

## **Appendix B**

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### **Remedial Alternative Cost Estimates**

**Table B-1. Estimated cost for Alternative 1, Waste Removal, Off-Site Disposal (Special Waste Classification), Dispersion/Dilution, and Compliance Monitoring—Heglar Kronquist Landfill, Mead, Washington**

Description	Units	Estimated Quantity	Unit Price	Total	Notes
<b>Cover Removal, Waste Excavation, and Backfilling</b>					
Mob/demob	LS	1	\$5,000	\$5,000	Estimate.
Excavate	CY	81,930	\$3.59	\$293,863	Remedial Action Cost Engineering and Requirements system (RACER), Version 10.4.0, 2011. Remove cover and set aside for reuse. Excavate waste, assuming 20% over-excavation in dross pit area.
Backfill (purchase, delivery, and place)					
Unclassified - imported	CY	78,876	\$10.59	\$835,293	RACER (2011).
Reuse	CY	15,344	\$5.11	\$78,373	Assumes removed cover material will be reused to backfill pit, including gravel.
Seeding/vegetation	acre	2.9	\$4,137	\$11,998	Estimate from local landscaping subcontractor.
Laboratory analyses	each	84	\$271	\$22,787	RACER (2011). Assumes one sample for every 27 truck loads. Analytical costs will vary based on landfill requirements.
Management and oversight	hours	4,382	\$105	\$460,110	Assumes waste removed during 6 months from April 1 through September 30, 6 days per week, 156 days. Assumes 34 CY per truck and approximately 15 trucks per day. Oversight by two personnel with preparation, follow-up, and management.
Field and travel expenses	days	156	\$397	\$61,974	Field and travel expenses assuming 156 days.
<b>Offsite Disposal</b>					
Bulk waste loading	CY	68,230	\$2.80	\$191,288	RACER (2011). Based on in-place volumes (dross and over-excavation soils).
Tipping fee (special waste classification)	TON	79,647	\$129	\$10,274,463	Estimate from local landfill assuming deactivation and solidification. Includes dross and over-excavation soils. Assumes soil density of 110 lb/CF.
Transport (240 miles one way; 34 CY truck)	TON	79,647	\$42.18	\$3,359,510	Estimate from local transporter, including truck liners. Assume 1.09 TON/CY for dross and 1.49 TON/CY for moist soil.
Equipment, expenses, supplies, and minor decontamination	days	156	\$450	\$70,200	Estimated equipment, supplies, and decontamination.
<b>Engineering and Documentation</b>					
Cleanup Action Plan (CAP) review	LS	2	\$10,000	\$20,000	Estimate; draft and final.
Plans, specifications, and permitting	LS	1	\$40,000	\$40,000	Estimate assuming grading permit, final topographic survey and related.
Work plan	LS	1	\$65,000	\$65,000	Estimate.
Closure report	LS	1	\$85,000	\$85,000	Estimate assuming site closure report with removal confirmation/documentation, including a final topographic survey.
<b>Compliance Monitoring - Groundwater and Surface Water (5 years)</b>					
<b>Year 1 Groundwater and Surface Water Monitoring/Reporting (4 quarterly events)</b>					
Labor	LS	1	\$23,800	\$23,800	Estimate assuming 4 events, 9 sampling locations, and 3 QA/QC samples.
Analytical laboratory	LS	4	\$864	\$3,457	Estimate assuming 4 events, 9 sampling locations, 3 QA/QC samples, and analysis of chloride, nitrate, sodium.
Field and travel expenses	LS	4	\$2,231	\$8,925	Estimate assuming 4 events.
Waste disposal	LS	1	\$950	\$950	Estimate assuming discharge to City sewer, 2 drums per event, and 1 waste removal event following completion of monitoring.
Validation and reporting	LS	1	\$7,536	\$7,536	Estimate assuming 1 annual memorandum.
<b>Year 2 Groundwater and Surface Water Monitoring/Reporting (4 quarterly events)</b>					
Labor	LS	1	\$23,800	\$23,800	Estimate assuming 4 events, 9 sampling locations, and 3 QA/QC samples.
Analytical laboratory	LS	4	\$864	\$3,457	Estimate assuming 4 events, 9 sampling locations, 3 QA/QC samples, and analysis of chloride, nitrate, sodium.
Field and travel expenses	LS	4	\$2,205	\$8,820	Estimate assuming 4 events.
Waste disposal	LS	1	\$950	\$950	Estimate assuming discharge to City sewer, 2 drums per event and 1 waste removal event following completion of monitoring.
Validation and reporting	LS	1	\$6,336	\$6,336	Estimate assuming 1 annual memorandum report.

