

GROUND ELEVATION 1,021' ± MSL SHEET 2 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20							Total Depth = 20 feet. Groundwater not encountered during drilling. Backfilled on 2/11/11 promptly after completion of drilling. Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-10

DATE DRILLED 2/11/11 BORING NO. B-6

GROUND ELEVATION 1,017' ± MSL SHEET 1 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0		19				SC	FILL: Brown, damp, medium dense, clayey fine to coarse SAND; scattered reworked caliche nodules.
		36				SC	ALLUVIUM: Brown, damp, medium dense, clayey fine to coarse SAND; trace gravel; scattered caliche nodules and pinhole-size pore spaces.
5		36					Very dense; moderate emendation.
		28					Medium dense; weak cementation.
10		8					
15		26	4.6	105.7		SM	Brown, damp, medium dense, silty fine SAND; trace coarse gravel.
20							

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BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-11

DATE DRILLED 2/11/11 BORING NO. B-6

GROUND ELEVATION 1,017' ± MSL SHEET 2 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20							Total Depth = 20 feet. Groundwater not encountered during drilling. Backfilled on 2/11/11 promptly after completion of drilling. Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-12

DATE DRILLED 2/11/11 BORING NO. B-7

GROUND ELEVATION 1,011' ± MSL SHEET 1 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0		26				SM	FILL: Brown, damp, medium dense, silty fine to medium SAND.
5		9				SC	Brown, damp, medium dense, clayey fine to medium SAND.
10		22 15	6.4	105.5		SC	ALLUVIUM: Brown, damp, medium dense, clayey fine to coarse SAND; trace gravel; scattered caliche nodules.
15		30				CL	Brown, damp, hard, sandy CLAY; scattered caliche nodules; weak cementation.
20		21					

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BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-13

DATE DRILLED 2/11/11 BORING NO. B-7

GROUND ELEVATION 1,011' ± MSL SHEET 2 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES: Bulk	SAMPLES: Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20								Total Depth = 20 feet. Groundwater not encountered during drilling. Backfilled on 2/11/11 promptly after completion of drilling. Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-14

DATE DRILLED 2/11/11 BORING NO. B-8

GROUND ELEVATION 1,009' ± MSL SHEET 1 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0		12				SM	FILL: Brown, damp, medium dense, silty fine to medium SAND.
5		20				SC	ALLUVIUM: Brown, damp, medium dense, clayey fine to medium SAND; scattered caliche filaments and pinhole-size pore spaces.
		17					Light brown; scattered caliche nodules; weak cementation.
10		42					Medium dense to dense; moderate cementation.
15		22					Dense.
		50/5"				GC	Brown, damp, very dense, clayey fine to coarse GRAVEL with sand; moderate cementation; cobbles and possible boulders.
20							Total Depth = 19.4 feet.

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BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-15

DATE DRILLED 2/11/11 BORING NO. B-8

GROUND ELEVATION 1,009' ± MSL SHEET 2 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20							Groundwater not encountered during drilling. Backfilled on 2/15/11 promptly after completion of drilling. Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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35							
40							

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BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-16

DATE DRILLED 2/14/11 BORING NO. B-9

GROUND ELEVATION 1,006' ± MSL SHEET 1 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SM	FILL: Brown, damp, medium dense, silty fine to medium SAND.
	Driven	26	7.2	113.8		SC	Brown, damp, medium dense, clayey fine to medium SAND.
	Driven	15					Light brown; scattered reworked caliche nodules.
5						SM	Brown, damp, loose, silty fine to coarse SAND.
	Driven	12	3.1	109.4			
						SM	ALLUVIUM: Brown, damp, medium dense, silty fine to coarse SAND.
	Driven	18					
10						SC	Brown, damp, medium dense, clayey fine to coarse SAND; trace gravel; weak cementation.
	Driven	38	7.3	121.2			
15						SM	Brown, damp, dense, silty fine to coarse SAND; weak cementation.
	Driven	22					
20							

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BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-17

DATE DRILLED 2/14/11 BORING NO. B-9

GROUND ELEVATION 1,006' ± MSL SHEET 2 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20						SM	ALLUVIUM: (Continued) Brown, damp, dense, silty fine to coarse SAND; weak cementation.
		35	4.7	108.9			Medium dense.
25							Total Depth = 25 feet. Groundwater not encountered during drilling. Backfilled on 2/14/11 promptly after completion of drilling. Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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40							

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BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-18

DATE DRILLED 2/14/11 BORING NO. B-10

GROUND ELEVATION 1,010' ± MSL SHEET 1 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SM	FILL: Brown, damp, medium dense, silty fine to medium SAND.
	Driven	8					
	Driven	14	8.4	105.5		SC	Brown, damp, medium dense, clayey fine to coarse SAND; trace fine gravel.
5	Driven	4					Loose; scattered reworked caliche filaments.
						SM	ALLUVIUM: Brown, damp, medium dense, silty fine to coarse SAND; trace gravel.
	Driven	20	8.8	100.8			
10						SC	Brown, damp, medium dense, clayey fine to medium SAND; trace scattered caliche filaments and nodules; weak cementation.
	Driven	8					
15						ML	Brown, damp, medium dense, sandy SILT; scattered caliche filaments; weak cementation.
	Driven	20	13.3	90.2			
20							

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BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-19

DATE DRILLED 2/14/11 BORING NO. B-10

GROUND ELEVATION 1,010' ± MSL SHEET 2 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20						ML	ALLUVIUM: (Continued) Brown, damp, medium dense, sandy SILT; scattered caliche filaments; weak cementation.
		32					Dense; increase in sand content; moderate cementation.
25							Total Depth = 25 feet. Groundwater not encountered during drilling. Backfilled on 2/14/11 promptly after completion of drilling. Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-20

DATE DRILLED 2/14/11 BORING NO. B-11

GROUND ELEVATION 1,004' ± MSL SHEET 1 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0		18				SM	FILL: Brown, damp, medium dense, silty fine to coarse SAND; trace gravel.
5		12				SC	ALLUVIUM: Brown, damp, medium dense, clayey fine to medium SAND; trace gravel.
		16					
10		10				SM	Brown, damp, medium dense, silty fine to coarse SAND; few gravel.
15		50/5"				SC	Brown, damp, very dense, clayey fine to coarse SAND; few to little gravel; moderate cementation.
20		42					

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BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-21

DATE DRILLED 2/14/11 BORING NO. B-11

GROUND ELEVATION 1,004' ± MSL SHEET 2 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES: Bulk	SAMPLES: Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20								Total Depth = 20 feet. Groundwater not encountered during drilling. Backfilled on 2/14/11 promptly after completion of drilling. Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
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BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-22

DATE DRILLED 2/14/11 BORING NO. B-12

GROUND ELEVATION 1,002' ± MSL SHEET 1 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SC	FILL: Brown, damp, dense, clayey fine to medium SAND; scattered reworked caliche nodules.
		25					
		18	3.8	102.2		SM	ALLUVIUM: Brown, damp, medium dense, silty fine to medium SAND; scattered caliche nodules; weak cementation.
5		11					Trace gravel.
		32					Increase in gravel content.
10							
		15					
15							
		50/4"				CL	Brown, damp, hard, sandy CLAY; moderate cementation.
20							Total Depth = 19.3 feet. Groundwater not encountered during drilling.

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BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-23

DATE DRILLED 2/14/11 BORING NO. B-12

GROUND ELEVATION 1,002' ± MSL SHEET 2 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20							Backfilled on 2/14/11 promptly after completion of drilling. Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
25							
30							
35							
40							

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BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-24

DATE DRILLED 2/14/11 BORING NO. B-13

GROUND ELEVATION 1,003' ± MSL SHEET 1 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SC	FILL: Brown, damp, medium dense, clayey fine to coarse SAND; trace gravel.
		35					
						SM	Brown, damp, medium dense, silty fine to medium SAND.
5		12					
						SM	ALLUVIUM: Brown, damp, medium dense, silty fine to medium SAND.
		33					
		13					
10						GM	Brown, damp, very dense, silty fine to coarse GRAVEL with sand; cobbles and possible boulders.
		50/5"					
15							
		59					
20							

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BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-25

DATE DRILLED 2/14/11 BORING NO. B-13

GROUND ELEVATION 1,003' ± MSL SHEET 2 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES: Bulk	SAMPLES: Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20								Total Depth = 20 feet. Groundwater not encountered during drilling. Backfilled on 2/14/11 promptly after completion of drilling. Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
25								
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40								

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BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-26

DATE DRILLED 2/15/11 BORING NO. B-14

GROUND ELEVATION 1,002' ± MSL SHEET 1 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SM	FILL: Brown, damp, medium dense, silty fine to medium SAND; scattered caliche filaments.
		10					
		21					Fine- to-coarse grained; trace gravel; scattered caliche nodules.
5						SW-SM	ALLUVIUM: Brown, damp, medium dense, well graded SAND with silt and gravel.
		14					
		23	2.9	110.8			
10							
						SM	Brown, damp, medium dense, silty fine to coarse SAND with gravel.
		15					
15							
		22					
20							

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BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-27

DATE DRILLED 2/15/11 BORING NO. B-14

GROUND ELEVATION 1,002' ± MSL SHEET 2 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20							Total Depth = 20 feet. Groundwater not encountered during drilling. Backfilled on 2/15/11 promptly after completion of drilling. Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
25							
30							
35							
40							

Ninyo & Moore

BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-28

DATE DRILLED 2/15/11 BORING NO. B-15

GROUND ELEVATION 999' ± MSL SHEET 1 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0		11				SC	FILL: Brown, damp, loose, clayey fine to medium SAND.
5		7				SC	ALLUVIUM: Brown, damp, loose to medium dense, clayey fine to medium SAND.
		9					Moist; loose.
10		14				CL	Brown, damp, very stiff, sandy CLAY; scattered caliche nodules.
15		18				SM	Brown, damp, medium dense, silty fine to coarse SAND; trace gravel.
20		20					Medium dense to dense; increase in gravel content.

Ninyo & Moore

BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-29

DATE DRILLED 2/15/11 BORING NO. B-15

GROUND ELEVATION 999' ± MSL SHEET 2 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES: Bulk	SAMPLES: Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20								Total Depth = 20 feet. Groundwater not encountered during drilling. Backfilled on 2/15/11 promptly after completion of drilling. Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
25								
30								
35								
40								

Ninyo & Moore

BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-30

DATE DRILLED 2/15/11 BORING NO. B-16

GROUND ELEVATION 997' ± MSL SHEET 1 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							ASPHALT CONCRETE: Approximately 5 inches thick.
							AGGREGATE BASE: Approximately 10 inches thick. Brown, damp, medium dense, poorly graded GRAVEL with sand.
		9				SC	FILL: Brown, damp, medium dense, clayey fine to medium SAND; scattered caliche nodules.
5		15					
		10				ML	ALLUVIUM: Brown, damp, medium dense, sandy SILT; trace gravel.
		21	5.8	97.4			
10							
		17				CL	Brown, damp, very stiff, sandy CLAY.
15							
		36					Hard.
20							

Ninyo & Moore

BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-31

DATE DRILLED 2/15/11 BORING NO. B-16

GROUND ELEVATION 997' ± MSL SHEET 2 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20							Total Depth = 20 feet. Groundwater not encountered during drilling. Backfilled and asphalt patched on 2/15/11 promptly after completion of drilling. Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
25							
30							
35							
40							

Ninyo & Moore

BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-32

DATE DRILLED 2/15/11 BORING NO. B-17

GROUND ELEVATION 995' ± MSL SHEET 1 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SM	FILL: Brown, damp, medium dense, silty fine to medium SAND.
		20				SC	Brown, damp, medium dense, clayey fine to medium SAND.
		10				SM	Light brown, damp, medium dense, silty fine to medium SAND.
5		23	7.2	103.4		SC	ALLUVIUM: Brown, damp, medium dense, clayey fine to medium SAND.
		14				SM	Brown, damp, medium dense, silty fine to coarse SAND; trace gravel.
10		50/5"				SC	Brown, damp, very dense, clayey fine SAND; trace gravel; scattered caliche filaments; moderate cementation.
15		41					
20							

Ninyo & Moore

BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-33

DATE DRILLED 2/15/11 BORING NO. B-17

GROUND ELEVATION 995' ± MSL SHEET 2 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES: Bulk	SAMPLES: Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20								Total Depth = 20 feet. Groundwater not encountered during drilling. Backfilled on 2/15/11 promptly after completion of drilling. Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
25								
30								
35								
40								

Ninyo & Moore

BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-34

DATE DRILLED 2/15/11 BORING NO. B-18

GROUND ELEVATION 993' ± MSL SHEET 1 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0		7				SC	FILL: Brown, damp, loose to medium dense, clayey fine to coarse SAND; trace fine gravel.
5		10				SM	ALLUVIUM: Brown, damp, loose, silty fine to medium SAND.
		6					Trace gravel.
10		47	3.9	107.0		GM	Brown, damp, dense, silty fine to coarse GRAVEL with sand.
		42				SC	Brown, damp, very dense, clayey fine to coarse SAND with gravel; scattered caliche nodules; moderate cementation.
15						GC	Brown, damp, very dense, clayey fine to coarse GRAVEL with sand; cobbles and possible boulders.
	W	50/0"					Total Depth = 18.5 feet (Refusal). Groundwater not encountered during drilling. Backfilled on 2/15/11 promptly after completion of drilling. Groundwater, though not encountered at the time of drilling, may rise to a higher level
20							

Ninyo & Moore

BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-35

DATE DRILLED 2/15/11 BORING NO. B-18

GROUND ELEVATION 993' ± MSL SHEET 2 OF 2

METHOD OF DRILLING Diedrich D-120, 8" Diameter Hollow-Stem Auger (D&S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY JSR

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
20								due to seasonal variations in precipitation and several other factors as discussed in the report.
25								
30								
35								
40								

Ninyo & Moore

BORING LOG

WHITE TANKS NO. 4 OUTLET FACILITY
MARICOPA COUNTY, ARIZONA

PROJECT NO.	DATE	FIGURE
603248001	11/11	A-36

APPENDIX B

LABORATORY TESTING

Classification

Soils were visually and texturally classified in accordance with the Unified Soil Classification System (USCS) in general accordance with ASTM D 2488. Soil classifications are indicated on the logs of the exploratory excavations in Appendix A.

In-Place Moisture and Density Tests

The moisture content and dry density of relatively undisturbed samples obtained from the exploratory excavations were evaluated in general accordance with ASTM D 2937. The test results are presented on the logs of the exploratory excavations in Appendix A.

Gradation Analysis

Gradation analysis tests were performed on selected representative soil samples in general accordance with ASTM D 422. The grain-size distribution curves are shown in Figures B-1 through B-8. These test results were utilized in evaluating the soil classifications in accordance with the Unified Soil Classification System.

Atterberg Limits

Tests were performed on selected representative fine-grained soil samples to evaluate the liquid limit, plastic limit, and plasticity index in general accordance with ASTM D 4318. These test results were utilized to evaluate the soil classification in accordance with the Unified Soil Classification System. The test results and classifications are shown on Figure B-9.

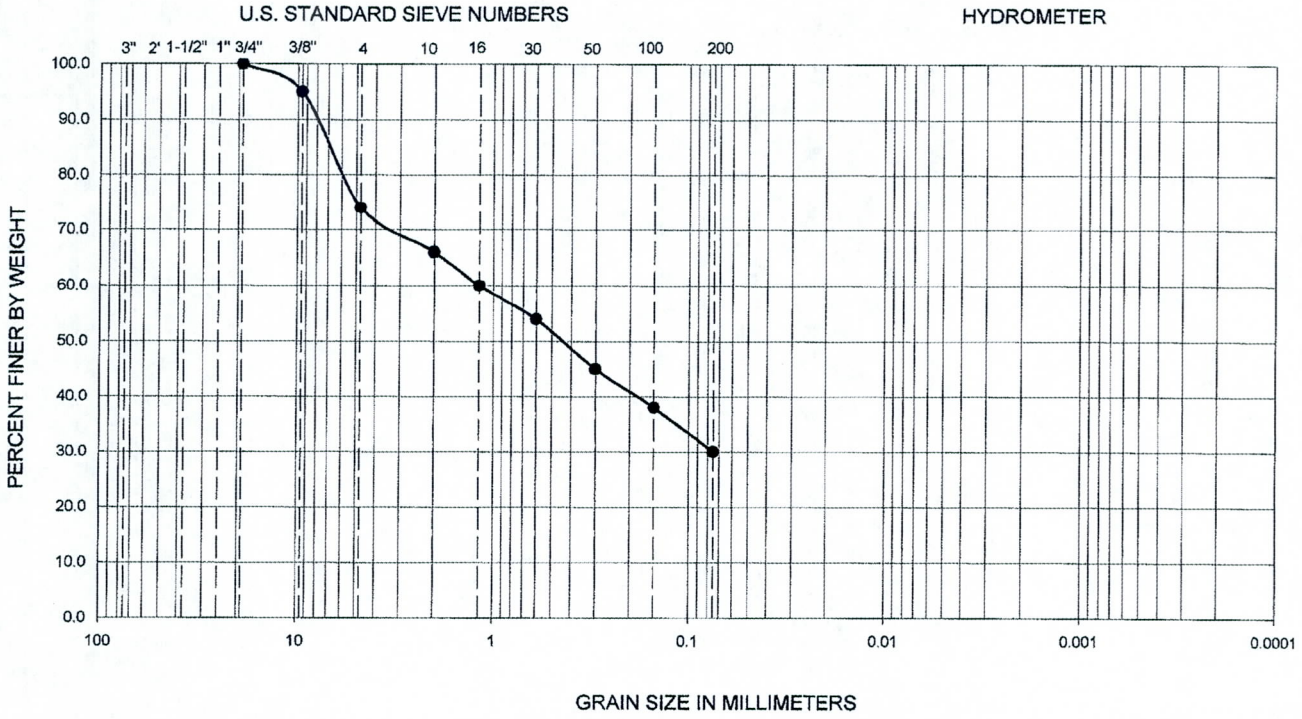
Consolidation Tests

A consolidation test was performed on a selected relatively undisturbed soil sample in general accordance with ASTM D 2435. The sample was inundated during testing to represent adverse field conditions. The percent of consolidation for each load cycle was recorded as a ratio of the amount of vertical compression to the original height of the sample. The result of the test is summarized on Figure B-10.

Soil Corrosivity Tests

Soil pH and minimum resistivity tests were performed on representative samples in general accordance with Arizona Test 236b. The chloride content of selected samples was evaluated in general accordance with Arizona Test 736. The sulfate content of selected samples was evaluated in general accordance with Arizona Test 733. The test results are presented on Figure B-11.

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

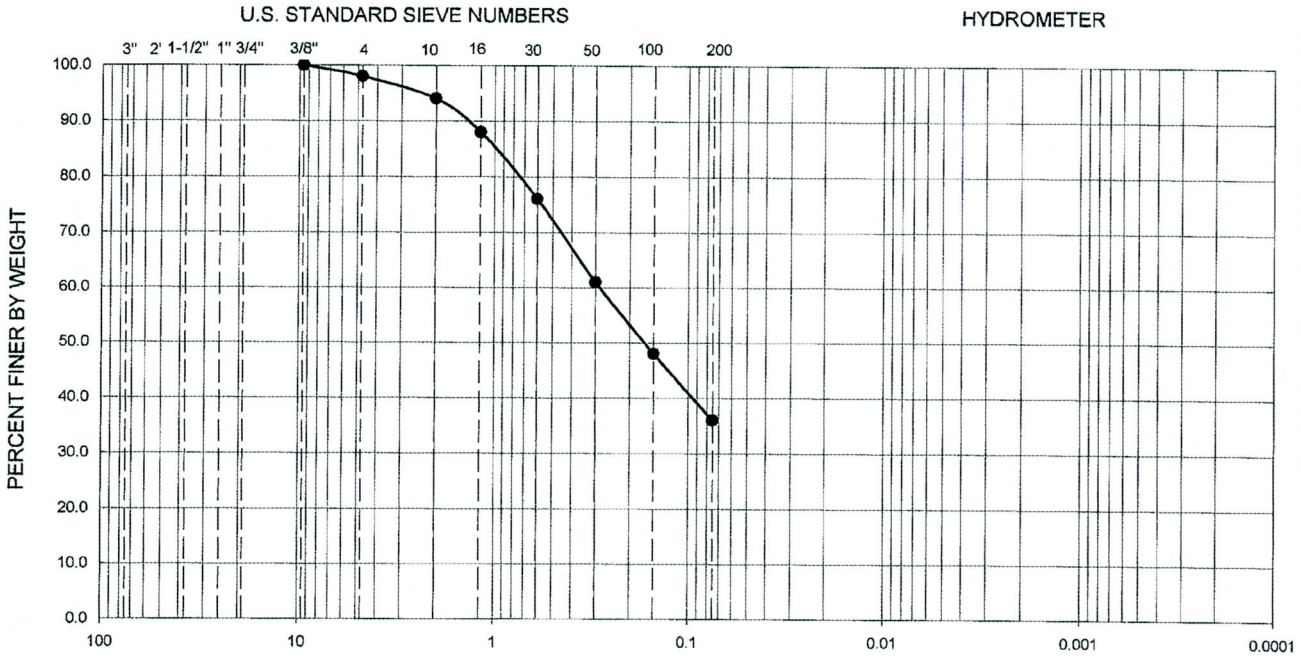


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-1	6-7.5	30	18	12	--	--	--	--	--	30	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

Ninyo & Moore	GRADATION TEST RESULTS	FIGURE
PROJECT NO. 603248001 / DATE 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	B-1

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

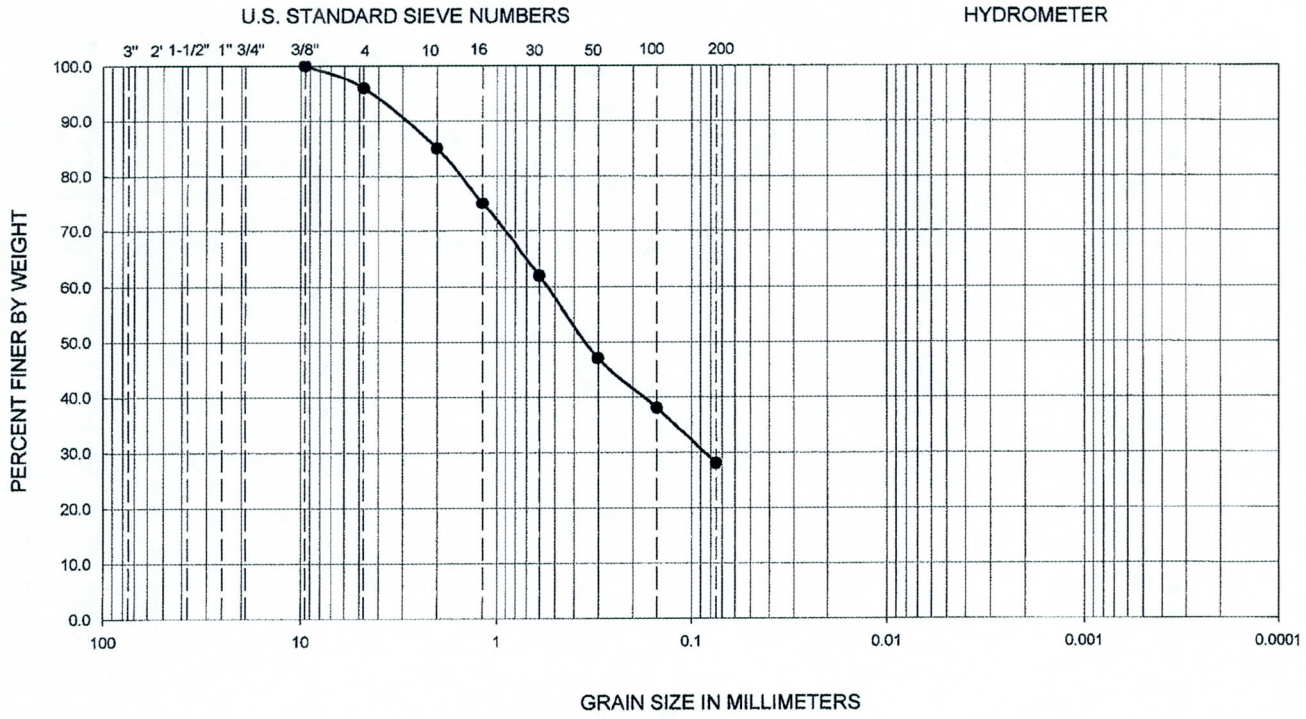


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-4	8.5-10	42	24	18	--	--	--	--	--	36	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

Ninyo & Moore	GRADATION TEST RESULTS	FIGURE
PROJECT NO. 603248001 / DATE 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	B-2

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

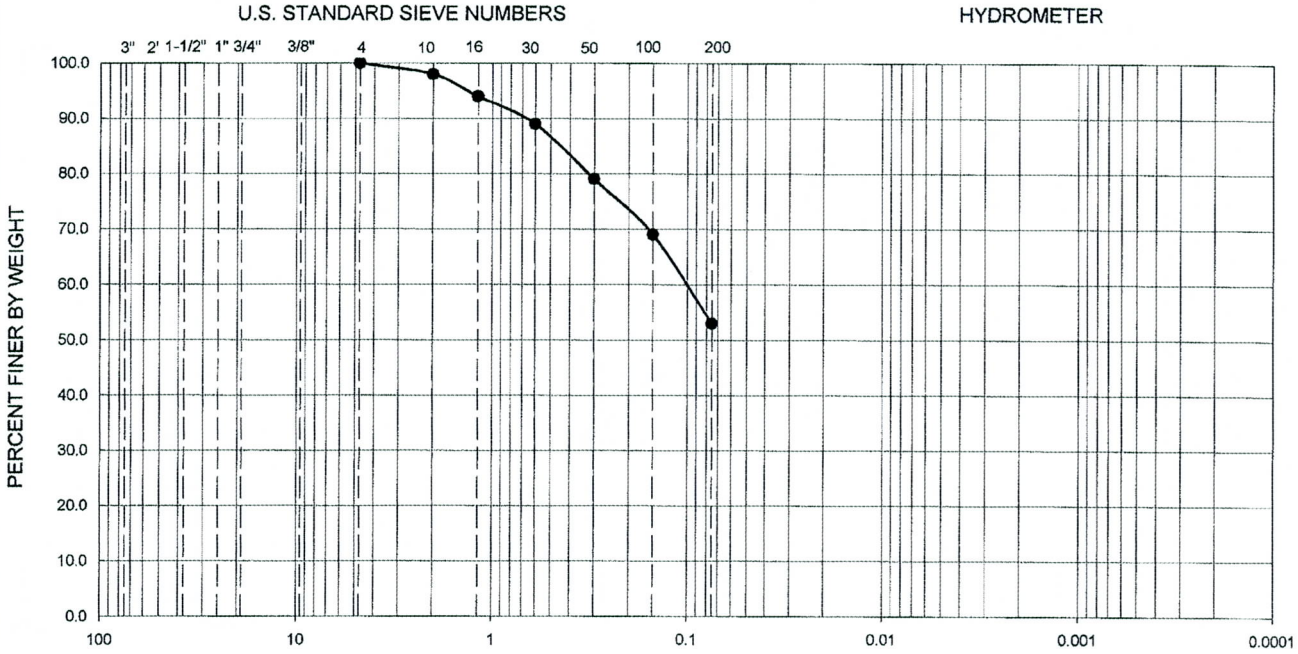


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-5	13.5-15	37	20	17	--	--	--	--	--	28	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

Ninyo & Moore	GRADATION TEST RESULTS	FIGURE
PROJECT NO. 603248001 / DATE 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	B-3

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

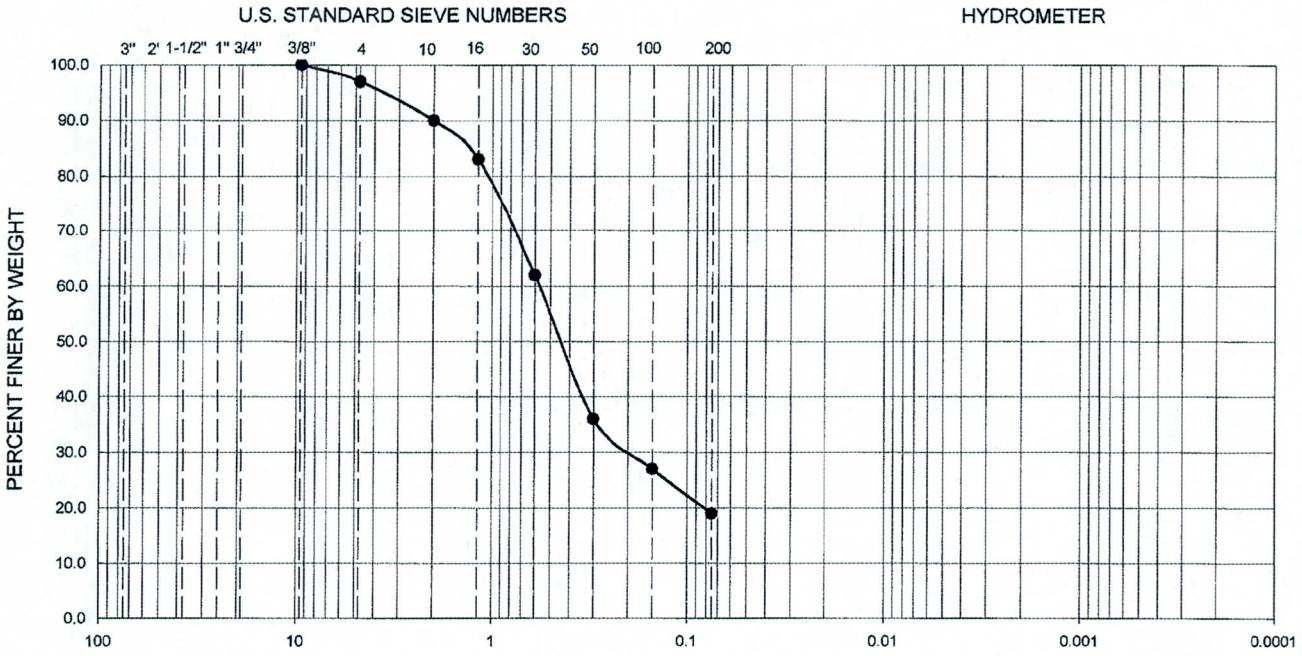


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-7	13.5-15	36	20	16	--	--	--	--	--	53	CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

Ninyo & Moore		GRADATION TEST RESULTS	FIGURE
PROJECT NO.	DATE	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	B-4
603248001	11/11		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

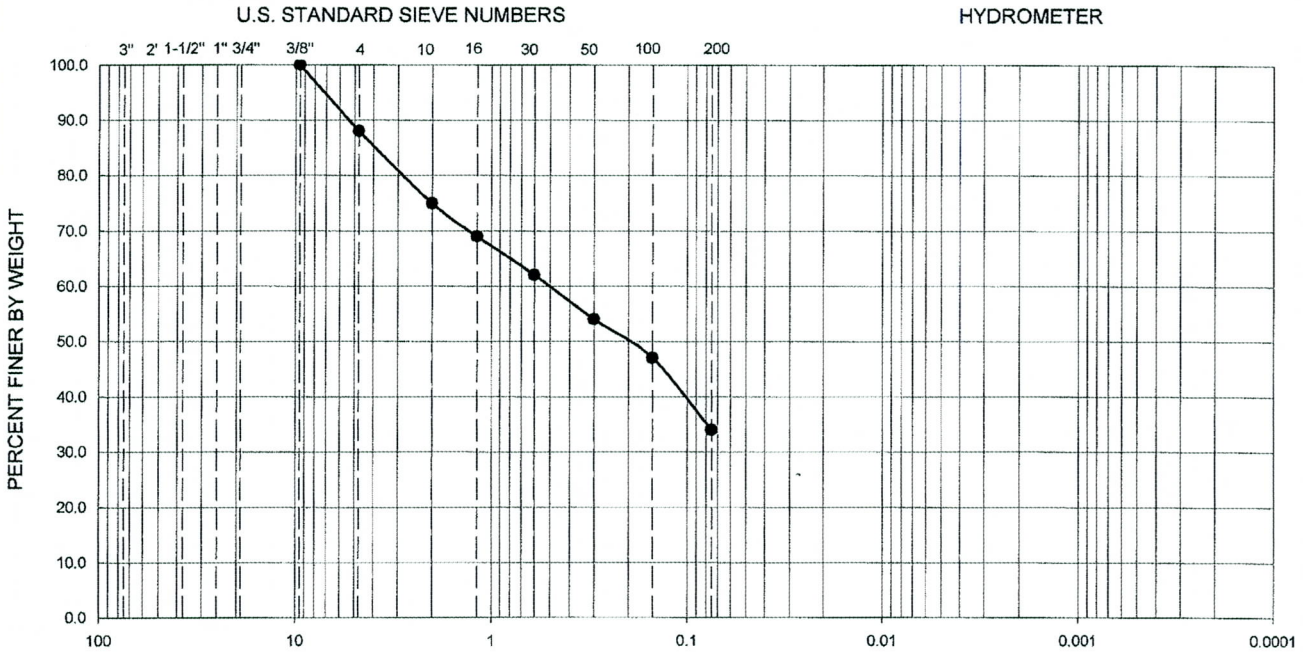


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-9	13.5-15	37	19	18	--	--	--	--	--	19	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

Ninyo & Moore		GRADATION TEST RESULTS	FIGURE
PROJECT NO.	DATE	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	B-5
603248001	11/11		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

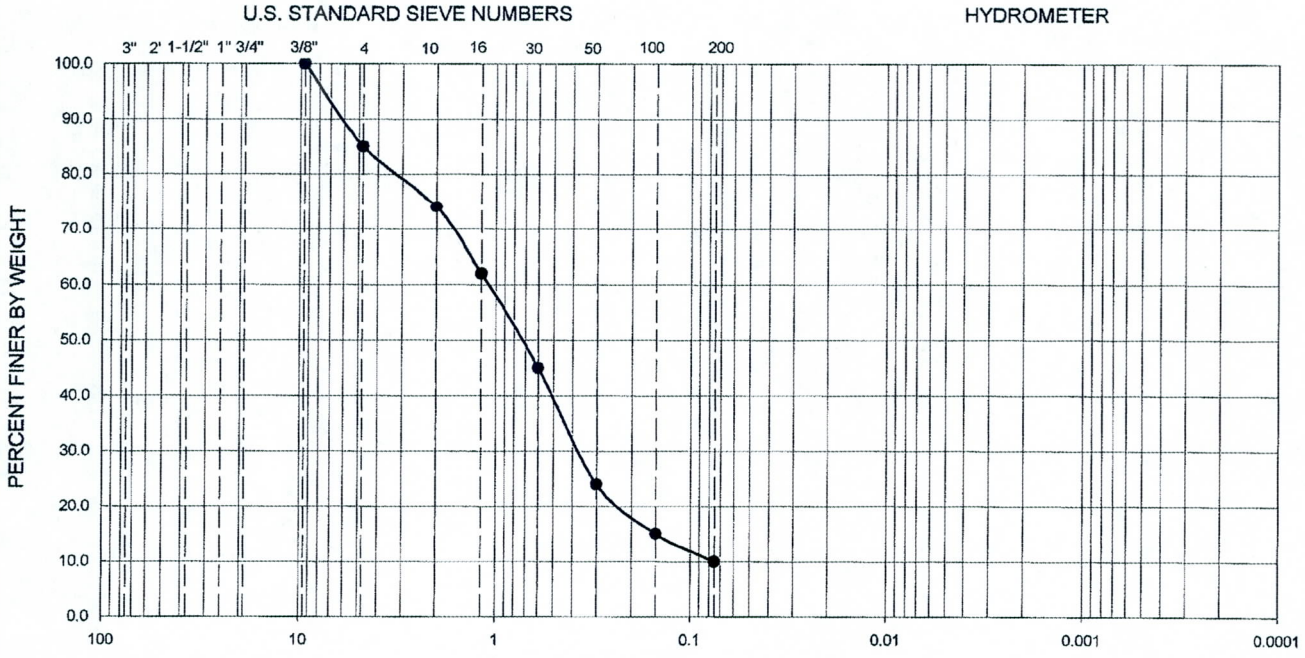


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-11	13.5-14.5	47	26	21	--	--	--	--	--	34	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

Ninyo & Moore		GRADATION TEST RESULTS	FIGURE
PROJECT NO.	DATE	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	B-6
603248001	11/11		

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



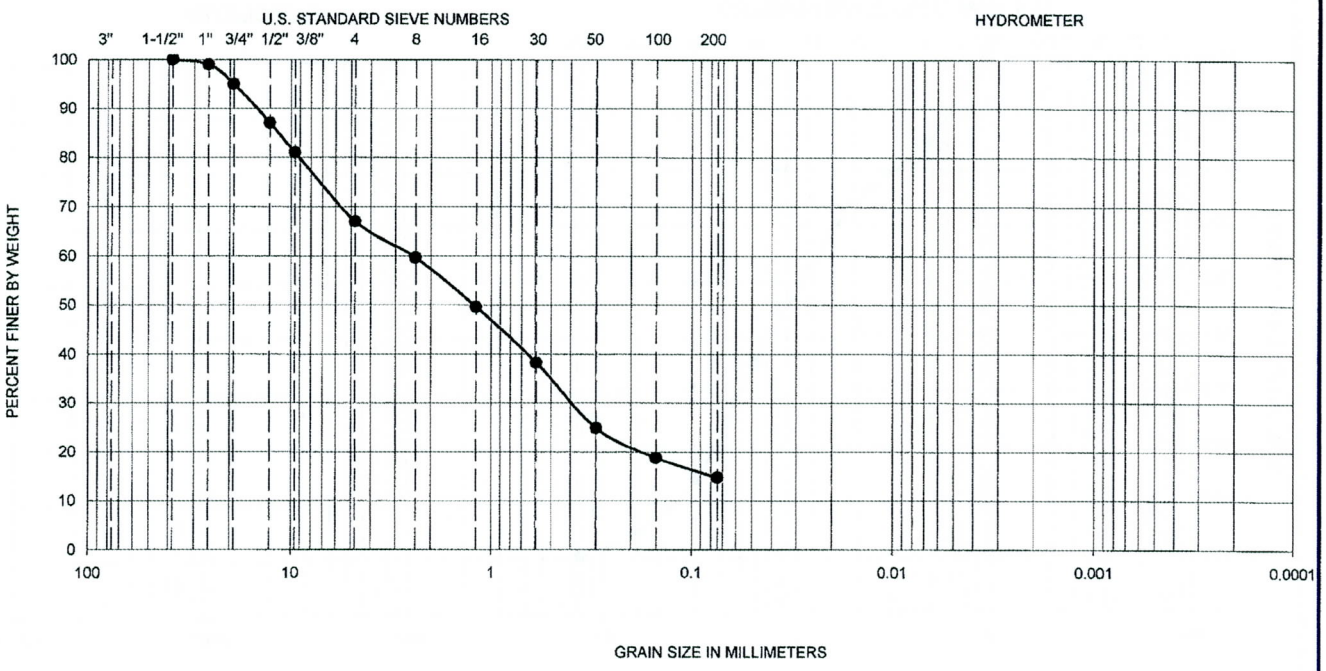
Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-14	8.5-10	--	--	NP	0.08	0.37	1.20	16.0	1.5	10	SW-SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

NP - INDICATES NON-PLASTIC

Ninyo & Moore	GRADATION TEST RESULTS	FIGURE
PROJECT NO. 603248001 / DATE 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	B-7

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	Silt	Clay



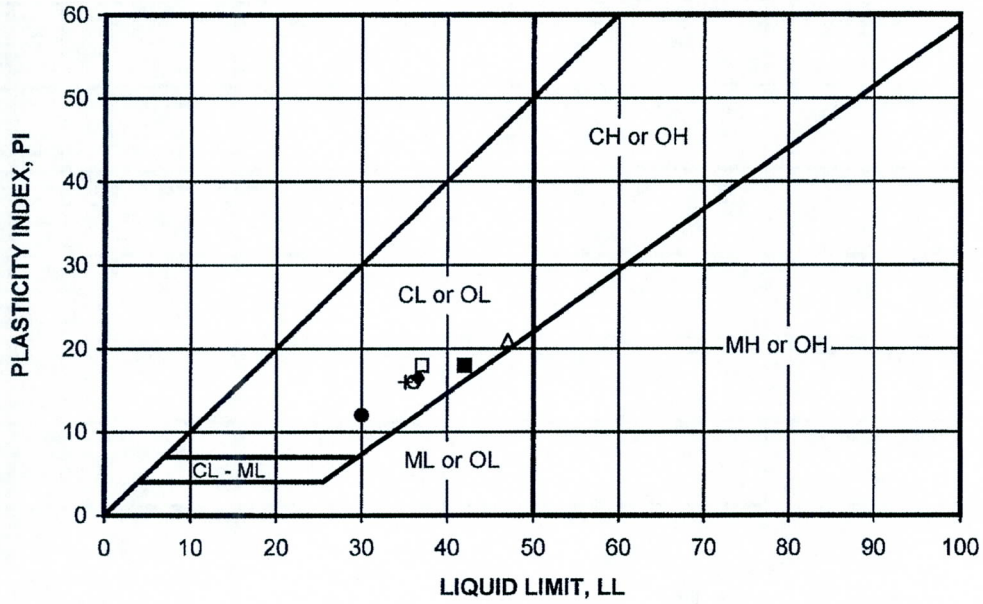
Symbol	Hole No.	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	U.S.C.S
●	B-18	10-15	35	19	16	--	--	--	--	--	15	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422

