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December 12, 2002

Alaska Dept. of Environmental Conservation
Division of Spill Prevention and Response
Storage Tank Program
43335 Kalifornsky Beach Rd, Suite 11
Soldotna, Alaska 99669

RE: Kenai Airport Fuel Service—Interim Remedial Action Report #5
UST Facility ID #2187, Reckey #90230026801

Attention: Monica English, Environmental Specialist

This report presents the results of the survey of the water table and analysis of samples collected from six monitor wells, on October 31, 2002, by Rozak Engineering. The work was done on behalf of Dean Eichholz and Dan Pitts, per the department's letter of October 24, 2002.

Summary

The survey showed the groundwater was about one foot higher than any of the previous surveys. The flow was toward the south-southeast, similar to many of the previous surveys, but the gradient was a little steeper. Groundwater contours in the vicinity of the evaporation pond reflected mounding, possibly due to a large discharge of water from the 30" culvert into the evaporation pond.

Analytical results for most of the samples collected October 31st were generally equal or lower than previous sample events. Except for MW-9, EDB levels were less than the cleanup level. MW-1 and MW-6 were dramatically less than any other sample event. MW-10 and MW-11 have only been sampled twice, May and October 2002, but the October results were typically non-detect or 1/10th of the May results. MW-8 results for October were similar to the May results but were equal or less than the two previous events in July and December of 2000. MW-9 has only been sampled twice; the results for October were in the same ballpark as May 2002 and no trend was apparent at this time. Reduced contamination levels observed during this event might be due, in part, to the high water caused by heavy rains during September and October. Results of the elevation survey and analytical testing are presented in Tables 1 through 6.

Survey

Before sampling, the static water level (SWL) was measured from the top of PVC casing to the groundwater surface. Then water was bailed from each well until it was clear and free of sand. After the samples were collected, the tops of PVC casings at the monitor wells were surveyed.

Groundwater elevations were determined by subtracting the SWL measurement from the PVC casing elevation. The groundwater elevations are shown on Figure 2, next to the monitor wells, and are included (rounded to the nearest 1/10th foot) on Tables 1-6. On the tables, "SWL" refers to the elevation, in feet, of the static water level at the monitor well. The elevations are relative to a temporary reference elevation of 100.00 feet on the northeast corner of the concrete sidewalk outside the southwest door of the Alaska Flying Network office. Groundwater elevations on October 31, 2002 were approximately one foot higher than any previous surveys.

Analytical Testing

The water samples were sent to CT&E Environmental Services Inc. for analytical testing to determine the presence of BTEX, GRO and EDB. In the following tables, analytical results of water samples are reported in mg/l. Where available, results are included for all monitor well samples collected since August 3, 1994. "NS" indicates no sample was collected. "NA" indicates no analysis was performed. "U" indicates the analyte was not detected at the value shown. Shaded cells indicate concentrations that exceed the cleanup levels.

MW-1. Results of analytical testing of seven rounds of water samples collected from this monitor well show that contamination concentrations have dropped since 1994. MW-1 was not sampled on May 30, 2002. On October 31, 2002, the benzene level was 11 times the cleanup level. EDB was less than half the cleanup level.

TABLE 1 – Groundwater Analytical Results at MW-1

Sample ID#	Date	SWL	GRO	Benz	Tol	E-Benz	Xylenes	EDB
KA-42	8/03/94	90.8	NA	64.2	62.7	2.46	11.6	NA
KAFS-99-2	6/16/99	91.5	79	12.6	21.5	1.45	7.1	0.010000
KAFS-99-21W	9/13/99	91.6	3.4	0.5	0.7	0.13	0.4	NA
KAFS-99-24W	11/29/99	91.6	64	12.8	12.1	0.06	2.5	NA
KAFS-00-32W	7/06/00	91.6	200	32.4	45.5	2.64	12.7	NA
KAFS-00-38	12/13/00	91.1	170	34.6	45.2	2.14	10.1	NA
	5/30/02	91.3	NS	NS	NS	NS	NS	NS
KAFS-02-13	10/31/02	92.6	0.5	0.054	0.07	0.01	0.04	0.000022
Cleanup Level			*1.3*	*0.005*	*1.00*	*0.70*	*10.0*	*0.000050*

1.3 feet

MW-6. Results of analytical testing of four rounds of groundwater samples are reported. MW-6 was not sampled on May 30, 2002. All analysis results are less the cleanup levels for the first time since this well was installed.

