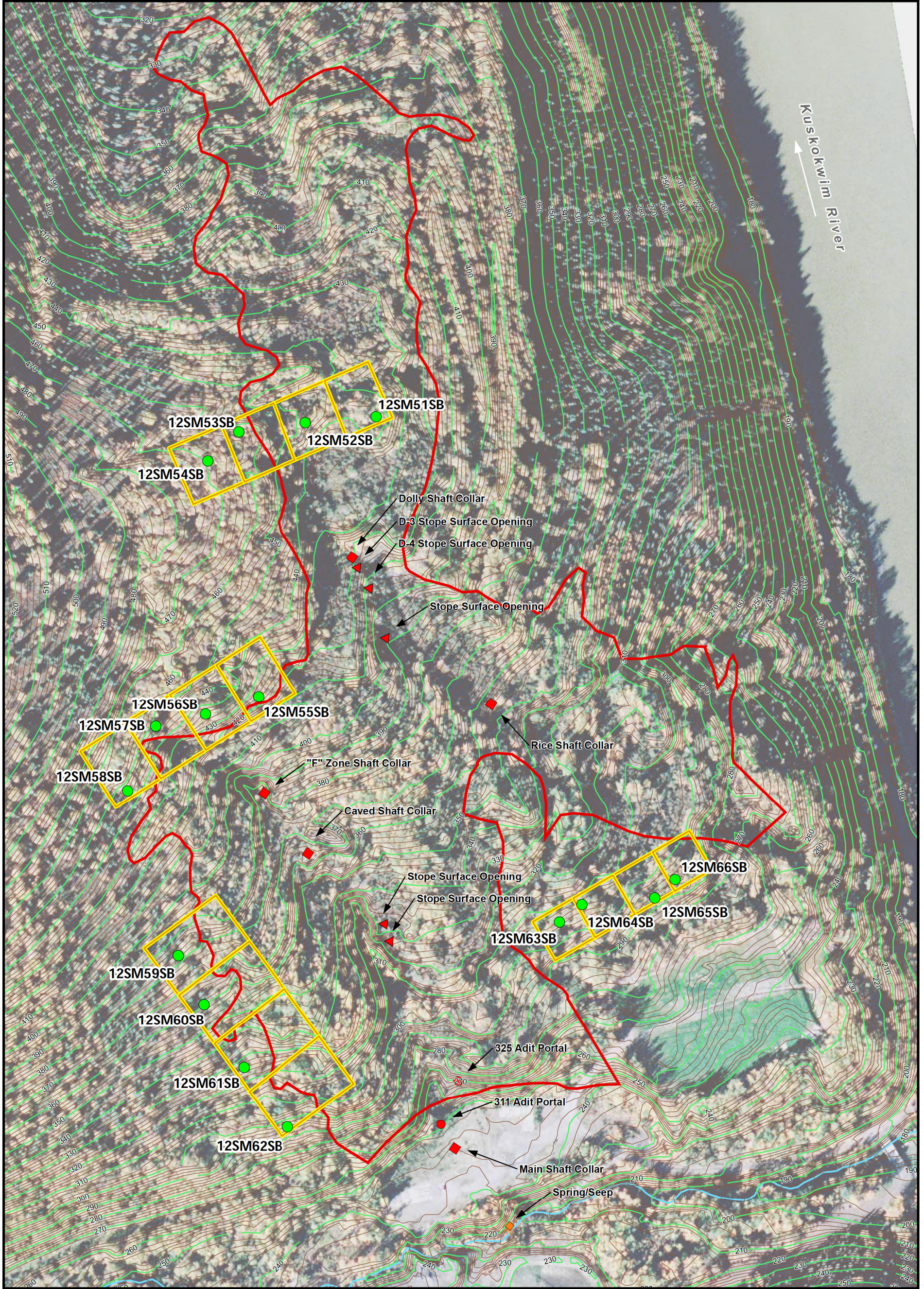


# E

## 2012 Additional Soil Characterization Data



**RED DEVIL MINE**  
**Red Devil, Alaska**

|   |   |
|---|---|
| <p><b>Former Mine Openings</b></p> <ul style="list-style-type: none"> <li>● Adit Portal</li> <li>■ Shaft Collar</li> <li>▲ Stope Surface Opening</li> <li>✦ Spring/Seep Location</li> </ul> | <ul style="list-style-type: none"> <li>● 2012 Soil Boring Locations</li> <li>□ Approximate Extent of Surface Mining</li> <li>□ Proposed Sampling Area</li> <li>— Topographic Contour (2 ft. interval)</li> <li>— Topographic Contour (10 ft. interval)</li> </ul> |
|---|---|