Ninyo & Moore		GRADATION TEST RESULTS	FIGURE
PROJECT NO.	DATE	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	B-8
603248001	11/11		

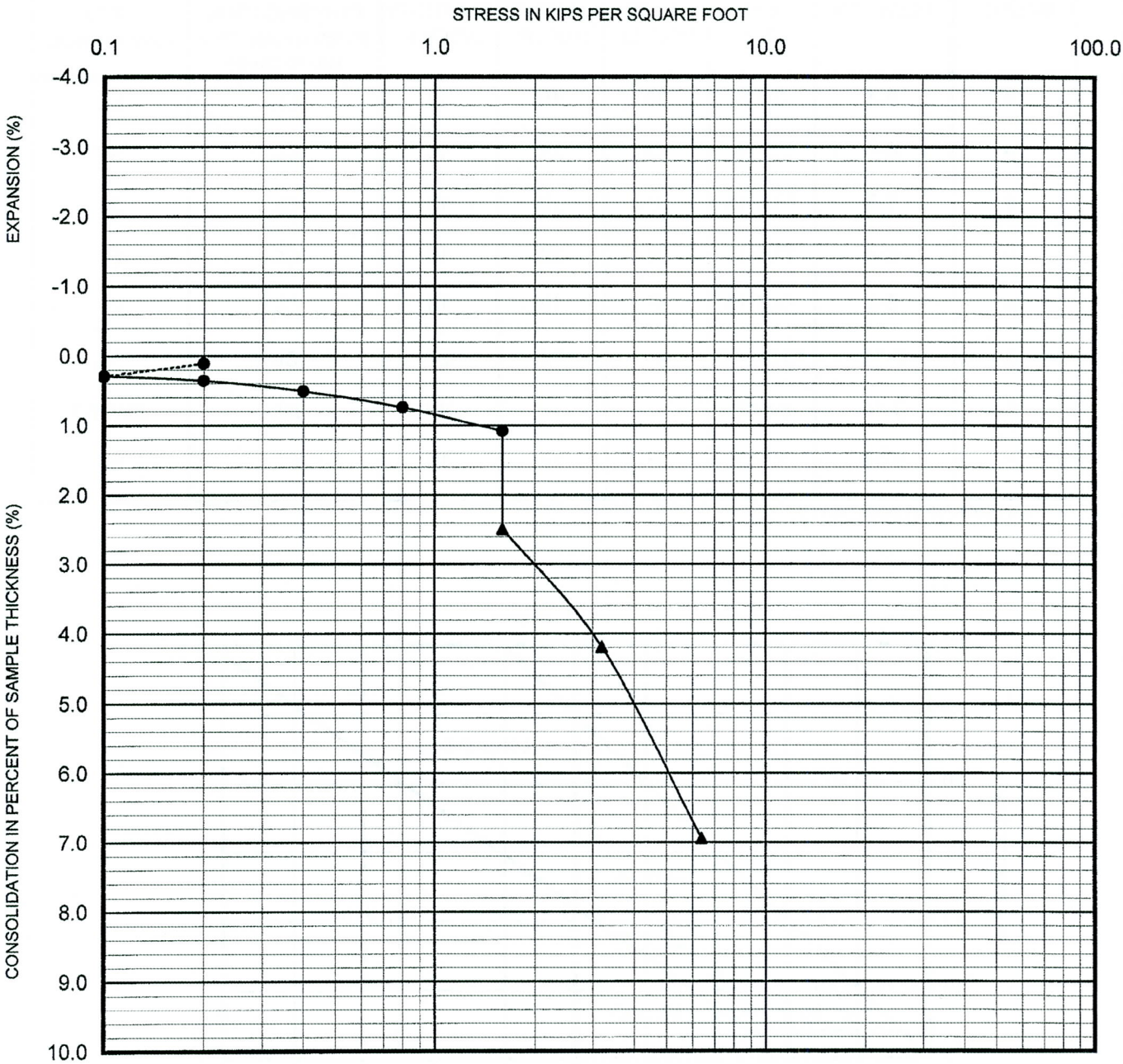
SYMBOL	LOCATION	DEPTH (FT)	LIQUID LIMIT, LL	PLASTIC LIMIT, PL	PLASTICITY INDEX, PI	USCS CLASSIFICATION (Fraction Finer Than No. 40 Sieve)	USCS (Entire Sample)
●	B-1	6-7.5	30	18	12	CL	SC
■	B-4	8.5-10	42	24	18	CL	SC
◆	B-5	13.5-15	37	20	17	CL	SC
○	B-7	13.5-15	36	20	16	CL	CL
□	B-9	13.5-15	37	19	18	CL	SC
Δ	B-11	13.5-14.5	47	26	21	CL	SC
X	B-14	8.5-10	--	--	NP	ML	SW-SM
+	B-18	10-15	35	19	16	CL	SC

NP - INDICATES NON-PLASTIC



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4318

Ninyo & Moore	ATTERBERG LIMITS TEST RESULTS	FIGURE
PROJECT NO. 603248001 / DATE 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	B-9



Seating Cycle	Sample Location B-1
Loading Prior to Inundation	Depth (ft.) 13.5-15
Loading After Inundation	Soil Type SM
Rebound Cycle	

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2435

Ninyo & Moore	CONSOLIDATION TEST RESULTS	FIGURE
PROJECT NO. 603248001 / DATE 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	B-10

SAMPLE LOCATION	SAMPLE DEPTH (FT)	pH [1]	RESISTIVITY [1] (Ohm-cm)	SULFATE CONTENT [2]		CHLORIDE CONTENT [3] (ppm)
				(ppm)	(%)	
B-4	10-15	7.9	4,036	79	0.008	21
B-18	10-15	7.7	3,283	74	0.007	62

[1] PERFORMED IN GENERAL ACCORDANCE WITH ARIZONA TEST METHOD 236b
[2] PERFORMED IN GENERAL ACCORDANCE WITH ARIZONA TEST METHOD 733
[3] PERFORMED IN GENERAL ACCORDANCE WITH ARIZONA TEST METHOD 736

Ninyo & Moore	CORROSIVITY TEST RESULTS	FIGURE
PROJECT NO. 603248001 / DATE 11/11	WHITE TANKS NO. 4 OUTLET FACILITY VAN BUREN STREET FROM JACKRABBIT TRAIL TO COTTON LANE MARICOPA COUNTY, ARIZONA	B-11

APPENDIX C

AGRONOMIC TEST RESULTS

MOTZZ LABORATORY, INC.
2113 S 48th St Suite 109
Tempe, AZ 85282

Soil Analysis Report

Ninyo & Moore
Kristen Tvedten
3202 East Harbour Drive
Phoenix AZ 85034-7233

Project: 603248001
Sampler:
Date Received: 3/16/2011
Date Reported: 3/17/2011

PO Number: 603248001

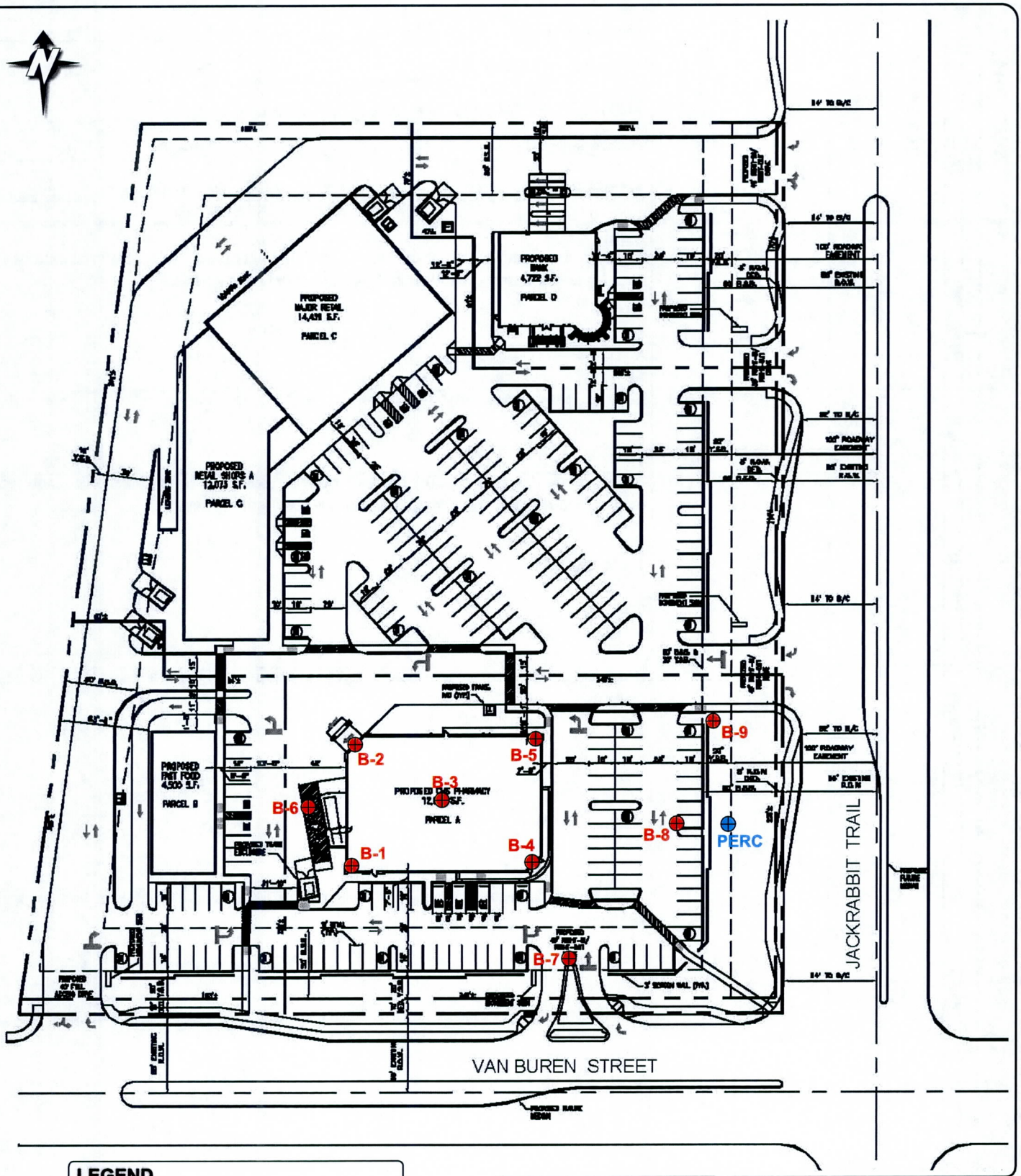
Lab Number: 903185-01 **B-5 (1-20)** **Crop: Landscape**

Soil Complete Test	Method	Result	Units	Levels
pH	1:1	8.2	SU	High
Electrical Conductivity, EC	1:1	0.92	dS/m	Medium
Calcium, Ca	NH4OAc (pH 8.5)	3,100	ppm	Very High
Magnesium, Mg	NH4OAc (pH 8.5)	310	ppm	Very High
Sodium, Na	NH4OAc (pH 8.5)	200	ppm	Medium
Potassium, K	NH4OAc (pH 8.5)	58	ppm	Low
Zinc, Zn	DTPA	23	ppm	Very High
Iron, Fe	DTPA	2.2	ppm	Low
Manganese, Mn	DTPA	1.2	ppm	Low
Copper, Cu	DTPA	2.9	ppm	Very High
Nickel, Ni	DTPA	0.045	ppm	
Nitrate-N, NO3-N	Cd Reduction	100	ppm	Very High
Phosphate-P, PO4-P	Olsen	3.6	ppm	Low
Sulfate-S, SO4-S	Hot Water	70	ppm	Very High
Boron, B	Hot Water	0.45	ppm	Medium
Free Lime, FL	Acid Test	High		
ESP	Calculated	4.6	%	
CEC	Calculated	19.1	meq/100g	

Levels are generalized and apply to most cropping environments.
Low means a high probability that applying nutrient will elicit a growth response.
Medium means a moderate probability of plant growth from application.
High means little or no response expected from application of this nutrient.
Very High means adding the nutrient may reduce growth or cause imbalance.

APPENDIX D

BORING LOGS AND LABORATORY TESTING FROM PREVIOUS GEOTECHNICAL STUDY



LEGEND

B-8	Approximate Boring Location
PERC	Approximate Percolation Test Location

0 40

Approximate Scale:
1 inch = 40 feet

Ninyo & Moore

BORING LOCATION MAP

CVS PHARMACY (STORE # 75162)
NWC OF VAN BUREN ST. AND JACKRABBIT TR.
MARICOPA COUNTY, ARIZONA

FIGURE 2

PROJECT No:	FILE No:	DATE:
600222067	222blm1005	10/05

DATE DRILLED 10/7/05 BORING NO. B-1

GROUND ELEVATION -- SHEET 1 OF 1

METHOD OF DRILLING CME-75, 6.5" Hollow-Stem Auger

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY TLC LOGGED BY TLC REVIEWED BY ESZ

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SC	ALLUVIUM: Light brown, damp, medium dense, clayey fine to coarse SAND; scattered caliche nodules and filaments, rootlets and pinhole-sized pore spaces.
		24					
						SM	Brown, damp, dense, silty fine to medium SAND; trace clay.
		31					
5						CL	Light brown, damp, hard, silty CLAY; medium plasticity; trace fine sand; scattered caliche nodules and filaments, and pinhole-sized pore spaces. Trace gravel.
		54					
						SC	Reddish brown, damp, very dense, clayey medium SAND; scattered caliche filaments and nodules.
		73					
10						CL	Light brown to brown, damp, hard, fine sandy CLAY; scattered caliche nodules and filaments.
		50/5"					
15							Total depth = 14.4 feet. Groundwater not encountered. Backfilled on 10/07/05.
20							

Ninyo & Moore

BORING LOG

CVS Pharmacy (Store No. 75162) - NWC of Van Buren St. and Jackrabbit Tr.
Maricopa County, Arizona

PROJECT NO.	DATE	FIGURE
600222067	10/05	A-1

DATE DRILLED 10/7/05 BORING NO. B-2

GROUND ELEVATION -- SHEET 1 OF 1

METHOD OF DRILLING CME-75, 6.5" Hollow-Stem Auger

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY TLC LOGGED BY TLC REVIEWED BY ESZ

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0		28				SC	ALLUVIUM: Brown, damp, medium dense, clayey fine SAND; scattered caliche filaments, rootlets and pinhole-sized pore spaces.
5		44				CL	Light brown, damp, hard, silty CLAY; few sand; scattered caliche filaments and nodules.
		52					No sand observed; scattered pinhole-sized pore spaces; weakly to moderately cemented.
10		46				ML	Light brown, damp, hard, clayey SILT; few fine sand; scattered caliche filaments.
15		44				SC	Brown, damp, very dense, clayey fine to medium SAND; trace gravel.
20							Total depth = 15 feet. Groundwater not encountered. Backfilled on 10/07/05.

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BORING LOG

CVS Pharmacy (Store No. 75162) - NWC of Van Buren St. and Jackrabbit Tr.
Maricopa County, Arizona

PROJECT NO.	DATE	FIGURE
600222067	10/05	A-2

DATE DRILLED 10/7/05 BORING NO. B-3

GROUND ELEVATION -- SHEET 1 OF 1

METHOD OF DRILLING CME-75, 6.5" Hollow-Stem Auger

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY TLC LOGGED BY TLC REVIEWED BY ESZ

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SC	ALLUVIUM: Light brown, damp, medium dense, clayey fine SAND; scattered caliche nodules and filaments, pinhole-sized pore spaces and rootlets.
	Driven	26	4.1	98.7			
	Driven	52	4.1	102.4			Dense.
5							Few medium sand.
	Driven	38				CL	Light brown, damp, hard, silty CLAY; trace sand; scattered caliche nodules and filaments, and pinhole-sized pore spaces.
	Driven	30				SC	Brown, damp, dense, clayey fine to medium SAND; scattered caliche nodules.
10							
	Driven	44					Very dense; trace gravel.
15							Total depth = 15 feet. Groundwater not encountered. Backfilled on 10/07/05.
20							

Ninyo & Moore

BORING LOG

CVS Pharmacy (Store No. 75162) - NWC of Van Buren St. and Jackrabbit Tr.
Maricopa County, Arizona

PROJECT NO.	DATE	FIGURE
600222067	10/05	A-3

DATE DRILLED 10/7/05 BORING NO. B-4

GROUND ELEVATION -- SHEET 1 OF 1

METHOD OF DRILLING CME-75, 6.5" Hollow-Stem Auger

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY TLC LOGGED BY TLC REVIEWED BY ESZ

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SC	ALLUVIUM: Light brown, damp, medium dense, clayey fine to medium SAND; scattered caliche nodules and filaments, pinhole-sized pore spaces, and rootlets.
		21					
						CL	Light brown, damp, hard, silty CLAY; few fine sand; scattered caliche nodules and filaments, and pinhole-sized pore spaces.
		48					
5							
		63					Trace coarse sand.
		89					Light brown to brown; sandy; weakly to moderately cemented.
10							
		50/5"					Silty; trace fine sand; moderately cemented.
							Total depth = 14.4 feet. Groundwater not encountered. Backfilled on 10/07/05.
15							
20							

Ninyo & Moore

BORING LOG

CVS Pharmacy (Store No. 75162) - NWC of Van Buren St. and Jackrabbit Tr.
Maricopa County, Arizona

PROJECT NO.	DATE	FIGURE
600222067	10/05	A-4

DATE DRILLED 10/7/05 BORING NO. B-5

GROUND ELEVATION -- SHEET 1 OF 1

METHOD OF DRILLING CME-75, 6.5" Hollow-Stem Auger

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY TLC LOGGED BY TLC REVIEWED BY ESZ

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SM	ALLUVIUM: Brown, damp, medium dense, silty fine to medium SAND; trace clay; scattered caliche filaments and nodules, and rootlets.
		24					
						SC	Light brown, damp, dense, clayey fine to medium SAND; scattered caliche nodules.
		30					
5						CL	Light brown, damp, hard, sandy CLAY; scattered caliche filaments and nodules.
		41					
		43					Silty; trace sand.
10							
		80					Weakly to moderately cemented.
15							Total depth = 15 feet. Groundwater not encountered. Backfilled on 10/07/05.
20							

Ninyo & Moore

BORING LOG

CVS Pharmacy (Store No. 75162) - NWC of Van Buren St. and Jackrabbit Tr.
Maricopa County, Arizona

PROJECT NO.	DATE	FIGURE
600222067	10/05	A-5

DATE DRILLED 10/7/05 BORING NO. B-6

GROUND ELEVATION -- SHEET 1 OF 1

METHOD OF DRILLING CME-75, 6.5" Hollow-Stem Auger

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY TLC LOGGED BY TLC REVIEWED BY ESZ

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SC	ALLUVIUM: Light brown, damp, medium dense, clayey fine to medium SAND; scattered caliche filaments, rootlets and pinhole-sized pore spaces.
		9					
		11					Few gravel.
5						CL	Light brown, damp, hard, silty CLAY; trace fine sand; scattered caliche nodules and filaments.
		22					
		80					
10							Total depth = 10 feet. Groundwater not encountered. Backfilled on 10/07/05.
15							
20							

Ninyo & Moore

BORING LOG

CVS Pharmacy (Store No. 75162) - NWC of Van Buren St. and Jackrabbit Tr.
Maricopa County, Arizona

PROJECT NO.	DATE	FIGURE
600222067	10/05	A-6

DATE DRILLED 10/7/05 BORING NO. B-7

GROUND ELEVATION -- SHEET 1 OF 1

METHOD OF DRILLING CME-75, 6.5" Hollow-Stem Auger

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY TLC LOGGED BY TLC REVIEWED BY ESZ

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						CL	ALLUVIUM: Light brown, damp, hard, fine sandy CLAY; low plasticity; scattered caliche nodules and filaments.
		37					
		36					Scattered pinhole-sized pore spaces.
5		42					
		50				SM	Brown to light brown, damp, very dense, silty fine to coarse SAND; trace clay; scattered caliche nodules.
10							Weakly cemented. Total depth = 10 feet. Groundwater not encountered. Backfilled on 10/07/05.
15							
20							

Ninyo & Moore

BORING LOG

CVS Pharmacy (Store No. 75162) - NWC of Van Buren St. and Jackrabbit Tr.
Maricopa County, Arizona

PROJECT NO.	DATE	FIGURE
600222067	10/05	A-7

DATE DRILLED 10/7/05 BORING NO. B-8

GROUND ELEVATION -- SHEET 1 OF 1

METHOD OF DRILLING CME-75, 6.5" Hollow-Stem Auger

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY TLC LOGGED BY TLC REVIEWED BY ESZ

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SM	ALLUVIUM: Brown, damp, very dense, silty fine to medium SAND; few clay; trace gravel.
		35					
						SC	Light brown, damp, dense, clayey fine to medium SAND; scattered caliche filaments and nodules.
5		28					
						CL	Light brown, damp, hard, silty CLAY; trace fine SAND; scattered caliche nodules and filaments.
		46					
						ML	Light brown, damp, hard, clayey SILT; scattered caliche nodules and filaments.
		49					
						SM	Light brown, damp, very dense, silty fine to coarse SAND; little clay.
10							Total depth = 10 feet. Groundwater not encountered. Backfilled on 10/07/05.
15							
20							

Ninyo & Moore

BORING LOG

CVS Pharmacy (Store No. 75162) - NWC of Van Buren St. and Jackrabbit Tr.
Maricopa County, Arizona

PROJECT NO.	DATE	FIGURE
600222067	10/05	A-8

DATE DRILLED 10/7/05 BORING NO. B-9

GROUND ELEVATION -- SHEET 1 OF 1

METHOD OF DRILLING CME-75, 6.5" Hollow-Stem Auger

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY TLC LOGGED BY TLC REVIEWED BY ESZ

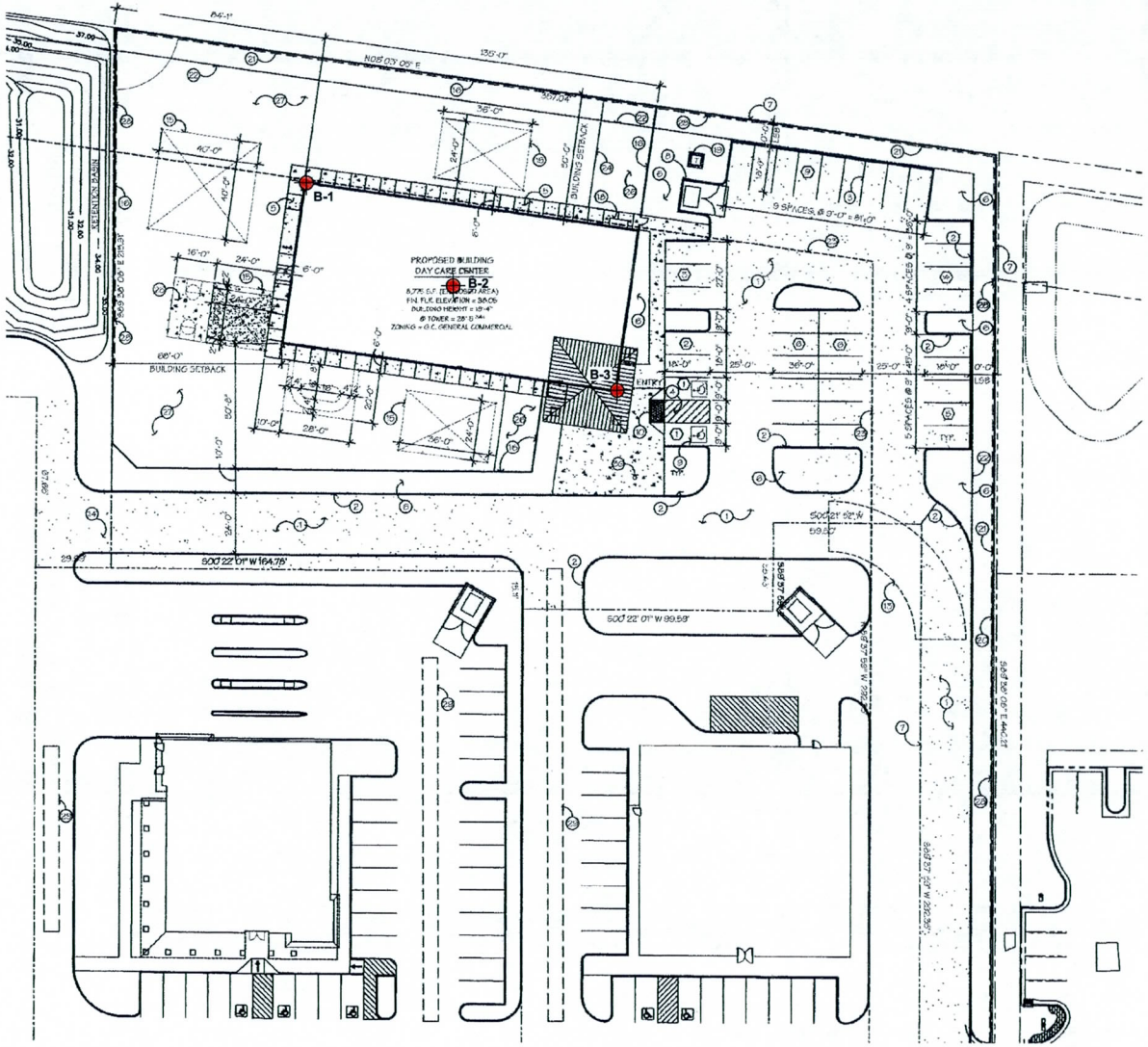
DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SC	FILL: Light brown, damp, dense, clayey fine to medium SAND; scattered caliche nodules, rootlets and pinhole-sized pore spaces.
		28					
		42					Very dense; piece of metal.
5						SC	ALLUVIUM: Light brown, damp, dense, clayey fine to medium SAND; trace gravel; scattered caliche filaments and pinhole-sized pore spaces.
		27					
						CL	Light brown, damp, hard, silty CLAY; trace sand; scattered caliche nodules and filaments.
		29					
10							Some sand. Total depth = 10 feet. Groundwater not encountered. Backfilled on 10/07/05.
15							
20							

Ninyo & Moore

BORING LOG

CVS Pharmacy (Store No. 75162) - NWC of Van Buren St. and Jackrabbit Tr.
Maricopa County, Arizona

PROJECT NO.	DATE	FIGURE
600222067	10/05	A-9



NOT TO SCALE

Source: Basemap modified after Eric Leibsohn & Associates, Ltd.

Ninyo & Moore	BORING LOCATION MAP	FIGURE
PROJECT NO: 602414001 / DATE: 11/08	SUNRISE PRESCHOOL NORTHWEST CORNER OF VAN BUREN STREET AND JACKRABBIT TRAIL BUCKEYE, ARIZONA	2

file no: 2414blm1108

DATE DRILLED 10/24/08 BORING NO. B-1

GROUND ELEVATION -- SHEET 1 OF 1

METHOD OF DRILLING Diedrich D-50, 8" Diameter Hollow-Stem Auger (D & S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY KJT

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SM	ALLUVIUM: Brown, damp, medium dense, silty fine to coarse SAND; scattered caliche nodules.
		35	1.6	96.7			
		38					Very dense.
5						SC	Brown, damp, very dense, clayey fine to coarse SAND; trace gravel; scattered caliche nodules.
		50/5"					
		60					
10							
		50/5"					
15							Total Depth = 14.4 feet. Groundwater not encountered during drilling. Backfilled on 10/24/08 promptly after completion of drilling. Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
20							

Ninyo & Moore

BORING LOG

SUNRISE PRESCHOOL
BUCKEYE, ARIZONA

PROJECT NO.	DATE	FIGURE
602414001	11/08	A-1

DATE DRILLED 10/24/08 BORING NO. B-2

GROUND ELEVATION -- SHEET 1 OF 1

METHOD OF DRILLING Diedrich D-50, 8" Diameter Hollow-Stem Auger (D & S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY KJT

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SC	ALLUVIUM: Brown, damp, very dense, clayey fine to coarse SAND; scattered caliche nodules; few gravel.
		46					
		53	2.3	107.7			Dense.
5							
		33					Very dense.
		50/4"					
10							
		34					
15							Total Depth = 15 feet. Groundwater not encountered during drilling. Backfilled on 10/24/08 promptly after completion of drilling. Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
20							

Ninyo & Moore

BORING LOG

SUNRISE PRESCHOOL
BUCKEYE, ARIZONA

PROJECT NO.	DATE	FIGURE
602414001	11/08	A-2

DATE DRILLED 10/24/08 BORING NO. B-3

GROUND ELEVATION -- SHEET 1 OF 1

METHOD OF DRILLING Diedrich D-50, 8" Diameter Hollow-Stem Auger (D & S Drilling)

DRIVE WEIGHT 140 lbs. (Automatic) DROP 30"

SAMPLED BY DM LOGGED BY DM REVIEWED BY KJT

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SC	ALLUVIUM: Brown, damp, medium dense, clayey fine to coarse SAND; trace gravel.
		32					
		32					Dense to very dense.
5		50/6"	2.1	117.4			
		31					Scattered caliche nodules.
10		50/3"					
							Total Depth = 14.3 feet. Groundwater not encountered during drilling. Backfilled on 10/24/08 promptly after completion of drilling. Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report.
15							
20							

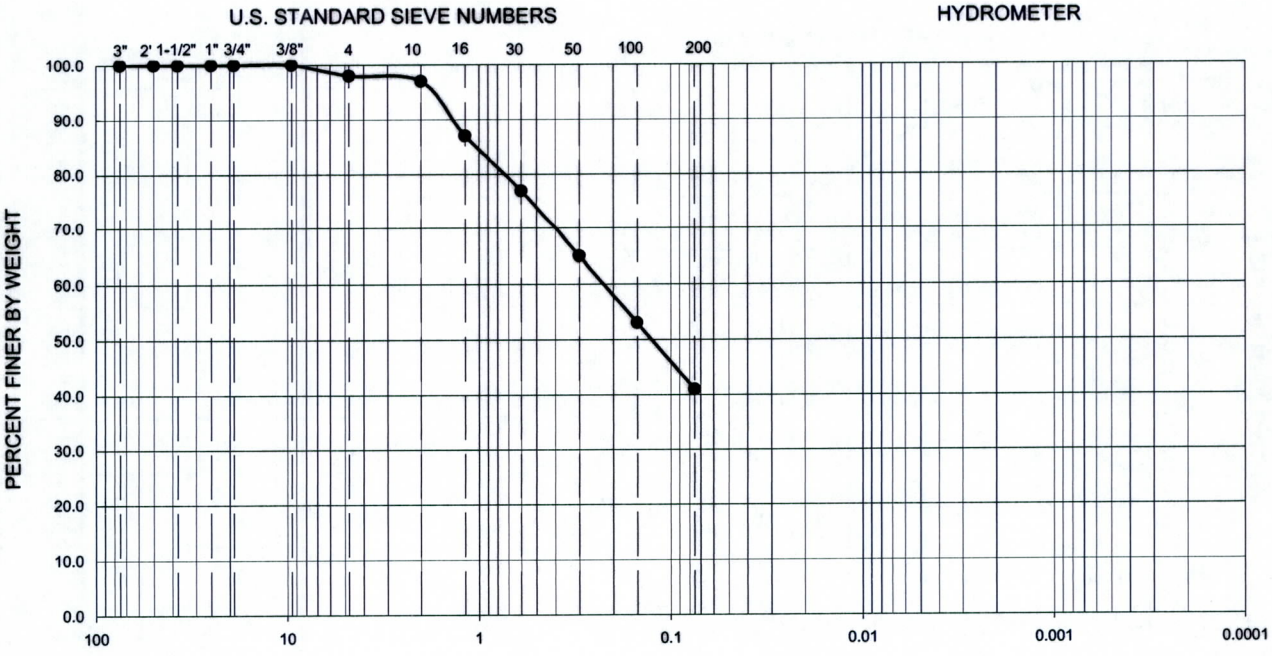
Ninyo & Moore

BORING LOG

SUNRISE PRESCHOOL
BUCKEYE, ARIZONA

PROJECT NO.	DATE	FIGURE
602414001	11/08	A-3

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

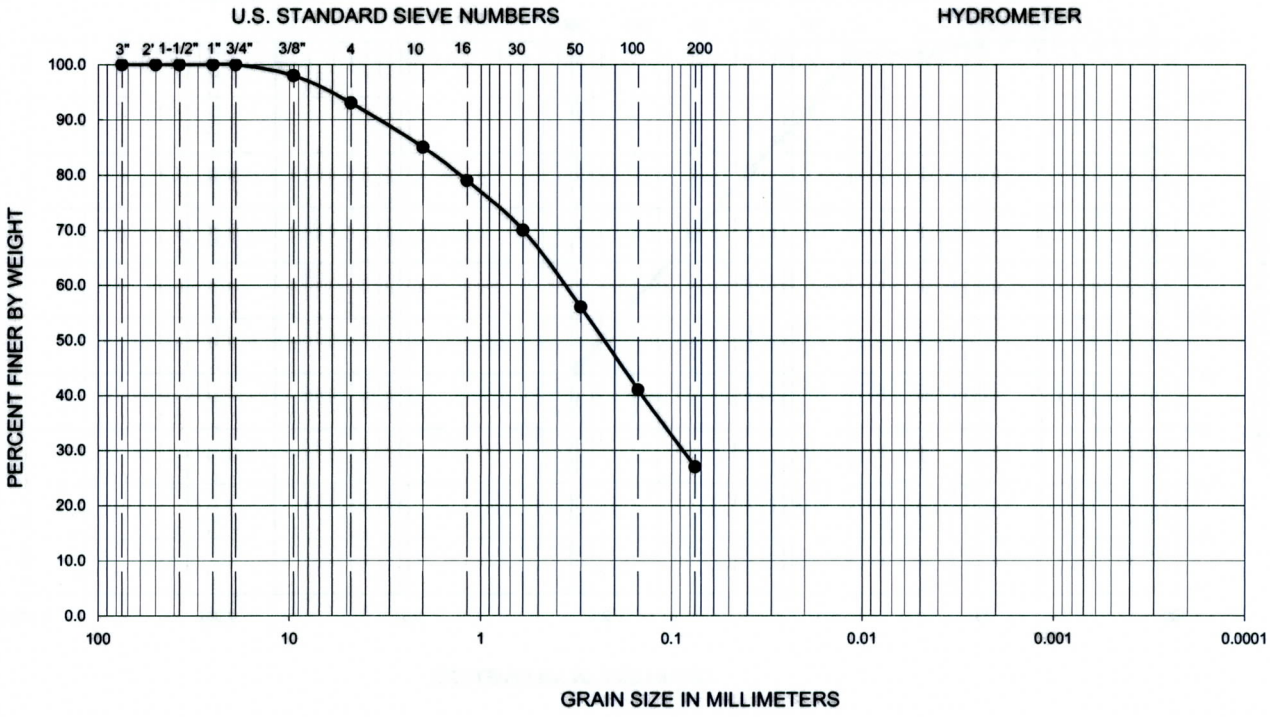


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-1	6-7	36	22	14	--	--	--	--	--	41	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422-63 (02)

Ninyo & Moore	GRADATION TEST RESULTS	FIGURE
PROJECT NO. 602414001 / DATE 11/08	SUNRISE PRESCHOOL NORTHWEST CORNER OF VAN BUREN STREET AND JACKRABBIT TRAIL BUCKEYE, ARIZONA	B-1

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY

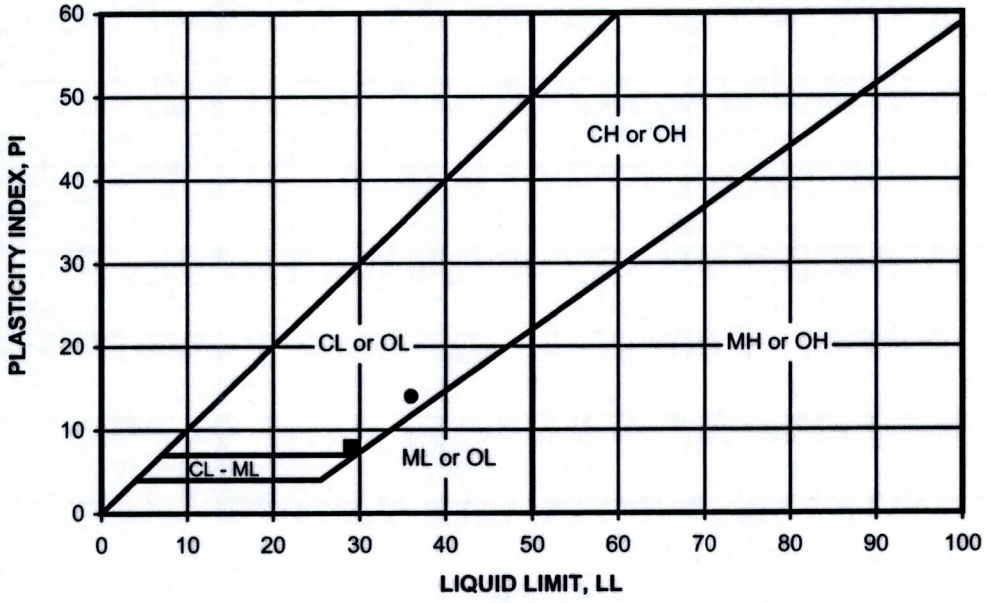


Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (%)	USCS
●	B-2	3.5-5.0	29	21	8	--	--	--	--	--	27	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 422-63 (02)

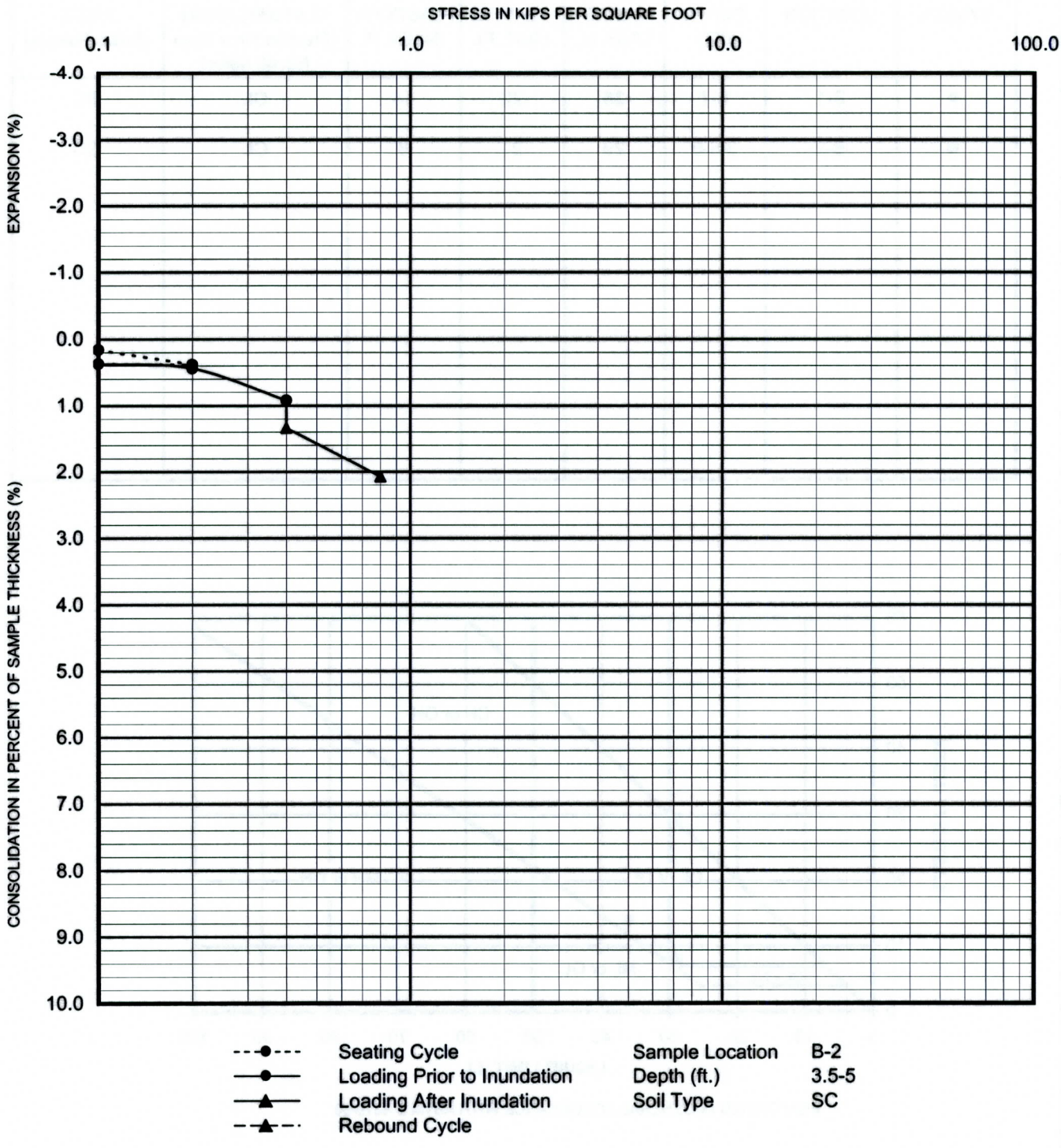
Ninyo & Moore		GRADATION TEST RESULTS	FIGURE
PROJECT NO.	DATE	SUNRISE PRESCHOOL NORTHWEST CORNER OF VAN BUREN STREET AND JACKRABBIT TRAIL BUCKEYE, ARIZONA	B-2
602414001	11/08		