TABLE 4 – Groundwater Analytical Results at MW-6

Sample ID#	Date	SWL	GRO	Benz	Tol	E-Benz	Xylenes	EDB
KAFS-99-25W	11/29/99	91.6	75	11.2	14.7	1.08	4.5	NA
KAFS-00-32W	7/06/00	91.1	55	9.41	12.1	0.79	3.2	NA
KAFS-00-37	12/13/00	91.1	163	30.2	41.5	2.57	11.5	NA
	5/30/02	91.3	NS	NS	NS	NS	NS	NS
KAFS-02-14	10/31/02	92.6	0.1	0.003	0.002U	0.004	0.018	0.00002U
Cleanup Level			*1.3*	*0.005*	*1.00*	*0.70*	*10.0*	*0.000050*

1.3 feet

MW-8. Results of analytical testing for five rounds of groundwater samples indicate that contamination concentrations have dropped since 1994. Benzene during the last round was 36 times the cleanup level. EDB was not detected.

TABLE 3 – Groundwater Analytical Results at MW-8

mg/liter

Sample ID#	Date	SWL	GRO	Benz	Tol	E-Benz	Xylenes	EDB
KAFS-99-22W	11/29/99	90.8	0.64	0.239	0.002U	0.002U	0.002U	NA
KAFS-00-28W	7/06/00	90.3	3.9	1.80	0.002U	0.002U	0.002U	NA
KAFS-00-38	12/13/00	90.3	1.6	0.830	0.023	0.002	0.002U	NA
KAFS-02-04	5/30/02	90.1	0.4	0.207	0.002U	0.002U	0.002U	0.000061
KAFS-02-09	10/30/02	91.5	0.5	0.182	0.002U	0.002U	0.002U	0.00002U
Cleanup Level			*1.3*	*0.005*	*1.00*	*0.70*	*10.0*	*0.000050*

35 x Benzene

1.4 feet

MW-9. Results of analytical testing for two rounds of groundwater samples indicate some of the contamination concentrations at this location are elevated. Benzene during the last round was 148 times the cleanup level. EDB was 3.7 times the cleanup level.

TABLE 4 - Groundwater Analytical Results at MW-9

Sample ID#	Date	SWL	GRO	Benz	Tol	E-Benz	Xylenes	EDB
KAFS-02-06	5/30/02	90.2	29.1	5.48	6.92	0.38	0.8	0.000069
KAFS-02-10	10/31/02	91.6	5.1	0.74	0.85	0.90	0.3	0.000186
Cleanup Level			*1.3*	*0.005*	*1.00*	*0.70*	*10.0*	*0.000050*

1.4 feet

MW-10. Results of analytical testing from two groundwater sample events that indicate that contamination concentrations, with the possible exception of benzene, are less than the cleanup levels.

TABLE 5 - Groundwater Analytical Results at MW-10

Sample ID#	Date	SWL	GRO	Benz	Tol	E-Benz	Xylenes	EDB
KAFS-02-06	5/30/02	90.9	0.3	0.022	0.05	0.01	0.02	.000019U
KAFS-02-11	10/31/02	92.5	0.1U	.0006U	.002U	.002U	.002U	.000019U
Cleanup Level			*1.3*	*0.005*	*1.00*	*0.70*	*10.0*	*.000050*

1.6

MW-11. Results of analytical testing from two groundwater sample events indicate that contamination concentrations, with the possible exception of benzene, are less than the cleanup levels.