**Table B-1. Estimated cost for Alternative 1, Waste Removal, Off-Site Disposal (Special Waste Classification), Dispersion/Dilution, and Compliance Monitoring—Heglar Kronquist Landfill, Mead, Washington**

Description	Units	Estimated Quantity	Unit Price	Total	Notes
<b>Year 3 Groundwater and Surface Water Monitoring/Reporting (2 semi-annual events)</b>					
Labor	LS	1	\$11,900	\$11,900	Estimate assuming 2 events, 9 sampling locations, and 3 QA/QC samples.
Analytical laboratory	LS	2	\$864	\$1,729	Estimate assuming 2 events, 9 sampling locations, 3 QA/QC samples, and analysis of chloride, nitrate, sodium.
Field and travel expenses	LS	2	\$2,205	\$4,410	Estimate assuming 2 events.
Waste disposal	LS	1	\$550	\$550	Estimate assuming discharge to City sewer, 2 drums per event and 1 waste removal event following completion of monitoring.
Validation and reporting	LS	1	\$4,168	\$4,168	Estimate assuming 1 annual memorandum.
<b>Year 4 Groundwater and Surface Water Monitoring/Reporting (2 semi-annual events)</b>					
Labor	LS	1	\$11,900	\$11,900	Estimate assuming 2 events, 9 sampling locations, and 3 QA/QC samples.
Analytical laboratory	LS	2	\$864	\$1,729	Estimate assuming 2 events, 9 sampling locations, 9 QA/QC samples, and analysis of chloride, nitrate, sodium.
Field and travel expenses	LS	2	\$2,205	\$4,410	Estimate assuming 2 events.
Waste disposal	LS	1	\$550	\$550	Estimate assuming discharge to City sewer, 2 drums per event and 1 waste removal event following completion of monitoring.
Validation and reporting	LS	1	\$4,168	\$4,168	Estimate assuming 1 annual memorandum.
<b>Year 5 Groundwater and Surface Water Monitoring/Reporting (1 annual event)</b>					
Labor	LS	1	\$5,950	\$5,950	Estimate assuming 1 event, 9 sampling locations, and 3 QA/QC samples.
Analytical laboratory	LS	1	\$864	\$864	Estimate assuming 1 event, 9 sampling locations, 3 QA/QC samples, and analysis of chloride, nitrate, sodium.
Field and travel expenses	LS	1	\$2,205	\$2,205	Estimate assuming 1 event.
Waste disposal	LS	1	\$450	\$450	Estimate assuming discharge to City sewer, 2 drums per event and 1 waste removal event following completion of monitoring.
Validation and reporting	LS	1	\$4,584	\$4,584	Estimate assuming 1 annual memorandum.
<b>Well Decommissioning (9 wells)</b>					
3 historic wells	LS	3	\$5,250	\$15,750	Estimate based on decommissioning historic private well in October 2010. Assumes decommissioning of Wells 3bcd-1, 3bcd-2, 3bcc prior to cap restoration work.
6 RI wells	LS	6	\$983	\$5,900	Estimate from local drilling contractor to decommission Wells MW-1 through MW-6 following post-closure monitoring.
Field oversight and management	LS	1	\$6,270	\$6,270	Estimate assuming 3 days of field activities.
Field oversight expenses	LS	3	\$350	\$1,050	Estimate assuming 3 days of field activities.
<b>SUBTOTAL</b>				<b>\$16,051,427</b>	
<b>Contingency (25% of costs)</b>	LS	1	\$4,012,857	\$4,012,857	
<b>TOTAL</b>				<b>\$20,064,284</b>	

**Notes:** Local sales tax at current rate of 8.1% added to cost estimates, including RACER estimates, as appropriate.

Costs will vary depending on final engineering design, and fuel and material costs. Assumes existing gravel layer can be reused to backfill excavation (no disposal).