SYMBOL	LOCATION	DEPTH (FT)	LIQUID LIMIT, LL	PLASTIC LIMIT, PL	PLASTICITY INDEX, PI	USCS CLASSIFICATION (Fraction Finer Than No. 40 Sieve)	USCS (Entire Sample)
●	B-1	6-7	36	22	14	CL	SC
■	B-2	3.5-5	29	21	8	CL	SC



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4318-05

Ninyo & Moore	ATTERBERG LIMITS TEST RESULTS	FIGURE
PROJECT NO. 602414001 / DATE 11/08	SUNRISE PRESCHOOL NORTHWEST CORNER OF VAN BUREN STREET AND JACKRABBIT TRAIL BUCKEYE, ARIZONA	B-3



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2435-04

Ninyo & Moore	CONSOLIDATION TEST RESULTS	FIGURE
PROJECT NO. 602414001 / DATE 11/08	SUNRISE PRESCHOOL NORTHWEST CORNER OF VAN BUREN STREET AND JACKRABBIT TRAIL BUCKEYE, ARIZONA	B-4

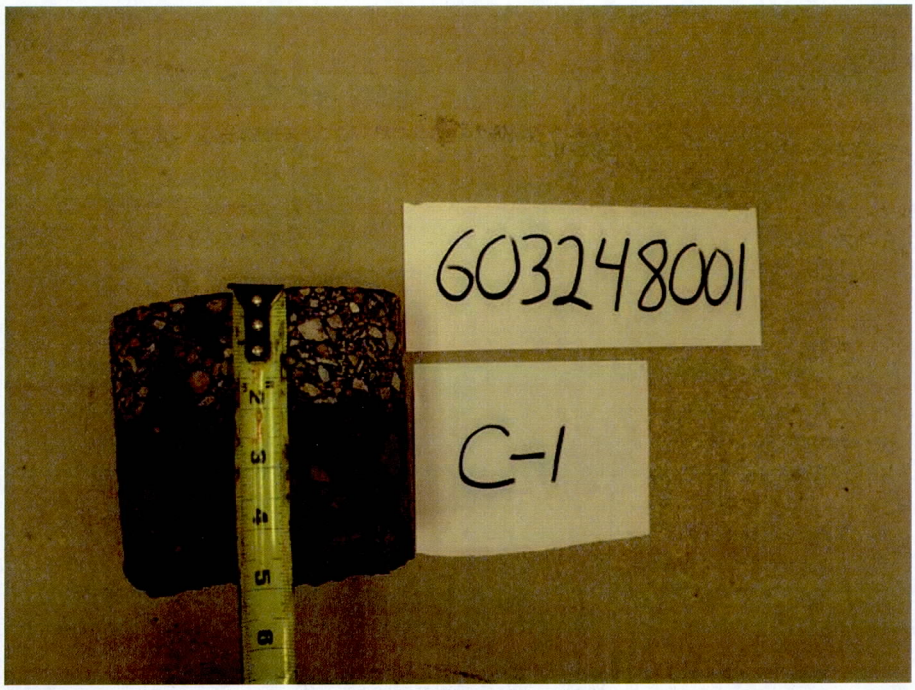
SAMPLE LOCATION	SAMPLE DEPTH (FT)	pH [1]	RESISTIVITY [1] (Ohm-cm)	SULFATE CONTENT [2]		CHLORIDE CONTENT [3] (ppm)
				(ppm)	(%)	
B-2	0-5	8.4	1,846	18	0.002	70

[1] PERFORMED IN GENERAL ACCORDANCE WITH ARIZONA TEST METHOD 236b
[2] PERFORMED IN GENERAL ACCORDANCE WITH ARIZONA TEST METHOD 733
[3] PERFORMED IN GENERAL ACCORDANCE WITH ARIZONA TEST METHOD 736

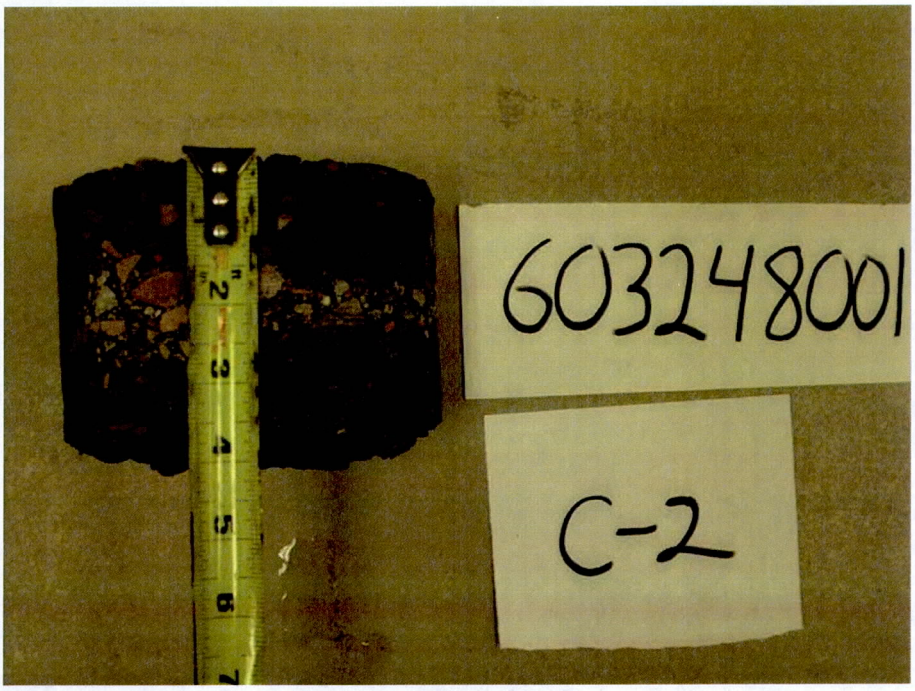
Ninyo & Moore		CORROSIVITY TEST RESULTS	FIGURE
PROJECT NO.	DATE	SUNRISE PRESCHOOL NORTHWEST CORNER OF VAN BUREN STREET AND JACKRABBIT TRAIL BUCKEYE, ARIZONA	B-5
602414001	11/08		

APPENDIX E

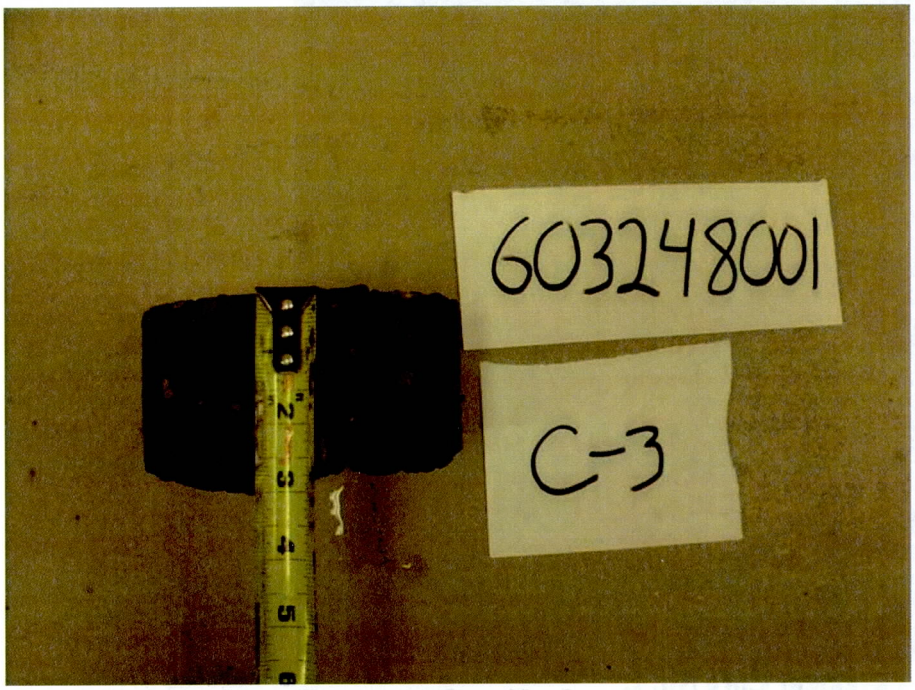
PHOTOGRAPHIC DOCUMENTATION OF PAVEMENT CORES



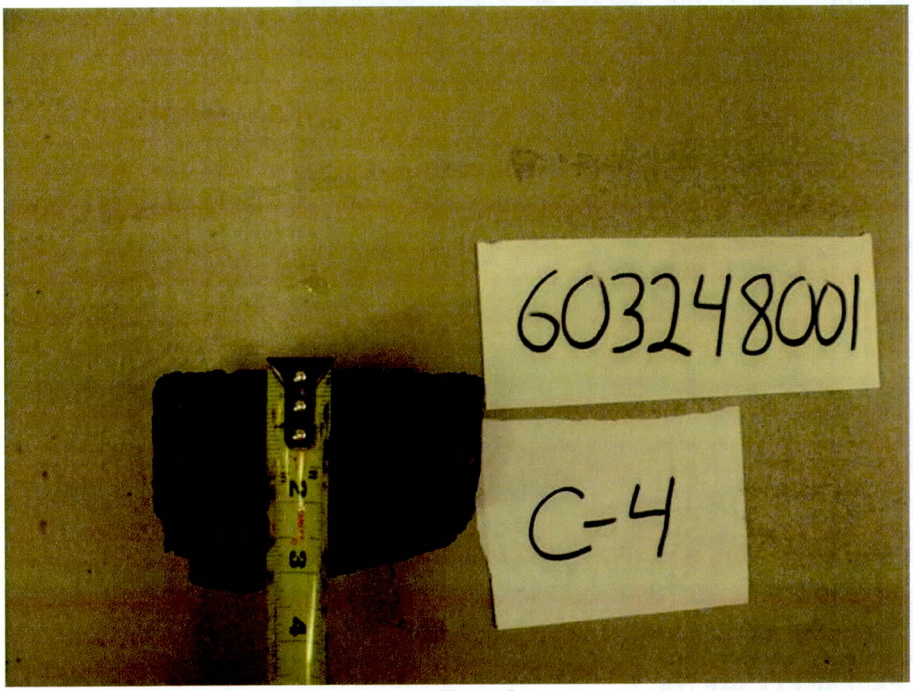
Photograph No. 1: **Pavement Core No. 1.**



Photograph No. 2: **Pavement Core No. 2.**



Photograph No. 3: **Pavement Core No. 3.**



Photograph No. 4: **Pavement Core No. 4.**

Appendix E

RID Figures

Sean Wozny

From: Michael Duncan - FCDX [mwd@mail.maricopa.gov]
Sent: Thursday, May 19, 2011 7:31 AM
To: Jeff Ford
Cc: Sean Wozny
Subject: FW: MORE ON CLEARANCE FW: Recap of Van Buren bridge at RID canal

Jeff and Sean, this is the email that I sent to Melody at Stantec. I will let you know when I have any news on this issue.

From: Michael Duncan - FCDX
Sent: Wednesday, May 18, 2011 2:12 PM
To: 'Zyburt, Melody'
Cc: sashby@rooseveltirrigation.org; 'walt.cooper@stantec.com'; Scott Vogel - FCDX
Subject: MORE ON CLEARANCE FW: Recap of Van Buren bridge at RID canal

Melody,
I have done some research on the RID canal bridge (on Van Buren St. between Perryville and Citrus). The existing bridge can handle 5 lanes. Also, expansion of the bridge and roadway to seven lanes can occur without interference from our proposed storm drain. See the emails below concerning my discussions with the County Bridge Engineer. Does this address RID's concerns about the 12-inch vertical clearance (between the bottom of the canal lining and the top of the elliptical pipe) that my project has proposed? Please call me and we can discuss this.

Mike Duncan, P.E., CFM
Project Manager
Flood Control District of Maricopa County
602-506-4732

From: Tom Sonnemann - MCDOTX
Sent: Wednesday, May 18, 2011 1:41 PM
To: Michael Duncan - FCDX
Subject: RE: Recap of Van Buren bridge at RID canal

Yes. In addition, I don't know of any plans by MCDOT to widen the existing roadway in the near future,
Although I realize that this would not impact your project as much.

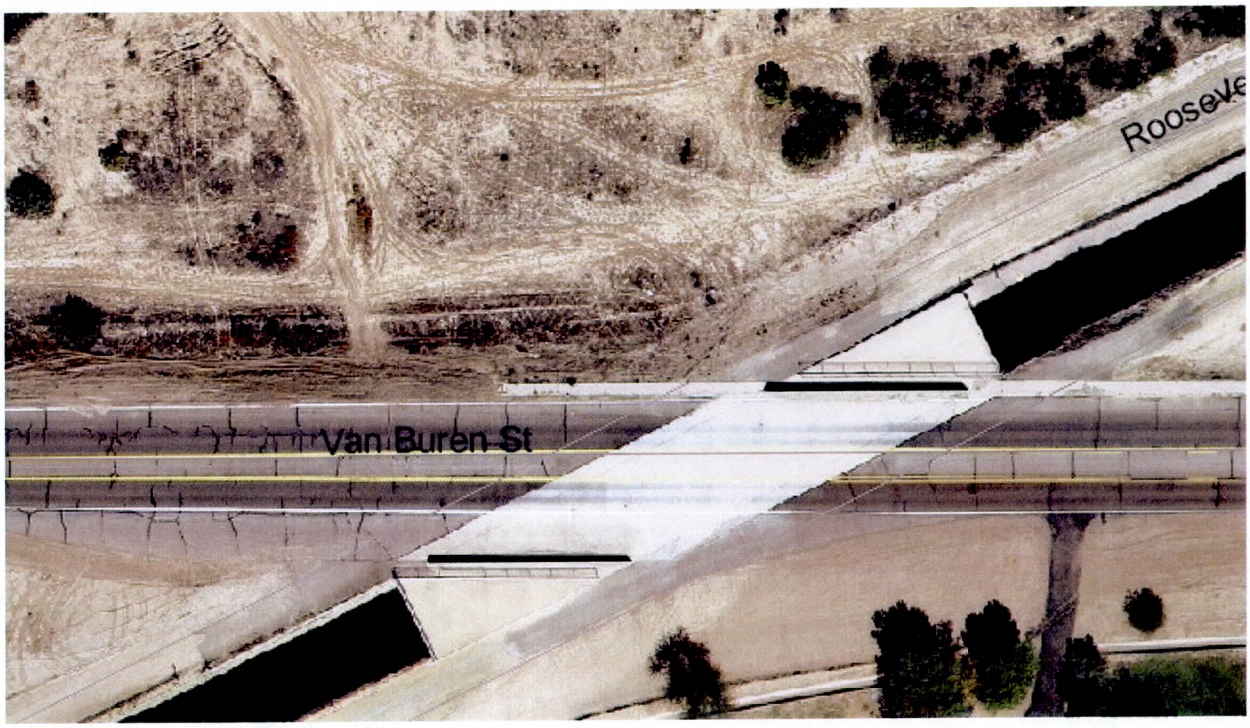
Thomas E. Sonnemann
County Bridge Engineer
2901 W. Durango st.
(602) 506-4880

From: Michael Duncan - FCDX
Sent: Wednesday, May 18, 2011 1:35 PM
To: Tom Sonnemann - MCDOTX
Subject: Recap of Van Buren bridge at RID canal

Tom, thanks for your time this morning to discuss this bridge. As you pointed out the Van Buren pavement is 48 ft. wide and the existing bridge is 68 ft. wide plus two sidewalk or bike ways that are each 8 ft. wide. This will allow pavement expansion to the south of about 20 ft. The 68 ft. width is 6 ft. wider than the 62 ft. standard for five lanes (12, 12, 14, 12, 12 ft.). You also indicated that McDOT has no plan to expand the bridge in the near future.

Looking at our storm drain 40% plans (of the White Tanks FRS #4 Outlet), the proposed storm drain is about 32 ft. (along the canal) from the bridge. This 32 ft. would provide about 13 ft. of lane width which would mean that 7 lanes plus the two 8ft. sidewalks could be accommodated before any interference between the storm drain and future bridge expansion.

Does this summarize our discussion?



Mike Duncan, P.E., CFM
Project Manager
Flood Control District of Maricopa County
602-506-4732

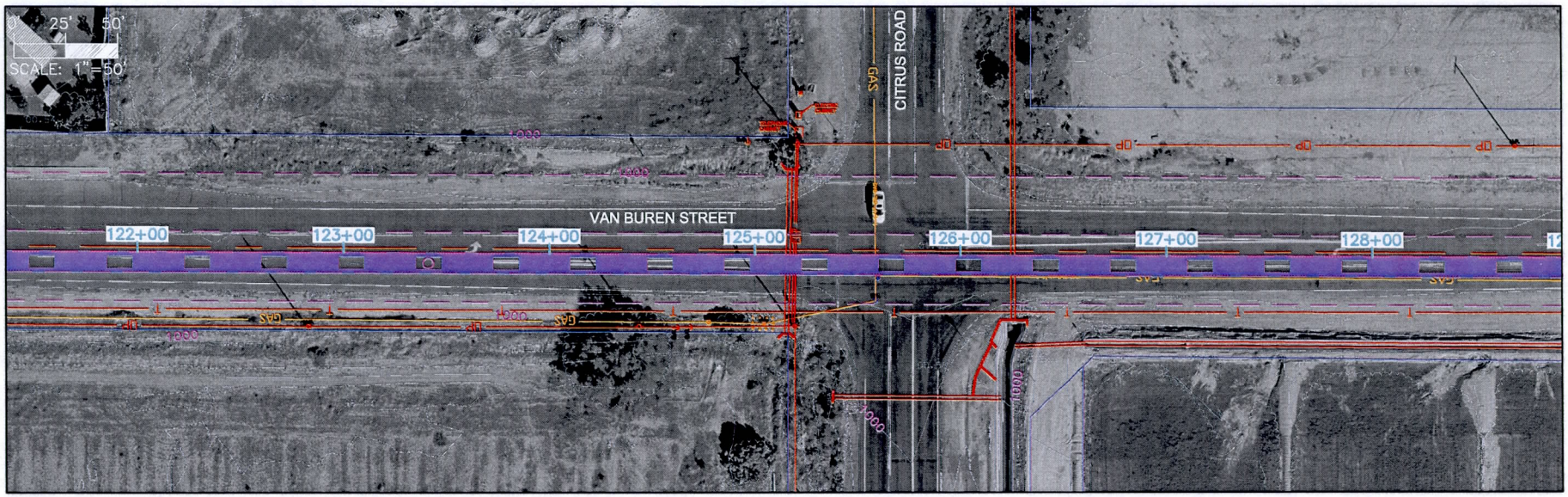
Sean Wozny

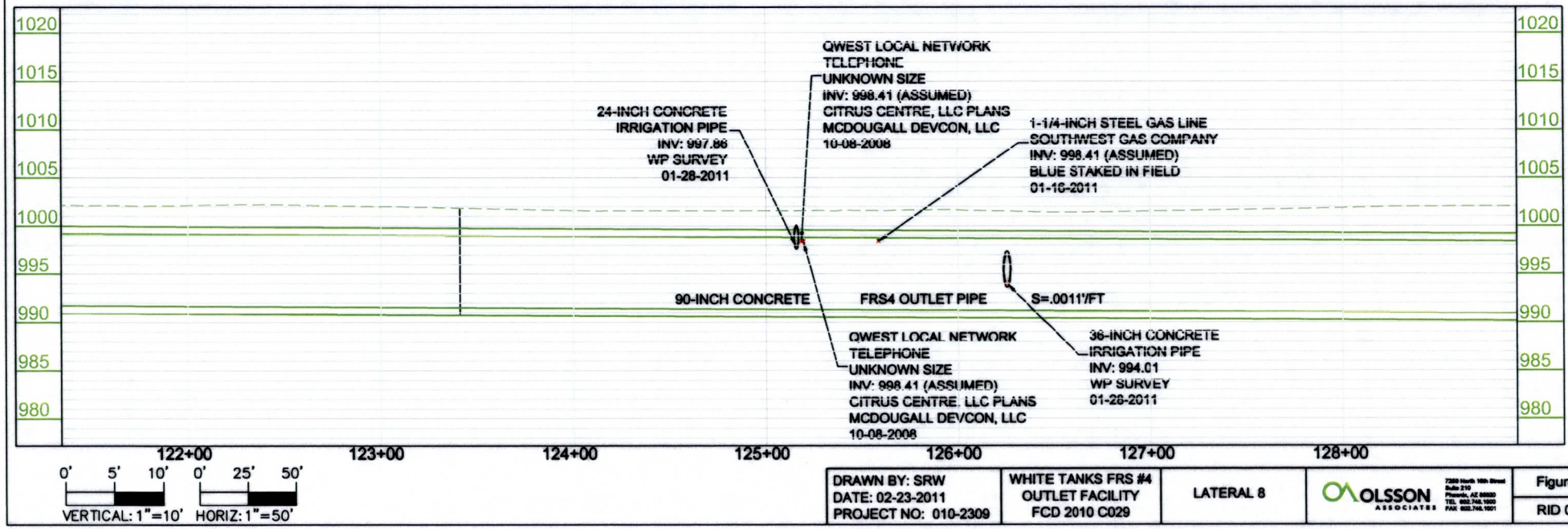
From: Michael Duncan - FCDX [mwd@mail.maricopa.gov]
Sent: Wednesday, May 25, 2011 8:14 AM
To: Jeff Ford
Cc: Sean Wozny
Subject: WT-FRS-4 Outlet -- Final approval for 12-in clearance at RID canal

To follow-up on what I anticipated on Monday:

I received a final verbal approval for the 12-inch clearance with 6-inch canal lining from Stan Ashby, Superintendent, Roosevelt Irrigation District, on May 24, at 11:20 am.

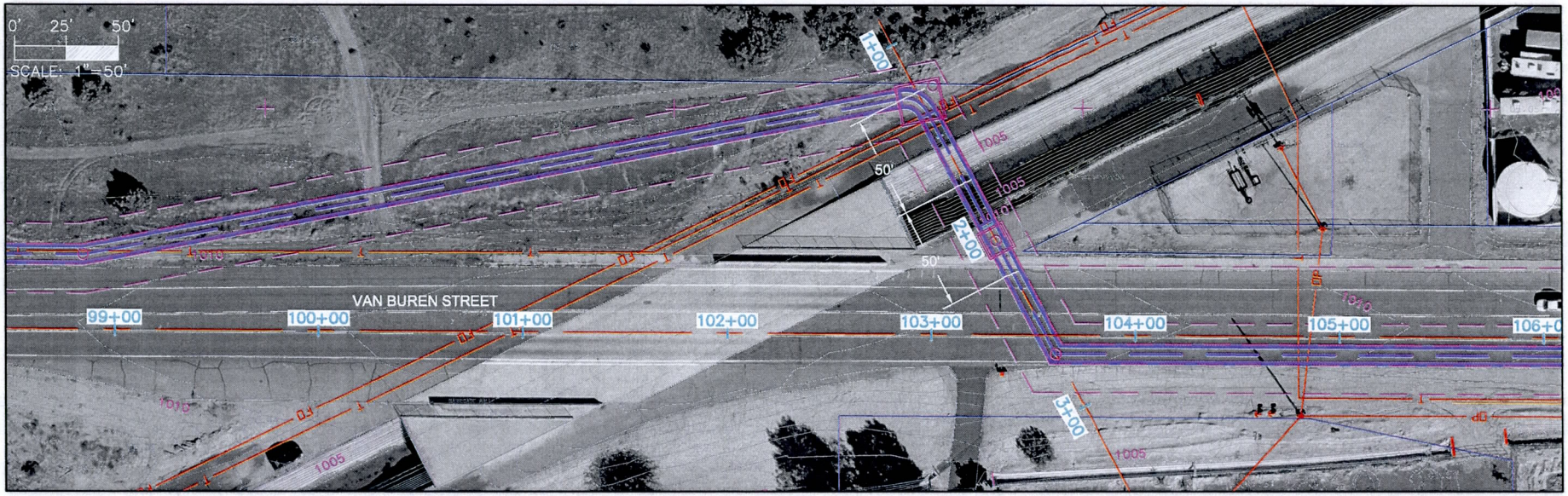
(This occurred at an on-site meeting for my Loop 303 Outfall project.)

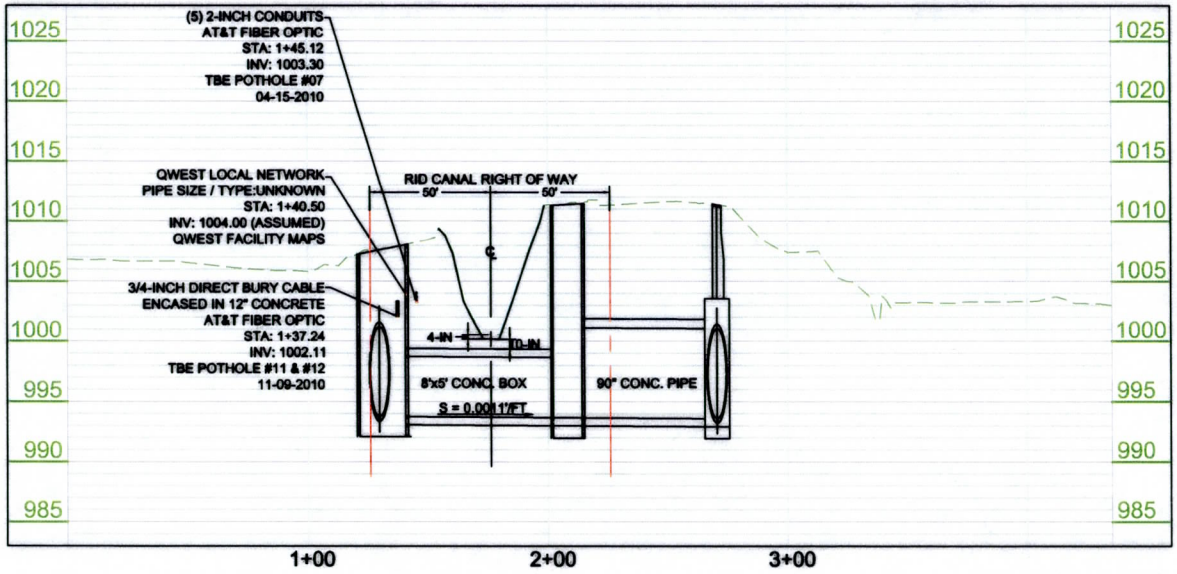




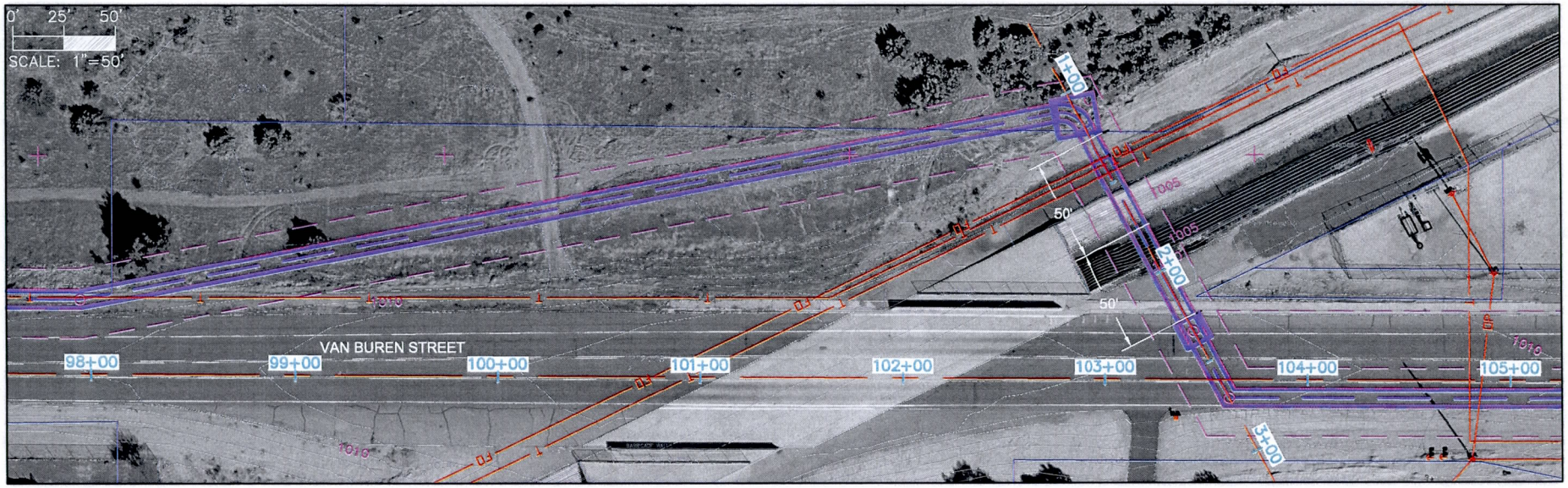
0' 5' 10' 0' 25' 50'
VERTICAL: 1"=10' HORIZ: 1"=50'

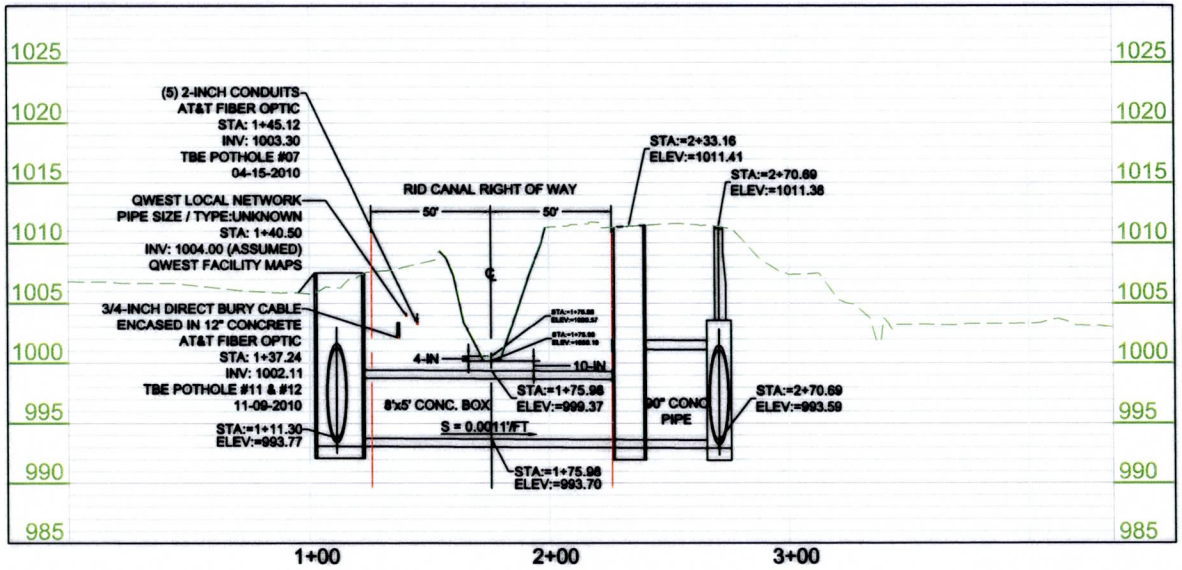
DRAWN BY: SRW DATE: 02-23-2011 PROJECT NO: 010-2309	WHITE TANKS FRS #4 OUTLET FACILITY FCD 2010 C029	LATERAL 8	OLSSON ASSOCIATES	Figure RID 01



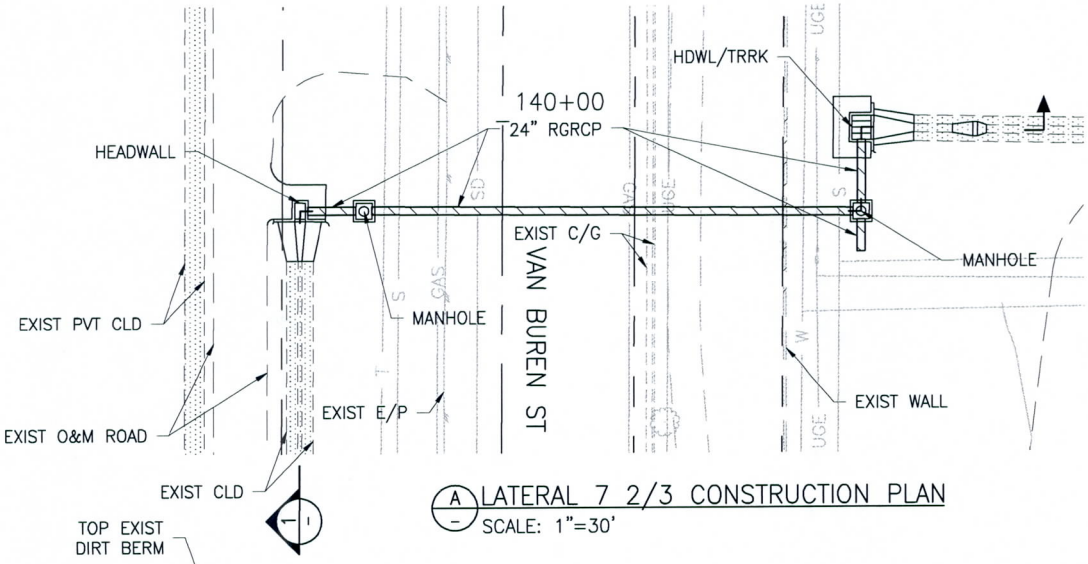


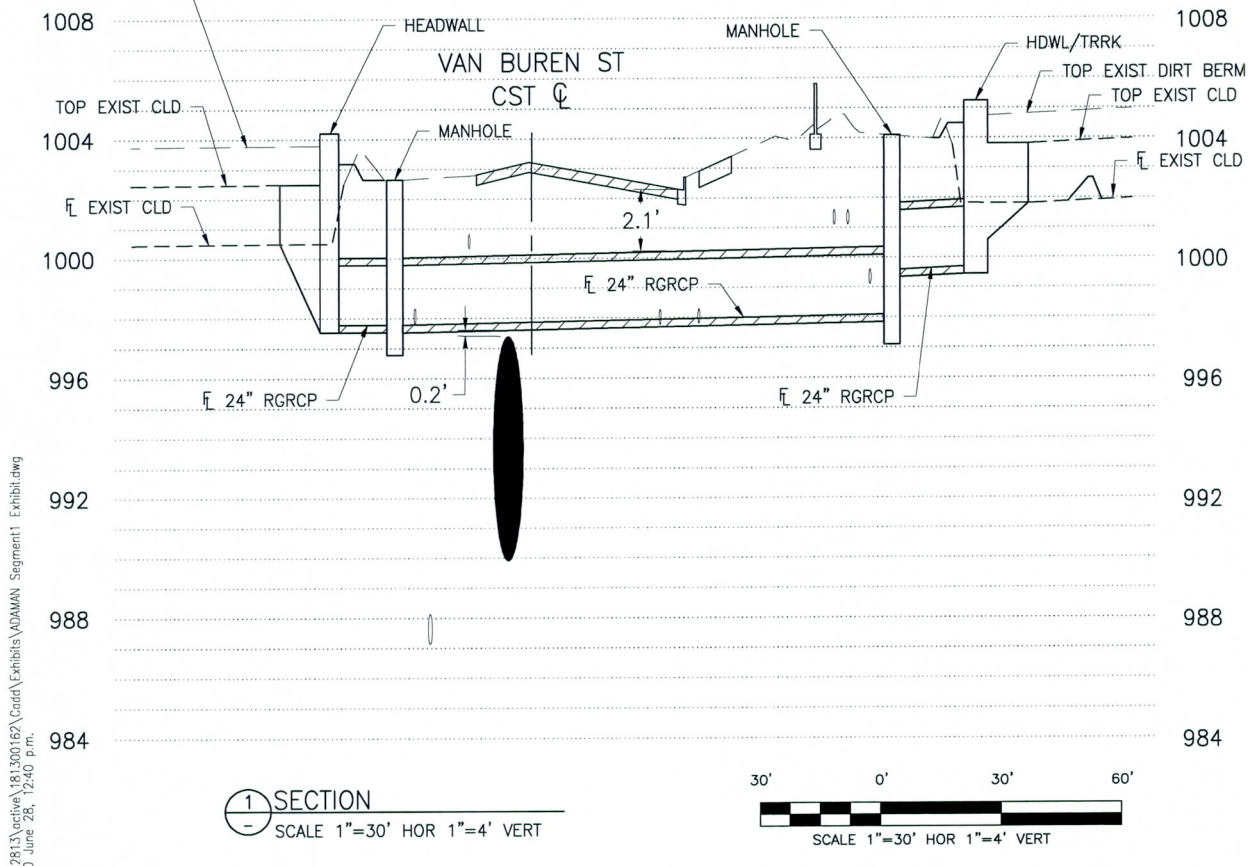
DRAWN BY: SRW DATE: 02-23-2011 PROJECT NO: 010-2309	WHITE TANKS FRS #4 OUTLET FACILITY FCD 2010 C029	RID CROSSING	OLSSON ASSOCIATES	Figure RID 02





DRAWN BY: SRW DATE: 02-23-2011 PROJECT NO: 010-2309	WHITE TANKS FRS #4 OUTLET FACILITY FCD 2010 C029	RID CROSSING	OLSSON ASSOCIATES	Figure RID 03





V:\52813\active\181300162\Cadd\Exhibits\ADAMAN Segment1 Exhibit.dwg
2010 June 28, 12:40 p.m.

