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MARE ISLAND
SSIC NO. 5090.3.A

June 15, 2005

Mr. Chip Gribble
Department of Toxic Substances Control
Northern California Region
Site Mitigation Branch
700 Heinz Avenue, Suite 200
Berkeley, CA 94710-2721

Subject: California Geological Services Unit Memorandum of April 25, 2005, on Mare Island Investigation Area H1 proposed monitoring well locations

Dear Mr. Gribble,

A memorandum dated April 25, 2005, from Buck King, Northern California Geological Services Unit (GSU) Hazardous Waste Management Program to Chip Gribble of the Department of Toxic Substances Control (DTSC) addressed the placement of interim point of compliance (IPOC) wells and monitoring wells around the Resource Conservation and Recovery Act (RCRA) regulated unit located at Investigation Area (IA) H1 on Mare Island, Vallejo California. This regulated unit is subject to groundwater monitoring under the provisions of California Code of Regulations (CCR) Title 22, Division 4.5 Chapter 15 Article 6. In the shallow water-bearing zone (SWBZ) the RCRA unit and the adjoining disposal areas have been encircled by a containment barrier (slurry wall) and a groundwater extraction system to prevent migration of contaminated groundwater. The final remedy for the 70-acre Containment Area will most likely be an appropriate impermeable cap.

The GSU's memorandum is a change from what has been previously discussed, including a requirement that the IPOC boundary be defined by the outline of the slurry wall, essentially regardless of hydraulic flow direction. The memorandum also recommends the placement of IPOC wells outside the slurry wall to avoid the potential for creating leaks in the cap and proposes the locations of these wells. These GSU's recommendations were based on the hydrology data gathered by the end of 2004.

The construction of the slurry wall and the extraction trench operation has changed the hydrological profile of the SWBZ, and new data have been collected that should be taken into account during decision-making related to the placement of the IPOC wells at the site. The current conditions within the SWBZ may be summarized as follows:

1. The extraction trench and the pump system currently control the groundwater levels and flow directions inside the slurry wall. Figure 1 shows a SWBZ potentiometric surface map and groundwater flow directions as determined in the second quarter of 2005. Notably, the highest point of the groundwater mound in the RCRA Landfill has moved from the southwestern corner of the Landfill (well 01W4A) to the northeastern quadrant of the Landfill (well 01W18A). Figure 1 shows that the radial flow from the Landfill





groundwater mound is completely contained within the slurry wall and controlled by the extraction trench.

2. Groundwater levels in the trench sumps are lower than the levels measured in the monitoring wells outside the slurry wall. Continued operation of the extraction trench will reduce the groundwater mound and will maintain the head differential from outside the wall to inside. In the future, the impermeable cap over the Containment Area will further assist in maintaining lower water levels within the Containment Area. Continued operation of the extraction trench will also prevent migration of contaminants beyond the slurry wall. In addition, the head differential will preclude the outward flow of groundwater from the contained area in the unlikely case of damage to a portion of the slurry wall.

According to CCR Title 22, Article 6 §6624.95(a), "*The point of compliance is a vertical surface, located at the hydraulically downgradient limit of the waste management area that extends through the uppermost aquifer underlying the regulated unit.*" The uppermost aquifer for the regulated unit has been defined as the three water-bearing zones underlying IA H1. The GSU's memorandum recommends IPOC wells at locations upgradient of the regulated unit for the IWBZ and DWBZ, which is contradictory to the regulatory reference cited above. The exact positions of the IPOC wells recommended in the memorandum require further discussion based on the new hydrologic profile of the SWBZ summarized above.

The following discussion addresses the positioning of IPOC and nature and extent wells based in the latest hydrological data; Table 1 summarizes the proposed POC/IPOC and nature and extent wells for the evaluation monitoring program. Groundwater levels in all three water-bearing zones are monitored quarterly, whereas water levels in the sumps of the extraction system are measured weekly. Any changes in flow directions will be detected based on these measurements. If warranted by a groundwater flow direction change, the monitoring well network may be re-evaluated and amended as necessary in the future.