Costs shown in 2011 dollars. Costs in future contractor bids may vary.

Estimates for liner material based on \$75 per barrel crude ([http://www.tsocorp.com/stellent/groups/corpcomm/documents/tsocorp\\_documents/001326.pdf](http://www.tsocorp.com/stellent/groups/corpcomm/documents/tsocorp_documents/001326.pdf)), and fuel prices on \$102.50 per barrel (<http://www.tradingnrg.com/will-opec-raise-oil-quota-current-crude-oil-prices-fall-june-1-2011/>).

CF - cubic foot

CY - cubic yard

LS - lump sum

Table B-2. Estimated cost for Alternative 2, Cap Enhancement, Institutional Controls, Dispersion/Dilution, and Compliance Monitoring—Heglar Kronquist Landfill, Mead, Washington

Description	Units	Estimated Quantity	Unit Price	Total	Notes
<b>Cap Enhancement (preparation, liner, cap cover)</b>					
Mob/demob	LS	1	\$5,000	\$5,000	Estimate.
Site preparation (bulldozing)	SY	12,347	\$0.72	\$8,829	Remedial Action Cost Engineering and Requirements system (RACER), Version 10.4.0, 2011.
Site preparation (single pass grading)	SY	12,347	\$0.40	\$4,905	RACER (2011).
<b>Materials (imported)</b>					
<b>Non-expansive fill (<math>k = 10^{-4} - 10^{-5}</math> cm/s)</b>					
Purchase and delivery	CY	3,607	\$35.186550	\$126,918	Estimate from local earthwork subcontractor.
Placement <sup>a</sup>	CY	3,544	\$5.11	\$18,102	Estimate from local earthwork subcontractor.
<b>Gravel (3/4" angular)</b>					
Purchase and delivery	CY	2,109	\$17	\$35,907	Estimate from local earthwork subcontractor.
Placement <sup>b</sup>	CY	2,024	\$9	\$17,230	Estimate from local earthwork subcontractor.
<b>Top Soil</b>					
Purchase and delivery	CY	6,095	\$23	\$138,363	Estimate from local earthwork subcontractor.
Placement	CY	6,095	\$5.11	\$31,132	Estimate from local earthwork subcontractor.
<b>Gravel (3" minus)</b>					
Purchase and delivery	CY	284	\$17	\$4,835	Estimate from local earthwork subcontractor.
Placement (toe buttress)	CY	284	\$12	\$3,546	Estimate from local earthwork subcontractor.
<b>Seeding/Vegetation and Watering</b>					
	acre	2.64	\$4,608	\$12,166	Estimate from local landscaping subcontractor.
<b>Geosynthetics (purchase, transport, and install)</b>					
200 mil geonet	LS	1	\$49,500	\$49,500	Estimate from local liner subcontractor (based on 123,177 SF).
16 oz non-woven geotextile	LS	1	\$39,384	\$39,384	Estimate from local liner subcontractor (based on 123,177 SF).
Geocomposite drainage material	LS	1	\$82,104	\$82,104	Estimate from local liner subcontractor (based on 123,177 SF).
60 mil HDPE geomembrane	LS	1	\$75,833	\$75,833	Estimate from local liner subcontractor (based on 123,177 SF).
Construction of anchor trench	feet	1,296	\$7	\$8,826	Estimate from local earthwork subcontractor.
Tree removal	LS	10	\$568	\$5,675	Estimate.
Fence replacement, vent repair, drain pipe, cleanup	LS	1	\$62,428	\$62,428	Estimate from local fencing subcontractor. General estimate for vent repair, drain pipe and cleanup.
Preparation, oversight, and follow-up	LS	1	\$86,000	\$86,000	Estimate for project preparation (health and safety plan, site walks, contracting, project set-up), 15 days of field work (2 personnel), PE supervision during key aspects of cover work, follow-up, and management during field activities.
Field and travel expenses	LS	15	\$494	\$7,406	Travel and field expenses assuming 15 days.
<b>Engineering and Documentation</b>					
Management and meetings	LS	1	\$50,000	\$50,000	Estimate.
Cleanup Action Plan (CAP) review	LS	2	\$10,000	\$20,000	Estimate; draft and final.
Plans, specifications, permitting, and access agreement	LS	1	\$69,500	\$69,500	Estimate assuming plans and specs for construction, grading permit, and access agreement for property east of landfill. Assumes geotechnical report not necessary.