ORIGINAL SHEET - ANSI A

September 2011
181300162

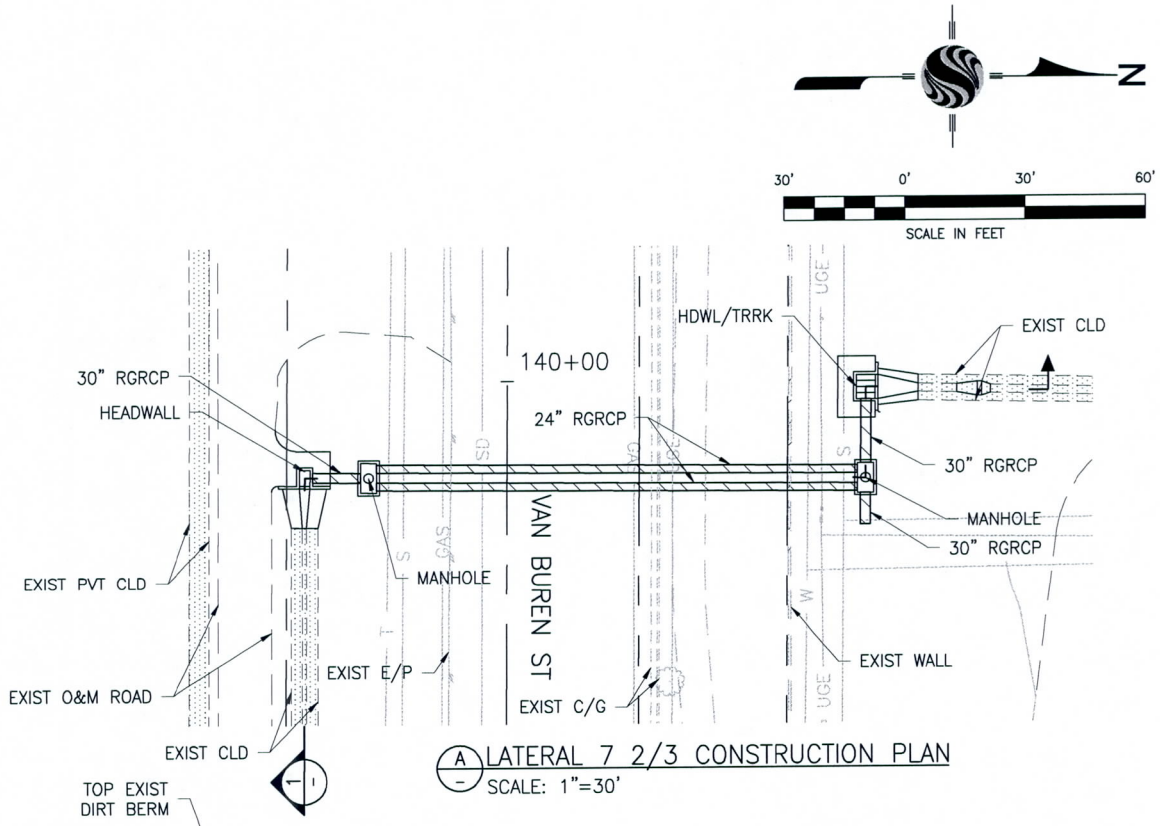
Stantec

Stantec Consulting Services, Inc.
8211 South 48th Street
Phoenix, AZ
85044-5355
Tel. 602.438.2200
Fax. 602.431.9562
www.stantec.com

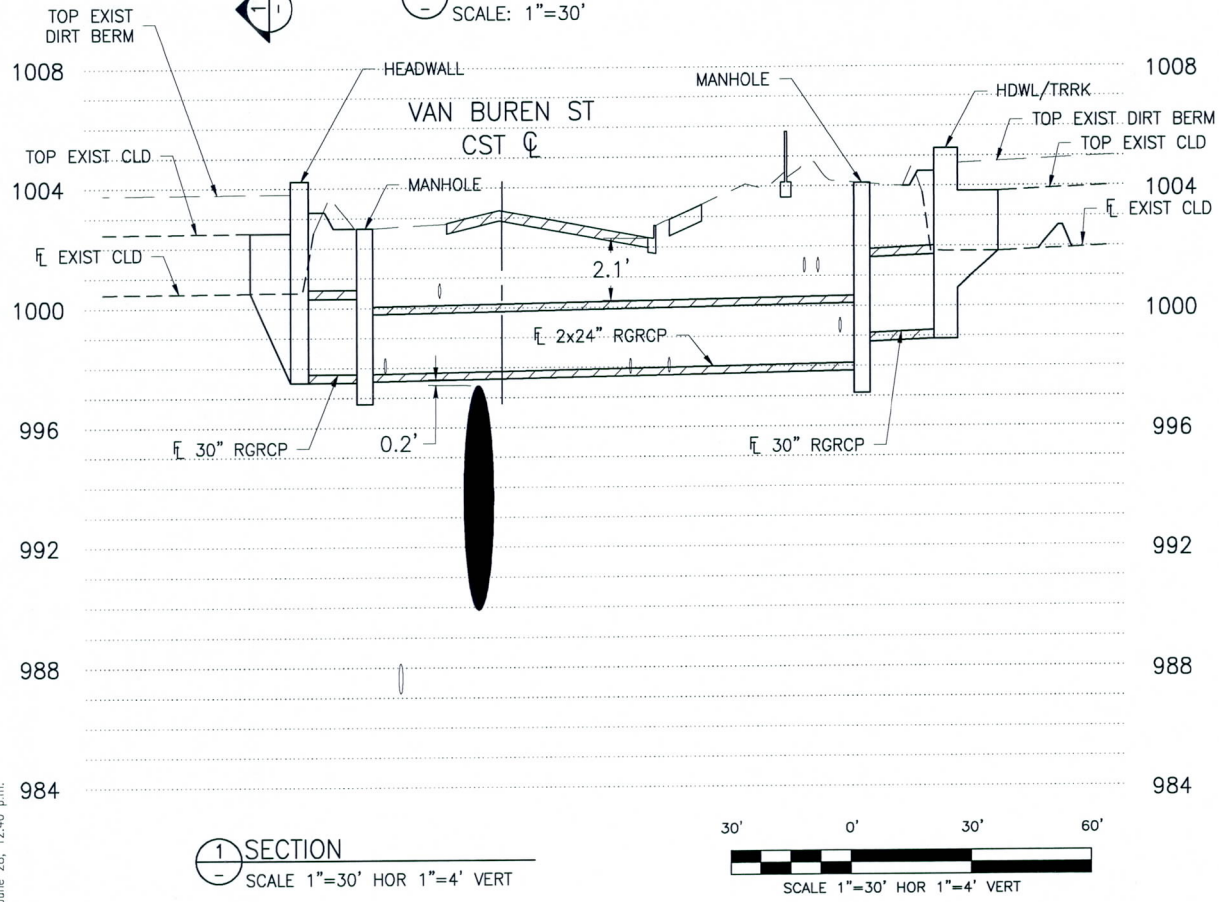
Client/Project
Roosevelt Irrigation District
White Tanks FRS #4 Outlet

Figure No.
1 of 5

Title
RID Lat 7 2/3 Relocations Alternative 1



A — LATERAL 7 2/3 CONSTRUCTION PLAN
SCALE: 1"=30'



1 — SECTION
SCALE 1"=30' HOR 1"=4' VERT

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2010 June 28, 12:40 p.m.

ORIGINAL SHEET - ANSI A

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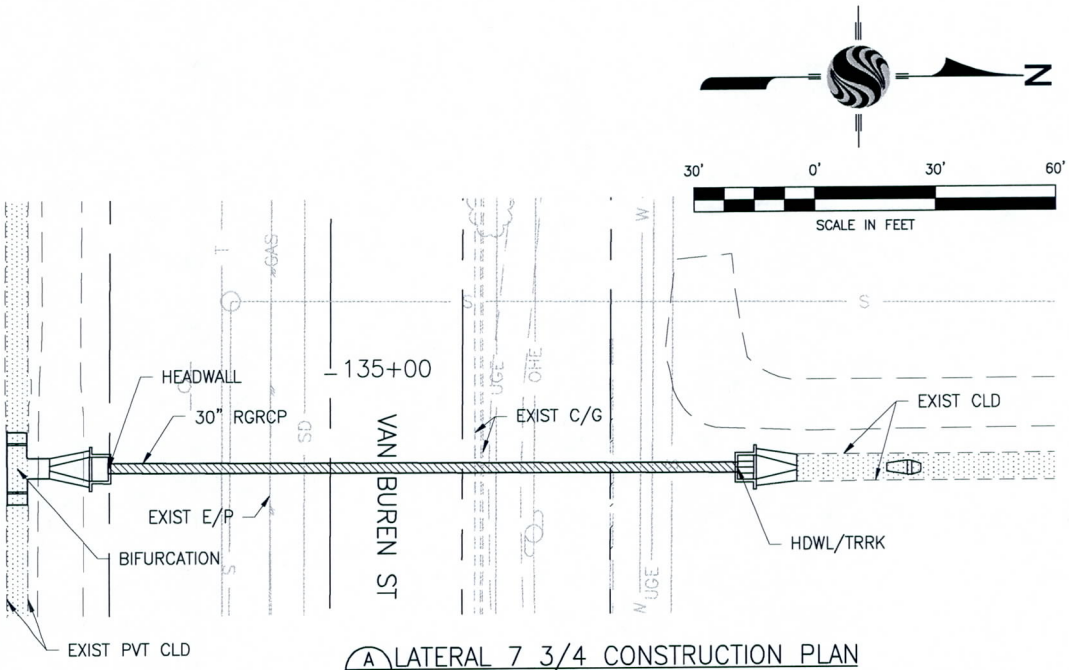
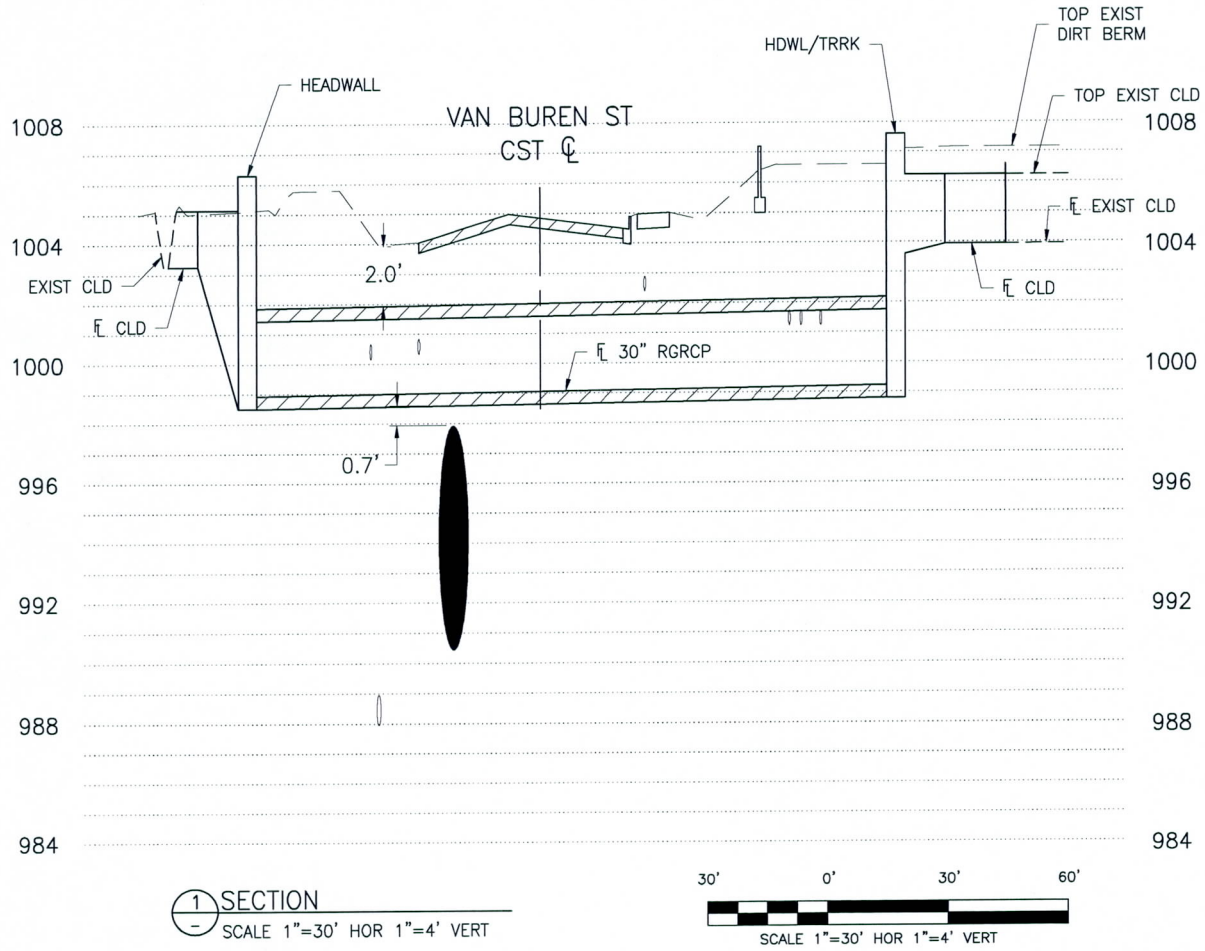
Client/Project
Roosevelt Irrigation District
White Tanks FRS #4 Outlet

Figure No.
2 of 5

Title
RID Lat 7 2/3 Relocations
Alternative 2



A — LATERAL 7 3/4 CONSTRUCTION PLAN
SCALE: 1"=30'



1 — SECTION
SCALE 1"=30' HOR 1"=4' VERT

30' 0' 30' 60'
SCALE 1"=30' HOR 1"=4' VERT

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2010 June 28, 12:40 p.m.

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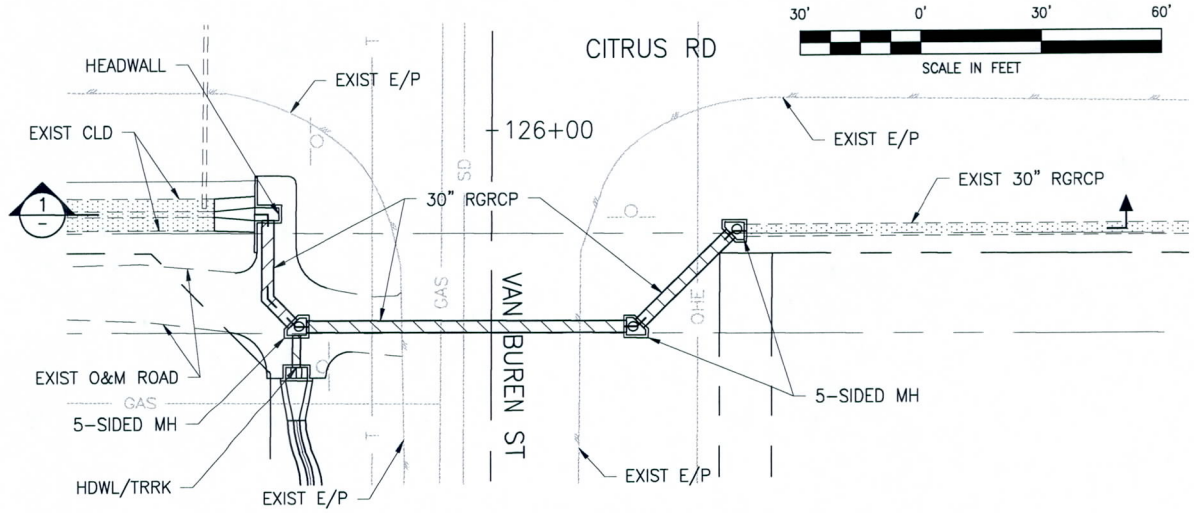
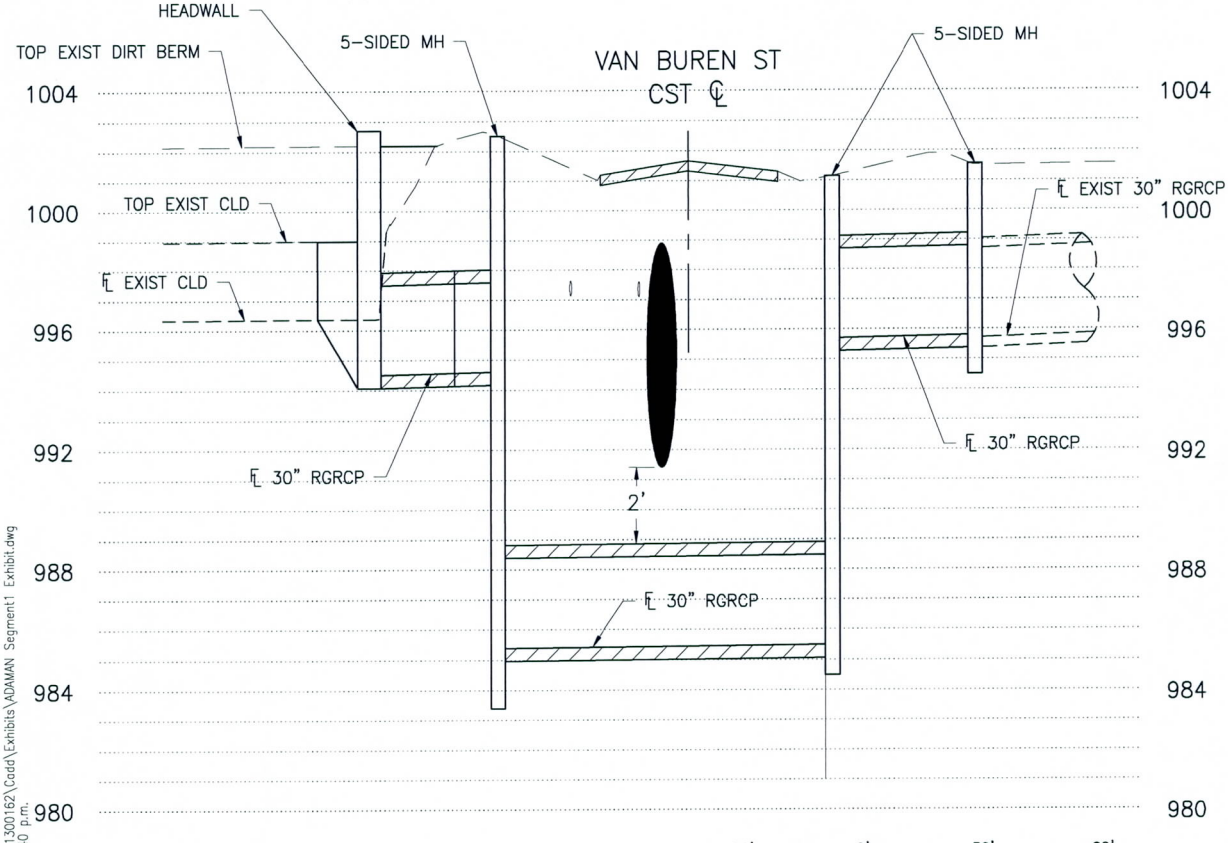
Client/Project
Roosevelt Irrigation District
White Tanks FRS #4 Outlet

Figure No.
3 of 5

Title
RID Lat 7 3/4 Relocations
Alternative 1



A LATERAL 8 CONSTRUCTION PLAN
SCALE: 1"=30'



1 SECTION
SCALE 1"=30' HOR 1"=4' VERT

30' 0' 30' 60'
SCALE 1"=30' HOR 1"=4' VERT

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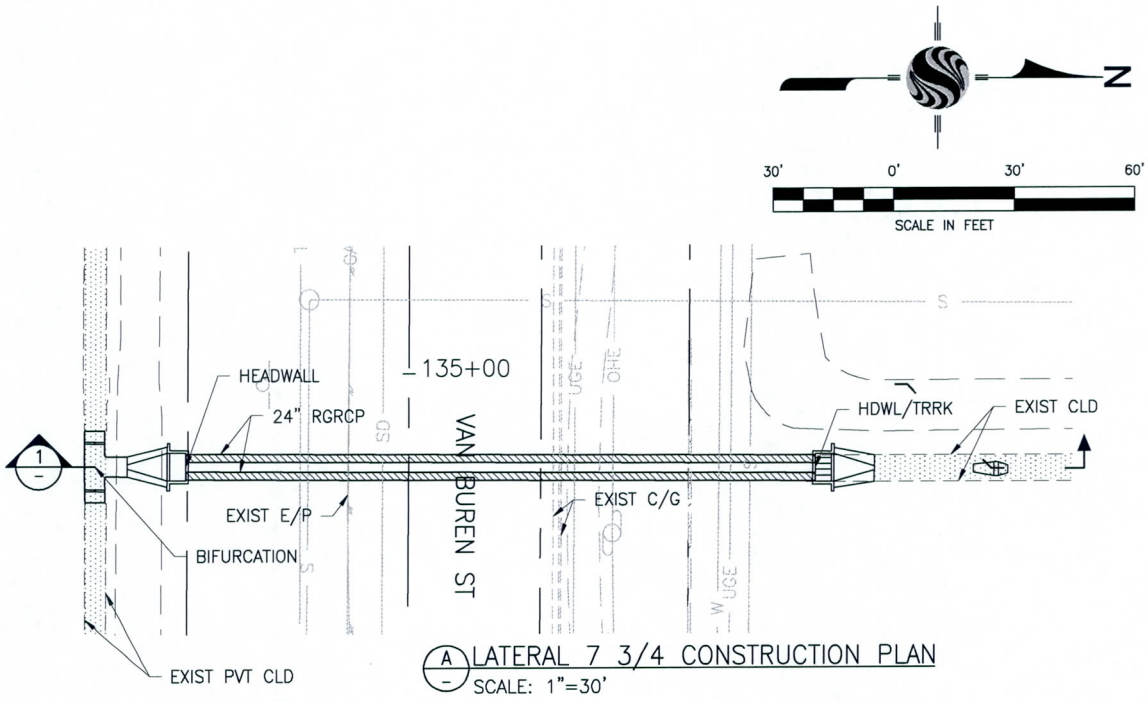
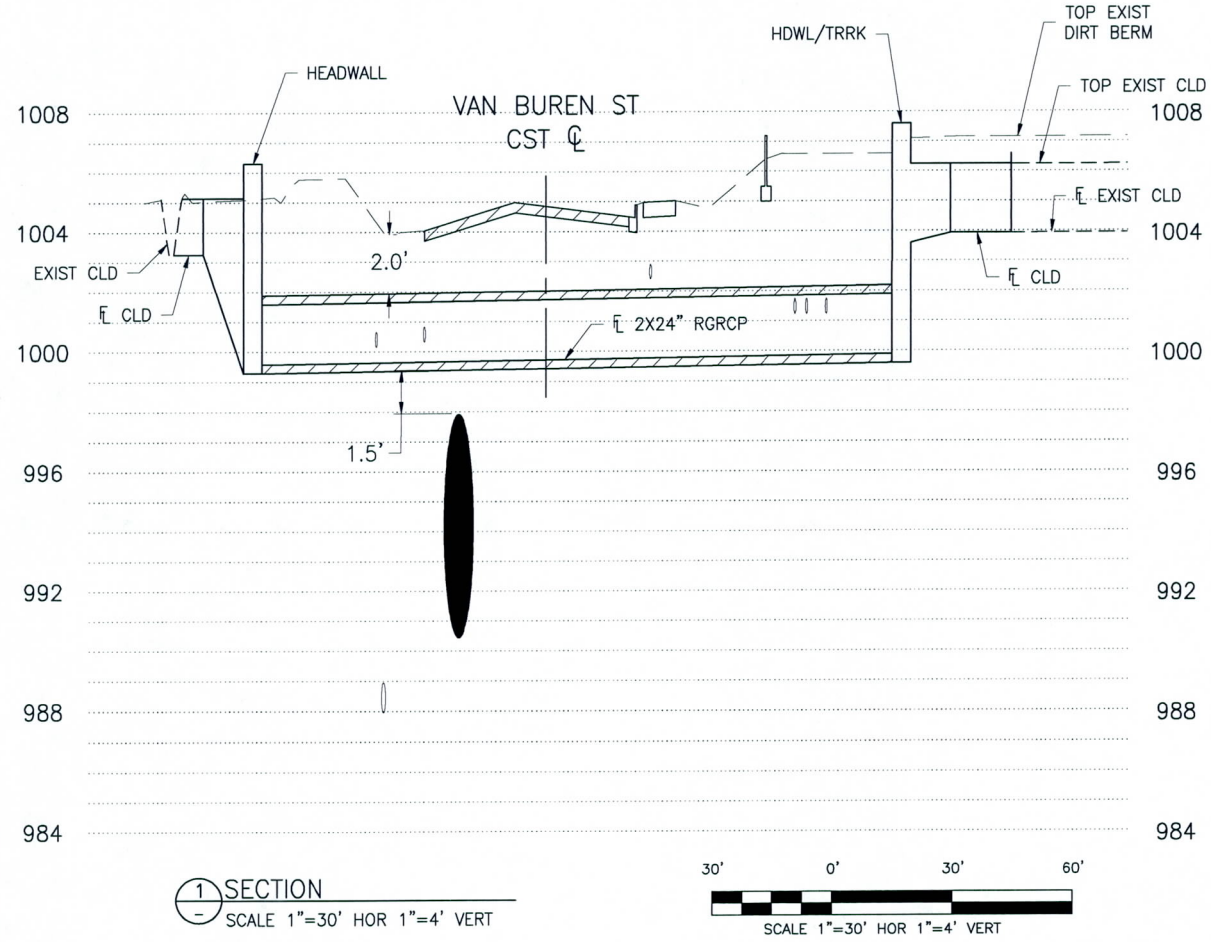
Client/Project
Roosevelt Irrigation District
White Tanks FRS #4 Outlet

Figure No.
5 of 5

Title
RID Lat 8 Relocations





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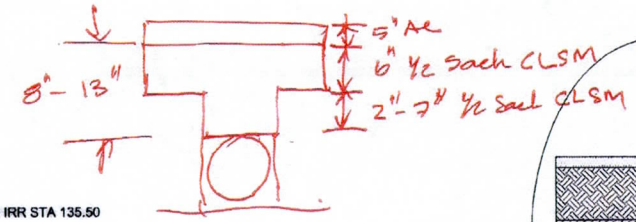
Client/Project
Roosevelt Irrigation District
White Tanks FRS #4 Outlet

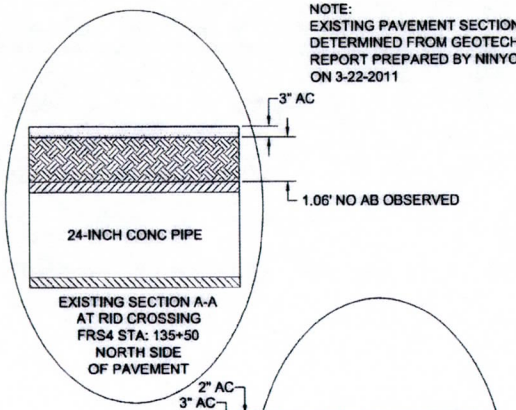
Figure No.
4 of 5

Title
RID Lat 7 3/4 Relocations
Alternative 2

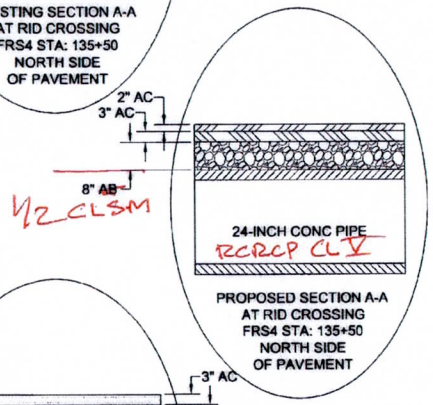
KKS # 4, # 11-138
Van Buren (Jacksonville Cotton)
9/20/11

NOTE:
EXISTING PAVEMENT SECTION
DETERMINED FROM GEOTECHNICAL
REPORT PREPARED BY NINYO & MOORE
ON 3-22-2011



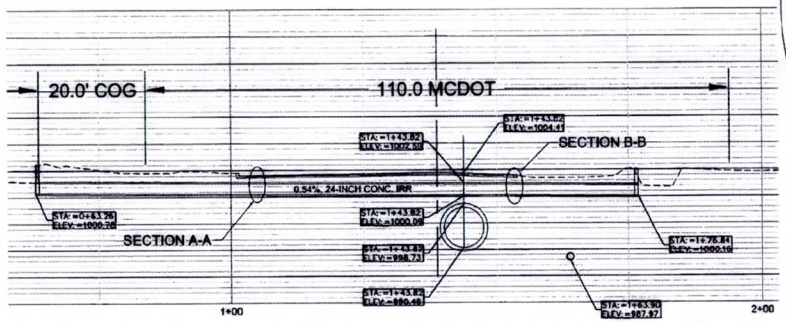


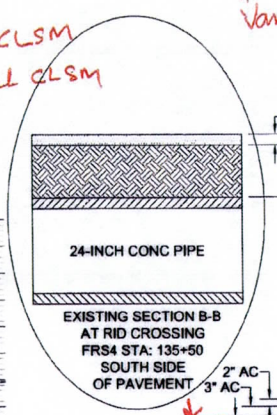
EXISTING SECTION A-A
AT RID CROSSING
FRS4 STA: 135+50
NORTH SIDE
OF PAVEMENT



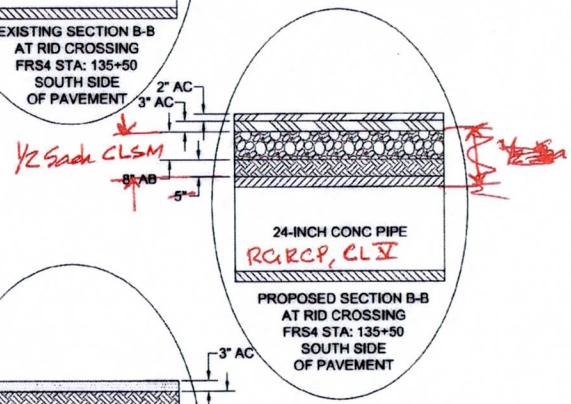
PROPOSED SECTION A-A
AT RID CROSSING
FRS4 STA: 135+50
NORTH SIDE
OF PAVEMENT

RID IRR STA 135.50

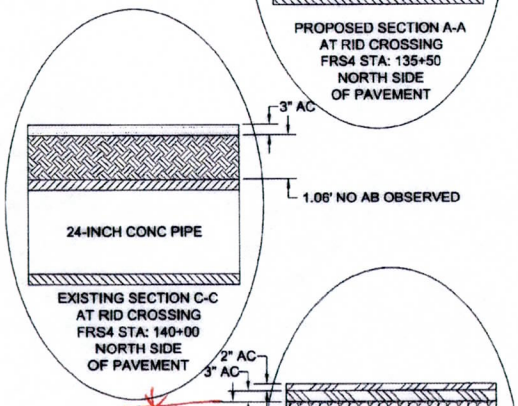




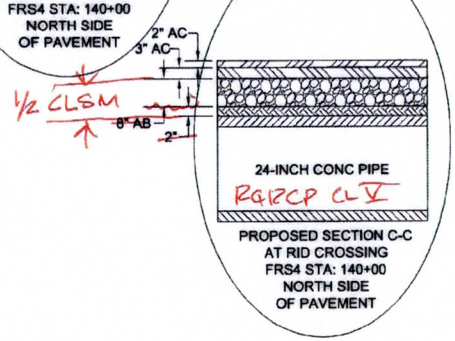
EXISTING SECTION B-B
AT RID CROSSING
FRS4 STA: 135+50
SOUTH SIDE
OF PAVEMENT



PROPOSED SECTION B-B
AT RID CROSSING
FRS4 STA: 135+50
SOUTH SIDE
OF PAVEMENT

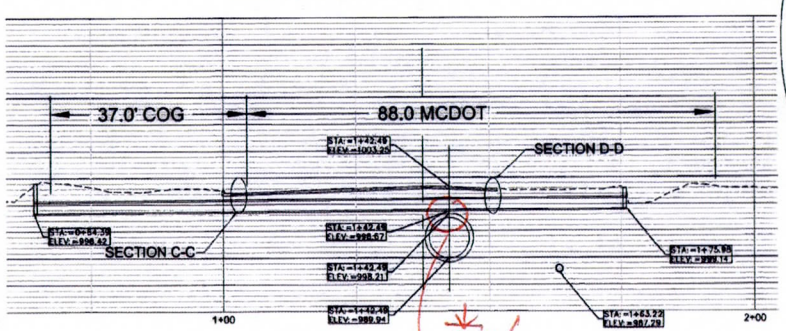


EXISTING SECTION C-C
AT RID CROSSING
FRS4 STA: 140+00
NORTH SIDE
OF PAVEMENT



PROPOSED SECTION C-C
AT RID CROSSING
FRS4 STA: 140+00
NORTH SIDE
OF PAVEMENT

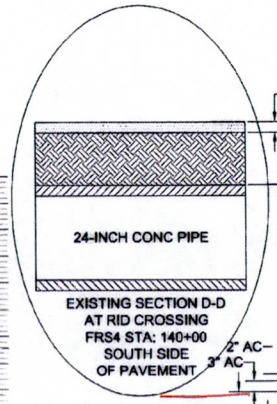
RID IRR STA 140+00



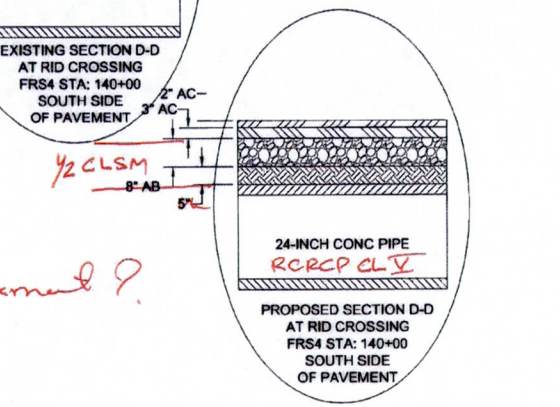
* Trench Per MAG 200 "T-TOP" (MOD.)
* Use RCRCP Class V

0.4c'

Do we need Conc. Encasement?



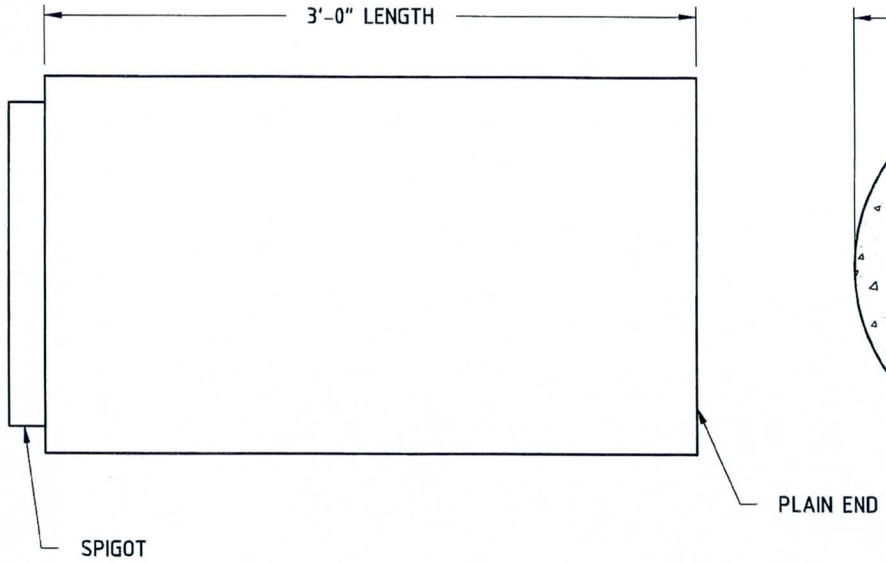
EXISTING SECTION D-D
AT RID CROSSING
FRS4 STA: 140+00
SOUTH SIDE
OF PAVEMENT



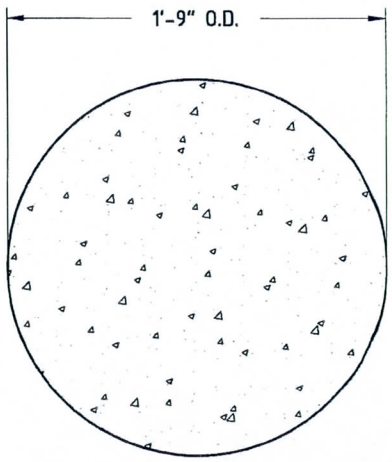
PROPOSED SECTION D-D
AT RID CROSSING
FRS4 STA: 140+00
SOUTH SIDE
OF PAVEMENT

Appendix F

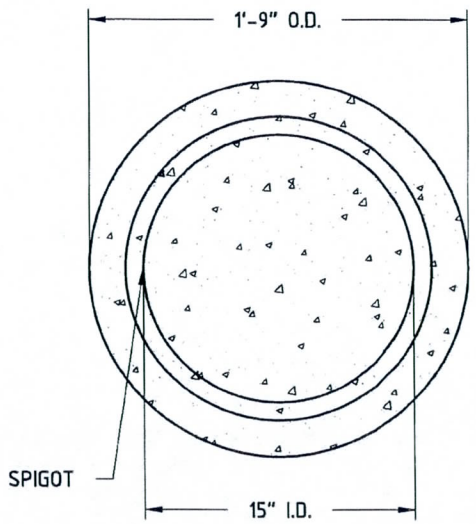
Reference Documents



PLAN VIEW



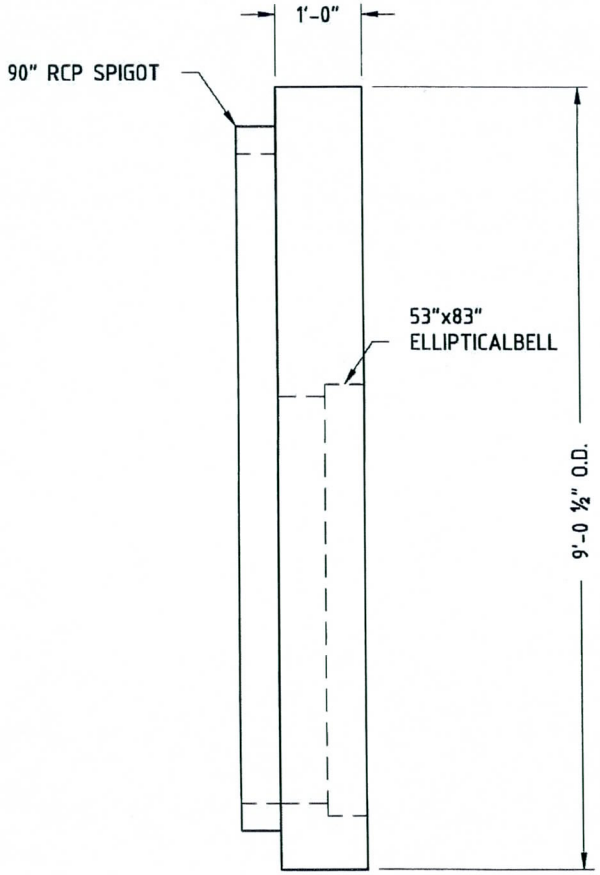
PLAIN END VIEW



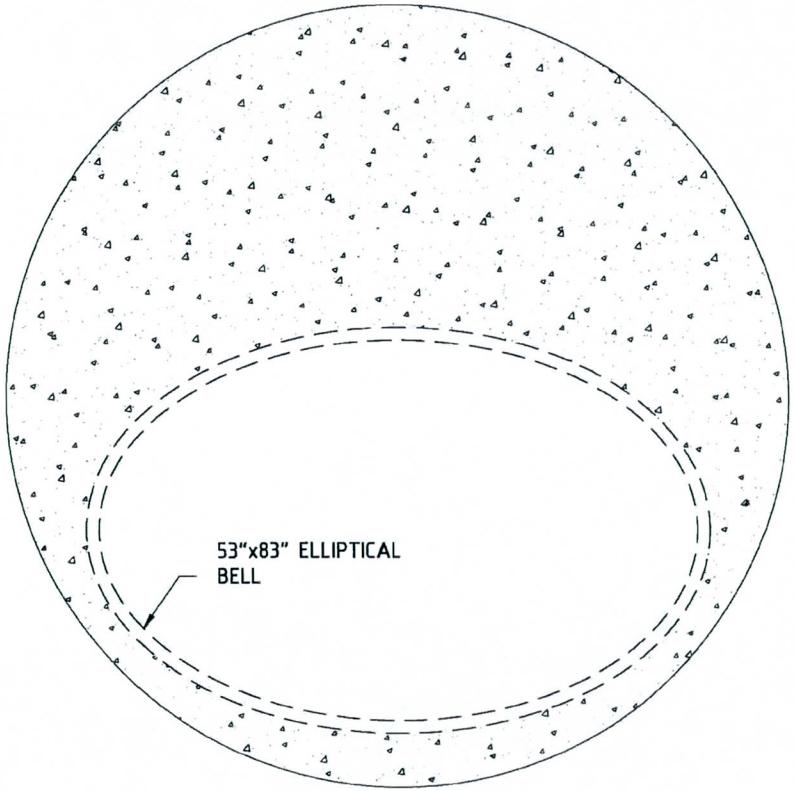
SPIGOT END VIEW

Hanson
HEIDELBERGCEMENT Group

REVISIONS			DRAWN BY: MCP	SLABTOP #	15" STOPPER (BELL PLUG) - 3'-0" LONG
A	–	–	CHECKED:	MONOTOP #	OLSSON & ASSOCIATES
B	–	–	SOLD BY: –	RISER #	
C	–	–	SCALE: N.T.S.	BASE #	
D	–	–	ORDER# –	BASESLAB #	
				TOTALS: #	DATE: 6/13/11 PAGE 1 OF 1