1. Shallow Water-Bearing Zone

Under the current hydrological conditions, the regional SWBZ groundwater flow direction defines the placement of the IPOC wells. If the slurry wall is the IPOC, then the hydraulically downgradient limit of the IPOC would be located on the western and northern sides of the Containment Area. Wells 01W34AN, 01W33AR, MW80A (proposed), 01W39AR, 01W38AR (proposed), and 24W04A shown in Figure 1 intersect this limit and thus would be the appropriate IPOC wells.

Based on the current hydrological site conditions (head differential at the slurry wall induced by the extraction trench) and knowing that these conditions are not likely to change in the future, it is obvious that upgradient remedy wells would not yield any useful information. Therefore, we propose to remove them from the monitoring well network.

The appropriate hydraulically downgradient nature and extent wells for the Containment Area would be 01W33AR, MW80A (proposed), 24W04A, MW82A (proposed), 01W13A, MW81A (proposed), and 01W53A.



Until the IR14 industrial wastewater pipeline has been cleaned and approved for closure in-place the appropriate pipeline nature and extent wells are 16W05A, 01W53A, 01W13A, MW81A (proposed). Well 16W05A, which does not show any present or historical contamination, may be abandoned after the pipeline closure without compromising the integrity of the evaluation monitoring program.

2. Intermediate Water-Bearing Zone

In the intermediate water-bearing zone (IWBZ), the groundwater flow is regional and unaffected by interim remediation activities, other than from a beneficial reduction in the vertical hydraulic gradient due to the extraction of SWBZ groundwater within the Containment Area. Figure 2 shows that the IWBZ groundwater flows in the western and northwestern directions. There is no technical or regulatory basis for placing upgradient IPOC wells as recommended by GSU. It has been agreed in previous discussions and communications with DTSC that the IPOC wells are downgradient wells as defined by Title 22 Article 6. The following downgradient wells are appropriate for the IWBZ POC/IPOC wells: 01W34BN, MW80B (proposed), 01W39BR, and 01W38BR (proposed).

The same wells serve as nature and extent wells in the IWBZ.

3. Deep Water-Bearing Zone

In the deep water-bearing zone (DWBZ), the regional groundwater flow is in the western and northwestern direction as shown in Figure 3. The DWBZ groundwater flow will not be affected by remediation activities. Using the same rationale as for the IWBZ, the following downgradient wells would be by definition the appropriate POC/IPOC wells: 01W33CR, MW80C (proposed), 01W39CR, and 01W38CR (proposed).

The same wells serve as nature and extent wells in the DWBZ.

The GSU memorandum states that the Navy must install a network of wells and piezometers that would assess the hydrologic control of the slurry wall and impacts of the slurry wall on groundwater flow in the SWBZ, IWBZ, and DWBZ. It is worth noting that the slurry wall is not expected to have any effect on the groundwater flow in the IWBZ and DWBZ. Following the GSU's recommendations, the following changes to the existing network will be made:

- a. Wells 01W36A and 01W37A will be decommissioned as recommended by GSU. However, well 01W18A, previously proposed for abandonment, will be saved and used as a water level monitoring well. This well is in the area of the maximum groundwater elevation within the slurry wall as shown in Figure 1 and is critical for accurate groundwater flow direction evaluation. Preservation of this well will be incorporated into the overall cap design. Well 01W4A, the former highest point of groundwater elevation within the mound, may be abandoned.
- b. The groundwater elevation monitoring wells PZ30A and PZ301A inside the slurry wall will be installed in coordination with the cap construction activity.
- c. Wells 01W36B and 01W37B will be decommissioned as recommended by GSU.
- d. Wells 01W36C and 01W37C will be decommissioned as recommended by GSU.

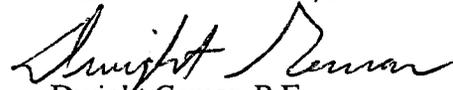
Table 2 shows a list of wells to be abandoned. The well destruction will be conducted in accordance with the specifications for well abandonment as described in Appendix B to the WQSAP (October 2004).