**Figure E-1**  
**Soil Boring Locations,**  
**Additional Soil Characterization,**  
**September 2012**

0 50 100 200 300 400  
 Feet

0 12.5 25 50 75 100  
 Meters

Scale 1:2,000

Source: Malone 1962 and MacKevett and Berg 1963  
 Image Source: Aero-Metric, Inc. 2010a  
 Topographic elevation contours source: Aero-Metric, Inc. 2010b, based on Aero-Metric, Inc. aerial photograph dated 5/29/2001

Table E-1 (part 1) Additional Soil Characterization, Soil Type and XRF Data

| Station ID | Sample Depth (inches bgs) | Laboratory Sample ID | Field Lithological Description  | Interpreted Soil Type                                     | Comments Regarding Possible Usefulness for Background Soil Characterization | Field Moisture Description | XRF Result (ppm) |         |          |         |         |         |        |          |
|------------|---------------------------|----------------------|---|---|---|----------------------------|------------------|---------|----------|---------|---------|---------|--------|----------|
|            |                           |                      |   |   |   |                            | Arsenic          | Mercury | Antimony | Barium  | Cadmium | Calcium | Cesium | Chromium |
| 12SM51SB   | 0-4                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   |                            |                  |         |          |         |         |         |        |          |
| 12SM51SB   | 4-24                      |                      | Medium gray gravelly silt with sand. Sand is very fine to medium grained. Gravel is angular to blocky to subblocky, 0.5-3cm, sandstone and siltstone. Silt is moist, soft to firm, no plasticity, occasional organics, occasional Fe-staining.  | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | 52.05            | < LOD   | < LOD    | 644.84  | < LOD   | 4225.86 | < LOD  | 71.08    |
| 12SM51SB   | 24-48                     |                      | Same as above, except less gravel and sand, low plasticity. Appears to be possible loess mixed with gravel.   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | 55.35            | < LOD   | < LOD    | 561.74  | < LOD   | 4889.05 | < LOD  | 64.12    |
| 12SM51SB   | 48-72                     | 12SM51SB06           | Grading from above to light gray to brown gravelly silt. Gravel is 0.5-4cm, angular to subrounded sandstone (orange brown) and siltstone. Silt is firm, low plasticity, occasional Fe-staining, occasional roots and organics. Refusal at 72" bgs due to gravel.                                      | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          |                            | 80.14            | < LOD   | < LOD    | 572.54  | < LOD   | 4983.11 | < LOD  | 79.8     |
| 12SM52SB   | 0-4                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   |                            |                  |         |          |         |         |         |        |          |
| 12SM52SB   | 4-24                      | 12SM52SB02           | Brown sandy silt. Sand is very fine grained. Silt is very silt, no plasticity, organic-rich, loamy.   | Indeterminate. Possible loess. Abundant organic material. |   |                            | < LOD            | < LOD   | < LOD    | 401.31  | < LOD   | 4482.01 | < LOD  | 38.55    |
| 12SM52SB   | 24-48                     |                      | Same as above, except includes roots.   | Indeterminate. Possible loess. Abundant organic material. |   |                            | 9.85             | < LOD   | < LOD    | 356.73  | < LOD   | 5427.95 | < LOD  | 76.92    |
| 12SM52SB   | 48-72                     |                      | Light gray silt with sand. Sand is very fine grained. Silt is low to medium plasticity, low moisture, firm, root casts, Fe-staining.  | Indeterminate. Possible loess.                            |   | Dry to moist               | < LOD            | < LOD   | < LOD    | 612.76  | < LOD   | 5509.35 | < LOD  | 79.69    |
| 12SM52SB   | 72-96                     |                      | Same as above   | Indeterminate. Possible loess.                            |   | Dry to moist               | 10.57            | < LOD   | < LOD    | 607.55  | < LOD   | 6025.37 | 28.74  | 58.71    |
| 12SM52SB   | 96-120                    | 12SM52SB10           | Olive gray to dark gray with occasional brown mottling (Fe-staining) gravelly silt with sand. Gravel is angular to subrounded, fine to 2cm sandstone and siltstone. Sand is fine grained. Silt is firm to stiff, low plasticity, moist. Possible grading of loess to KG Group soil.                   | Indeterminate. Possible mixed loess and KG soil.          |   | Moist                      | 12.49            | < LOD   | < LOD    | 520.88  | < LOD   | 3974.16 | < LOD  | 93.01    |