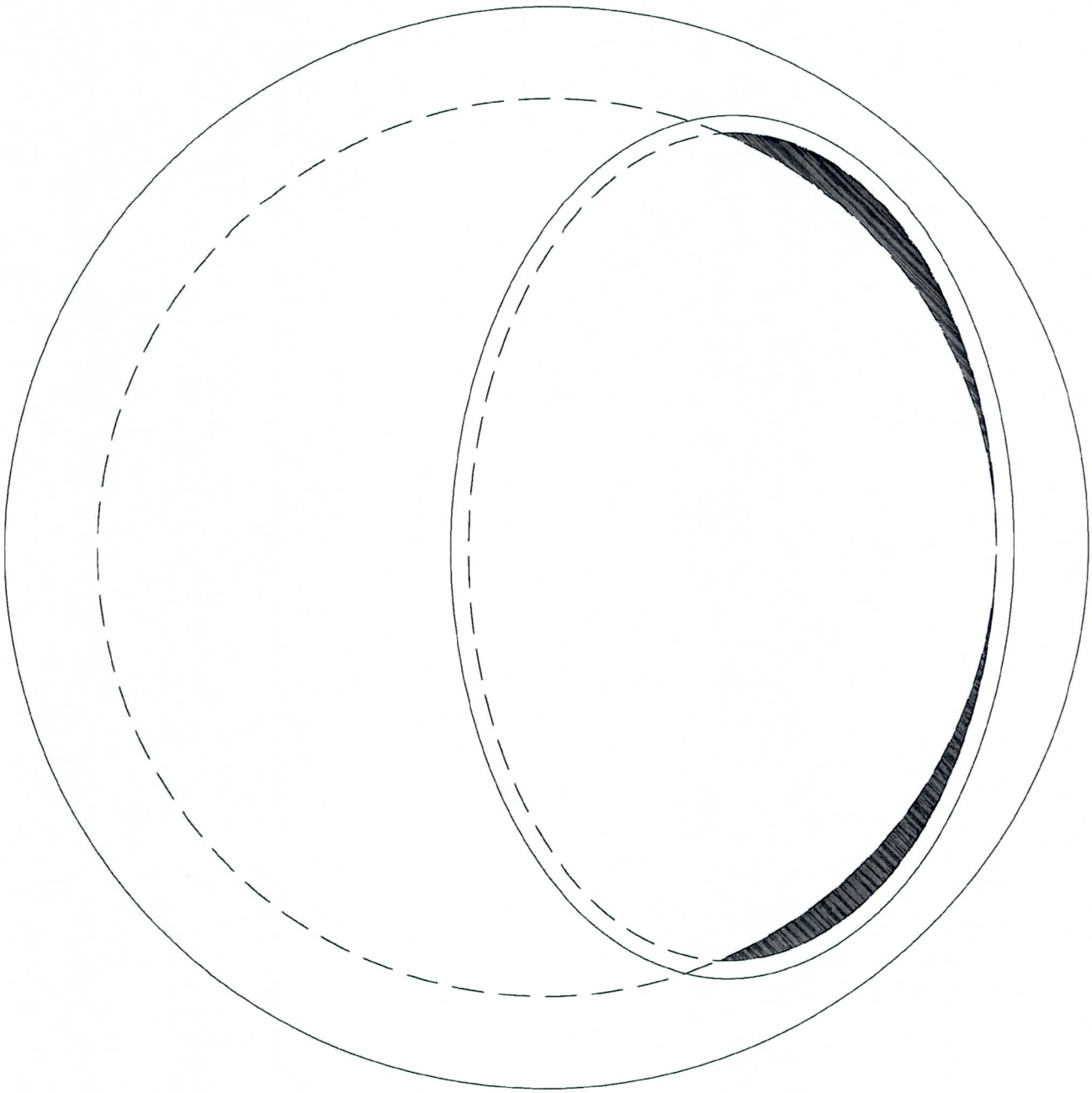
PROFILE VIEW

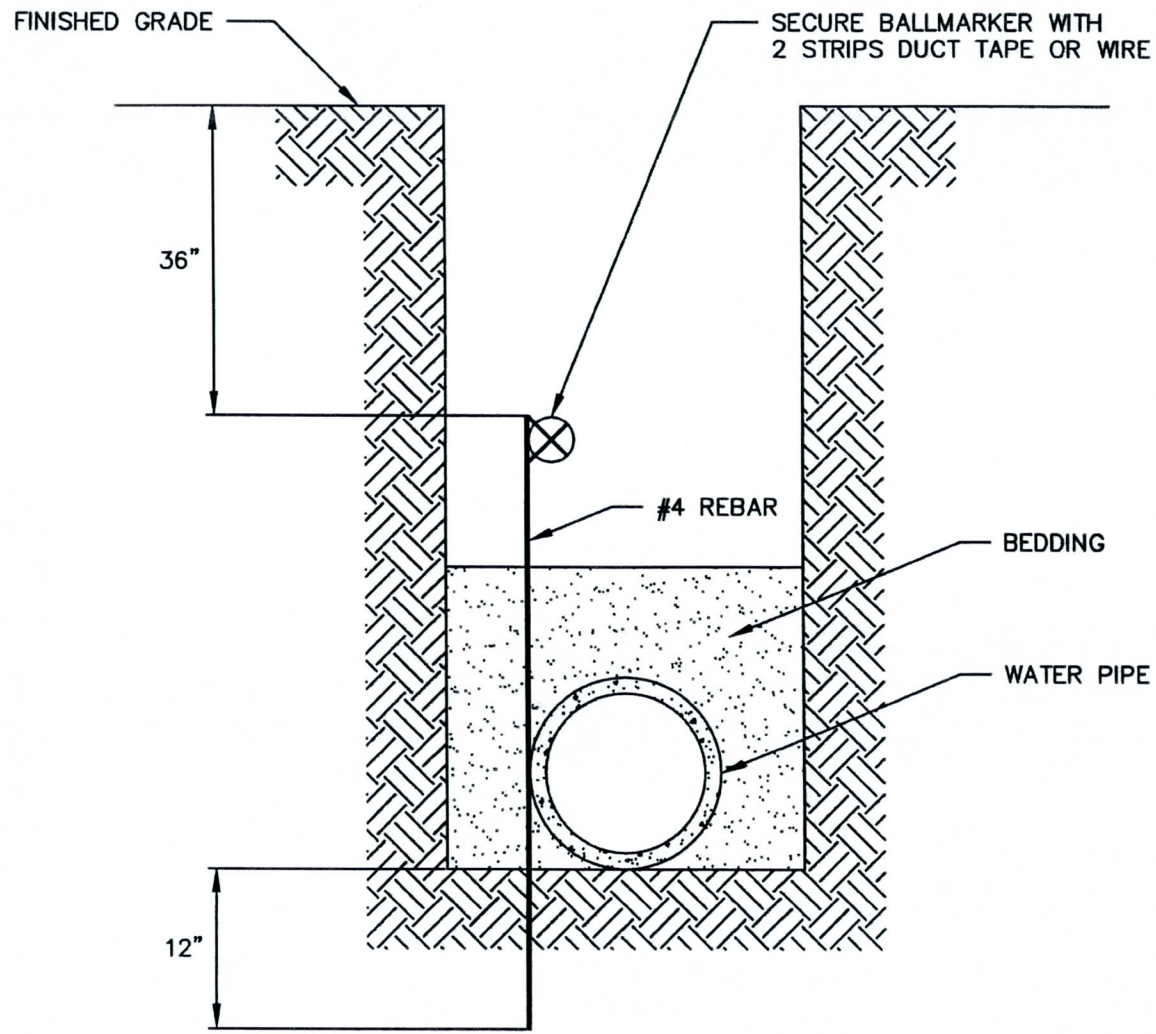


90" TO 53"x83" REDUCER
BELL END

Hanson
HEIDELBERGCEMENT Group

REVISIONS			DRAWN BY: MCP	SLABTOP #	90" X 53"x83" REDUCER
A	–	–	CHECKED:	MONOTOP #	OLSSON & ASSOCIATES
B	–	–	SOLD BY: –	RISER #	FRS 4 OUTFALL FACILITY
C	–	–	SCALE: N.T.S.	BASE #	
D	–	–	ORDER# –	BASESLAB #	
				TOTALS: #	DATE: 6/10/11 PAGE 1 OF 1

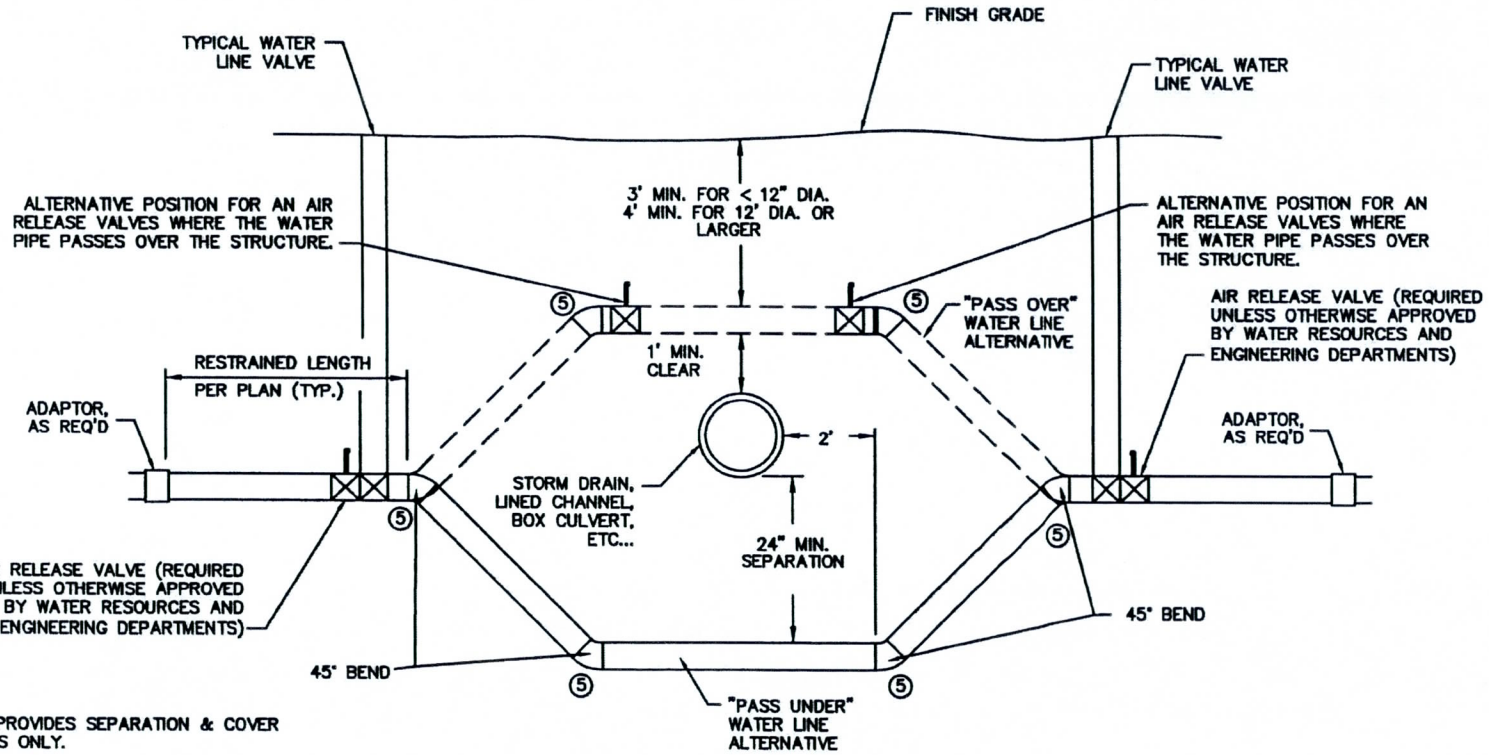




NOTES:

1. CONTRACTOR IS TO INSTALL, ACTIVATE, AND PROGRAM MARKER BALL WITH SIZE OF MAIN, MATERIAL OF MAIN, AND THE TYPE OF FITTING.

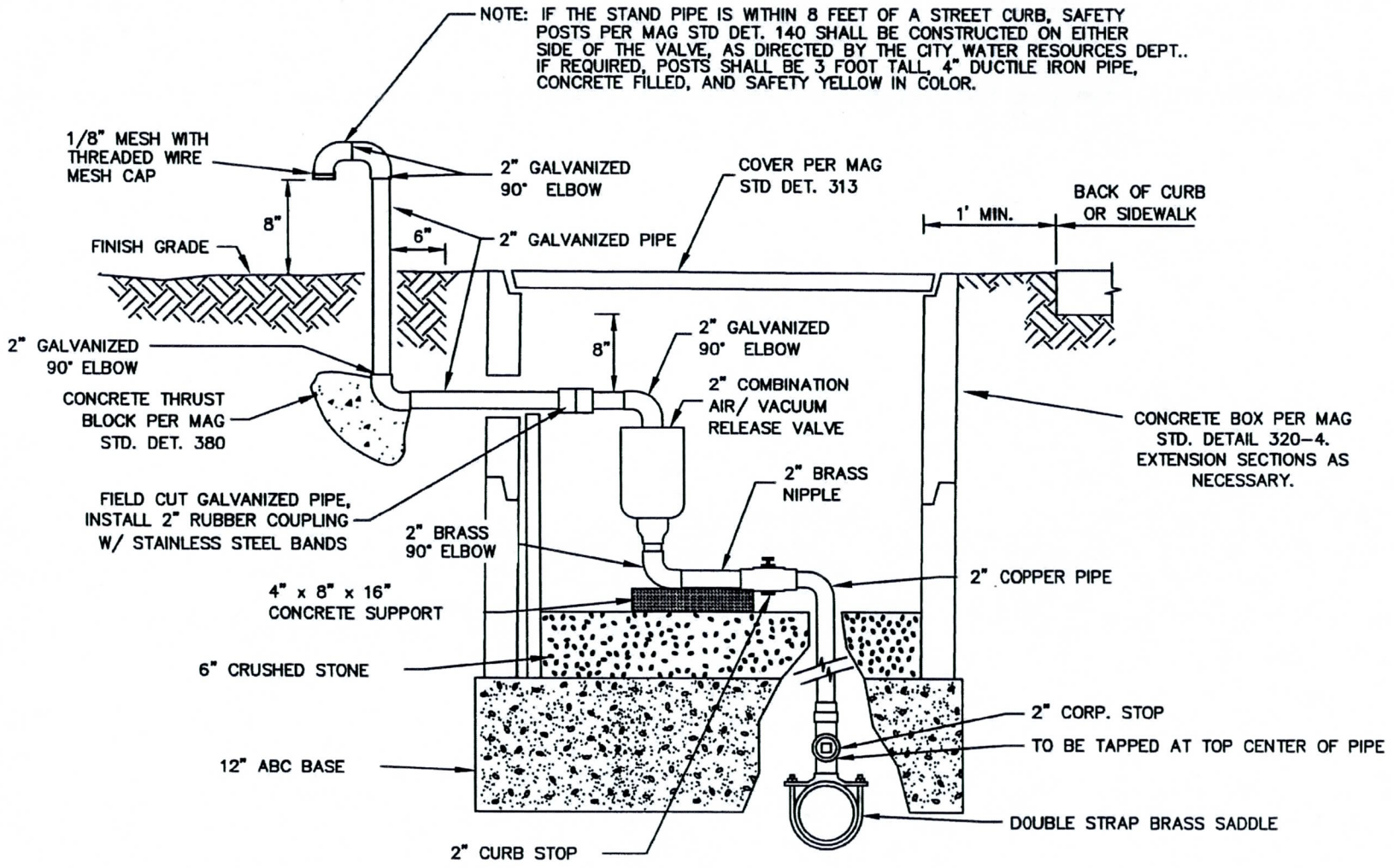
DETAIL NO. G-3305	CITY OF GOODYEAR STANDARD DETAIL	APPROVED: 11/07	ELECTRONIC BALLMARKER PLACEMENT	DETAIL NO. G-3305



NOTES:

1. THIS DETAIL PROVIDES SEPARATION & COVER REQUIREMENTS ONLY.
2. RESTRAINED JOINTS SHALL BE USED ON ALL BENDS AND FOR THE APPROPRIATE LENGTH OF PIPE PER THE MANUFACTURERS SPECIFICATIONS.
3. ALL PIPE SHALL BE DUCTILE IRON PIPE PER MAG STANDARDS.
4. THE AIR RELEASE VALVES SHALL BE LOCATED ON THE HIGHEST ELEVATED PORTION OF WATER LINE.
5. INSTALL NON-PASSIVE MARKER BALLS, WITH 36" OF COVER MINIMUM, PROGRAMMED WITH "PASS UNDER" OR "PASS OVER" AT ANY CHANGE IN DIRECTION

DETAIL NO. G-3301	CITY OF GOODYEAR STANDARD DETAIL	APPROVED: 11/07	VERTICAL REALIGNMENT OF WATER MAINS	DETAIL NO. G-3301



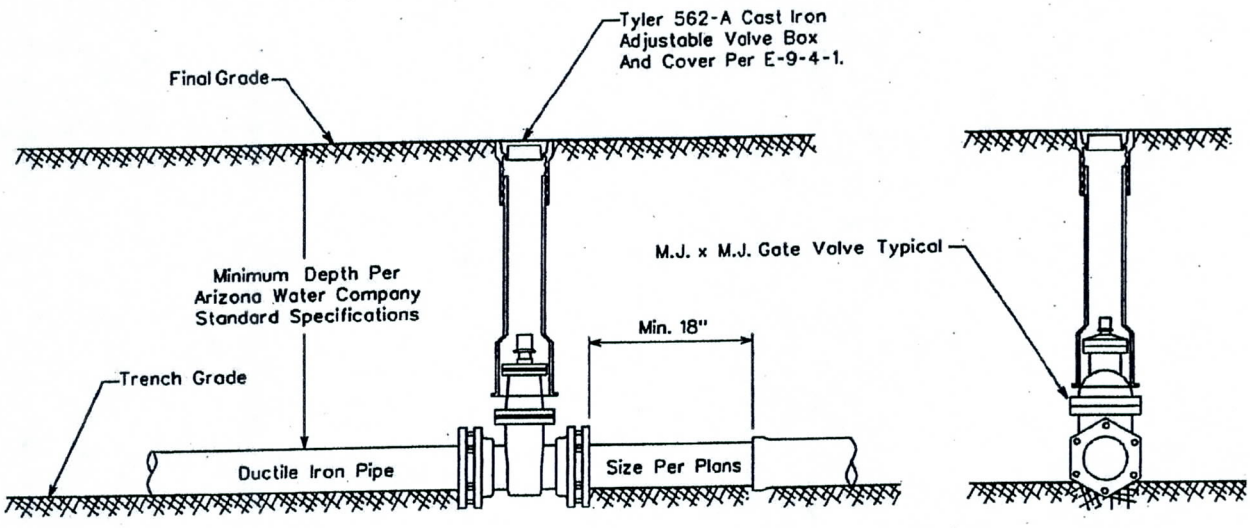
DETAIL NO. G-3328	CITY OF GOODYEAR STANDARD DETAIL	APPROVED: 11/07	2" AIR/VACUUM RELEASE VALVE	DETAIL NO. G-3328

FOR 6" THROUGH 12" GATE VALVES

Mueller Resiliant Wedge Gate Valves
Catalog Number A-2360-__
ANSI/AWWA C509 Compliant

FOR 14" THROUGH 16" GATE VALVES

Mueller Resiliant Wedge Gate Valves
Catalog Number A-2361-__
ANSI/AWWA C509 Compliant



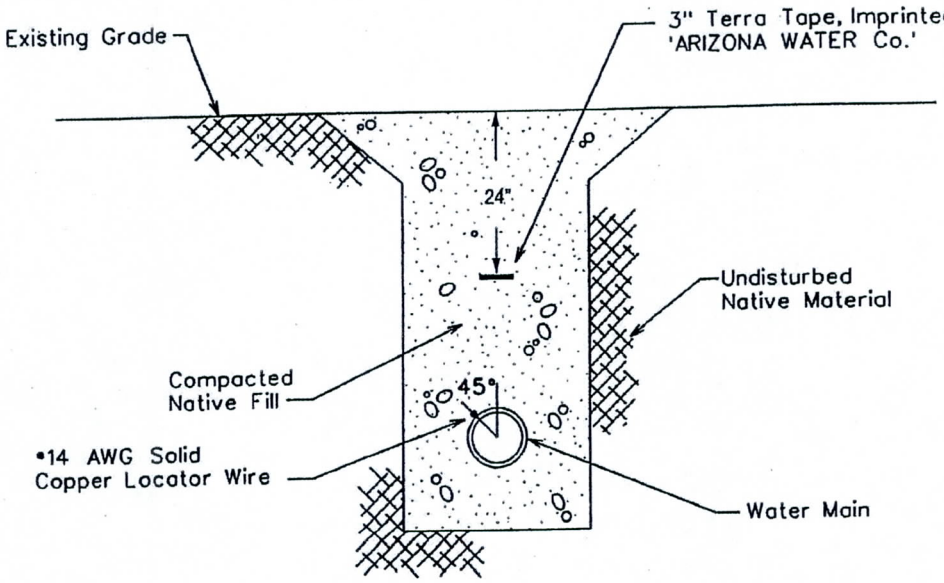
All Valves Installed On Pipe Five Feet (5') Deep And Greater Are To Be Installed With A Valve Operator Extension, Mueller Catalog No. A-26441.

ARIZONA WATER COMPANY

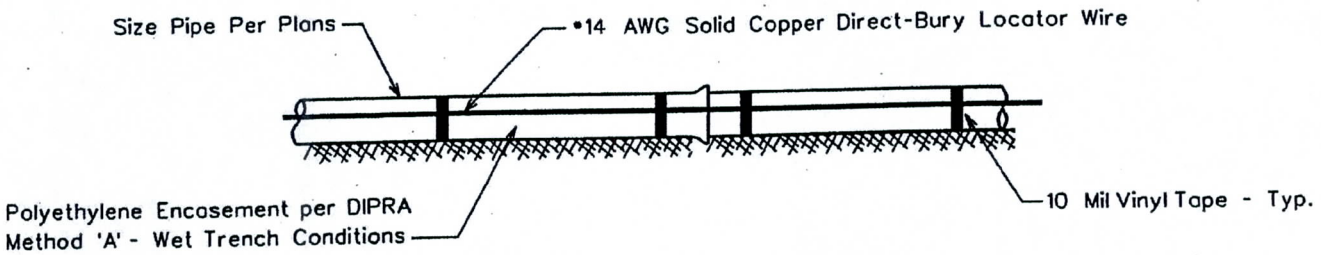
STANDARD SPECIFICATION
FOR THE INSTALLATION OF

TYPICAL VERTICAL GATE VALVES

DRAWN BY:	APPROVED BY:	DATE:	△ 08.23.2006	E-9-2-1
CB	MW	03.20.1986		



TYPICAL WATER TRENCH DETAIL



TYPICAL PROFILE VIEW

WIRE GENERAL NOTES:

1. All pipe shall have •14 AWG Solid Copper Direct-Bury Locator Wire Installed Directly To The Polywrap At 45° From The Vertical Center Of The Pipe and Shall Be Attached Using 10 Mil Vinyl Tape.
2. The Locating Wire Shall Terminate At the Top Of Each Valve Box and Be Capable of Extending 12" Above the Top Of The Box In Such A Manner So As Not To Interfere With Valve Operation.

TAPE GENERAL NOTES:

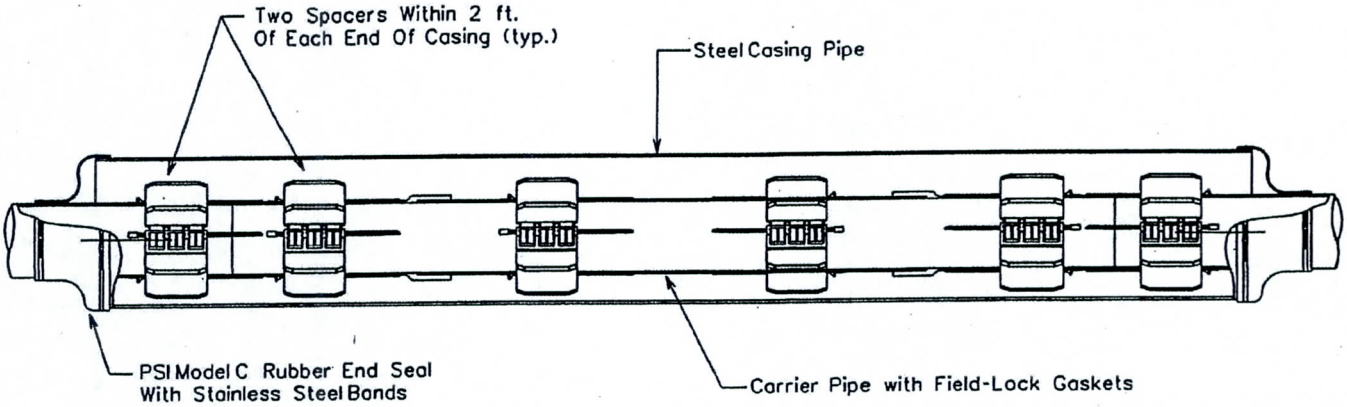
1. Use Terra Tape 3" Marking Tape As Manufactured By Reef Industries Inc. Of Houston, Texas (1-800-231-2417)
2. The Tape Is Blue & Imprinted 'ARIZONA WATER Co.'
3. INSTALLATION: The Pipe Warning Tape Shall Be Installed Over All Water Mains And Shall Be Buried 24 Inches Below The Surface Over The Center Of The Pipe.
   A) The Backfill Shall Be Sufficiently Leveled So That The Tape Is Installed On A Flat Surface.
   B) The Tape Shall Be Centered In The Trench With The Printed Side Up.
   C) Care Shall Be Exercised To Avoid Movement Of The Tape While The Remaining Backfill Is Moved Into The Trench.

ARIZONA WATER COMPANY

STANDARD SPECIFICATION
FOR THE INSTALLATION OF

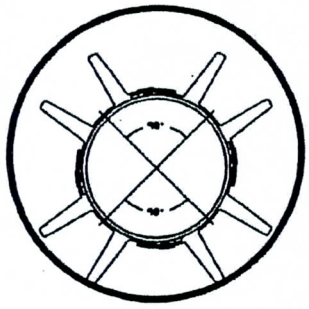
PIPE WARNING TAPE AND LOCATOR WIRE

DRAWN BY:	APPROVED BY:	DATE:	△	
CB		03.24.1997	△09.27.2006	E-9-28-1



CROSS SECTION

The casing spacers shall be the PSI Ranger II Casing Spacers as manufactured by Pipeline Seal and Insulator, Inc., Houston, Texas.



SECTION CUT

End Seals
After insertion of the carrier pipe into the casing, the ends of the casing shall be closed by installing 1/8" thick synthetic rubber end seals equal to the PSI Model "C" end seal as manufactured by Pipeline Seal and Insulator, Inc., Houston, Texas.

NOTE: The Carrier Pipe Shall Be Polywrapped Prior To The Skid Installation & Insertion Into The Carrier Casing For Divisions Requiring Polywrapped Pipe.

OD Push On Joint Bell	OD M.J. BELL
6" - 8.66"	6" - 11.12"
8" - 10.82"	8" - 13.37"
12" - 15.05"	12" - 17.94"
16" - 19.74"	16" - 22.56"
20" - 23.98"	20" - 27.08"
24" - 28.16"	24" - 31.58"
30" - 35.40"	30" - 39.12"
36" - 41.84"	36" - 46.00"
48" - 55.94"	48" - 60.00"

*Thickness Of Skid To Extend A Minimum of 1/2" Above The O.D. Of The Pipe Bell or Gland.

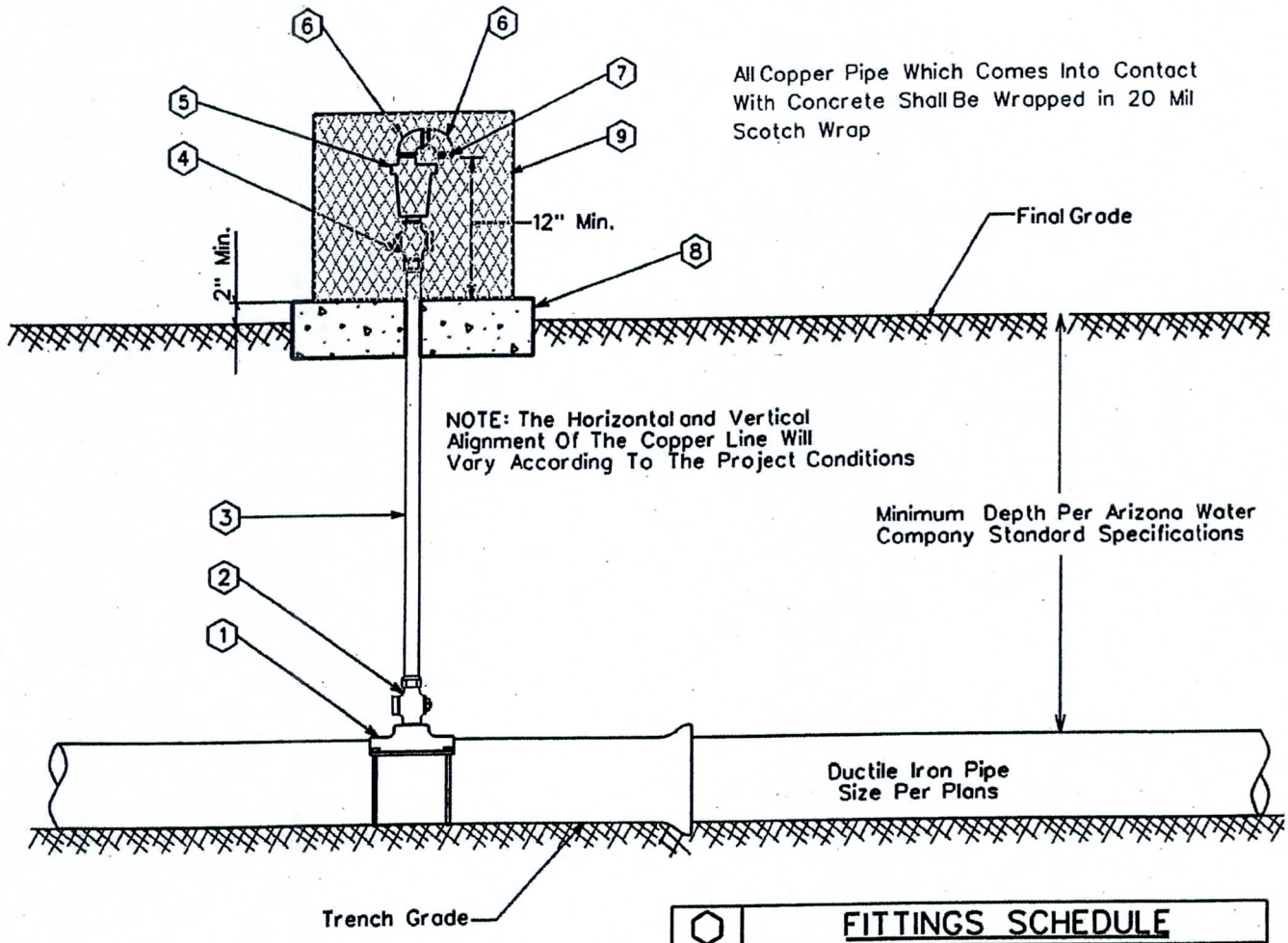
PIPE SIZE	CASING SIZE	CASING SIZE ID	CASING SCHEDULE	WALL THICKNESS	SKID SIZE
6"	16"	15.25"	STD.	.375	*x4x12
8"	18"	18.25"	STD.	.375	*x4x12
12"	22"	21.25"	STD.	.375	*x4x12
16"	28"	27.25"	STD.	.375	*x4x12
20"	32"	31.25"	STD.	.375	*x4x12
24"	36"	35.25"	STD.	.375	*x4x12
30"	48"	47.25"	STD.	.375	*x4x12
36"	54"	53.25"	STD.	.375	*x4x12
48"	66"	65.25"	STD.	.375	*x4x12

ARIZONA WATER COMPANY

STANDARD SPECIFICATION
FOR THE INSTALLATION OF

TYPICAL WATER LINE ENCASEMENT

DRAWN BY:	APPROVED BY:	DATE:	△	
CB		3/20/1996	△ 09.27.2006	E-9-24-1



⬡	FITTINGS SCHEDULE
1.	Mueller BR2B Bronze Service Saddle - Double Strap
2.	1" Mueller B-25008 Taper x Comp. Ball Corp Stop
3.	1" Type 'K' Copper w/NO Splices - Field Fit
4.	1" Mueller B-25028 IP x Comp. Ball Corp Stop
5.	Crispin 1" Air Release Valve, Model AR10
6.	½" Brass Street Elbow
7.	No.16 Wire Mesh Screen (Non-Corrodible)
8.	4" Thick Concrete Pad - Class 'C' Concrete
9.	Guardshack, Model GS-1, Available From BPDI, Inc. Available In Leaf Green Or Desert Tan

GENERAL NOTES:

1. The valve shall be installed at high points and on long runs to vent the accumulation of air with the line under pressure- see the construction plans for specific locations.
2. The valve shall have a 5/64 " orifice with valve sealing faces of stainless steel and BUNA-N rubber.
3. The valve shall be Crispin model AR10 for 6" and larger water mains.
4. Crispin model AR10 valve construction consists of a 1" IPST inlet & ½" IPST outlet, cast iron body and top flange with stainless steel float and trim.
5. The air release assembly shall be located out of the path of traffic but within right-of-way or easement.

ARIZONA WATER COMPANY

STANDARD SPECIFICATION
FOR THE INSTALLATION OF

TYPICAL AIR RELEASE VALVE

DRAWN BY:	APPROVED BY:	DATE:	△08.24.2006	E-9-8-2
CB	MW	03.20.1997		

Appendix G

Sewer Technical Memo

OLSSON ASSOCIATES

MEMO

	Overnight
	Regular Mail
	Hand Delivery
	Other: _____

TO:	Town of Buckeye
PHONE:	
FROM:	Jeff Ford, P.E. (Olsson Associates)
RE:	Sanitary Sewer design along Perryville Road
DATE:	10/11/11
PROJECT #:	010-2309
PHASE:	

NOTES:

The Flood Control District of Maricopa County is currently designing a dedicated outfall for FRS 4 along Van Buren Street. During the course of this design, it was discovered that the Town of Buckeye has a future extension to the existing sanitary sewer line within Perryville Road planned that will be in conflict with the proposed storm drain pipe. This will require that the existing sewer line be reconstructed downstream to a distance that will allow the storm drain to pass below the proposed storm drain.

DESIGN CRITERIA

-Design flow for this sewer line is 2.759 MGD (4.27 cfs). This is attached in Appendix A.
-Minimum velocity used is 2.5 ft/s.
-Maximum d/D = 0.8
-Match crown line at tie-in point
-Clearance between SS and storm drain = 10 to 12-inches (will be encased)

This results in a pipe size of 18-inches at a minimum slope of 0.00205 ft/ft.

The as-builts are included in Appendix B.

PROPOSED DESIGN

The proposed design is included in Appendix C. This design will replace the existing 15-inch SS with an 18-inch SS for approximately 1,400 linear feet south and will tie into the existing 18-inch SS at the RID.

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The approximate design parameters are compared to the existing conditions in the attached table.

	Dia	Length	Slope	Peak Flow (Design Flow)	Avg Flow	Vel (ft/s)	d/D	q/Q	Full Flow (mgd)
Existing	15-inch	1371	0.005	2.759	1.55	4.389	0.739	0.897	3.077
Proposed	18-inch	1371*	0.00205	2.759	1.55	3.04	0.740	0.898	3.070

* Plus an additional 30 linear feet north of the existing under the proposed storm drain

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APPENDIX A

7250 North 16th Street, Suite 210
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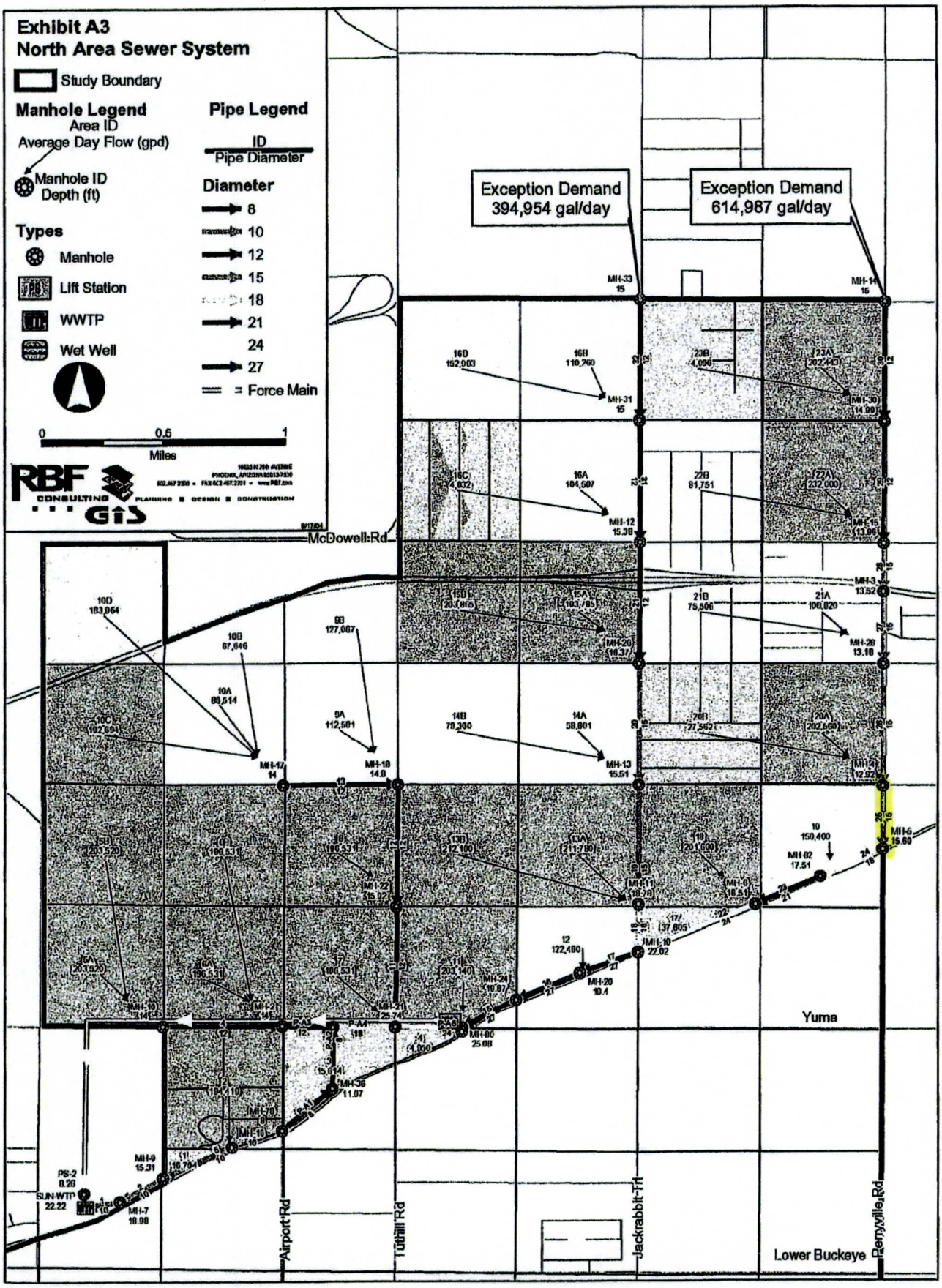
Exhibit A3
North Area Sewer System
Study Boundary
Manhole Legend
Area ID
Average Day Flow (gpd)
Manhole ID
Depth (ft)
Types
Manhole
Lift Station
WWTP
Wet Well
Pipe Legend
ID
Pipe Diameter
Diameter
8
10
12
15
18
21
24
27
= Force Main
0
0.5
1
Miles
RBF CONSULTING
GIS
Exception Demand
394,954 gal/day
Exception Demand
614,987 gal/day
McDowell Rd
Airport Rd
Tuthill Rd
Jackrabbit Trl
Beryville Rd
Yuma
Lower Buckeye

Appendix A Model Results

ID	From ID	To ID	Diam	Length (ft)	Slope	Peak Flow (mgd)	Avg Flow (mgd)	Vel (ft/s)	d/D	q/Q	Full Flow (mgd)
1	MH-7	SUN-WTP	10	761.833	0.002402	0.459	0.211	2.109	0.593	0.66	0.696
11	MH-22	MH-21	12	2,614.81	0.01098	1.797	0.968	5.222	0.642	0.743	2.419
12	MH-18	MH-22	12	2,645.21	0.007602	1.462	0.771	4.324	0.632	0.726	2.013
13	MH-17	MH-18	12	2,508.19	0.003999	1.045	0.531	3.124	0.626	0.715	1.46
15	MH-24	MH-80	27	1,343.45	0.00134	6.29	3.789	3.214	0.712	0.856	7.346
16	MH-20	MH-24	27	1,510.74	0.001297	6.29	3.789	3.167	0.722	0.87	7.229
17	MH-19	MH-20	27	1,341.02	0.001201	6.087	3.667	3.052	0.725	0.875	6.954
18	MH-11	MH-19	18	1,033.02	0.005605	3.047	1.727	4.66	0.557	0.598	5.096
19	MH-13	MH-11	15	2,587.37	0.009299	2.358	1.303	5.288	0.549	0.584	4.037
2	MH-9	MH-7	10	1,073.35	0.002404	0.459	0.211	2.109	0.593	0.66	0.696
20	MH-26	MH-13	15	2,647.37	0.008099	2.128	1.165	4.893	0.538	0.565	3.767
21	MH-12	MH-26	12	2,638.84	0.011001	1.455	0.767	4.988	0.559	0.601	2.422
22	MH-6	MH-19	24	2,748.93	0.000771	3.329	1.902	2.236	0.688	0.818	4.071
23	MH-82	MH-6	21	1,540.59	0.001097	3.009	1.7	2.469	0.731	0.885	3.401
24	MH-5	MH-82	18	1,466.44	0.003	2.759	1.55	3.573	0.64	0.74	3.729
25	MH-4	MH-5	15	1,371.17	0.005404	2.759	1.55	4.389	0.739	0.897	3.077
26	MH-28	MH-4	15	2,657.68	0.005998	2.384	1.32	4.465	0.638	0.735	3.242
27	MH-3	MH-28	15	1,569.31	0.008004	2.079	1.136	4.845	0.532	0.555	3.745
28	MH-15	MH-3	15	1,048.15	0.007995	2.079	1.136	4.845	0.532	0.555	3.743
29	MH-30	MH-15	12	2,647.64	0.0067	1.55	0.822	4.152	0.689	0.82	1.89
30	MH-14	MH-30	12	2,626.82	0.005231	1.191	0.615	3.576	0.624	0.713	1.67
31	MH-31	MH-12	12	2,651.64	0.007901	1.268	0.658	4.256	0.568	0.618	2.052
32	MH-33	MH-31	12	2,643.03	0.009599	0.803	0.395	4.076	0.412	0.355	2.262
4	MH-10	MH-2	12	2,587.39	0.005133	0.824	0.407	3.256	0.499	0.498	1.654
5	MH-16	MH-9	10	1,628.31	0.002401	0.426	0.194	2.073	0.565	0.612	0.696
FM-2	PS-2	SUN-WTP	24	301.246	0.044117	9.614	5.994	13.399	0.384	0.312	30.792
P-A1	MH-78	MH-36	8	1,435.05	0.004	0.052	0.016	1.424	0.219	0.105	0.495
P-A2	MH-36	MH-35	8	1,325.32	0.003999	0.092	0.032	1.675	0.291	0.185	0.495
P-A3	MH-2	MH-35	12	1,120.51	0.014984	1.512	0.8	5.662	0.521	0.535	2.826
P-A4	MH-35	MH-21	18	1,348.80	0.001105	1.567	0.832	2.138	0.612	0.693	2.262
P-A5	MH-21	MH-80	24	1,455.04	0.001512	3.483	2.002	2.949	0.564	0.611	5.701
P-A6	MH-80	WW-A1	24	83.738	0.011942	9.614	5.994	8.243	0.559	0.6	16.021