Another change in the proposed monitoring well network concerns well 01W40C, which is one of the background wells for the DWBZ. In the course of the last sampling event an obstruction within the casing was found making lowering of the sampling pump impractical. A proposed well MW83C shown in Figure 3 in the vicinity of well 01W40C will be used as a DWBZ background well. Well 01W40C will serve for groundwater level measurements only.

Further discussion and/or clarification from DTSC is required to address the IPOC and nature and extent designations as described above before the WQSAP can be updated and submitted to DTSC. A meeting between DSTC representatives and Weston Solutions technical staff is requested to be scheduled in the near future to resolve these issues.

Sincerely,
WESTON Solutions, Inc.



Dwight Gemar, P.E.
Senior Project Manager

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cc: 05GIH.DS (1 copy admin records, 2 copies repository)
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06CM.DG
06KB.RP (RAB Library [2 copies], CSO [1 copy])



**Table 1
Sampling Schedule
IA H1 RCRA Evaluation Monitoring Program
Mare Island, Vallejo, California**

Well	Well Purpose	Monitoring parameters	Constituents of concern	Appendix IX parameters
Shallow Water-Bearing Zone (SWBZ) Wells				
01W34AN	POC	Quarterly 1 st year Semiannually thereafter	Every 5 Years	Annually
01W33AR	IPOC/NE	Quarterly 1 st year Semiannually thereafter	Every 5 Years	Annually
MW80A*	IPOC/NE	Quarterly 1 st year Semiannually thereafter	Every 5 Years	Annually
01W39AR	IPOC	Quarterly 1 st year Semiannually thereafter	Every 5 Years	Annually
01W38AR*	IPOC	Quarterly 1 st year Semiannually thereafter	Every 5 Years	Annually
24W04A	IPOC/NE	Quarterly 1 st year Semiannually thereafter	Every 5 Years	Annually
MW82A*	NE	Quarterly 1 st year Annually thereafter		
01W53A	NE	Quarterly 1 st year Annually thereafter		
01W13A	NE	Quarterly 1 st year Annually thereafter		
MW81A*	NE	Quarterly 1 st year Annually thereafter		
01W07A	Background	Quarterly 1 st year Annually thereafter		
DPW-76A	Background	Quarterly 1 st year Annually thereafter		
01W09A	Background	Initial evaluation only		
01W49A	Background	Initial evaluation only		



Table 1
Sampling Schedule
Evaluation Monitoring Program at IA H1
Mare Island, Vallejo, California

Well	Well Purpose	Monitoring parameters	Constituents of concern	Appendix IX parameters
Intermediate Water-Bearing Zone (IWBZ) Wells				
01W34BN	POC/NE	Quarterly 1 st year Semiannually thereafter	Every 5 Years	Annually
MW80B*	IPOC/NE	Quarterly 1 st year Semiannually thereafter	Every 5 Years	Annually
01W39BR	IPOC/NE	Quarterly 1 st year Semiannually thereafter	Every 5 Years	Annually
01W38BR*	IPOC/NE	Quarterly 1 st year Semiannually thereafter	Every 5 Years	Annually
DPW75B	Background	Quarterly 1 st year Annually thereafter		
DPW76B*	Background	Quarterly 1 st year Annually thereafter		
DPW74B	Background	Initial evaluation only		
Deep Water-Bearing Zone (DWBZ) Wells				
01W33CR	IPOC/NE	Quarterly 1 st year Semiannually thereafter	Every 5 Years	Annually
MW80C*	IPOC/NE	Quarterly 1 st year Semiannually thereafter	Every 5 Years	Annually
01W39CR	IPOC/NE	Quarterly 1 st year Semiannually thereafter	Every 5 Years	Annually
01W38CR*	IPOC/NE	Quarterly 1 st year Semiannually thereafter	Every 5 Years	Annually
01W76C*	Background	Quarterly 1 st year Annually thereafter		
DPW83C*	Background	Quarterly 1 st year Annually thereafter		
DPW71C	Background	Initial evaluation only		
DPW70C	Background	Initial evaluation only		

* Proposed well
 POC denotes Point of Compliance
 IPOC denotes Interim Point of Compliance
 NE denotes Nature and Extent