TABLE 6 - Groundwater Analytical Results at MW-11

Sample ID#	Date	SWL	GRO	Benz	Tol	E-Benz	Xylenes	EDB
KAFS-02-06	5/30/02	90.9	0.7	0.093	0.15	0.02	0.06	0.000034
KAPS-02-11	10/31/02	92.5	0.09U	0.0006	0.002U	0.002U	0.002U	0.000019U
Cleanup Level			*1.3*	*0.005*	*1.00*	*0.70*	*10.0*	*0.000050*

1.6

Interpretation of Results and Discussion

The groundwater flow during the last sample event was south to southeast (Figure 1), similar to the last five sample events. The flow direction has fluctuated a little but ~~has~~ generally has been toward the south-southeast. The gradient typically has been 0.0021 to 0.0025 ft/ft, but on October 31, 2002 the gradient was a little steeper (approximately 0.0030 ft/ft). The steeper gradient and higher water table are probably due to the unusually heavy rainfall that occurred during September and October 2002. Figure 2 shows approximate groundwater contours derived from the elevation survey conducted October 31, 2002. The contours reflect mounding of the groundwater in the vicinity of the evaporation pond. The mounding is probably due to a large discharge of water from the 30" culvert into the evaporation pond.

Samples collected in May and October of 2002 had significantly lower EDB levels than during June 1999. Analysis results also indicate a significant reduction in benzene levels occurred at MW-1 and MW-6, but the record high groundwater may account for part of the difference. Samples collected after the water table drops closer to the historic levels should provide a more accurate assessment of the contamination trend. Monitor wells MW-10 and MW-11, installed in May 2002, have significantly lower contamination levels than at MW-1 and MW-6. This strongly supports our previous conclusion that the drainage swale, located between the two pairs of wells, is a major contributor to the volatile loss, and the evaporation pond, excavated during May 2002, should continue to enhance the volatile loss.

The first water sample collected at MW-9 (May 30, 2002) yielded unexpectedly high levels of benzene and GRO, when compared to samples taken at other monitor wells during that and previous sample events. The benzene level was 26 times higher than MW-8, and these two wells are about the same distance (620 to 650 ft.) down gradient from the UST site.

MW-8 on edge of plume?
MW-9 in line of plume?

We previously recommended having an independent consultant evaluate our data, participate in developing any future monitoring programs, as well as evaluating whether air sparging or other remedial methods should be installed to reduce the levels of contamination migrating beyond the property boundary. Mr. Eichholz and Mr. Pitts have arranged for a consultant, soil physicist Mark Prieksat, PhD, to provide these services.

Conclusions and Recommendations

It appears the groundwater contamination south of the evaporation pond is being reduced by natural attenuation, probably due to the swale and evaporation pond north of the Ramp Access. However, contamination levels exceed cleanup levels at the two down-gradient monitor wells, MW-8 and MW-9, and the west and south (leading) edges of the plume from the KAFS UST site have not been adequately defined. A Point of Compliance monitor well needs to be installed down gradient of MW-9, near the southeast corner of the Main Terminal. Since the EDB levels are close to cleanup levels, in the future we recommend reducing the EDB analysis to three monitor wells: MW-1, MW-8, and MW-9. Okay.

The high contamination levels at MW-9 do not fit with the contamination pattern developed from earlier test results, and indicate another source may be contributing to the plume, especially at MW-9 and possibly at MW-8. The presence of another source between the Ramp Access gate and MW-9 should be investigated. Since spill records are not available, additional soil and groundwater sample points should be used to determine the source of contamination at MW-9.

Closure

This work was performed in general accordance with work plans approved by ADEC and the standards of care and diligence normally practiced by recognized consulting firms in performing services of a similar nature. The discussion, conclusions and recommendations relate the site conditions present at the time of our sampling, based on analytical results from a limited number of locations. The scope of this report is limited to matters expressly covered.