OLSSON ASSOCIATES

APPENDIX B

7250 North 16th Street, Suite 210
Phoenix, AZ 85020-5282

TEL 602.748.1000
FAX 602.748.1001

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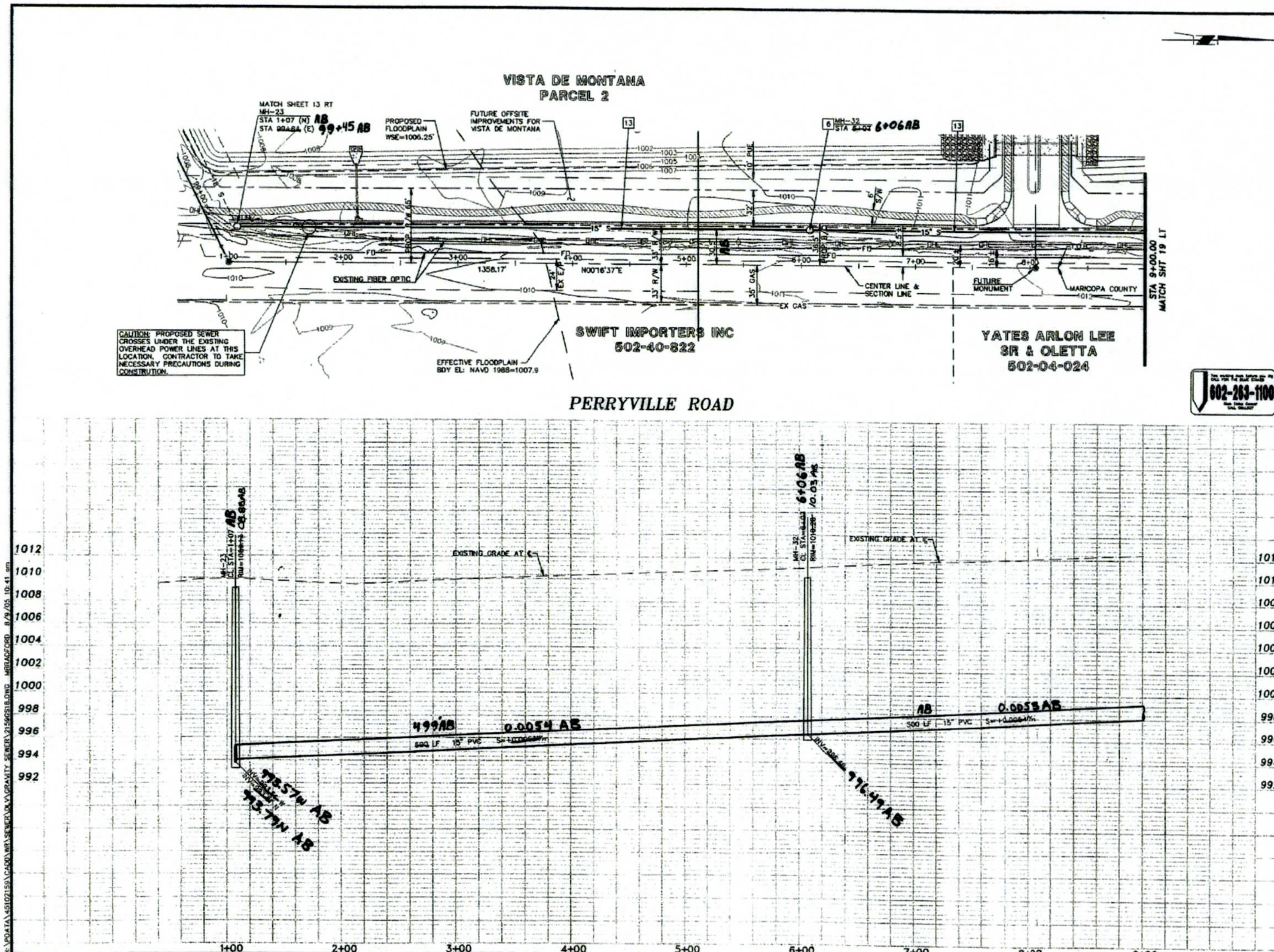


SCALE 1" = 40'

0 40 80 120

SEWER CONSTRUCTION NOTES

1. INSTALL 18" HOBAS CLASS SN 46 SEWERLINE. BEDDING PER DETAIL ON SHEET 2.
2. INSTALL 21" HOBAS CLASS SN 46 SEWERLINE. BEDDING PER DETAIL ON SHEET 2.
3. INSTALL 24" HOBAS CLASS SN 46 SEWERLINE. BEDDING PER DETAIL ON SHEET 2.
4. INSTALL 27" HOBAS CLASS SN 46 SEWERLINE. BEDDING PER DETAIL ON SHEET 2.
5. INSTALL 30" HOBAS CLASS SN 46 SEWERLINE. BEDDING PER DETAIL ON SHEET 2.
6. INSTALL 5' SEWER MANHOLE MAG STD DET 420. FRAME AND COVER PER MAG STD DET 423. (WATER TIGHT)(COAT PER NOTE #23, SHEET 2)
7. INSTALL SEWER STUB OUT AND PLUG PER MAG STD DET 427, TO 5' OUTSIDE OF MANHOLE. INVERT & SLOPE AS SHOWN.
8. ADJUST MANHOLE COVER TO GRADE PER MAG STD DET 422.
9. INSTALL 30" PLUG. IF ONSITE SEWER MAIN ALREADY EXISTS, REMOVE PLUG AND CONNECT TO EXISTING.
10. SAWCUT, REMOVE & REPLACE EXISTING AC PAVEMENT, PER MAG SECTION 200-T-TOP TYPE B, AREA AS SHOWN ON PLANS. CONTRACTOR TO MEET AND MAINTAIN EXISTING ELEVATIONS AND REPLACE CROSS SECTION IN KIND.
11. THE PORTION OF THE IRRIGATION PIPE THAT IS IN CONFLICT WITH THE TRENCHING IS TO BE REMOVED AND DISPOSED.
12. INSTALL 2" DECOMPOSED GRANITE ON COMPACTED NATIVE SOIL. SY AS SHOWN. SEE DETAILS ON SHEET 2.
13. INSTALL 15" PVC SDR-35. BEDDING PER DETAIL ON SHEET 2.
14. CAUTION: CONTRACTOR TO VERIFY ACTUAL LOCATION OF EXISTING GAS LINE PRIOR TO ANY CONSTRUCTION. SEWERLINE TO MAINTAIN MINIMUM OF 2' VERTICAL SEPARATION WHEN CROSSING GAS LINE. IF CONFLICT IS FOUND, CONTRACTOR TO NOTIFY ENGINEER.

NE BUCKEYE SEWER COLLECTION SYSTEM
GRAVITY SEWER LINE

RBF CONSULTING — PLANNING ■ DESIGN ■ CONSTRUCTION

Registered Professional Engineer (Civil) Certificate No. 37553 TRAVIS J. NUTTALL

LAYOUT	DRAFTED	CHECKED
TJN	KJM	MAW

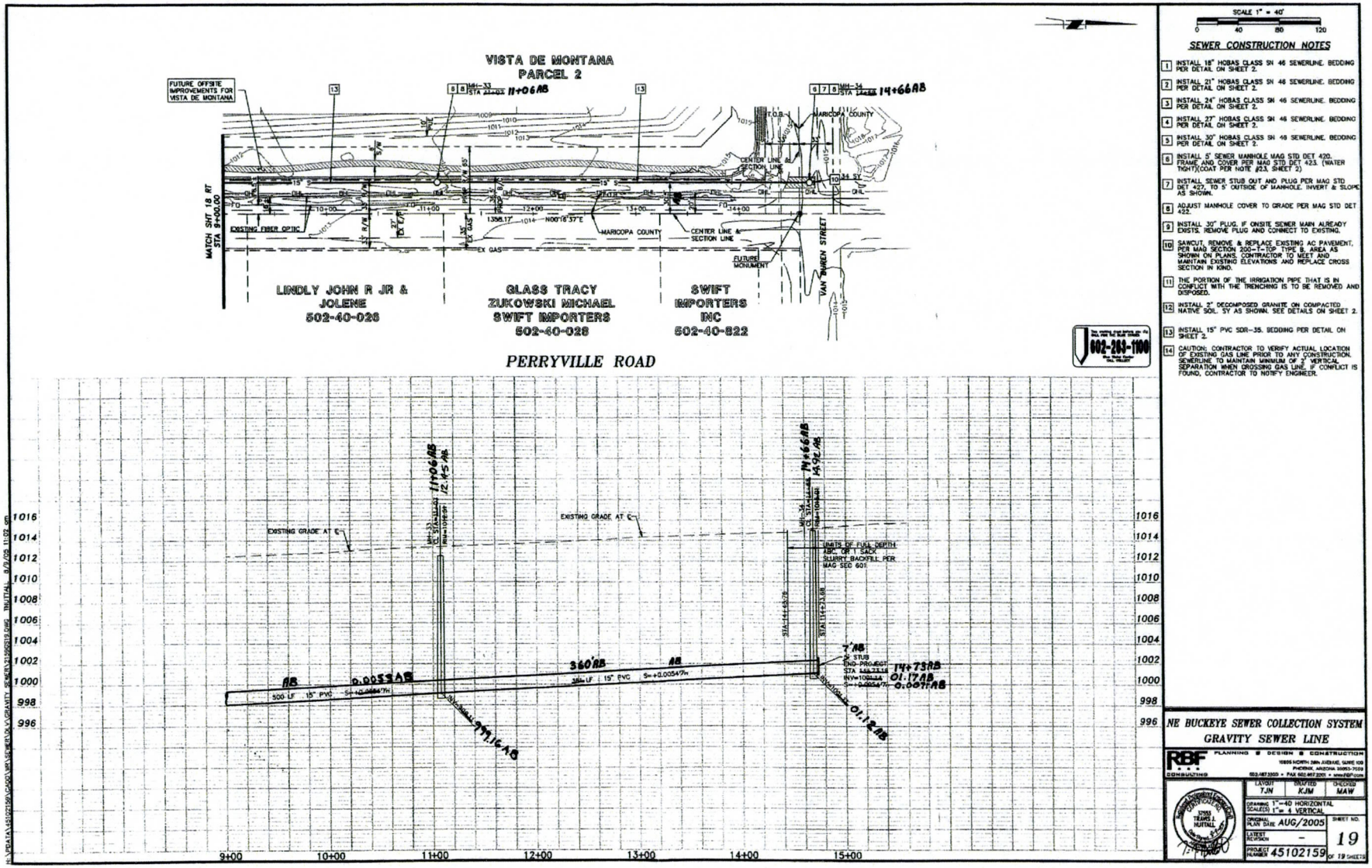
DRAWING SCALE(S): 1"=40 HORIZONTAL, 1"= 4 VERTICAL

ORIGINAL PLAN DATE: AUG/2005

LATEST REVISION: –

PROJECT NUMBER: 45102159

SHEET NO. 18 OF 19 SHEETS



SCALE 1" = 40'

0 40 80 120

SEWER CONSTRUCTION NOTES

1. INSTALL 18" HOBAS CLASS SN 46 SEWERLINE. BEDDING PER DETAIL ON SHEET 2.
2. INSTALL 21" HOBAS CLASS SN 46 SEWERLINE. BEDDING PER DETAIL ON SHEET 2.
3. INSTALL 24" HOBAS CLASS SN 46 SEWERLINE. BEDDING PER DETAIL ON SHEET 2.
4. INSTALL 27" HOBAS CLASS SN 46 SEWERLINE. BEDDING PER DETAIL ON SHEET 2.
5. INSTALL 30" HOBAS CLASS SN 46 SEWERLINE. BEDDING PER DETAIL ON SHEET 2.
6. INSTALL 5' SEWER MANHOLE MAG STD DET 420. FRAME AND COVER PER MAG STD DET 423. (WATER TIGHT)(COAT PER NOTE #23, SHEET 2)
7. INSTALL SEWER STUB OUT AND PLUG PER MAG STD DET 422, TO 5' OUTSIDE OF MANHOLE. INVERT & SLOPE AS SHOWN.
8. ADJUST MANHOLE COVER TO GRADE PER MAG STD DET 422.
9. INSTALL 30" PLUG. IF ONSITE SEWER MAIN ALREADY EXISTS. REMOVE PLUG AND CONNECT TO EXISTING.
10. SAWCUT, REMOVE & REPLACE EXISTING AC PAVEMENT, PER MAG SECTION 200-1-TOP TYPE B, AREA AS SHOWN ON PLANS. CONTRACTOR TO MEET AND MAINTAIN EXISTING ELEVATIONS AND REPLACE CROSS SECTION IN KIND.
11. THE PORTION OF THE IRRIGATION PIPE THAT IS IN CONFLICT WITH THE TRENCHING IS TO BE REMOVED AND DISPOSED.
12. INSTALL 2" DECOMPOSED GRANITE ON COMPACTED NATIVE SOIL 5Y AS SHOWN. SEE DETAILS ON SHEET 2.
13. INSTALL 15" PVC SDR-35. BEDDING PER DETAIL ON SHEET 2.
14. CAUTION: CONTRACTOR TO VERIFY ACTUAL LOCATION OF EXISTING GAS LINE PRIOR TO ANY CONSTRUCTION. SEWERLINE TO MAINTAIN MINIMUM OF 2' VERTICAL SEPARATION WHEN CROSSING GAS LINE. IF CONFLICT IS FOUND, CONTRACTOR TO NOTIFY ENGINEER.

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GRAVITY SEWER LINE

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PHOENIX, ARIZONA 85051-7519
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LAYOUT	REVIEWED	CHECKED
TJN	KJM	MAW

DRAWING SCALE(S): 1"=40 HORIZONTAL, 1"= 4 VERTICAL

ORIGINAL PLAN DATE: AUG/2005

LATEST REVISION: -

SHEET NO. 19

PROJECT NUMBER 45102159 OF 19 SHEETS

CERTIFICATE OF CONSTRUCTION — 37553 TRAVIS L. HUITAILL — EXPIRES 3-31-07

OLSSON ASSOCIATES

APPENDIX C

7250 North 16th Street, Suite 210
Phoenix, AZ 85020-5282

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FAX 602.748.1001

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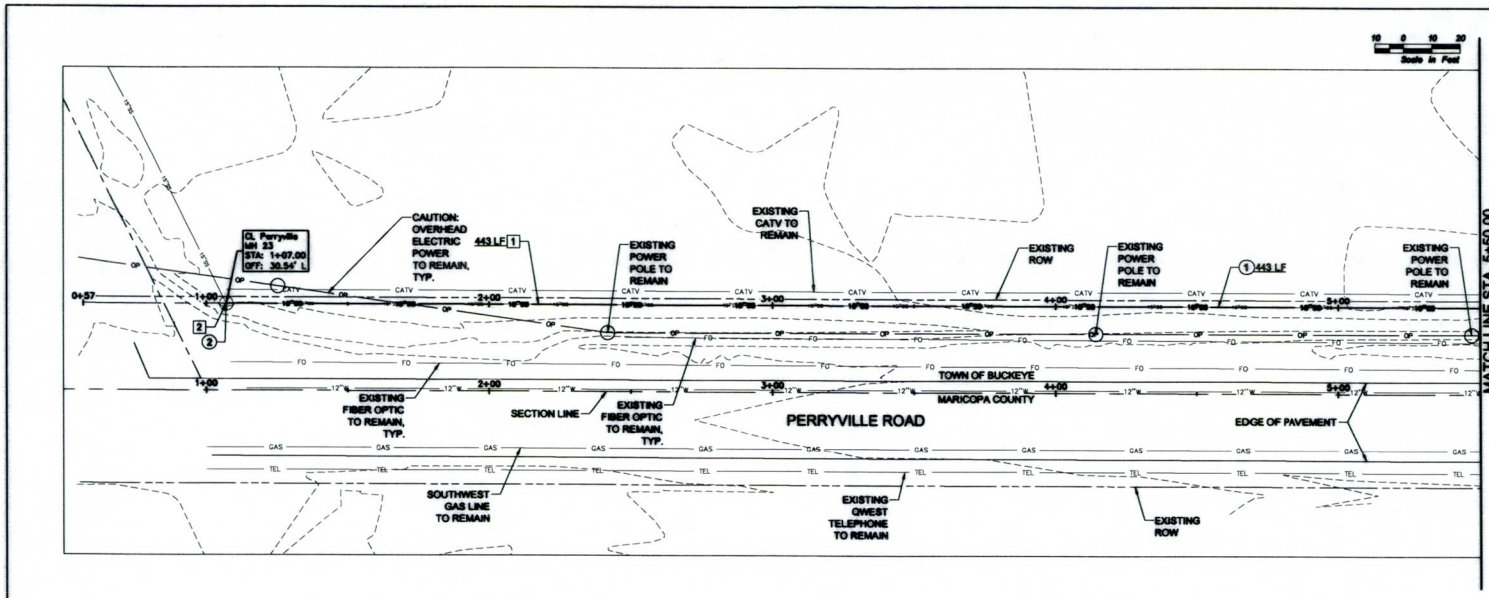
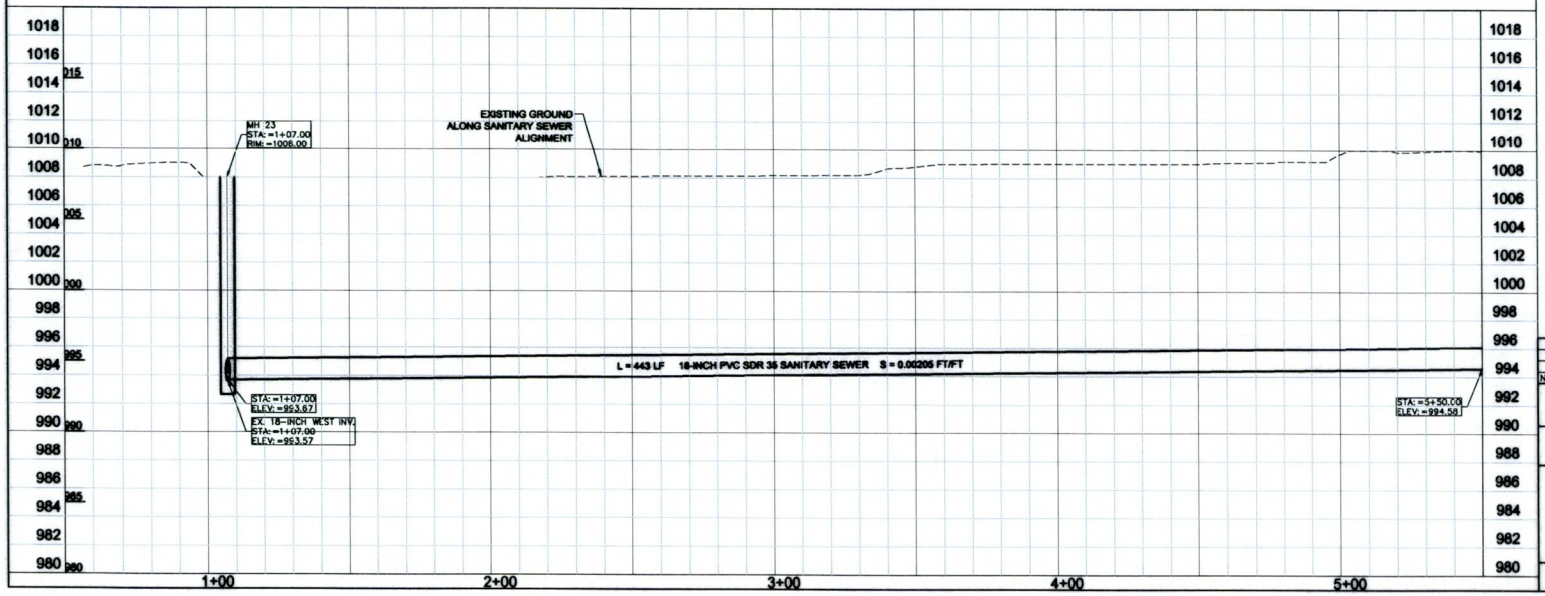




REMOVE

		QTY
1	REMOVE EXISTING 15" PVC SANITARY SEWER MAIN	443 LF
2	REMOVE EXISTING SANITARY SEWER MANHOLE	1 EA

RELOCATE

RELOCATE BY OTHERS

CONSTRUCT

		QTY
1	INSTALL 18-INCH SANITARY SEWER PVC SDR 35	443 LF
2	INSTALL 5' DIAMETER SANITARY SEWER MANHOLE AS PER MAG STD. DTL. 420. FRAME AND COVER PER MAG STD. DTL. 423. WATER TIGHT, T-LOC MANHOLE COATING.	1 EA

GENERAL NOTES:
PRELIMINARY PLANS, NOT FOR CONSTRUCTION
PLANS ARE FOR CONCEPTUAL USE ONLY.

UTILITY LOCATIONS ARE SCHEMATIC, CULVERT LOCATIONS AND DEPTH ARE APPROXIMATE.

Scale in Feet Vertical Scale
Scale in Feet Horizontal Scale

TWO WORKING DAYS BEFORE YOU DIG, CALL 263-1100 BLUE STAKE

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

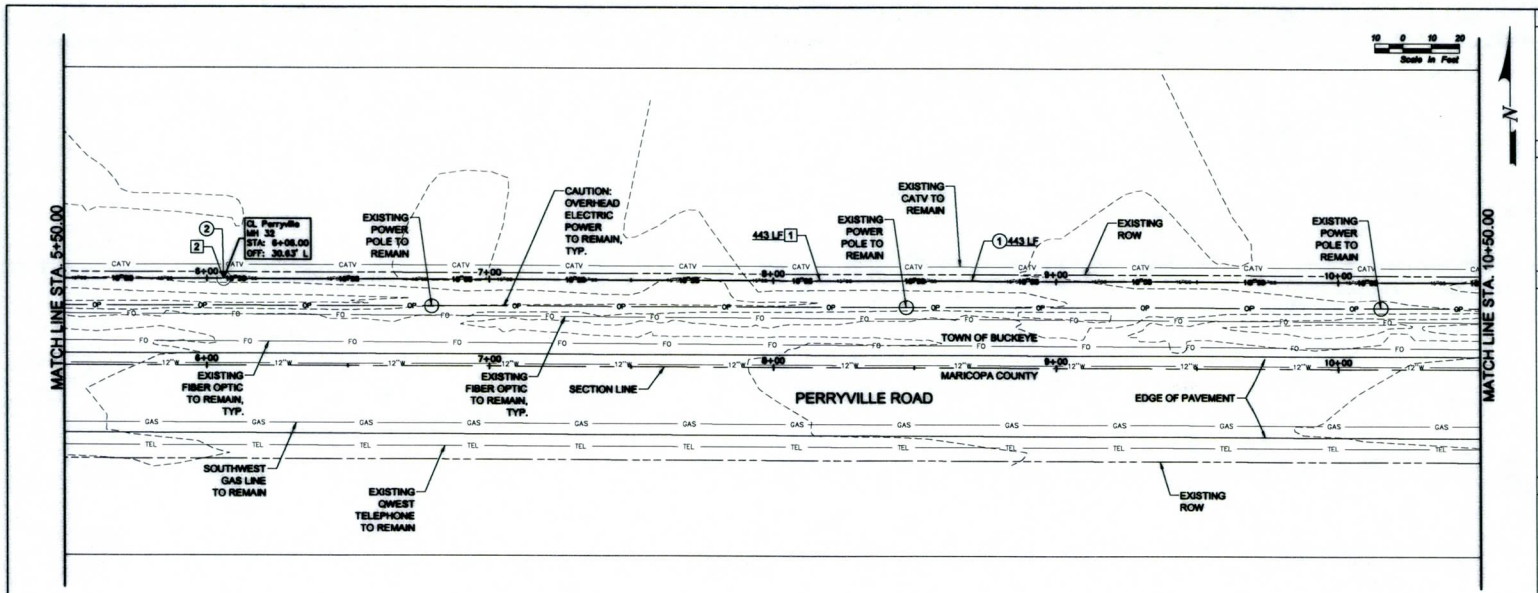
WHITE TANKS FRS #4 FACILITY OUTLET

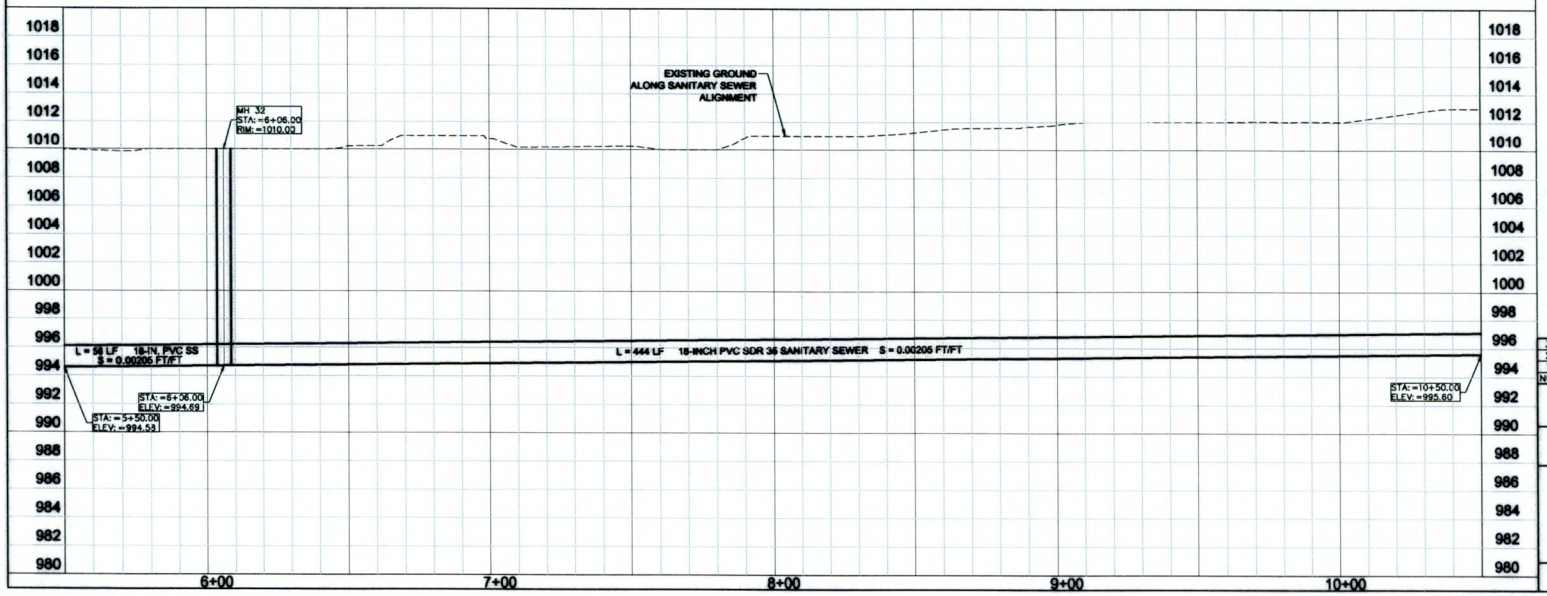
PRELIMINARY REVIEW ONLY NOT FOR CONSTRUCTION

	BY	DATE
DESIGNED	SW	10/13/11
DRAWN	SW	10/13/11
CHECKED	JCF	10/13/11

OLSSON ASSOCIATES

DRAWING NO. | SANITARY SEWER RELOCATION PLAN & PROFILE | SHEET 01 OF 03





REMOVE

	QTY
1 REMOVE EXISTING 15" PVC SANITARY SEWER MAIN	443 LF
2 REMOVE EXISTING SANITARY SEWER MANHOLE	1 EA

RELOCATE

RELOCATE BY OTHERS

CONSTRUCT

	QTY
1 INSTALL 18-INCH SANITARY SEWER PVC SDR 35	500 LF
2 INSTALL 5' DIAMETER SANITARY SEWER MANHOLE AS PER MAG STD. DTL. 420. FRAME AND COVER PER MAG STD. DTL. 423. WATER TIGHT, T-LOC MANHOLE COATING.	1 EA

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UTILITY LOCATIONS ARE SCHEMATIC, CULVERT LOCATIONS AND DEPTH ARE APPROXIMATE.

Scale In Feet Vertical Scale

Scale In Feet Horizontal Scale

TWO WORKING DAYS BEFORE YOU DIG, CALL 263-1100 BLUE STAKE

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

WHITE TANKS FRS #4 FACILITY OUTLET

PRELIMINARY REVIEW ONLY NOT FOR CONSTRUCTION

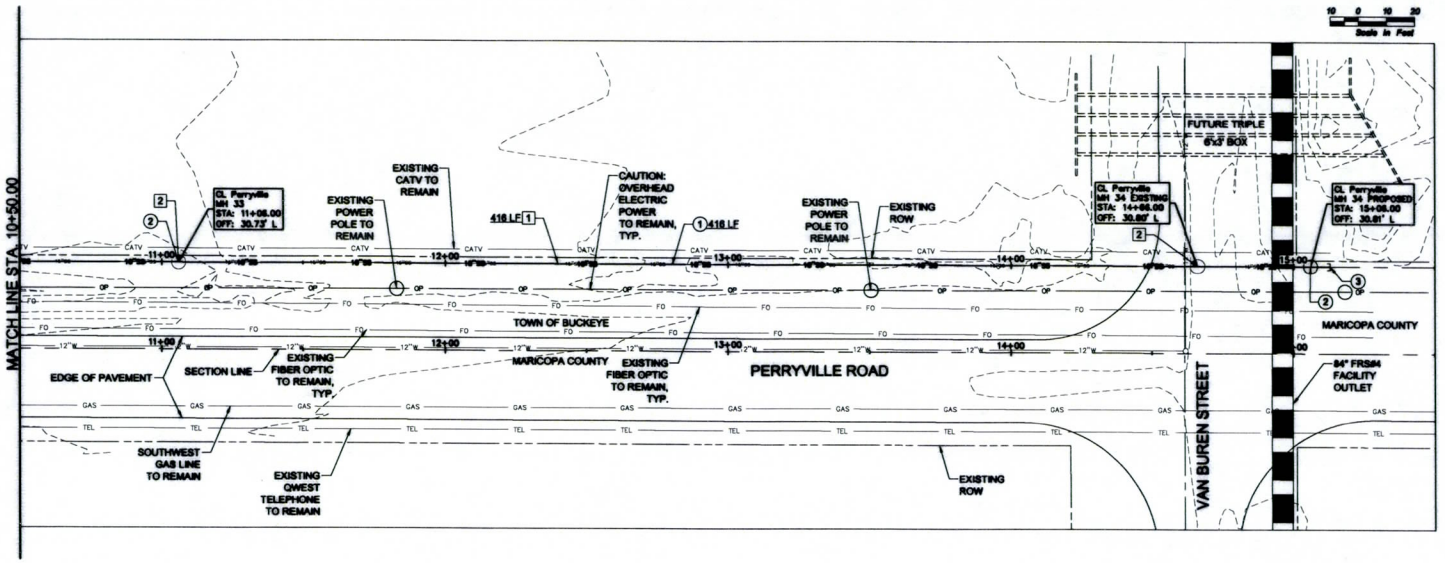
	BY	DATE
DESIGNED	SW	10/13/11
DRAWN	SW	10/13/11
CHECKED	JCF	10/13/11

OLSSON ASSOCIATES

DRAWING NO.

SANITARY SEWER RELOCATION PLAN & PROFILE

SHEET 02 OF 03



REMOVE

		QTY
1	REMOVE EXISTING 15" PVC SANITARY SEWER MAIN	416 LF
2	REMOVE EXISTING SANITARY SEWER MANHOLE	2 EA

RELOCATE

RELOCATE BY OTHERS

CONSTRUCT

		QTY
1	INSTALL 18-INCH SANITARY SEWER PVC SDR 35	463 LF
2	INSTALL 5' DIAMETER SANITARY SEWER MANHOLE AS PER MAG STD. DTL. 420. FRAME AND COVER PER MAG STD. DTL. 423. WATER TIGHT, T-LOC MANHOLE COATING.	2 EA
3	INSTALL SEWER STUB OUT AND PLUG AS PER MAG STD. DTL. 427.	1 EA

GENERAL NOTES:
PRELIMINARY PLANS, NOT FOR CONSTRUCTION
PLANS ARE FOR CONCEPTUAL USE ONLY.

UTILITY LOCATIONS ARE SCHEMATIC, CULVERT LOCATIONS
AND DEPTH ARE APPROXIMATE.

Scale In Feet Vertical Scale

Scale In Feet Horizontal Scale

TWO WORKING DAYS BEFORE YOU DIG, CALL 263-1100 BLUE STAKE

NO.	REVISION	BY	DATE
3			
2			
1			

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OLSSON ASSOCIATES

DRAWING NO.

SANITARY SEWER RELOCATION PLAN & PROFILE

SHEET 03 OF 03

Appendix H

Meeting Minutes

WHITE TANKS FRS #4
OUTLET FACILITY FINAL DESIGN
FCD 2010C029

Kickoff Meeting Minutes
January 5th, 2011
9:30 am

ATTENDEES
See attached list.

INTRODUCTION
The meeting began with self introduction of the project team members.

SCHEDULE OVERVIEW
Jeff Ford, Olsson Associates, began the meeting with an overview of the White Tanks FRS #4 project schedule. This project will be a fast track seven month design schedule with plan review submittals at 40%, 70% & 100%. The notice to proceed for this project was granted on January 5th, 2011.

Biweekly Design Meeting:
A biweekly design progress meeting has been scheduled for *Thursday at 1pm* at the District; however the first design progress meeting due to a schedule conflict will be on Tuesday January 18th, 2011 at 8:00 am in the AC/DC conference room at the District.

Schedule Highlights include:

- February 3rd, 2011 - Horizontal Alignment Design Review/Approval
- March 29th, 2011 - 40% Plan Submittal
- April 5th, 2011 - Constructability Review - week after 40% submittal during review of plans

Public Involvement:
Jeff Ford asked the question if the project would benefit from an early newsletter due to the fast track schedule. Gant Wegner, FCDMC, would like to try and provide the public with a brief update / schedule on all three projects with the announcement of the FRS#4 Outlet Facility project. Jeff Ford will meet with Steve Nowaczyk, Ninyo & Moore, and Jeff Minch, Wood Patel, to work on an overall big picture combined schedule for the three projects. The FRS#4 newsletter will have a summary paragraph including big picture project information for all three projects

in this area. Gant would like to see the horizontal alignment approved prior to the distribution of the newsletter. Further discussion regarding dates for the newsletter distribution and public meeting resulted in the following timeframe:

- Newsletter with Public Meeting Announcement end of March 2011
- Public Meeting mid April 2011
- Final Newsletter 2 weeks after 100% Plan Submittal end of July / early August 2011

ADJACENT PROJECT COORDINATION

FRS #4 Dam Rehabilitation Project Update:

Steve Nowaczyk provided an update of the upstream FRS #4 Dam Rehabilitation project. This project has two design phases. The first design phase of the rehabilitation work did not include any hydrology / hydraulics or outlet riser design. The plans are currently out for bid with a construction award at the end of January. The second phase of the dam rehabilitation will include the design of the two outlet risers.

A design memo involving the riser design at the east end of the FRS #4 facility (near Jackrabbit Trail) was submitted to NRCS and is currently in review. The riser design is on hold until comments from NRCS are received. A second design memo will also be submitted by Wood Patel to NRCS detailing the operational procedures, gate configurations and flow rates. Jeff Minch also mentioned that a freeboard memo will be submitted to ADWR to determine if the FRS #4 Facility top of dam needs to be raised.

Steve spoke about how the team needs have the NRCS review comments and answers prior to the start of the phase 2 design. The end of February / early March would be the earliest design would start. Dave Degerness, FCDMC, is factoring a year for design which will include a 30%, 60%, 90% and 100% submittal process with bid documents completed by January 2012. Phase 2 construction award would be around April 2012 with the construction duration around nine months.

Loop 303 Drainage Project Update:

Jeff Minch provided an update of the downstream Loop 303 Drainage Project. The project team is on track to make the 30% submittal this Friday 01/07/2011. The is a gap between the ADOT and FCD project tie-in point approximately 300 feet north of Van Buren Street. ADOT is paying for the design change to the Flood Control District project which includes the 300 foot gap at the ADOT/FCDMC channel tie-in. Jeff Minch said Olsson will receive a copy of the 30% plan submittal. Construction for the Loop 303 project is anticipated in early 2012.

FIELD WORK

Mapping & Survey:

Mapping and survey is being handled by Wood Patel. This work was scheduled early and completed under an FCD on-call contract in order to coincide with the RID eleven day dry up period which began on Friday Nov. 5th, 2010.

The field survey and mapping has been completed by Wood Patel and electronic files will be transmitted to Olsson Associates on Thursday January 6th, 2011.

Right of Way:

The team will be forwarding on a formal request to the District to acquire GIS parcel and ROW information.

ACTION ITEM: Olsson to forward a request to the District to acquire GIS parcel and ROW information.

Utility Potholing:

TBE was also on-site during the dry up period to completed five additional utility potholes of the AT&T fiber optic line just north of the RID Canal crossing at Van Buren Street. These potholes helped to further determine the AT&T fiber optic dipped line depth. The fiber optic line depth does not fall below the bottom of the RID canal. TBE also provided eleven utility potholes during the pre-design study. The need for additional utility potholing will be determined after the horizontal alignment is approved at the February 3rd design progress meeting.

Geotechnical Borings:

Steve Nowaczyk provided an aerial map of the project area showing eighteen boring locations. The spacing between borings is approximately a thousand feet. The depth of boring will be twenty feet, however a twenty-five feet boring depth will be utilized at the RID canal crossing. The original thought was to take borings just outside the RID canal right-of-way. Borings within the RID right-of-way will require a permit from the RID. Steve would like to not leave anything to chance with a contractor especially if there is soil saturation from any leaks within the canal lining in this area.

The contact for the RID right-of-way crossing permit is Melody Zyburt with Stantec Consulting. Melody's phone number is (602) 438 2200 and email: melody.zyburt@stantec.com.

The team agreed that it made sense to hold off on boring until early February when the Horizontal Alignment is further established. Steve anticipated 3 to 4 days onsite and agreed this would be beneficial and allow time to begin the RID permit paperwork process now prior to the early February time frame.

PROJECT DESIGN APPROACH

Design Q:

The team is currently assuming a 300 cfs design Q for the 40% design submittal. Dave Degerness, FCDMC, said the phase 2 project is currently anticipating a design Q range of 270 – 320 cfs (maximum).

Jeff Ford did not have concerns with the FRS#4 outlet being able to accommodate this Q range; however this would have an impact downstream at the 303 channel outlet.

Dave also spoke about an error with Hazen-Williams equation in the Gannet Fleming spreadsheet resulting in a 40 to 50 cfs difference in flow. Dave would like to his design team utilize the 'SITES' hydrology software to develop a rating curve for the riser. Dave believes one 36-inch diameter riser outlet will be under the 300 cfs, but has concern with two 36-inch diameter outlets being over the 300 cfs design flow. The team will have to develop an Operation Manuel to provide direction is the second riser is to be gated and only opened half way in order to not exceed the 300 cfs.

The velocity at the upstream outlet is anticipated to be in the range of 20 to 30 ft/sec thus the baffle design to help slow flow down into the stilling basin.

Project Tie-ins – Upstream & Downstream:

In terms of construction sequencing among the three projects the FRS#4 Outlet project will be constructed first. Jeff Ford spoke about the 40% design approach of the structure tie-ins with both the upstream and downstream projects.

Upstream

The pond within the FRS#4 Facility has an elevation around 1,038 feet. The preliminary FRS#4 Outlet pre-design report showed an outlet pipe invert elevation of 1,027 feet. This provides an eleven foot range at the upstream outlet structure tie-in. Jeff Ford spoke about the FRS #4 Outlet project approach at the

tie-in upstream for the 40% design plans. The idea is to leave approximately 100 ft and have the upstream project construct pipe to tie-in with outlet project since the outlet pipe will be constructed first. This will provide flexibility in the schedule for the upstream structure design.

Downstream

Wood Patel will provide Olsson with 30% design plans for the Loop 303 drainage project where the FRS#4 Outlet project ties in downstream. Jeff Ford spoke about the idea of adding an additional barrel dedicated to the FRS#4 Outlet pipe to the Loop 303 three barrel box crossing at Van Buren Street. Another idea would be to have an angled headwall prior to the three barrel box at the outlet tie-in point.