**Table 2
Wells Proposed To Be Abandoned
IA H1 Mare Island, Vallejo, California**

Well	Well diameter (inch)	Depth to Top of Screen (feet bgs)	Depth to Bottom of Screen (feet bgs)	Rationale for Concurrence/Non-Concurrence with GSU's Recommendations
SWBZ				
01W01	3.5	5.0	15.0	Concur—abandon
01W04	3.5	5.0	15.0	Do not concur—abandon
01W14	3	5.5	15.5	Do not concur—will retain adjacent IR01PZ022/23/24
01W18	2	20.0	25.0	Do not concur—retain for water levels
01W19	2	20.0	25.0	Concur—abandon
01W20X	--	--	--	Do not concur—well has been abandoned
01W21	2	20.0	25.0	Concur—abandon
01W22	2	25.0	30.0	Concur—abandon
01W36A	4	12.5	17.5	Concur—abandon
01W37A	4	8.5	13.5	Concur—abandon
01W38A*	4	7.0	12.0	Concur—abandon and replace with 01W38AR
01W55	4	6.0	21.0	Abandon because well is screened across SWBZ and IWBZ
06W01	3	3.5	12.5	Concur—abandon
06W02	3	5.5	15.0	Concur—abandon
06W03	4	7.5	12.5	Concur—abandon
06W04	4	7.0	12.0	Concur—abandon
06W05	4	4.0	9.0	Concur—abandon
06W06	4	4.0	9.0	Concur—abandon
24W02	2	5.0	15.0	Do not concur—sufficient data points in this area
24W03	2	5.0	15.0	Do not concur—sufficient data points in this area
24W04	2	5.0	15.0	Concur—retain
24W05X	2	5.0	10.0	Do not concur—well has been abandoned