Sincerely,

Ronald T. Rozak, PE
Principal Investigator

Mark Prieksat

Attachments:

Figure 1 – Groundwater Contamination Results for 10/31/02
Figure 2 – Groundwater Contour Map
Laboratory Analysis Reports

cc: Dan Pitts
Dean Eichholz

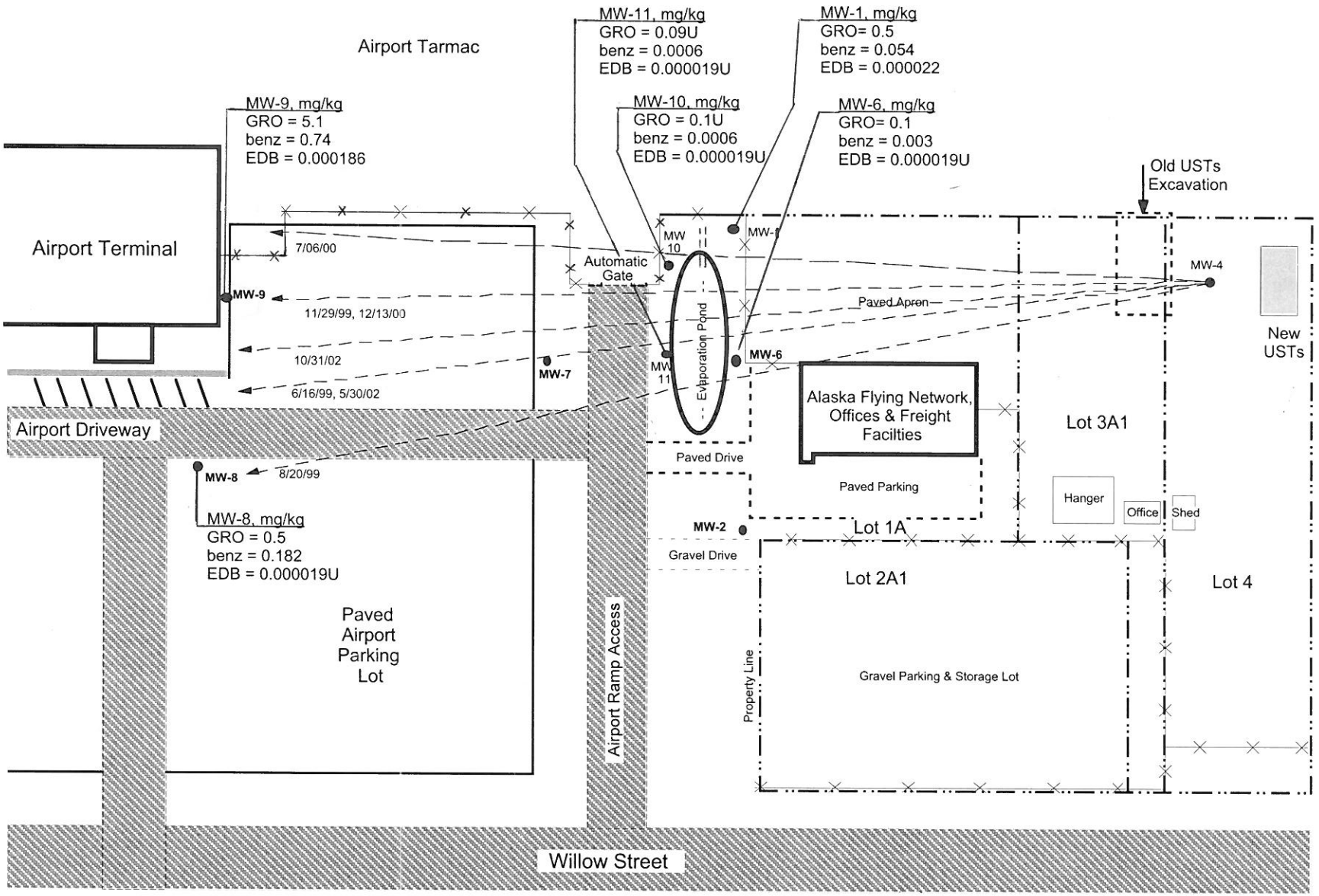


Figure 1. Groundwater Contamination Results for 10-31-02

Kenai Airport Fuel Service ADEC Reckey #90230026801