Utilities:

Once the surveying and mapping for the FRS#4 Outlet project is delivered Olsson will begin to overlay the utility information from the pre-design project and to reconcile information for the creation of the utility base file. The utility information from the pre-design includes as-built plans, utility mapping, and eleven utility potholes by TBE. This utility base will be utilized for the horizontal alignment layout which will determine if any additional utility potholing will be required.

Stub-outs / Future Van Buren Street Catch Basins:

Mike Duncan, FCDMC Project Manager, has spoken with the City of Goodyear and provided a memo outlining the methodology of providing 15-inch diameter stub-outs every 900ft (alternating sides) for future roadway catch basins. Mike has not heard back from the Town of Buckeye regarding any project partnering.

ACTION ITEM: Mike Duncan will provide Olsson with a copy of this memo.

RID Canal Crossing:

The RID Canal is the major constraint hydraulically on the FRS#4 Outlet alignment as it forces the pipe down. The team is looking at utilizing a box at the RID Canal crossing. At the RID coordination meeting in November of 2010, the RID engineering representative seemed to have some flexibility in the acceptable clearance between the RID Canal and the concrete box. A CD with photos and videos documenting the condition of the canal at the Van Buren Street crossing during the November 2010 dry up was provided by Olsson to Mike Duncan.

Meeting Minutes prepared by:

If these Meeting Minutes do not accurately affect your understanding of the meeting or if something is missing, please notify us.

WHITE TANKS FRS #4
OUTLET FACILITY DESIGN
KICK-OFF MEETING
SIGN IN SHEET
January 5th, 2011 - 9:30am - Pass Mountain Room

PRESENT	NAME	TITLE	ADDRESS	Phone / e-mail:
MD	Mike Duncan	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	(602) 506-4732 mwd@mail.maricopa.gov
	Gary Shapiro	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	(602) 506-3076 ghs@mail.maricopa.gov
	Gary Maiers	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	(602) 506-0562 gsm@mail.maricopa.gov
GW	Gent Wegner	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	602-506-7841 GANTWEGNER@MAIL.MARICOPA.GOV
DD	Dave Degerness	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	(602) 506-4730 did@mail.maricopa.gov
JCF	Jeff Ford	Project Manager Olsson Associates	7250 N. 16th Street, Suite 210 Phoenix, AZ 85020	(480) 333-4325; (602) 402-9909 (cell) jford@oaconsulting.com
SRW	Sean Wozny	Project Engineer Olsson Associates	7250 N. 16th Street, Suite 210 Phoenix, AZ 85020	(480) 333-4326 swozny@oaconsulting.com
JM	Jeff Minch	Principal Wood Patel	2051 West Northern, Ste. 100 Phoenix, AZ 85021	(602) 335-8577 jminch@woodpatel.com
JT	James Taillon	Project Engineer Wood Patel	2051 West Northern, Ste. 100 Phoenix, AZ 85021	(602) 335-8523 jtaillon@woodpatel.com
	STEVE NOWACZYK	NINYO & MOORE	3202 E. HARBOUR PHOENIX, AZ	602.243.1600 SNOWACZYK@NINYOANDMOORE.COM.

WHITE TANKS FRS #4
OUTLET FACILITY FINAL DESIGN
FCD 2010C029

Design Meeting #01 Minutes
January 18th, 2011
8:00 am

ATTENDEES

See attached list.

INTRODUCTION/ PROJECT UPDATE

Jeff Ford, Olsson Associates, identified that the February 3rd, 2011 design meeting will be to finalize the horizontal alignment of the FRS#4 Outlet Pipe. The team plans to have an internal session prior to the February 3rd design meeting to go through the alignment design opportunities and constraints.

Jeff Ford provided a big picture combination schedule of the three projects within the project area:

- FRS #4 Dam Rehabilitation and Riser Design – Phase 1 & 2 (upstream)
- FRS#4 Outlet Facility
- Loop 303 Drainage Channel (downstream)

The FRS #4 Outlet Facility will be the first to start and finish construction of the three projects within the area. Jeff coordinated with Jeff Minch, Wood Patel and Steve Nowaczyk, Ninyo & Moore regarding project date information for the adjacent projects.

Gant Wegner, FCDMC, asked about the differences between the Phase 1 & 2 of the FRS#4 Dam Rehabilitation Project. James Taillon, Wood Patel, said the Phase 1 portion includes the central filter of the FRS#4 facility and the Phase 2 work includes grading the FRS #4 facility riser outlet work.

Survey aerial mapping has been completed. Olsson walked the project limits on Monday January 17th, 2011to verify the utility survey information shown in the mapping to the field.

GIS Parcel information was requested by Jeff Ford on 01-14-2011. Eric Feldman, MCPW, provided the parcel information files on 01-18-2011.

Initial Alignment - Horizontal Layout

RID Canal Crossing:

The RID Canal is a major constraint on the FRS#4 Outlet alignment as it forces the pipe down. The team is looking at utilizing a box at the RID Canal crossing. At the RID coordination meeting in November of 2010, the RID engineering representative seemed to have some flexibility in the acceptable clearance between the RID Canal and the concrete box.

The design concept report 15% plans show a 2 ft separation from the top of box and RID canal at the crossing. The RID is open to less of a separation with the use of a concrete box for the crossing of the canal. We will look at a 1 ft separation between the box and canal lining.

The RID is also open to crossing the canal at an angle, but this requires a longer support for the fiber optic line if the crossing is not perpendicular to the canal.

FRS#4 Facility Rehabilitation Project Update:

Mike Duncan, FCDMC, said that Dave Degerness the project manager on the FRS#4 Facility project said they have a new lower discharge flow rate, but Mike has not heard the latest and greatest discharge flow rate.

Ken Rakestraw, FCDMC, joined the meeting to give an update on the upstream FRS #4 riser design. Still working on the design discharge flow and riser design. Different stage discharge results in different reservoir levels resulting in a larger riser. Wood Patel is currently utilizing the "Sites" software to verify the analysis for the riser design. They have found a 5 cfs difference between the spreadsheet and the "Sites" software. Ken found a difference of 12 cfs using the "Sites" software, but he did not include a gate at the riser resulting in the difference between the 5 cfs and 12 cfs numbers. Ken said the range for the discharge rate is between 280 cfs and 300 cfs, but change in the design is with the development of the staged outlet not the capacity.

The FRS#4 Facility Riser design is utilizing two 36" diameter risers, one gated and one un-gated (future condition). Mike wants to match the capacity of the two 36" diameter risers for the FRS#4 Outlet design.

FRS#4 Facility Outlet Horizontal Alignment:

Mike would like the FRS#4 Facility Outlet project to continue to use 300 cfs as the discharge rate. The Olsson team will also start to look at the hydraulics for the outlet system and can analyze different discharge flow rates through the outlet. Hydraulic analysis of the outlet will begin with the horizontal alignment iteration process.

The consultant design team will be having an internal constructability meeting on next week prior to the February 3rd design progress meeting at the District. The meeting will be looking at the horizontal alignment to understand the needs for traffic control and construction as the design moves forward. Jeff Ford will coordinate schedules with the team to set the date and time for this meeting. Mike Duncan is welcome to attend as well.

Loop 303 Downstream Drainage Channel Tie-in:

The 30% Wood Patel plans show the tie-in for the FRS#4 Outlet Facility at an elevation of 981.50 feet. The FRS#4 Outlet Facility 15% plans from the design concept report show an elevation of 979.02 which is almost 2.5 feet deeper than the Loop 303 tie-in. The channel's side slopes are 2:1 (3:1 outside of channel lining) minimum slope is 0.0015 ft/ft and has a 2 ft vertical drop down further downstream. James Taillon, Wood Patel, said they are close to right of way along Van Buren Street and going deeper will result in retaining wall. Mike did say that they do have some flexibility with the ramp placement which might help with the right of way if the channel needs to be lowered at the outlet tie-in.

Olsson will look for opportunities to raise the invert of the FRS#4 Outlet pipe at the Loop 303 connection point. Need to look at where we have opportunities for utility relocations between Citrus Road and Cotton Lane. Olsson will continue to coordinate with the Loop 303 project regarding the outlet tie-in elevation.

Mike is working on his Loop 303 30% plan review and will provide a comment to the Loop 303 project team to lower the channel to 1179.50.

The Loop 303 drainage channel 30% comment resolution meeting will be held next Wednesday January 26th, 2011.

The design discharge for the Loop 303 channel is 480 cfs and the boxes are sized with a minimum 6-inch air gap.

Jeff Ford spoke about chasing the channel further downstream with a smaller 18-inch diameter pipe from the outlet pipe. Mike would like to match the channel invert with the outlet tie-in.

Two options for the outfall pipe tie-in with the Loop 303 drainage channel:

- Pipe with a headwall next to the box
- Third barrel at the Van Buren Street dual box channel

Adding a third box to the dual box at the Van Buren Street channel crossing might be the cleanest outlet tie-in with the Loop 303 channel. The outlet pipe to the transition box will be a 45 degree segment.

Meeting Minutes prepared by: Sean Wozny

If these Meeting Minutes do not accurately affect your understanding of the meeting or if something is missing, please notify us.

WHITE TANKS FRS #4
OUTLET FACILITY DESIGN
PROGRESS MEETING NO. 1
SIGN IN SHEET
January 18th, 2011 - 8:00am

PRESENT	NAME	TITLE	ADDRESS	Phone / e-mail:
MD	Mike Duncan	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	(602) 506-4732 mwd@mail.maricopa.gov
✓	Gary Shapiro	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	(602) 506-3076 ghs@mail.maricopa.gov
GSM	Gary Maiers	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	(602) 506-0562 gsm@mail.maricopa.gov
GW	Gant Wegner	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	
	Dave Degerness	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	(602) 506-4730 did@mail.maricopa.gov
JCF	Jeff Ford	Project Manager Olsson Associates	7250 N. 16th Street, Suite 210 Phoenix, AZ 85020	(480) 333-4325; (602) 402-9909 (cell) jford@oaconsulting.com
SPW	Sean Wozny	Project Engineer Olsson Associates	7250 N. 16th Street, Suite 210 Phoenix, AZ 85020	(480) 333-4326 swozny@oaconsulting.com
	Jeff Minch	Principal Wood Patel	2051 West Northern, Ste. 100 Phoenix, AZ 85021	(602) 335-8577 jminch@woodpatel.com
JT	James Taillon	Project Engineer Wood Patel	2051 West Northern, Ste. 100 Phoenix, AZ 85021	(602) 335-8523 jtaillon@woodpatel.com

WHITE TANKS FRS #4
OUTLET FACILITY FINAL DESIGN
FCD 2010C029

Design Meeting #02 Minutes
February 3rd, 2011
1:00 pm

ATTENDEES

See attached list.

PROJECT UPDATE

Jeff Ford, Olsson Associates, began the meeting with discussion regarding the project datum. The preliminary design concept utilized NGVD29 for the vertical datum. The FRS#4 Final Design survey mapping is based on the NGS NAVD 88 vertical datum.

The design team had a constructability review meeting for the initial horizontal alignment. The layout is currently showing an 84-inch diameter pipe which might need to be upsized to a 90-inch diameter pipe downstream. The next step will be to look at the hydraulics of the outlet. Mike Duncan, FCDMC, commented that elliptical pipe could be an option referring to the Elm Lane past project.

The 40% plan submittal date is March 29, 2011 and the goal for this meeting is obtain approval of the horizontal alignment layout.

SOIL BORINGS

The soil borings are schedule for next week. Ninyo and Moore has been obtaining permits from Buckeye, McDot, and Goodyear. They have also completed the RID permit paperwork however they have not heard back from the RID representative Stantec. Jeff Rodgers said he would follow up with Stantec to check the status of the permit. The borings within the RID area are being shifted from the south to the north. Blue stake has also been notified of the boring work and will have the existing utilities marked up next week.

METHODOLOGY

The outlet work zone is 34 ft wide, which includes 1 - 10ft wide section for pipe storage, 1 - 10ft wide section for the trench and a 14 ft wide access area for vehicles. The layout also provides a 28 ft wide section for two way traffic. The team looked at a 2:1 side slope within the work zone area and 1:1 maintenance work zone from the top of pipe. Jeff Rodgers, Ninyo and Moore, viewed the 2:1 side slopes within the work zone as conservative and a 1.5:1 side slope might be allowable for this area.

The following updated sections consider side slopes of 2:1, 1.5:1, & 1:1 to illustrate the relationship of the depth of trench and side slope to the required TCE width. For example section 1 has the following TCE widths based on the depth of trench and side slopes:

Section 1 (see bottom of this page)
Depth of Trench approximately 10ft

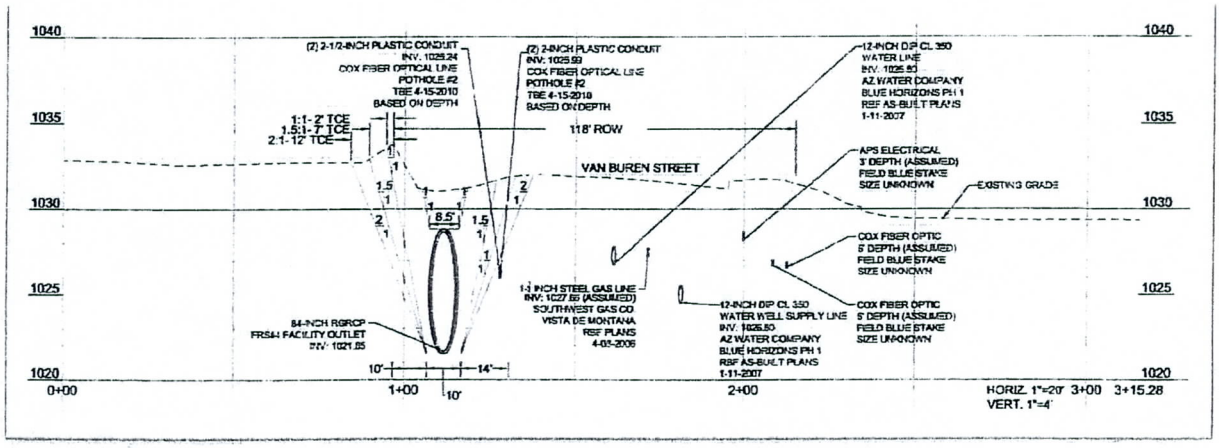
- Side Slope 2:1 = 12ft wide TCE swath
- Side Slope 1.5:1 = 7ft wide TCE swath
- Side Slope 1:1 = 2ft wide TCE swath

Section 2 (see page 3)
Depth of Trench approximately 15ft

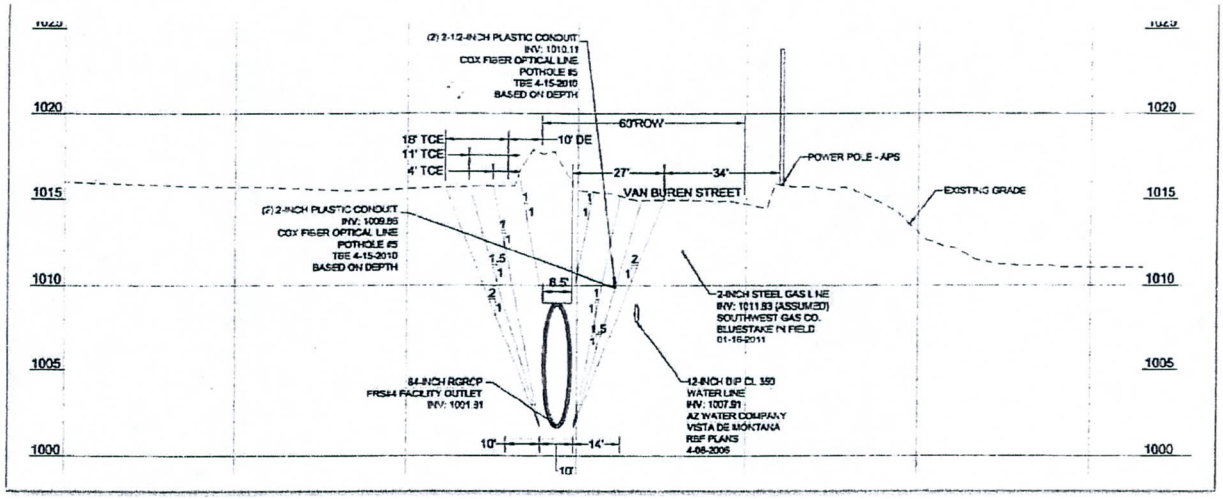
- Side Slope 2:1 = 18ft wide TCE swath
- Side Slope 1.5:1 = 11ft wide TCE swath
- Side Slope 1:1 = 4ft wide TCE swath

The following **updated** five sections provide 3 side slope considerations (2:1, 1.5:1, & 1:1) to illustrate the typical work zone throughout the proposed FRS#4 outfall alignment.

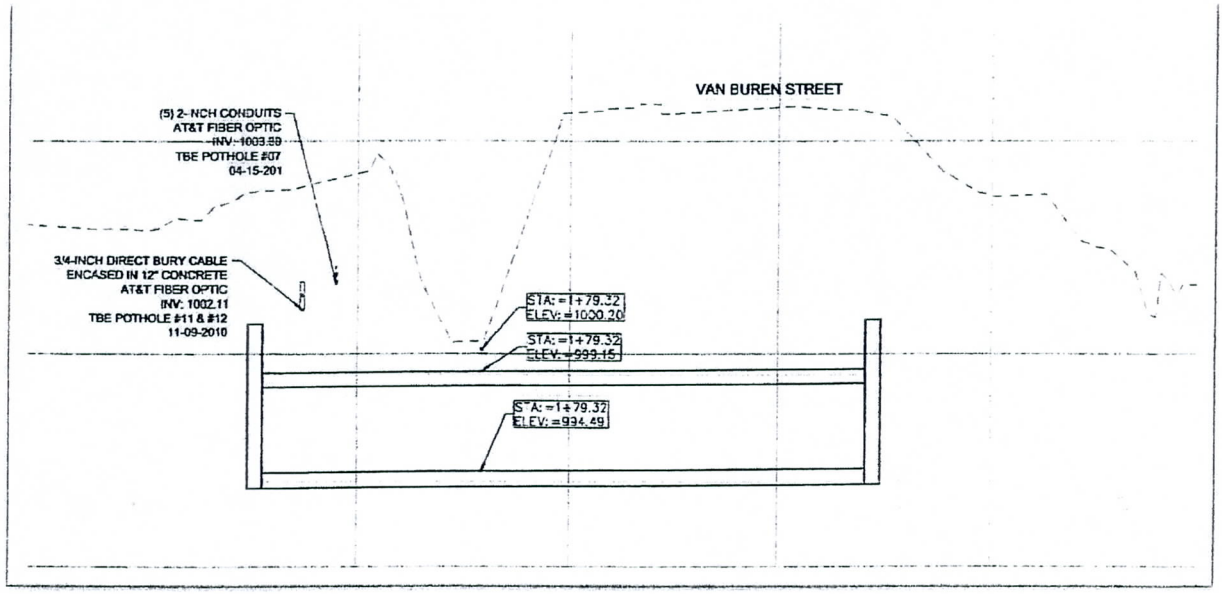
Section #01 Looking East on Van Buren Street just after the Jackrabbit intersection



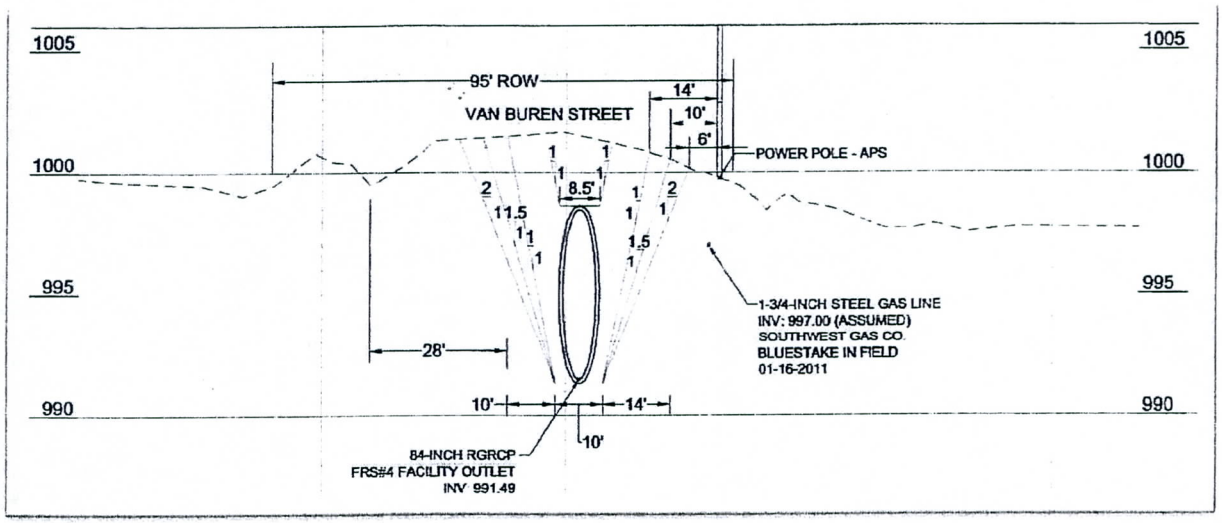
Section #02 Looking East on Van Buren Street West of Perryville Road



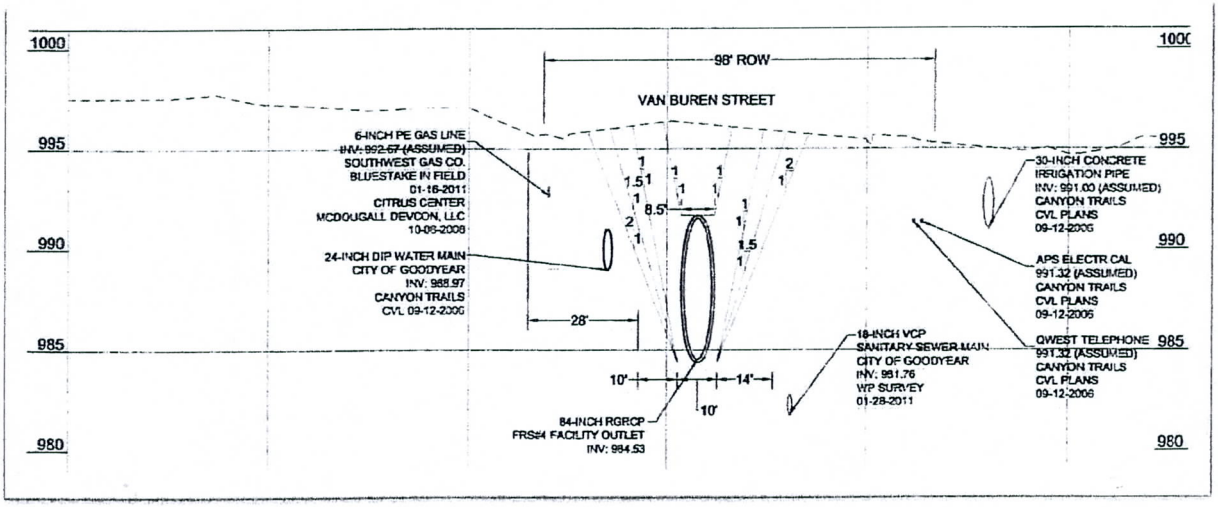
Section #03 Looking North East at the RID Canal Crossing at Van Buren Street



Section #04 Looking East on Van Buren Street West of Citrus Road



Section #05 Looking East on Van Buren Street West of 173rd Avenue



TEMPORARY CONSTRUCTION EASEMENTS

The side slope of the trench within the work area will determine if TCEs will be required and the team agreed that TCEs should be acquired for any potential slope failure. Jeff Ford asked what is the required time frame for the TCE process. Mike said he would look into it. Mike provided an email after the meeting with the following update regarding the TCS process time frame. If each TCE is a relatively small area, we can skip the full Appraisal via an on-call, and Appraisal Review via another on-call process. It should only be a few months to get "small" ones.

Mike asked if there would be any football routes for the contractor during construction. There would not be any football routes with the current work area / alignment layout.

RIGHT OF WAY

Vista De Montana to Perryville Road:
Right of Way take along the north side of Van Buren Street from Vista De Montana to Perryville Road. This would be approximately 12ft of ROW along the north side of Van Buren Street. This would be within the ultimate roadway ROW section. The north half of Van Buren Street is MCDOT jurisdiction and the south side of Van Buren Street is Buckeye jurisdiction.

Perryville Road to RID Canal (approximately 380ft west of the bridge):
Right of Way take along the north side of Van Buren Street from Perryville to approximately 380ft west of the MCDOT bridge. This would be approximately 12 ft of ROW along the north side of Van Buren Street. This would be within the ultimate roadway ROW section. The north side of Van Buren Street is City of Goodyear jurisdiction and the south side of Van Buren Street is MCDOT jurisdiction. There is a small MCDOT jurisdictional piece just east of the intersection with Perryville Road which is approximately 208ft in length.

State Trust Land exists at the downstream Loop 303 tie-in approximately 265ft west of 173rd Avenue. We have approximately 26ft of pavement for two way traffic prior to the 10ft wide staging area within the pipe work zone area.

TEMPORARY PAVEMENT

There are two areas that would require temporary pavement in order to provide a 28 ft wide two traffic travel lane during construction. Both areas are within the ultimate roadway right of way for Van Buren Street.

Area 1 is approximately 300 ft of temporary pavement along the north side of Van Buren Street just west of the Citrus Road intersection and approximately 700 ft of temporary pavement east of the Citrus Road intersection. Another option for this area may include a temporary closure of Van Buren Street from Perryville to Citrus Road. Gary Maiers, FCDMC, said a 12 ft swath for emergency vehicles and school buses might be an option as well. The jurisdiction of the roadway will ultimately determine the traffic routing in this area. Gary also added that the MCDOT jurisdiction will require pavement replacement to the centerline of roadway. Jeff Rodgers said the majority of Van Buren is MCDOT jurisdiction as he has been acquiring permits for the boring excavation.

Area 2 is approximately 1,300 ft in length along Van Buren Street just east of 173rd Avenue up to Cotton Lane. This is required to provide a 28 ft wide two traffic travel lane.

UTILITIES

Olsson provided a preliminary profile of the current horizontal alignment. Wood Patel completed their field survey review on 01-28-2011. The sanitary sewer invert and rim information is based off the 88 datum. The profile provides all utility crossing as well as the source for the utility information. Olsson will continue to look at opportunities for existing utility realignments such as the sanitary sewer line crossing prior to 173rd Avenue to determine if there are options to help increase the slope of the outlet pipe. There are two concrete irrigation pipe crossings at the Citrus intersection that are relatively deep. Olsson to put together a memo for Stantec regarding the option to siphon the irrigation line due to the outlet pipe. Olsson will start to put together a list of additional pothole and utility tracings as the alignment work moves forward.

LOOP 303 TIE-IN

Jeff Ford spoke about the Loop 303 downstream tie-in in terms of constructing a 3rd box for the outfall pipe to tie-in and if it made more sense to have the 3rd box be part of the Loop 303 drainage project. Jeff Minch, Wood Patel, said it would be easier for the Loop 303 construction to tie in with a pipe than a structure. Gary Shapiro, FCDMC, added that it might be easier to have the tie-in occur at the Loop 303 headwall.

Mike asked about head loss and plugging factor for an inclined trash rack. Mike provided the following information in an email after the meeting. There are two sections in the draft hydraulics manuel related to the head losses of trash racks at outlets, the end of sections 4.3.2 and 8.6.4

Mike also provided Olsson with Wood Patel's draft hydrographs and tables from the FRS#4 modeling. The PMF is 293 cfs, but Mike would like to utilize 300 cfs for the FRS#4 Outlet design.

ACTION ITEMS:

- Geotechnical boring fieldwork is scheduled for February 14th, 2011.
- Jeff Rodgers to check in with RID regarding permit status.
- Olsson will start to look at the hydraulics of the outlet pipe.
- Olsson will check the velocities within the pipe outlet.
- Olsson to provide a memo regarding a siphon for the RID pipe crossings at Citrus Road.
- Olsson to put together a utility pothole request and tracing request.
- Olsson to look at the option of relocating the sanitary sewer line near 173rd Avenue.
- Olsson to start on the newsletter and mailing list for the public meeting.
- Mike to check with Goodyear regarding the 15-inch diameter inlet stub-outs.

Meeting Minutes prepared by: Sean Wozny

If these Meeting Minutes do not accurately affect your understanding of the meeting or if something is missing, please notify us.

WHITE TANKS FRS #4
OUTLET FACILITY DESIGN
PROGRESS MEETING NO. 2
SIGN IN SHEET
February 3rd, 2011 - 1:00 pm

PRESENT	NAME	TITLE	ADDRESS	Phone / e-mail:
MD	Mike Duncan	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	(602) 506-4732 mwd@mail.maricopa.gov
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	Gary Maiers	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	(602) 506-0562 gsm@mail.maricopa.gov
	Gant Wegner	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	
	Dave Degerness	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	(602) 506-4730 did@mail.maricopa.gov
JF	Jeff Ford	Project Manager Olsson Associates	7250 N. 16th Street, Suite 210 Phoenix, AZ 85020	(480) 333-4325; (602) 402-9909 (cell) jford@oaconsulting.com
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JM	Jeff Minch	Principal Wood Patel	2051 West Northern, Ste. 100 Phoenix, AZ 85021	(602) 335-8577 jminch@woodpatel.com
	James Taillon	Project Engineer Wood Patel	2051 West Northern, Ste. 100 Phoenix, AZ 85021	(602) 335-8523 jtaillon@woodpatel.com
JR	Jeff Rodgers	Project Geologist Ninyo & Moore	3202 E. Harbour Drive Phoenix AZ 85034	(602) 243-1600 jrodgers@ninyoandmoore.com

WHITE TANKS FRS #4
OUTLET FACILITY FINAL DESIGN
FCD 2010C029

Design Meeting #03 Minutes
February 17th, 2011
1:00 pm

ATTENDEES

See attached list.

Hydraulics

Jeff Ford, Olsson Associates, presented four iterations of the hydraulic modeling for the FRS#4 Outlet Facility project. Olsson provide copies of the four hydraulic model print out to the attendees.

Summary of the parameters for the four iterations:

- Iteration #01: 8'x4' Box with 84-inch diameter pipe for the entire layout
- Iteration #02: 8'x4' Box with 84-inch and 90-inch diameter pipe
- Iteration #03: 8'x5' Box with 84-inch diameter pipe for the entire layout
- Iteration #04: 8'x5' Box with 84-inch and 90-inch diameter pipe

Head Loss Calculations

The head loss calculations in the four models utilize a k value of 0.05 for straight manholes while angular deflection losses are as per the Flood Control District Volume 2 Hydraulics manual.

Transition Structures

In looking back at the head loss calculations within the transition structures for the Camelback storm drain project (102-inch diameter pipe into a 10'x6' box) the orifice calculation resulted in a 2 ft head loss while the expansion calculation was 0.71 ft.

The transition structures before and after the crossing of the RID Canal use a 2 ft head loss at each structure.

The orifice equation is considered to be conservative as the calculation considers the change from pipe to box without a transition length. Applying the orifice equation to the FRS4 Outlet project resulted in the following losses:

Orifice Calculation			
Transition	Total Head Loss	Transition	Total Head Loss
84" Pipe & 8'x4' Box	3.61 ft	90" Pipe & 8'x4' Box	3.93 ft
84" Pipe & 8'x5' Box	1.69 ft	90" Pipe & 8'x5' Box	1.55 ft
84" Pipe & 10'x4' Box	3.81 ft	90" Pipe & 10'x4' Box	4.13 ft
84" Pipe & 10'x5' Box	1.82 ft	90" Pipe & 10'x5' Box	2.00 ft

Iteration #01 84" pipe & 8'x4' box

The first iteration is considered to be the baseline condition. The head losses are as previously defined. The model utilizes a tail water elevation of 987.00 ft at the Loop 303 outfall tie-in.

HGL

This iteration results in the HGL being over 1 ft up to 3 ft between junction J-10 to J-13 Station 55+00 to 85+00. There is a dip within Van Buren Street in this area just east of Perryville Road up to the elevated RID bridge. This does not meet the FCD criteria of maintaining the HGL elevation 1 ft below the finished grade line.

Velocity

The average velocity for this model starts out high 15.57 ft/s (above the FCD maximum 15 ft/s). The average velocity through the box is around 9.38 ft/s. The velocity at the outlet is 9.82 ft/s.

Iteration #02 84" with 90" pipe & 8'x4' box

The second iteration looked at the effects of upsizing the pipe to 90" downstream of the 8'x4' box.

HGL

This lowers the HGL approximately 3 ft, but has two junctions (J-11 to J-12 / Station 65+00 to 73+00) where the HGL is almost 1 ft above the ground line. This does not meet the FCD criteria of maintaining the HGL elevation 1 ft below the finished grade line.

Velocity

The average velocity for this model starts out high 15.57 ft/s (above the FCD maximum 15 ft/s). The average velocity through the box is around 9.38 ft/s. The velocity at the outlet is 9.97 ft/s.

Iteration #03 84" pipe & 8'x5' box

The third iteration looked at the effects of upsizing the box to an 8'x5' structure.

HGL

This iteration results in the HGL being over 1 ft up to 2 ft between junction J-11 to J-14 Station 66+00 to 89+00. This does not meet the FCD criteria of maintaining the HGL elevation 1 ft below the finished grade line.

Velocity

The average velocity for this model starts out high 15.57 ft/s (above the FCD maximum 15 ft/s). The average velocity through the 8'x5' box is reduced from 9.38 ft/s in the 8'x4' box to 7.50 ft/s. The velocity at the outlet is 9.97 ft/s.

Iteration #04 84" with 90" pipe & 8'x5' box

The fourth iteration looked at the effects of upsizing the pipe to 90" downstream of the 8'x5' box.

HGL

This lowers the HGL approximately 2 ft, but has three junctions (J-11 to J-13 / Station 65+00 to 79+00) where the HGL is almost less than 1 ft above the ground line. This does not meet the FCD criteria of maintaining the HGL elevation 1 ft below the finished grade line.

Velocity
The average velocity for this model starts out high 15.57 ft/s (above the FCD maximum 15 ft/s). The average velocity through the box is 7.50 ft/s. The velocity at the outlet is 9.97 ft/s.

Profile Constraints
There are three constraint areas along the FRS4 Outfall Alignment:

- Jackrabbit Trail Intersection
- RID Canal
- City of Goodyear Sanitary Sewer Lines

Jackrabbit Trail Intersection:
There are several existing utilities within the intersection of Jackrabbit Trail and Van Buren Street. Utilities include:

- Town of Buckeye 15-inch VCP Sanitary Sewer
- Southwest Gas - 12-inch High Pressure Gas Line
- Southwest Gas - 4-inch PE Natural Gas Line
- Qwest - Local Telephone Network
- Cox Communications - Fiber Optic
- AZ Water Company - 12-inch DIP Water Main

If the alignment utilizes a drop structure prior to Jackrabbit Trail and is dropped 2 ft below the existing Town of Buckeye 15-inch sanitary sewer this would avoid utility relocations with both SWG gas lines, Cox Fiber Optic, and AZ Water Company water main.

RID Canal:
The use of a 8'x5' concrete box results in a 10-inch clearance between the bottom of the 4-inch canal liner and the top of concrete box. A 66-inch equivalent elliptical pipe (53"x83" - 7-inch wall thickness) allows for 12-inches of separation between the bottom canal liner and the top of elliptical pipe. The 12-inches of separation includes a 6-inch replacement canal liner.

City of Goodyear Sanitary Sewer Lines:
The constraint on the vertical alignment is a series of City of Goodyear sanitary sewer crossings within Van Buren Street. An existing 12-inch sanitary sewer line approximately 900ft east of Citrus Road crosses Van Buren Street and forces the outlet pipe to run at a minimum 0.01% slope from the RID canal to 173rd Avenue. The existing 12-inch sanitary sewer line is a deep line which has a slope of 0.02% and conveys sewage flow to the south and then to the east along Van Buren Street. Unfortunately there is no opportunity to drop the sanitary sewer line. Jeff spoke about the possibility of penetrating the outlet with a sanitary sewer line encasement through the outlet pipe. This is a costly and would be a last resort type of action. The tie-in outlet with the Loop 303 outfall channel is 981.17.

Hydraulic Model Refinement:
Mike Duncan, FCDMC, liked the forth iteration the best, but would like to see it refined further. He would like drop the upstream pipe down and use 90-inch pipe through the upstream side of the RID canal to help lower the HGL within the dipped roadway area between Perryville and the RID Canal bridge.

Mike also suggested looking into elliptical pipe as there would be less loss in the transition. Mike provided a table from Rinker with equivalent elliptical pipe diameters for circular pipe.

Catch Basins:
Mike previously provided a storm drain inlet layout which he prepared for the City of Goodyear. This included twelve 15-inch stub outs for future catch basins alternating each side of the road every 900 ft to help spread out the drainage areas and not overload the outlet pipe. Jeff asked if 15-inch stub outs should be included with the 40% submittal. Mike said to wait to see if the system is a pressurized system.
Action Item: Sean to send Mike some elevation information for the Jackrabbit Trail and Perryville intersections along Van Buren Street.

Utilities Update:
An existing utility methodology report was provided to Gary Maiers, FCDMC, documenting the location of existing utilities.

Gary added that the RID Canal has private wells that could be active during the dry up period and the contractor will need to bypass flows with pumping and coffin dams.

Olsson will work on a utility pothole request exhibit based on the finalized horizontal alignment.

Mike added that a lesson learned from Camelback would be to increase potholing at intersections.

The 40% submittal date is March 29th, 2011. No specification for the 40% submittal just plans and cost estimate. Special structures will require an interim submittal prior to the 70% submittal.

RID Coordination:
Olsson sent Melody an exhibit regarding the two RID Lateral no. 8 crossings at Citrus Road last Thursday.
Action Item: Sean to follow up with Melody to set up a meeting to discuss options for the mitigation of the Lateral 8 crossings as well as the clearances for the canal crossing.

ACTION ITEMS:

- Sean to send Mike some elevation information for the Jackrabbit Trail and Perryville intersections along Van Buren Street.
- Sean to send Mike a copy of the 40% Sheet Index.
- Sean to follow up with Melody to set up a RID coordination meeting.
- Olsson to put together a utility pothole request and tracing request.
- Olsson to start on the newsletter and mailing list for the public meeting.
- Olsson to look into public meeting venues.
- Mike to check with Goodyear regarding the 15-inch diameter inlet stub-outs.

Meeting Minutes prepared by: Sean Wozny, PE

If these Meeting Minutes do not accurately affect your understanding of the meeting or if something is missing, please notify us.

WHITE TANKS FRS #4
OUTLET FACILITY DESIGN
PROGRESS MEETING NO. 3
SIGN IN SHEET
February 17th, 2011 - 1:00 pm

PRESENT	NAME	TITLE	ADDRESS	Phone / e-mail:
MD	Mike Duncan	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	(602) 506-4732 mwd@mail.maricopa.gov
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GSM	Gary Maiers	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	(602) 506-0582 gsm@mail.maricopa.gov
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DDD	Dave Degerness	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	(602) 506-4730 ddd@mail.maricopa.gov
JFF	Jeff Ford	Project Manager Olsson Associates	7250 N. 16th Street, Suite 210 Phoenix, AZ 85020	(480) 333-4325; (602) 402-9909 (cell) jford@oaconsulting.com
SWW	Sean Wozny	Project Engineer Olsson Associates	7250 N. 16th Street, Suite 210 Phoenix, AZ 85020	(480) 333-4326 swozny@oaconsulting.com
	Jeff Minch	Principal Wood Patel	2051 West Northern, Ste. 100 Phoenix, AZ 85021	(602) 335-8577 jminch@woodpatel.com
JT	James Taillon	Project Engineer Wood Patel	2051 West Northern, Ste. 100 Phoenix, AZ 85021	(602) 335-8523 jtaillon@woodpatel.com

WHITE TANKS FRS #4
OUTLET FACILITY FINAL DESIGN
FCD 2010C029

Roosevelt Irrigation District Coordination Meeting Minutes
November 2, 2010
1:00 pm

ATTENDEES
See attached list.

INTRODUCTION
The meeting began with self introduction of the project team members.

PROJECT OVERVIEW
Mike Duncan, PM FCDMC, began the meeting with a brief overview of FCD facilities within the overall area including FRS #3 and FRS #4. The project pertaining to this meeting is for the FRS #4 Outlet Facility Final Design. The project includes the design of the FRS #4 outlet which spans west to east along Van Buren Street from the FRS #4 Facility (Jackrabbit Trail) to the Future 303 Drainage Channel (Cotton Lane).

Jeff Ford, PM Olsson Associates, spoke about the initial FRS #4 Outlet Facility preliminary design that was completed back in May 2010 and the coordination meeting that took place with the RID and Stantec during the DCR. In looking at the alignment along Van Buren Street the 84-inch outlet pipe has good slope prior to the RID canal crossing, however east of the canal the crossing forces the outlet alignment down. A box is being considered at the RID canal crossing in order to help raise the flow line up.