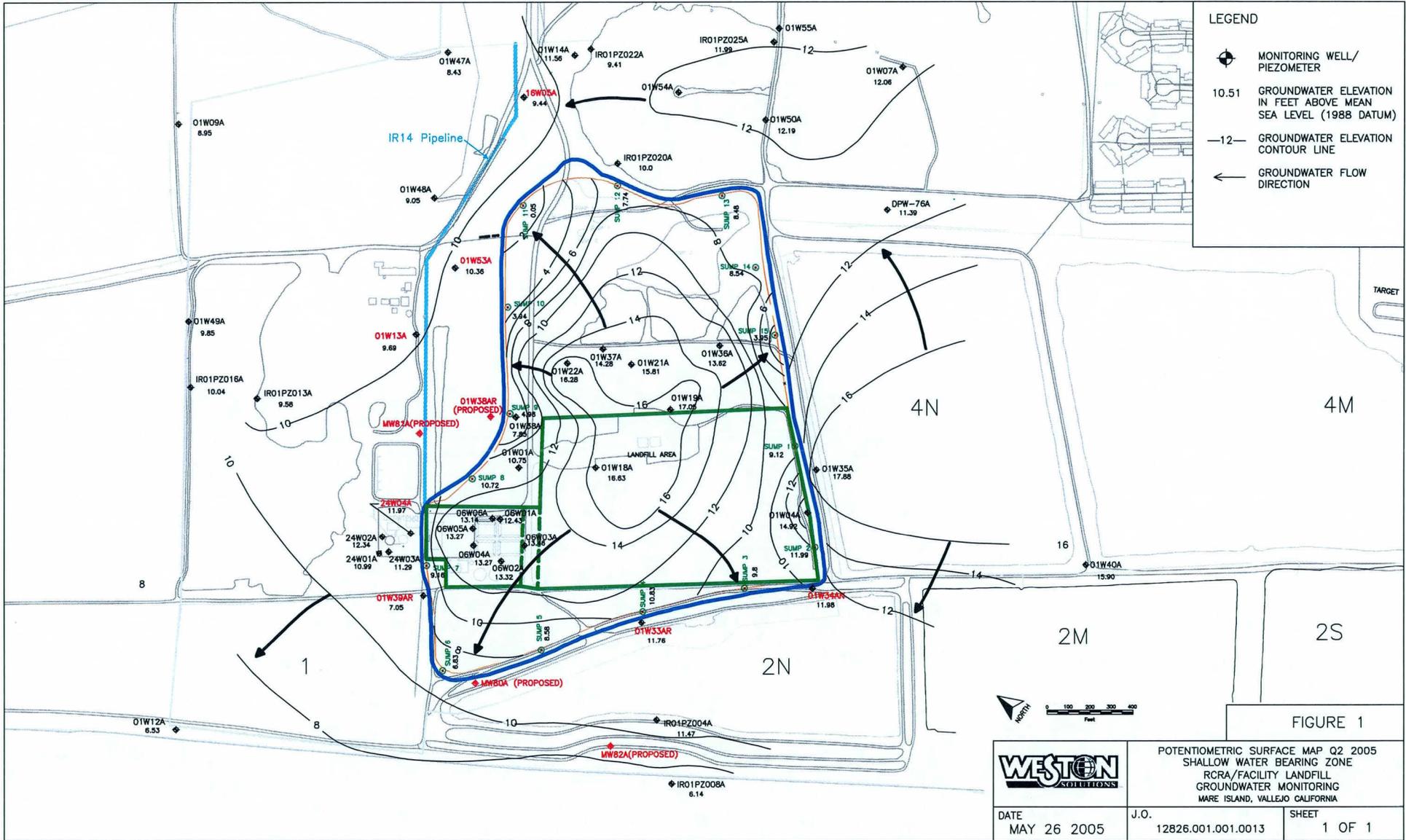


Table 2
Wells Proposed To Be Abandoned
IA H1 Mare Island, Vallejo, California

Well	Well diameter (inch)	Depth to Top of Screen (feet bgs)	Depth to Bottom of Screen (feet bgs)	Rationale for Concurrence/Non-Concurrence with GSU's Recommendations
IR01PZ013/14/15	1	7/14/21	9/16/23	Concur—retain for water levels
IR01PZ016/17/18	1	--	--	Concur—retain for water levels
IR01PZ19/20/21	1	9/16/22	11/18/24	Concur—retain for water levels
IR01PZ22/23/24	1	10/16/22	12/18/24	Concur—retain for water levels
IWBZ				
01W26	2	30.0	40.0	
01W28	2	27.0	37.0	Do not concur—retain for water levels
01W32	2	50.0	60.0	Concur—abandon
01W36B	4	32.0	37.0	Concur—abandon
01W37B	4	29.0	34.0	Concur—abandon
01W38B	4	30.0	35.0	Concur—abandon and replace with 01W38BR
01W42B	4	30.5	35.5	Add—abandon because there are sufficient data points
DWBZ				
06W07	2	50.0	55.0	Concur—abandon
01W36C	4	41.0	46.0	Concur—abandon
01W37C	4	43.0	48.0	Concur—abandon
01W38C	4	49.0	54.0	Concur—abandon and replace with 01W38CR
01W41C	4	52.0	62.0	Do not concur—sufficient data points in this area
01W60C	4	57.4	62.4	Do not concur—sufficient data points in this area
01W62B(C)	4	46.5	51.5	Do not concur—sufficient data points in this area

bgs denotes below ground surface.

** Wells to be abandoned by Method # 2: pressure grout then drill out to top of screen*



- LEGEND**
- MONITORING WELL/PIEZOMETER
 - 10.51 GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL (1988 DATUM)
 - 12- GROUNDWATER ELEVATION CONTOUR LINE
 - GROUNDWATER FLOW DIRECTION