| 12SM52SB   | 120-132                   | 12SM52SB11           | Dark gray gravel with silt and sand. Sand is medium to coarse grained. Gravel is angular to blocky altered sandstone and siltstone, fine to 3cm, Fe-staining, occasional calcareous mineralization. Low moisture.   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Dry to moist               | 1220.04          | 36.13   | 86.9     | 1200.98 | < LOD   | 1012.59 | 58.77  | < LOD    |
| 12SM53SB   | 0-4                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   |                            |                  |         |          |         |         |         |        |          |
| 12SM53SB   | 4-24                      |                      | Olive gray silt. Very soft. Very low moisture. No plasticity. Organic-rich. Roots. Loamy.   | Indeterminate. Possible loess. Abundant organic material. |   | Dry to moist               | < LOD            | < LOD   | < LOD    | 373.75  | < LOD   | 5341.39 | < LOD  | < LOD    |
| 12SM53SB   | 24-48                     |                      | Same as above, except slightly micaceous and less organics.   | Indeterminate. Possible loess. Abundant organic material. |   | Dry to moist               | < LOD            | < LOD   | < LOD    | 343.51  | < LOD   | 4872.63 | < LOD  | 39.82    |
| 12SM53SB   | 48-72                     |                      | Medium gray to olive gray silt with trace sand. Sand is very fine grained. Silt is firm, occasional Fe-staining, low plasticity, low moisture.  | Indeterminate. Possible loess.                            |   | Dry to moist               | 9.54             | < LOD   | < LOD    | 542.48  | < LOD   | 4338.71 | < LOD  | 62.98    |
| 12SM53SB   | 72-96                     |                      | Same as above, except increased moisture.   | Indeterminate. Possible loess.                            |   | Moist                      | 12.56            | < LOD   | < LOD    | 531.5   | < LOD   | 5181.65 | < LOD  | < LOD    |
| 12SM53SB   | 96-120                    | 12SM53SB10           | Dark gray and brown with orange Fe-staining gravelly silt with sand. Sand is fine to medium grained. Gravel is 1-4cm, subrounded to subblocky sandstone and siltstone, occasional red-brown sand grains. Silt is firm and moist. Refusal at 120" bgs due to gravel.                                   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears non-mineralized.      | Moist                      | 15.39            | < LOD   | < LOD    | 737.3   | < LOD   | 2666.06 | 48.34  | < LOD    |
| 12SM54SB   | 0-4                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   |                            |                  |         |          |         |         |         |        |          |
| 12SM54SB   | 4-24                      |                      | Medium brown to olive brown silt. Very soft, no plasticity, low moisture, organic-rich, occasional roots, loamy.  | Indeterminate. Possible loess. Abundant organic material. |   | Dry to moist               | < LOD            | < LOD   | < LOD    | 254.97  | < LOD   | 4573.7  | < LOD  | < LOD    |
| 12SM54SB   | 24-48                     |                      | Olive gray with occasional brown Fe-staining silt with trace sand. Sand is very fine. Low plasticity, firm, low moisture, Fe-staining with organics.  | Indeterminate. Possible loess.                            |   | Dry to moist               |                  |         |          |         |         |         |        |          |
| 12SM54SB   | 48-72                     |                      | Same as above   | Indeterminate. Possible loess.                            |   | Dry to moist               | < LOD            | < LOD   | < LOD    | 654.32  | < LOD   | 5350.96 | 36.83  | 83.74    |
| 12SM54SB   | 72-96                     |                      | Same as above, except with root casts and bubbles, increased moisture and plasticity.   | Indeterminate. Possible loess.                            |   | Moist                      | 15.25            | < LOD   | < LOD    | 605.82  | < LOD   | 4632.75 | < LOD  | 49.95    |