Design report/work plan	LS	1	\$65,000	\$65,000	Estimate.
Remedy implementation report	LS	1	\$95,000	\$95,000	Estimate assuming report with cap restoration documentation, including a final topographic survey.
<b>20-Year Maintenance</b>					
O&M plan	LS	1	\$30,000	\$30,000	O&M plan for inspections and minor maintenance.
Annual site inspection and mowing	year	20	\$1,000	\$20,000	Estimate assuming minor maintenance costs.
<b>Deed Restriction (covenant)</b>					
	LS	1	\$10,000	\$10,000	Estimate to review, facilitate document preparation and filing.
<b>Compliance Monitoring - Air, Groundwater and Surface Water (5 years)</b>					
<b>Year 1 Groundwater and Surface Water Monitoring/Reporting (4 quarterly events)</b>					
Labor	LS	1	\$23,800	\$23,800	Estimate assuming 4 events, 9 sampling locations, and 3 QA/QC samples.
Analytical laboratory	LS	4	\$864	\$3,457	Estimate assuming 4 events, 9 sampling locations, 3 QA/QC samples, and analysis of chloride, nitrate, sodium.
Field and travel expenses	LS	4	\$2,231	\$8,925	Estimate assuming 4 events.
Waste disposal	LS	1	\$950	\$950	Estimate assuming discharge to City sewer, 2 drums per event, and 1 waste removal event following completion of monitoring.
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Description	Units	Estimated Quantity	Unit Price	Total	Notes
<b>Year 2 Air Monitoring/Reporting (1 event)</b>					
Labor	LS	1	\$7,441	\$7,441	Estimate assuming 1 event, 3 sampling locations, ammonia only.
Analytical laboratory	LS	1	\$1,262	\$1,262	Estimate assuming 1 event, 3 sampling locations, ammonia only.
Field and travel expenses	LS	1	\$4,020	\$4,020	Estimate assuming 1 event, 3 sampling locations, ammonia only.
Validation and reporting	LS	1	\$6,854	\$6,854	Estimate assuming 1 event, 3 sampling locations, ammonia only.
<b>Year 3 Groundwater and Surface Water Monitoring/Reporting (2 semi-annual events)</b>					
Labor	LS	1	\$11,900	\$11,900	Estimate assuming 2 events, 9 sampling locations, and 3 QA/QC samples.
Analytical laboratory	LS	2	\$864	\$1,729	Estimate assuming 2 events, 9 sampling locations, 3 QA/QC samples, and analysis of chloride, nitrate, sodium.
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Labor	LS	1	\$11,900	\$11,900	Estimate assuming 2 events, 9 sampling locations, and 3 QA/QC samples.
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<b>Well Decommissioning (9 wells)</b>					
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6 RI wells	LS	6	\$983	\$5,900	Estimate from local drilling contractor to decommission Wells MW-1 through MW-6 following post-closure monitoring.
Field oversight and management	LS	1	\$6,270	\$6,270	Estimate assuming 3 days of field activities.
Field oversight expenses	LS	3	\$350	\$1,050	Estimate assuming 3 days of field activities.
<b>Five-Year Review and Closure Report</b>	LS	1	\$50,000	\$50,000	Estimate assuming site visit and closure report following monitoring.
<b>SUBTOTAL</b>				<b>\$1,429,734</b>	
<b>Contingency (25% of costs)</b>	LS	1	\$357,433	\$357,433	
<b>TOTAL</b>				<b>\$1,787,167</b>	

**Notes:** Local sales tax at current rate of 8.1% added to cost estimates, including RACER estimates, as appropriate. Costs will vary depending on final engineering design, and fuel and material costs. Costs shown in 2011 dollars. Costs in future contractor bids may vary. Estimates for liner material based on \$75 per barrel crude ([http://www.tsocorp.com/stellent/groups/corpcomm/documents/tsocorp\\_documents/001326.pdf](http://www.tsocorp.com/stellent/groups/corpcomm/documents/tsocorp_documents/001326.pdf)), and fuel prices on \$102.50 per barrel (<http://www.tradingnrg.com/will-opeac-raise-oil-quota-current-crude-oil-prices-fall-june-1-2011/>).