FIGURE 1

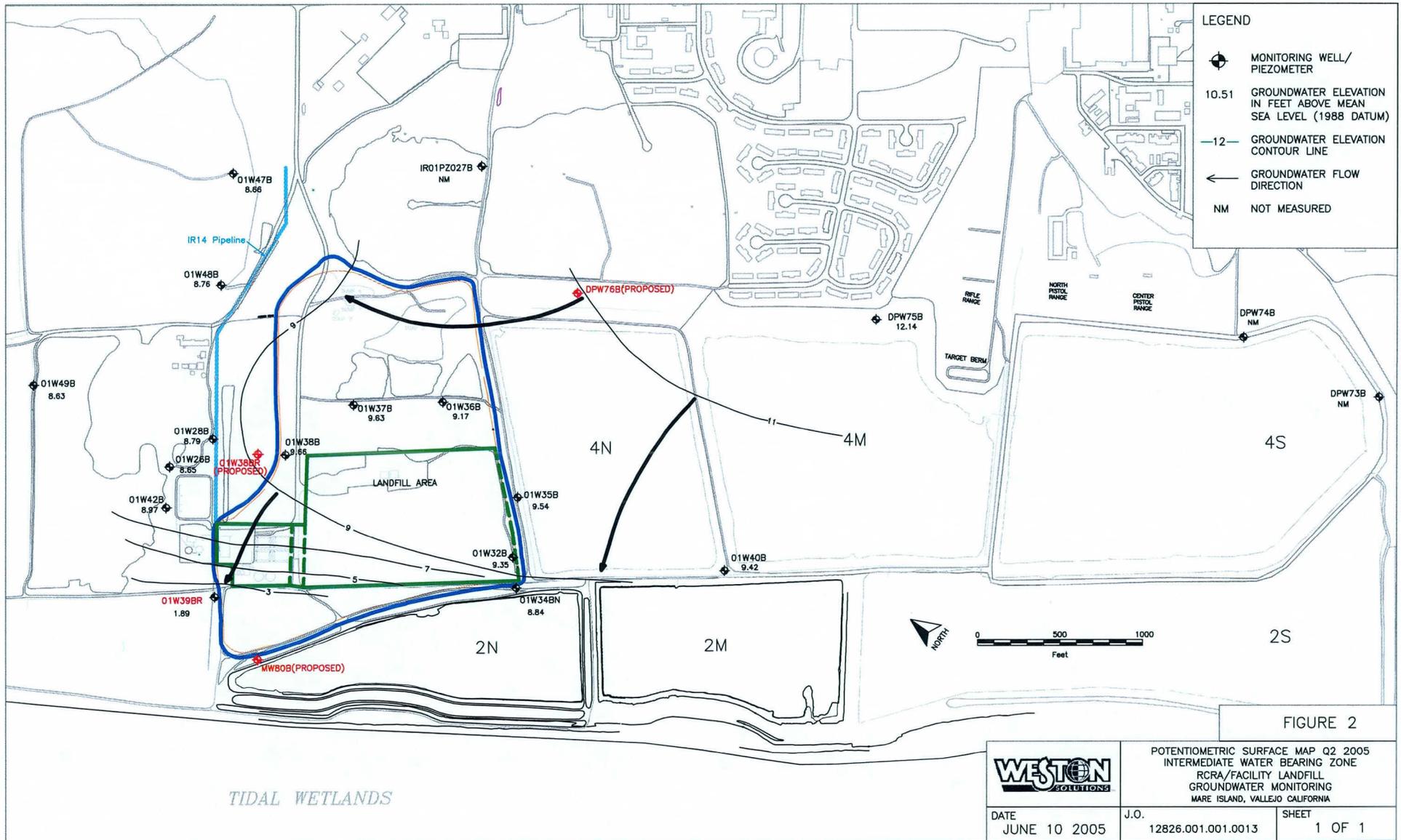


POTENTIOMETRIC SURFACE MAP Q2 2005
 SHALLOW WATER BEARING ZONE
 RCRA/FACILITY LANDFILL
 GROUNDWATER MONITORING
 MARE ISLAND, VALLEJO CALIFORNIA

DATE
 MAY 26 2005

J.O.
 12826.001.001.0013

SHEET
 1 OF 1



LEGEND

- MONITORING WELL/PIEZOMETER
- 10.51 GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL (1988 DATUM)
- 12- GROUNDWATER ELEVATION CONTOUR LINE
- GROUNDWATER FLOW DIRECTION
- NM NOT MEASURED

FIGURE 2

	POTENTIOMETRIC SURFACE MAP Q2 2005 INTERMEDIATE WATER BEARING ZONE RCRA/FACILITY LANDFILL GROUNDWATER MONITORING MARE ISLAND, VALLEJO CALIFORNIA	
	DATE JUNE 10 2005	J.O. 12826.001.001.0013