Rozak Engineering Rev. No. 5 12-11-02

Legend

Monitor Well MW

Property Line

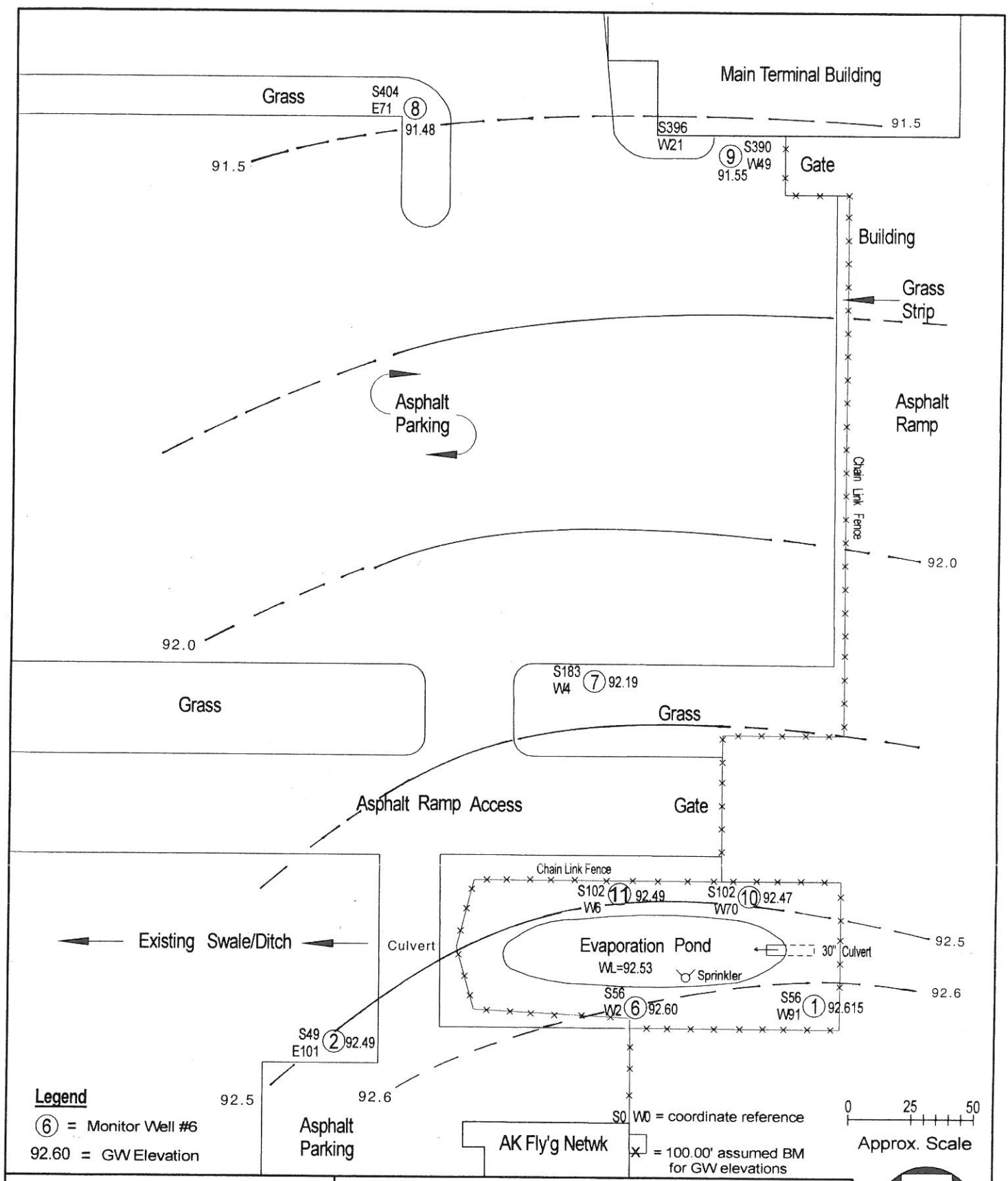
Chain Link Fence

Groundwater Flow

Asphalt Pavement

Plan North

0 50' 100'



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Drawn by: RTR 11.02.02
Rev. by: RTR 12.09.02

MONITOR WELL SURVEY
KENAI AIRPORT FUEL SERVICE

Kenai Airport, Kenai, Alaska
Surveyed October 31, 2002

Figure 2