cm/s - centimeters per second  
CY - cubic yard  
HDPE - high-density polyethylene  
k - permeability  
LS - lump sum  
O&M - operations and maintenance  
oz - ounce  
QA/QC - quality control/quality assurance  
RI - Remedial Investigation  
SF - square feet  
SY - square yard

<sup>a</sup> Excludes 63 CY allocated to anchor trench.

<sup>b</sup> Excludes 85 CY allocated to anchor trench and fill around vent pipes.

## **Appendix C**

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### **1994 Landfill Cover Evaluation Photographs**

# 1994 Landfill Cover Evaluation Photographs

Heglar Kronquist Landfill  
Mead, Washington



Photograph 1.



Photograph 2.



## 1994 Landfill Cover Evaluation Photographs

Heglar Kronquist Landfill  
Mead, Washington



Photograph 3.



Photograph 4.

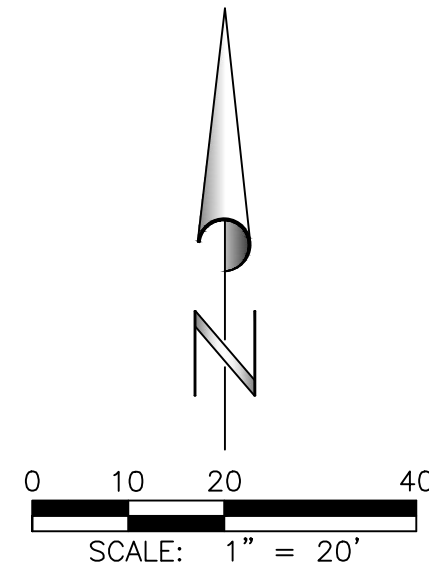
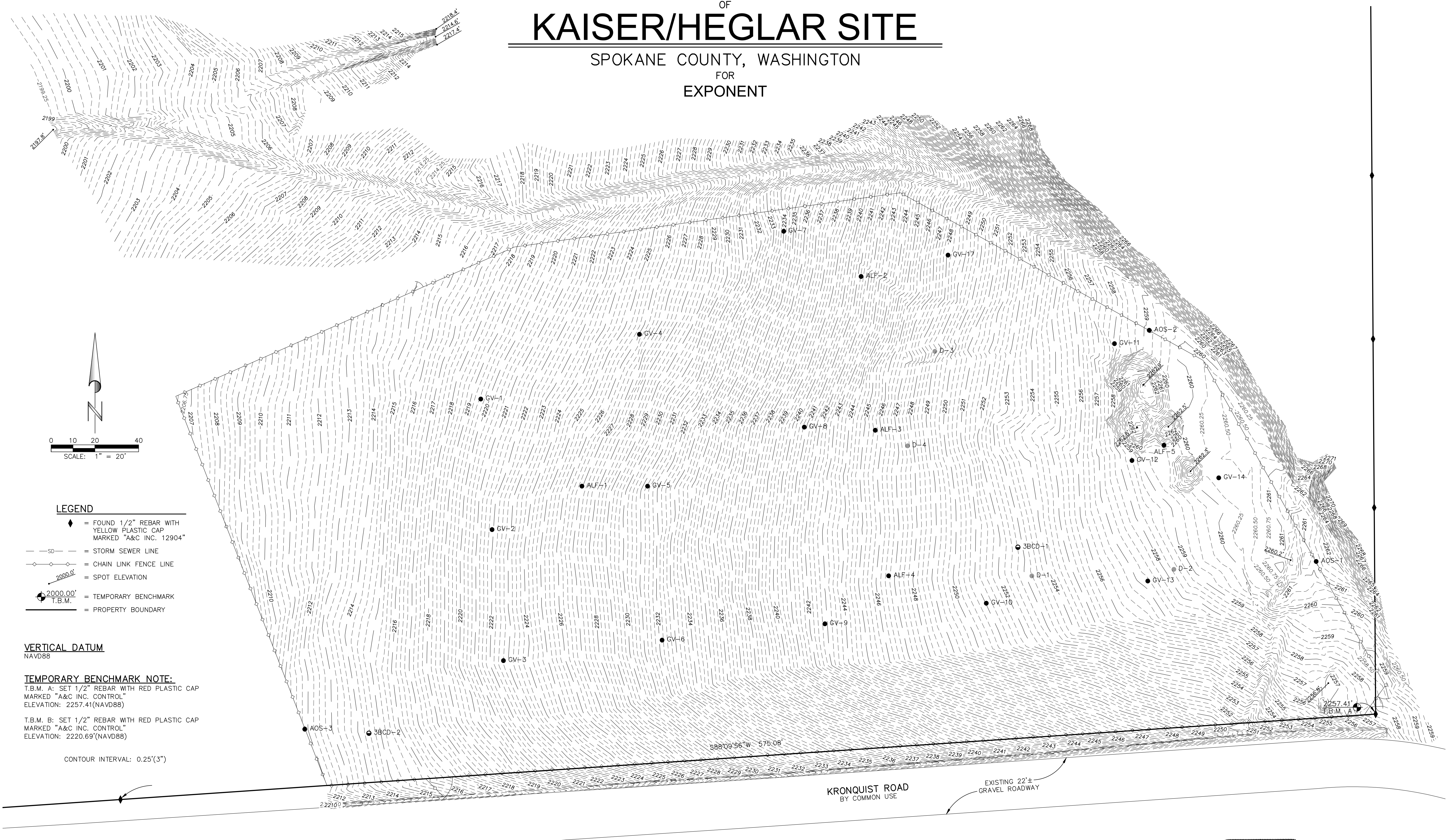