There are two AT&T utility lines that travel along the northwest side of the RID canal alignment. The northern AT&T line is a ¾-inch fiber optic line with high security and the second AT&T line is a bundle of five 2-inch plastic conduits.

INITIAL SCHEDULE / SURVEY & UTILITY POTHOLING

The NTP for the FRS #4 Outlet Facility Design is expected to occur in mid to late November 2010. Mapping and survey is being handled by Wood Patel who is a sub-consultant to Olsson. This work is starting early under an on-call contract in order to coincide with the RID dry up period beginning on Friday Nov. 5th, 2010. Survey crews will not be able to begin work within the canal prism until Monday Nov. 7th, 2010 as the canal takes two days to drain by gravity. The last day the survey

forces will have access to the canal is on Friday Nov. 19th as the RID will begin to fill the canal at 6:00pm. Dry up of the RID canal only occurs once during the year.

TBE will also be utility potholing the two AT&T lines just north of the RID Canal and Van Buren Street. TBE originally potholed both of these AT&T lines south of Van Buren Street to identify the horizontal location and vertical depth of lines during the pre-design. According to the AT&T as-built plans by Black and Veatch the AT&T fiber optic line dips just north of the RID Canal and Van Buren Street. The location of the dipped AT&T fiber optic line will help determine the limits for the pipe outlet crossing of the RID Canal.

RID RIGHT-OF-WAY CROSSING PERMIT

Stephen Powers, Stantec, sent the RID ROW Crossing Permit #181300155-11 to Mike Duncan by way of an email on 10-29-2010. This permit is for obtaining both pothole and survey data within the RID ROW. Both TBE and Wood Patel survey field crews will need copies of the signed RID ROW Crossing Permit with them while working within the RID ROW to show RID field personnel when they are stopped in the field. The RID maintenance personnel will need to have access to all existing RID maintenance roads. Please make sure the crews do not block or place stakes within the RID maintenance roads.

PIPE MATERIALS WITHIN THE RID RIGHT OF WAY

The team is looking at a precast box with grout at the RID crossing to help create a wide flow section and raise the flow line as per previous discussion. The absolute minimum clearance required by the RID from the bottom of the canal is two feet.

The preliminary design included a two foot clearance between the canal and the box, but the depth of canal will need to be looked at once the survey of the canal is completed. The depth of canal shown in the preliminary plans was based on general depths from Stantec as the RID did not have as-built plans for the canal in this area.

Walt Cooper, Stantec, reiterated that this outlet is for flood conveyance and intermittent flow. Mike Duncan said it could take 2 weeks to empty the FRS #4 structure. Walt and the RID had concerns with leakage with a precast box due to a pressure flow condition. The position of the RID is as long as the material and method satisfies the FCD as it is in their best interest to insure the crossing does not fail.

Walt also said the RID does consider the construction of a cast in place box during the 12 day dry up window able to be done. The RID has had 100 lf of cast in place concrete box constructed during the 12 day dry up period in the past. The shotcrete liner requires 24 hours curing time prior to water.

Jeff said that the team is looking at a precast box with slurry the entire length.

The RID would require all joint structures / alignment changes to remain outside of the 100 ft. RID Right of Way.

CONSTRUCTION

RID shuts off water on Friday to allow for a 2 day dry up on Saturday and Sunday. The contractor can start work on Monday at 6:00am. The contractor typically installs small earthen cofferdams upstream and downstream of the work area. The contractor usually has a pump onsite to help with transient flows. The contractor can use the water as dust control or can pump into a private irrigation ditch, but not a RID lateral. On day 12 of the dry up the water

comes online Friday at 6:00pm for delivery on Monday to the RID customers. The flow through the RID canal is approximately 250 cfs in this area.

Work outside of the canal prism can be completed before or after the dry up period.

Canal liner replacement will require the replacement up to the nearest joint within the disturbance area. The condition of the canal lining will need to be evaluated as the contractor will need to tie into a good joint. Walt believes the canal in this area to be in moderate to good condition. Surveyors will need to pick up the joints in the canal as well as inverts of lateral lines into the canal within the crossing area. Jeff also suggested setting up a meeting with the FCD to be onsite during the dry up next week to take photos and document the condition of the canal liner in this area.

The RID would like a perpendicular crossing of the canal rather than a diagonal crossing with the outlet alignment. They would require a valid reason to allow a large diameter utility to cross the canal diagonally.

The bridge along Van Buren crossing the RID canal is a MCDOT bridge which was constructed in 1986. The surveyors will need to verify where the RID ROW is located as several areas along the canal do not have formal coordinate or meets and bounds descriptions. The ROW is 50 ft from the center of the canal along each side creating a 100 ft ROW swath.

The preliminary design shows the crossing near the RID south lateral and any disturbance will require the contractor to replace the south lateral per current RID design standards (gate, pipe, and trash rack etc). The RID does have some details and specification for the canal construction that will be supplied and included on the plan set when applicable.

RID REVIEW AND APPROVAL PROCESS

The RID can approve plans for up to one year; additional approval time will require a quick look to re-approve the plans. The RID issues a license to construct to the project owner or the contractor – the preference is up to the project owner. The license is good for one year and the RID does not like to issue until a contractor has been selected.

This project will utilize a 40%, 70%, 100% submittal duration. The RID would appreciate pdf courtesy reviews prior to submittal milestones to become familiar with the plans during review.

RID LATERAL CROSSINGS

Melody Zybert, Stantec, provided a large aerial map showing the RID areas of influence for laterals 7 thru 10.5 covering Jackrabbit Trail to Cotton Lane. Laterals 8, 7-3/4 & 7-2/3 extend to the south from the RID canal across Van Buren Street. Lateral 8 along Citrus Road is a 30-inch diameter RGRCP crossing, while laterals 7-3/4 & 7-2/3 east of Citrus Road are both 24-inch diameter RGRCP pipes.

The RID will require RGRCP, Class III replacement; however the DOT will require RGRCP Class V pipe replacement within DOT ROW. Lateral / tile crossing relocation will require the RID to produce and provide the construction documents for the lateral relocations. If a contractor is on-board the plans will be provided to be included in the overall FCD construction documents. The 40% plans should provide the RID a good idea for the relocation design allowing the RID to scope the level of involvement required. The schedule for this project is still being developed, but 40% plans can be expected in mid February 2011.

The Watermaster and RID construction observation personnel will not likely allow a bypass pump during the lateral relocation. Construction at the lateral 8 crossing within Citrus Road will only be allowed in the winter most likely a week prior to the dry up period.

Walt and Melody will look to see if they have any information regarding the laterals and possible tail water crossings within the project area. A possible tail water drain crossing might occur diagonally at Citrus Road.

Please see the following page for a copy of the meeting sign-in sheet.

Meeting Minutes prepared by:

If these Meeting Minutes do not accurately affect your understanding of the meeting or if something is missing, please notify us.

WHITE TANKS FRS #4
OUTLET FACILITY DESIGN
RID COORDINATION MEETING
SIGN IN SHEET
November 2, 2010, 1:00 pm

PRESENT	NAME	TITLE	ADDRESS	Phone / e-mail:
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	Stan Ashby	RID	Buckeye	sashby@roosevelt.org
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SW	Sean Wozny	Project Engineer Olsson Associates	7250 N. 16th Street, Suite 210 Phoenix, AZ 85020	(480) 333-4326 swozny@oaconsulting.com

WHITE TANKS FRS #4
OUTLET FACILITY FINAL DESIGN
FCD 2010C029

RID Coordination Meeting No. 2 Minutes
February 23rd, 2011
9:00 am

ATTENDEES
See attached list.

PURPOSE OF THE MEETING

- Discuss options for mitigating the Lateral no. 8 crossings at the intersection of Citrus Road and Van Buren Street.
- Discuss RID Canal crossing tolerances and parameters.

Olsson provided a three page exhibit to the meeting attendees.

- Figure 01: Lateral 8 crossings at Citrus Road & Van Buren Street
- Figure 02: RID Canal Crossing No. 1 - Structures within RID Canal ROW
- Figure 03: RID Canal Crossing No. 2 - Structures outside of the RID ROW

The FRS4 Design Team is currently evaluating two options regarding the RID Canal crossing.

- Option No. 1: 90" pipe to a 8'x5' concrete box with two vault structures before and after the RID Canal.
- Option No. 2: 90" pipe to a 66" pipe equivalent elliptical pipe (53"x83" with a 7" wall thickness). This option will have two transition precast pieces from 90" pipe to the elliptical pipe. No large vault structures.

RID CANAL CROSSING
The RID will not allow structures within the RID ROW which is 50 ft on each of the Canal centerline. The canal centerline is not defined legally, but approximated. Figure 03, RID Canal Crossing No. 2 would be preferred, but MCDOT may have an issue with a vault structure being located within MCDOT ROW. Melody Zybert, Stantec/RID, suggested that the southern vault be located on the south side of Van Buren Street. Melody to verify the RID ROW limits within this area.

Melody asked about the distance between the RID Canal and the top of box. The RID criteria requires a 2 ft separation between bottom of canal liner (4-inch thick liner) and top of structure when the canal is lined. A 4 ft separation is required for areas where the canal is unlined. Melody did say that 1 ft separation distance was discussed for this project at the kick off meeting back in January.

The distance between the bottom of the RID Canal liner (4-inch thick liner) and the top of 8'x5' structure is 10-inches.

Melody also asked about the pipe bell thickness for the elliptical pipe option. If the pipe bell thickness is 5-inches this would be a concern with the separation between the RID Canal liner and the top of pipe.

Gary Brady, Stantec/RID, spoke about the structural section for the RID Canal crossing. The last 10 inches between the canal and the top of box might need to be a separate structural pour with the canal replacement liner to settle independently from the drainage structure.

Mike Duncan, FCDMC, suggested the elliptical pipe with a 6-inch structural replacement canal liner 10-feet each side of the pipe. Melody also added that the canal liner replacement would need to occur at the nearest existing canal liner construction joint.

Jeff Ford, Olsson Associates, asked about using a performance specification to over excavate beyond the area to minimize settlement and leakage.

Gary does not believe slurry all the way up to be the best approach and suggests a geotextile structural section to allow for settlement and adjustment between the canal liner and the drainage element.

Melody asked if the construction of the RID Canal crossing would in November 2011. Mike said he would have to check to see is money is to be allocated.

LATERAL CROSSINGS

The 24-inch concrete pipe crossing west of Citrus Road through Van Buren Street is a tailwater pick up pipe. If a siphon (10ft depth) is used for the crossing relocation will require a maintenance agreement with the property owner, FCD & RID which will carry with the land. The siphon will need to be vacuumed once or twice a year.

Lateral 8 will be able to utilize a siphon system. There will not be a tie in with the delivery system, but will require reconstruction of headwalls. The FCD contractor will construct the improvements, but Stantec will to the design.

If the construction cannot make the 11-day dry up period in November the RID can handle the construction by utilizing a JOC type on-call list of contractors. The RID has four or five qualified contractors available to solicit bids from. This would require bid documents by August to make the November construction window during the dry up period.

As for the RID Crossing Stantec will review Olsson's construction documents and add notes to the plans. Safety items or improvements to meet the current RID requirements and standards will be included on Olsson's plans.

The RID will need an IGA with the Flood Control to start a scope of services for design and construction administration services.

The scope and fee / IGA will take 2 to 3 weeks to approve.

Olsson to provide microstation base files to Melody for scope and fee development.

There are two additional shallow lateral crossings within Van Buren Street that will require siphon relocations as well.

RID will need a TCE as the RID blanket easement does not cover within the roadway ROW.

Action Items

1. Melody to verify the RID ROW limits within this area.
2. Sean to provide design files and photos of canal condition to Melody.

Meeting Minutes prepared by: Sean Wozny, PE

If these Meeting Minutes do not accurately affect your understanding of the meeting or if something is missing, please notify us.

WHITE TANKS FRS #4
OUTLET FACILITY FINAL DESIGN
FCD 2010C029

Utility Coordination Meeting
August 23, 2011
1:30 pm

ATTENDEES
See attached list.

INTRODUCTIONS

PURPOSE OF THE MEETING
The purpose of the meeting is to meet with the utility companies with facilities within the FRS4 Facility Outlet project area to discuss relocation, design procedures and schedule.

The utility companies have been provided 40% and 70% plan sets for review. A list of the utility company contacts, anticipated utility relocations, and pothole information log has been provided to the meeting attendees.

These meeting minutes provide a breakdown of the utility discussion per utility company.

1. Southwest Gas

Contact:
Valerie Gallardo Weller, Engineering Technician/Engineering - Central Arizona Division
9 South 43rd Avenue, Phoenix, AZ 85009-4633
Ph: 602 484-5342, Cell: 602 763-5111
Fax: 602 484-5353

Valerie has previously sent a conflict letter with a spreadsheet listing the southwest gas facilities that are in conflict with the proposed facility outlet at both the 40% and 70% submittals.

FRS 4 70% Plan Sheets 42, 43, & 44 show an existing 1-1/4-inch steel gas line with less than 4' horizontal separation. SWG is considering the abandonment of this line, but is waiting for the results of a flow study and the recommendation from the planning report.

Please add note on plans for the protection of the 12-inch HP line within Jackrabbit Trail.
SWG Design / Relocation process and needs:
SWG will need electronic design files for the project with all design files in Autocad format. Design for natural gas lines is 8 to 12 weeks. High pressure requires an extra 4 weeks. SWG construction crews are busy with scheduled work and SWG has a backlog of work that has already been scheduled.

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SWG is also looking into any prior rights with their right of way department.
Valerie Gallardo Weller is the contact for the contractor.

Plan Sheet	Street	Station	Offset	Pothole / Elev. TOP	Gas Type/Size/YR	Comments:	SWG Action
18	Jack Rabbit Trail	20+38	38' Left	#018 - 1021.09	12" HP Stl 2006	Will be under 78" SD with 2 ft separation	Confirm Separation
		20+40	39' Left	#018A - 1024.79	4" PE 2006	Will be in 78" SD - Plans call for Relocate	RELOCATE
28	Perryville Road	73+02	36' Left	#020 -1009.68	2" HP Stl 1961	Will be over 84" SD - 2' separation	Confirm Separation
34	Just E/ of Canal	104+87 to 105+00	5' Right	#042 - 1004.85	3/4" stl svc 1964	Will be crossed by 90" SD	
35	E/ of Canal	105+00 to 105+08	5' Right	#042 - 1004.85	3/4" stl svc 1964	Will be crossed by 90" SD	
36	E/E/ of Canal	110+36	5' Right	Not Potholed	1" PE Service	Will be crossed by 90" SD - May be in conflict Install Records show Depth at 36-inches	Confirm Depth
39	Citrus	125+05	39' Right		Reg Station	421690	
	Citrus	125+58	11' Right		Valve #4203060	13' w/o Citrus 11' s/o Van Buren	
	Citrus	125+58	26' Right		Valve #4203062	13' w/o Citrus 13' s/o Van Buren	
	Citrus	125+59	13' Right		Valve #4296027	12' w/o Citrus 13' s/o Van Buren	
	Citrus	125+58	2' L - 13' R	#25 - 993.81	1 1/4" Stl 1961	Will be crossed by 90" SD - Will be in conflict	RELOCATE
		125+58 to 130+00	11' Right	Not Potholed	1 1/4" Stl 1961	Marked by OA for Relocate -x'd by 90" SD < 3' Sep	RELOCATE
40	w/o Citrus	130+00 to 135+00	15' Right	#9A & Not Shown	1 1/4" Stl 1961	Marked by OA for Relocate -x'd by 90" SD < 3' Sep	RELOCATE
41	w, w/o Citrus	135+00 to 140+00	16' Right	#27 Not Shown	1 1/4" Stl 1961	Marked by OA for Relocate -x'd by 90" SD < 4' Sep	RELOCATE
		137+58	16' Right		CPTP		
42	w, w, w/o Citrus	140+00 to 145+00	16'-17- R		1 1/4" Stl 1961	Marked by OA for Relocate - x'd by 90" SD <4' Sep	FLOW Study and Planning Report to determine if line can be abandoned
43	w,w,w,w/o Citrus	145+00 to 150+00	16'-17- R	#28 Not Shown	1 1/4" Stl 1961	Marked by OA for Relocate - x'd by 90" SD <4' Sep	FLOW Study and Planning Report to determine if line can be abandoned
44	APX 175th Ave	150+00 to 155+00	31' L	#31 Not Shown	1 1/4" Stl 1961	Marked by OA for Relocate - x'd by 90" SD <4' Sep, gas maps show main at 28' R	FLOW Study and Planning Report to determine if line can be abandoned
		152+54	28' R		CPTP		
		152+54	16'-17' R or 28' Rt	#31 Not Shown	ABD 2" PE	Gas Main Abandoned in 2002	
46	APX 173rd Ave	160+38	27' R				
		163+65	2' L - 13' R	#34 - 991.99	4" PE in 6' Dia Sleeve 2006	Will be in 90" SD - Plans call for relocate	RELOCATE

Figure 1: Southwest Gas Utility Coordination Sheet for FRS4

2. Cox Communications

Contact:
Daniel Dischinger, Project Coordinator - Network Development
1550 W. Deer Valley Road
Phoenix, AZ 85027-2121
Ph: 623 328-4178, Cell: 602 694-1785
Fax: 623 322-7500

Cox does not have any Coaxial conflicts in the project area. Fiber will be the only relocation division involved with this project. Randy Sims is currently verifying all conflicts in the field and should have this completed in the next couple of weeks. Cox will send conflicts to Olsson once completed.

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Design and Permitting will take 1 month each resulting in 2 months for the Design process.

No Prior Rights as the existing COX facilities are in place by permit.

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Contact:
Zane Hoit, PM in place of Melody Zyburt
Stantec
8211 S. 48th Street
Phoenix, AZ
Ph: 602 438-2208

The RID consultant (Stantec) is providing Relocation plans for the three lateral crossings within Van Buren Street. Preliminary Plans are expected to be distributed by next week. Zane has provided a schedule for both the Loop 303 and the FRS4 Outlet Facility RID relocation plans. See below.

White Tanks FRS#4

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- Final Design 9-16-2011 to 10-07-2011

4. Arizona Power Service, APS

Contact:
John Rael
APS Sr. Governmental Liaison
Underground Construction
Mail Station 3876
PO Box 53933
Phoenix, AZ 85072-3933
Ph: 602 371-6945
Cell: 602 361-7817

John requested a copy of the utility potholes. A copy of the utility pothole summary was provided to all the utility companies with the 70% submittal. A hardcopy of the utility pothole summary was also provided at this meeting to all attendees. The 70% plans have the pothole locations shown on the plans with a hexagonal symbol and corresponding pothole number as listed on the pothole summary. The pothole number and elevation is also shown in the plan profile within the 70% plan set which was distributed to the utility companies on June 26th, 2011 for their review.

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5. City of Goodyear

Contact:
Darren Farar, City of Goodyear Engineering
195 N. 145th Avenue D
Goodyear, AZ 85338
Ph: 623 932-3010

Traffic Conduits within Van Buren Street at N. 173rd Avenue

Darren spoke with the City of Goodyear traffic engineering and they confirmed that the traffic signal conduits being crossed would need to be re-bored to pass beneath the outfall line. Generally pavement cuts for conduits are not allowed except for special circumstances. This should also be the most cost effective considering the depth of the trench that would be required for each conduit.

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Darren has requested the FRS4 project install a sleeve for a future 8" water line just east of Citrus within Van Buren Street. A preliminary plat is in review at the City of Goodyear for a residential subdivision at the south east corner of Citrus and Van Buren Street. Darren will

provide Olsson with a copy of the preliminary plat identifying the sleeve location area. The location corresponds with FRS 4 Plan station 139+15.

Utility Companies that were invited that did not make the meeting:

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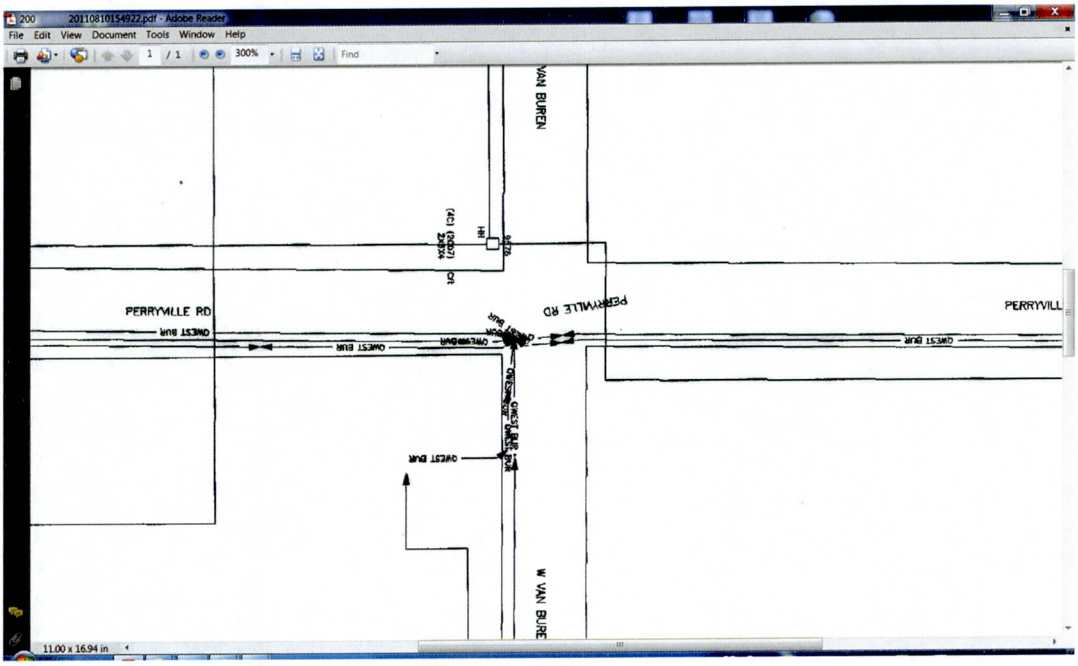
AT&T Inquiries
22311 Brookhurst Street, Ste 203
Huntington Beach, CA
Rosemary Hamill
Ph: 925 977-2413
Walter Werstiuk
Ph: 714 963-7964

AT&T has provided a No Conflict Letter for the two fiber lines north of the RID Canal.

Qwest Local Networks / Century Link
Matt Phillips
5025 N. Black Canyon Highway
Phoenix, AZ 85015, Ph: 602 630-0492

Matt is providing information regarding two the Citrus/Van Buren intersection and the Perryville/Van Buren intersection.

Perryville:



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ARIZONA WATER COMPANY
3805 N. Black Canyon Highway
Phoenix, AZ 85015
Joe Whelan, Engineering
Ph:602 240 6860
jwhelan@azwater.com
Henry Adan, Field Inspector
Ph: 623 853 9302

Spoke with Joe Whelan on the phone and he was going to try to make the Utility Coordination meeting, but could not fully commit to the meeting. AZ Water Company provided a no conflict notice with the 40% plan review (40% design was deeper at Jackrabbit Trail avoiding the utility crossings). The 70% plans went with a shallower outlet and will now require the AZ Water Company 12-inch DIP water line to be relocated. Joe has received the plans and did not have a problem with the relocation plan for the 12-inch DIP water line within Jackrabbit Trail. The plans are currently with their construction division. Joe said AZ Water Company is exploring two options regarding the relocation: either to procure a contractor for this work or utilize the contractor selected by the FCDMC for the FRS4 project. Joe will send along the updated conflict letter.

Level 3
1025 Eldorado Blvd. 33A-516
Broomfield, CO 80021
Contact: Adam Edwards
Ph: 720 888-4518
email: edwards.adam@level3.com

No Conflict. Facilities are located within Cotton Lane east of the outfall project area. LEVEL 3 has provided an email with no conflict.

MCI Verizon Business
OSP National Support / Investigations
2400 North Glenville
Richardson, TX 75082
Beth Seubert
Ph: 972 729 6016

Verison Business
Field Representative
Brad Landis

Ph: 425 201 0901
email: brad.landis@verizon.com

Spoke with Brad Landus on the phone and he has received the 70% plan submittal which shows the required clearance for both vertical and horizontal.

Town of Buckeye
WC Scoutten
Scott Zipprich
Ph: 623 547 4661 ext 224
email: scott@scoutten.com

Future three barrel 6'x3' Box Culvert west of Perryville Road

WC Scoutten has provided preliminary plat documents for Parkman Ranch which show a three barrel 6x3 box culvert crossing Van Buren Street just west of Perryville. This future culvert does cross into the proposed facility outlet. We are currently looking at re-aligning the facility outlet to accommodate the box culvert.

Future Extension of the 8-inch Sanitary Sewer in Perryville Road

WC Scoutten has indicated the existing 8-inch sanitary sewer is to be extended to the north in the future. A preliminary solution requiring re-alignment of the sanitary sewer to the west and north was not approved by WC Scoutten. WC Scoutten is requesting the sewer line be reconstructed to provide the required cover. WC Scoutten to provide as-built plans of the sanitary sewer within Perryville.

Meeting Minutes prepared by: Sean Wozny, PE

If these Meeting Minutes do not accurately affect your understanding of the meeting or if something is missing, please notify us.

WHITE TANKS FRS4 OUTLET FACILITY
VAN BUREN STREET
JACKRABBIT TRAIL TO COTTON LANE
UTILITY CONTACT DISTRIBUTION LIST
8/23/2011

	UTILITY COMPANY	CONTACT NAME	PHONE	ADDRESS FOR REVIEW	PLANS SENT	40% COMMENTS RECEIVED	70% COMMENTS RECEIVED	CONFLICT	Sign In 8-23-2011
1	AT&T	Rosemary Hamill Walter Werstiuk	(925) 977-2413 (714) 963-7964	AT&T Inquiries 22311 Brookhurst Street, Ste #203 Huntington Beach, CA 92646	USPS 3/31/11 USPS 6/26/11	04/01/11	7/8/2011	NO	
2	Qwest Local Networks	Matt Philips	(602) 630-0492	Qwest 5025 n. Black Canyon Highway Phoenix, AZ 85015	USPS 3/31/11 USPS 6/26/11	01/22/10			
3	APS	John Rael	(602) 371 6945	APS Mail Station 3876 P.O. Box 53933 Phoenix, AZ 85072-3933	USPS 3/31/11 USPS 6/26/11	05/02/11		YES	
4	Arizona Water Company	Joe Whelan - Engineering Henry Adan - Field Inspection	(623) 240 6860 (623) 853-9302	3805 N. Black Canyon Hwy Phoenix, AZ 85015	Courier 3/31/11 Courier 6/26/11	04/28/11		YES	
5	City of Goodyear Traffic Signals Reclaimed Water Water Sanitary Sewer Effluent Fiber	Darren Farar, City of Goodyear Engineering Robert Silver, City of Goodyear Engineering	(623) 932-3010	195 N. 145th Avenue #D Goodyear, AZ 85338	Courier 4/11 Courier 6/26/11	05/12/11		YES	
6	Cox Communications	Randy Sims Dan Dischinger	(602) 694-1783 694-1785	1550 W. Deer Valley Rd. Phoenix, AZ 85027	USPS 3/31/11 USPS 6/26/11	05/11/11	7/29/2011	YES	
7	Level 3	Adam Edwards	(720) 888-4518		USPS 4/11/11 USPS 6/26/11	05/09/11		NO	
8	MCI (Verizon Business)	Beth Seubert OSP National Support / Invest. Brad Landius	(972) 729-6016 (425) 201 0901	2400 North Glenvile Richardson, TX 75082	USPS 3/31/11 USPS 6/26/11	01/12/10		NO	
9	Roosevelt Irrigation District	Melody Zyburt, Stantec Zane Ho	(602) 438-2200	Stantec 8211 S. 48th St. Phoenix, AZ	USPS 3/31/11 USPS 6/26/11	04/05/11		YES	
10	Southwest Gas	Valerie Gallardo-Weller	(602) 484-5342	9 S. 43rd Avenue Phoenix, AZ 85009	Courier 3/31/11 Courier 6/26/11	04/19/11	7/26/2011	YES	
11	Southwest Gas High Pressure Gas	Andy Lugo	(602) 271-4277			04/19/11	7/26/2011	NO	
12	Cotton Lane RV MH Resort	Chip Jordan	(602) 309-3023	Roles Inn of America PO Box 74767 Phoenix, AZ 85087	USPS 3/31/11 USPS 6/26/11		7/11/2011	NO	
13	Town of Buckeye	Tom Leticia Scott Z. Woody Scoutten	(623) 547-4661	WC Scoutten 1626 N. Litchfield Rd. ste 310 Goodyear, AZ 85395	USPS 3/31/11 FCD 6-26-2011		7/21/2011	YES	
14	MCDOT	Sakda Kesgomol	(602) 506-8624		FCD 7-22-2011		8/11/2011		

F:\Projects\010-2309_WTRS\Utilities\Utility Conflict\70% 06-26-2011\FRS4 Utility Contact List 70%.xlsx

OLSSON ASSOCIATES

WHITE TANKS FRS #4
OUTLET FACILITY DESIGN
UTILITY COORDINATION MEETING
SIGN IN SHEET
AUGUST 23, 2011 - 1:30 PM
FCDMC - NEW RIVER ROOM

PRESENT	NAME	TITLE	ADDRESS	Phone / e-mail:
	Mike Duncan	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	(602) 506-4732 mwd@mail.maricopa.gov
	Gary Shapiro	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	(602) 506-3076 ghs@mail.maricopa.gov
	Gary Maiers	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	(602) 506-0562 gsm@mail.maricopa.gov
	Gant Wegner	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	(602) 506-7841 gantwegner@mail.maricopa.gov
	Dave Degerness	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	(602) 506-4730 dld@mail.maricopa.gov
	Ken Rakestraw	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	kennethrakestraw@mail.maricopa.gov
	Erik Arntz	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	
	Darren Farar	City of Goodyear		(623) 882-7990 Darren.Farar@goodyearaz.gov
JF ✓	Jeff Ford	Project Manager Olsson Associates	7250 N. 16th Street, Suite 210 Phoenix, AZ 85020	(480) 333-4325; (602) 402-9909 (cell) jford@oaconsulting.com
SAW ✓	Sean Wozny	Project Engineer Olsson Associates	7250 N. 16th Street, Suite 210 Phoenix, AZ 85020	(480) 333-4326 swozny@oaconsulting.com
	Jeff Minch	Principal Wood Patel	2051 West Northern, Ste. 100 Phoenix, AZ 85021	(602) 335-8577 jminch@woodpatel.com
	James Taillon	Project Engineer Wood Patel	2051 West Northern, Ste. 100 Phoenix, AZ 85021	(602) 335-8523 jtaillon@woodpatel.com

WHITE TANKS FRS #4
OUTLET FACILITY FINAL DESIGN
FCD 2010C029

Utility Coordination Meeting No. 2
October 25th, 2011
9:30 AM

ATTENDEES
See attached list.

INTRODUCTIONS

PURPOSE OF THE MEETING
The purpose of the meeting is to meet with the utility companies with facilities within the FRS4 Facility Outlet project area to discuss relocation, design procedures and schedule. This is a second follow up meeting to further define schedules and requirements for utility relocation design and construction.

The utility companies have been provided 40% and 70% plan sets for review. A list of the utility company contacts, anticipated utility relocations, and pothole information log has been provided to the meeting attendees.

These meeting minutes provide a breakdown of the utility discussion per utility company.

1. Southwest Gas

Contact:
Valerie Gallardo Weller, Engineering Technician/Engineering - Central Arizona Division
9 South 43rd Avenue, Phoenix, AZ 85009-4633
Ph: 602 484-5342, Cell: 602 763-5111
Fax: 602 484-5353

Valerie has previously sent a conflict letter with a spreadsheet listing the southwest gas facilities that are in conflict with the proposed facility outlet at both the 40% and 70% submittals.

FRS 4 70% Plan Sheets 42, 43, & 44 show an existing 1-1/4-inch steel gas line with less than 4' horizontal separation. The results from the flow study and planning report do in fact recommend the abandonment of the 1-1/4-inch steel high pressure gas line originally installed in 1961.

Southwest Gas has the following new policy in regards to abandonment and removal of an existing gas line:

Southwest Gas treats all of its steel gas pipe with unidentified coating/wrapping materials as potentially containing asbestos. Accordingly, whenever such pipe is necessary to be removed, it must be done so by one of Southwest Gas's NESHAP certified contractors. Also, care should be taken when exposing any such coated or wrapped pipe, and no portion of that pipe should be treated as abandoned by the FCDMC or its contractor until after the coating or wrap is removed.

Should the Flood Control District of Maricopa County or its contractor expose any abandoned Southwest Gas steel pipe that is in ***direct conflict*** *during construction, please contact Southwest Gas Construction Supervisor, Keith Johns (602-484-5438) to schedule its removal during the crew's work hours of 7:00 AM to 3:30 PM, Monday through Friday.*

Please add note on plans for the protection of the 12-inch HP line within Jackrabbit Trail.

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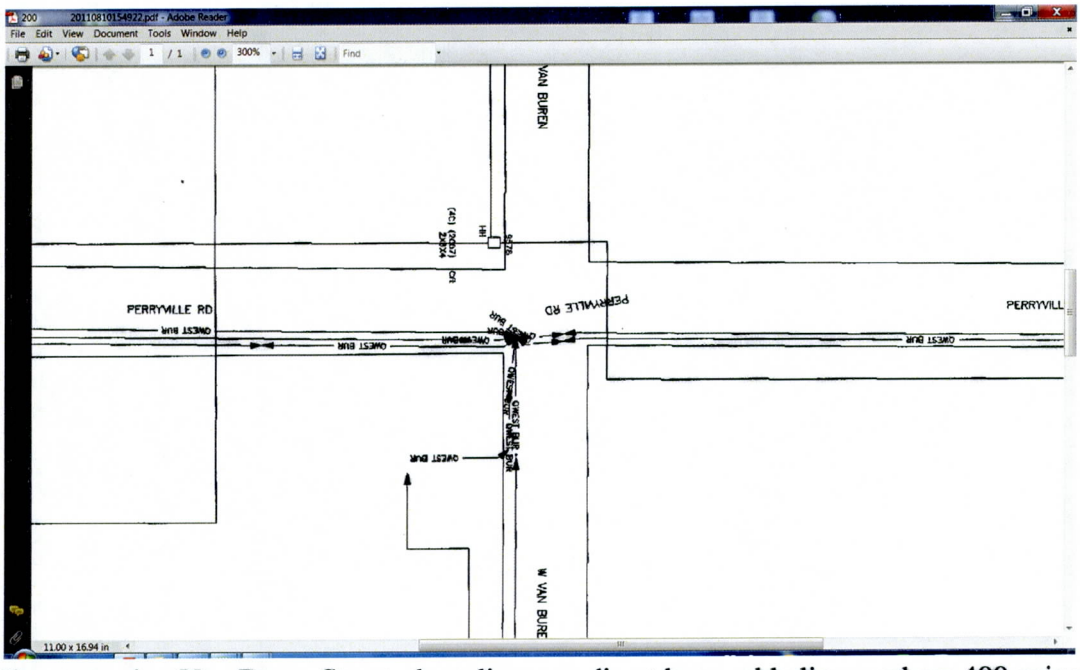

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email: edwards.adam@level3.com

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OSP National Support / Investigations
2400 North Glenville
Richardson, TX 75082
Beth Seubert
Ph: 972 729 6016

Verison Business
Field Representative
Brad Landis
Ph: 425 201 0901

email: brad.landis@verizon.com

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WC Scoutten
Scott Zipprich
Ph: 623 547 4661 ext 224
email: scott@scoutten.com

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Meeting Minutes prepared by: Sean Wozny, PE

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VAN BUREN STREET
JACKRABBIT TRAIL TO COTTON LANE
UTILITY CONTACT DISTRIBUTION LIST
10/25/2011

	UTILITY COMPANY	CONTACT NAME	PHONE	ADDRESS FOR REVIEW	PLANS SENT	40% COMMENTS RECEIVED	70% COMMENTS RECEIVED	CONFLICT	Sign In 10-25-2011
1	AT&T	Rosemary Hamill Walter Werstiuk	(925) 977-2413 (714) 963-7964	AT&T Inquiries 22311 Brookhurst Street, Ste #203 Huntington Beach, CA 92646	USPS 3/31/11 USPS 6/26/11	04/01/11	7/8/2011	NO	
2	Qwest Local Networks	Matt Philips	(602) 630-0492	Qwest 5025 n. Black Canyon Highway Phoenix, AZ 85015	USPS 3/31/11 USPS 6/26/11	01/22/10			
3	APS	John Rael	(602) 371 6945	APS Mail Station 3876 P.O. Box 53933 Phoenix, AZ 85072-3933	USPS 3/31/11 USPS 6/26/11	05/02/11		YES	
4	Arizona Water Company	Joe Whelan - Engineering Henry Adan - Field Inspection	(623) 240 6860 (623) 853-9302	3805 N. Black Canyon Hwy Phoenix, AZ 85015	Courier 3/31/11 Courier 6/26/11	04/28/11		YES	
5	City of Goodyear Traffic Signals Reclaimed Water Water Sanitary Sewer Effluent Fiber	Darren Farar, City of Goodyear Engineering Robert Silver, City of Goodyear Engineering	(623) 932-3010	195 N. 145th Avenue #D Goodyear, AZ 85338	Courier 4/11 Courier 6/26/11	05/12/11		YES	
6	Cox Communications	Randy Sims	(602) 694-1783	1550 W. Deer Valley Rd. Phoenix, AZ 85027	USPS 3/31/11 USPS 6/26/11	05/11/11	7/29/2011	YES	
7	Level 3	Adam Edwards	(720) 888-4518		USPS 4/11/11 USPS 6/26/11	05/09/11		NO	
8	MCI (Verizon Business)	Beth Seubert OSP National Support / Invest. Brad Landius	(972) 729-6016 (425) 201 0901	2400 North Glenvile Richardson, TX 75082	USPS 3/31/11 USPS 6/26/11	01/12/10		NO	
9	Roosevelt Irrigation District	Zane Holt	(602) 438-2200	Stantec 8211 S. 48th St. Phoenix, AZ	USPS 3/31/11 USPS 6/26/11	04/05/11		YES	
10	Southwest Gas	Valerie Gallardo-Weller	(602) 484-5342	9 S. 43rd Avenue Phoenix, AZ 85009	Courier 3/31/11 Courier 6/26/11	04/19/11	7/26/2011	YES	
11	Southwest Gas High Pressure Gas	Andy Lugo	(602) 271-4277			04/19/11	7/26/2011	NO	
12	Cotton Lane RV MH Resort	Chip Jordan	(602) 309-3023	Roles Inn of America PO Box 74767 Phoenix, AZ 85087	USPS 3/31/11 USPS 6/26/11		7/11/2011	NO	
13	Town of Buckeye	Tom Leticia Scott Z. Woody Scoutten	(623) 547-4661	WC Scoutten 1626 N. Litchfield Rd. ste 310 Goodyear, AZ 85395	USPS 3/31/11 FCD 6-26-2011		7/21/2011	YES	
14	MCDOT	Sakda Kesgomol	(602) 506-8624		FCD 7-22-2011		8/11/2011	NO	

WHITE TANKS FRS #4
OUTLET FACILITY DESIGN
UTILITY COORDINATION MEETING NO. 2
SIGN IN SHEET
OCTOBER 25, 2011 - 9:30 AM
FCDMC - NEW RIVER CONF ROOM

PRESENT	NAME	TITLE	ADDRESS	Phone / e-mail:
MD	Mike Duncan	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	(602) 506-4732 mwd@mail.maricopa.gov
	Gary Shapiro	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	(602) 506-3076 ghs@mail.maricopa.gov
GM	Gary Maiers	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	(602) 506-0562 gsm@mail.maricopa.gov
	Gant Wegner	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	(602) 506-7841 gantwegner@mail.maricopa.gov
	Dave Degerness	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	(602) 506-4730 did@mail.maricopa.gov
	Ken Rakestraw	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	kennethrakestraw@mail.maricopa.gov
	Erik Arntz	FCDMC	2801 W. Durango St. Phoenix, AZ 85009	
DF	Darren Farar	City of Goodyear		(623) 882-7990 Darren.Farar@goodyearaz.gov
	Scott Zipprich	Town of Buckeye		623 547 4661 scottz@scottzm.com
JF	Jeff Ford	Project Manager Olsson Associates	7250 N. 16th Street, Suite 210 Phoenix, AZ 85020	(480) 333-4325; (602) 402-9909 (cell) jford@oaconsulting.com
SW	Sean Wozny	Project Engineer Olsson Associates	7250 N. 16th Street, Suite 210 Phoenix, AZ 85020	(480) 333-4326 swozny@oaconsulting.com
	Jeff Minch	Principal Wood Patel	2051 West Northern, Ste. 100 Phoenix, AZ 85021	(602) 335-8577 jminch@woodpatel.com
JT	James Taillon	Project Engineer Wood Patel	2051 West Northern, Ste. 100 Phoenix, AZ 85021	(602) 335-8523 jtaillon@woodpatel.com