## **Appendix D**

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### **Topographic Survey of Landfill Cover, May 2011**

TOPOGRAPHIC SURVEY  
OF  
**KAISER/HEGLAR SITE**  
SPOKANE COUNTY, WASHINGTON  
FOR  
EXPONENT



**LEGEND**

- ◆ = FOUND 1/2" REBAR WITH YELLOW PLASTIC CAP MARKED "A&C INC. 12904"
- SD— = STORM SEWER LINE
- = CHAIN LINK FENCE LINE
- 2000.0' = SPOT ELEVATION
- 2000.00' T.B.M. = TEMPORARY BENCHMARK
- = PROPERTY BOUNDARY

**VERTICAL DATUM**

NAVD88

**TEMPORARY BENCHMARK NOTE:**

T.B.M. A: SET 1/2" REBAR WITH RED PLASTIC CAP MARKED "A&C INC. CONTROL" ELEVATION: 2257.41(NAVD88)

T.B.M. B: SET 1/2" REBAR WITH RED PLASTIC CAP MARKED "A&C INC. CONTROL" ELEVATION: 2220.69(NAVD88)

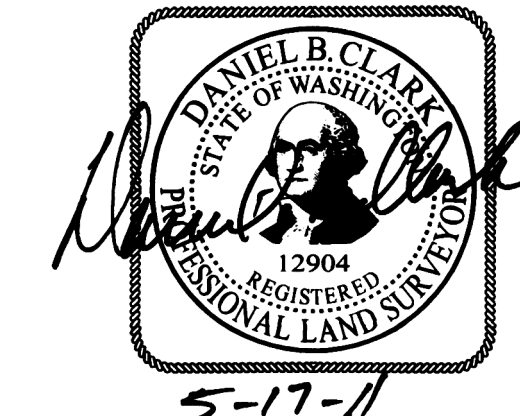
CONTOUR INTERVAL: 0.25'(3")

888°09'56"W 575.06'

KRONQUIST ROAD  
BY COMMON USE

EXISTING 22'±  
GRAVEL ROADWAY

2220.69'  
T.B.M. B



5-17-11

SHEET 1 OF 1

**AC**  
Adams & Clark, Inc.  
1720 W. Fourth Ave.  
Spokane, WA 99201-5302  
(509) 747-4600 F(509) 747-8913  
www.adamsandclark.com  
Project No. 2010-01-044

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