| 12SM54SB   | 84-120                    |                      | Same as above, except with trace gravel to 2 cm and increased moisture.   | Mixed loess/KG soil                                       |   | Moist                      | 10.32            | < LOD   | < LOD    | 561.77  | < LOD   | 5517.6  | < LOD  | 48.65    |
| 12SM54SB   | 120-126                   | 12SM54SB11           | Olive gray gravelly silt with sand. Sand is fine to medium grained. Gravel is 1-3 cm, angular to rounded sandstone and siltstone, altered, occasional calcareous mineralization, occasional Fe-stained sand grains. Silt is firm, low plasticity, moist. Refusal at 126" bgs due to gravel.           | KG soil   | KG soil not demonstrably undisturbed. KG soil appears non-mineralized.      | Moist                      | 15.99            | < LOD   | < LOD    | 386.23  | < LOD   | 1661.92 | < LOD  | 64.52    |
| 12SM55SB   | 0-2                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   | Moist                      |                  |         |          |         |         |         |        |          |
| 12SM55SB   | 2-12                      |                      | Olive brown sandy silt. Sand (30%) is very fine to fine grained. Silt is soft, no plasticity, moist, with organics and roots.   | Indeterminate. Possible loess. Abundant organic material. |   | Moist                      | < LOD            | < LOD   | < LOD    | 309.36  | < LOD   | 3750.83 | < LOD  | 54.65    |
| 12SM55SB   | 12-24                     |                      | Same as above, except with occasional Fe-staining and trace gravel (2-3 cm).  | Mixed loess/KG soil                                       |   | Moist                      | < LOD            | < LOD   | < LOD    | 199.85  | < LOD   | 3096.24 | < LOD  | 78.58    |
| 12SM55SB   | 24-36                     |                      | Olive brown gray gravelly silty sand. Gravel (30%) is fine to 3 cm, angular to blocky sandstone and siltstone. Sand (40%) is very fine to medium grained. 30% silt. Trace organics.   | Mixed loess/KG soil                                       |   | Moist                      | < LOD            | < LOD   | < LOD    | 311.17  | < LOD   | 1208.13 | < LOD  | 98.69    |
| 12SM55SB   | 36-48                     | 12SM55SB04           | Transition from above to sandy gravelly silt. Gravel is fine to 4 cm platy siltstone and angular to blocky sandstone. Sand is fine to coarse grained. Silt is firm with low plasticity. Occasional organics. Occasional orange brown Fe-staining associated with sand grains.                         | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | 14.47            | < LOD   | < LOD    | 719.54  | < LOD   | < LOD   | 27.11  | 64.48    |
| 12SM55SB   | 48-60                     |                      | Same as above, except with more larger sized gravel, silt has low to moderate plasticity, and increased Fe-staining.  | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | 27.05            | < LOD   | < LOD    | 480.97  | < LOD   | 828.53  | < LOD  | 78.71    |
| 12SM55SB   | 60-66                     |                      | Dark olive gray to brown silty gravelly sand. Sand is fine to medium grained. Silt has low plasticity. Gravel is weathered bedrock in 1-6cm clasts of hydro altered sandstone (strong Fe-staining) and siltstone. Breaking on Fe-stained facets. Some calcareous mineralizations. Angular and blocky. | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | 85.87            | < LOD   | < LOD    | 697.99  | < LOD   | < LOD   | < LOD  | 46.85    |

Table E-1 (part 1) Additional Soil Characterization, Soil Type and XRF Data

| Station ID | Sample Depth (inches bgs) | Laboratory Sample ID | Field Lithological Description  | Interpreted Soil Type                                     | Comments Regarding Possible Usefulness for Background Soil Characterization | Field Moisture Description | XRF Result (ppm) |         |          |         |         |         |        |          |
|------------|---------------------------|----------------------|---|---|---|----------------------------|------------------|---------|----------|---------|---------|---------|--------|----------|
|            |                           |                      |   |   |   |                            | Arsenic          | Mercury | Antimony | Barium  | Cadmium | Calcium | Cesium | Chromium |
| 12SM55SB   | 66-72                     |                      | Dark olive gray to brown silty gravelly sand. Sand is fine to medium grained. Silt has low plasticity. Gravel is weathered bedrock in 1-6cm clasts of hydro altered sandstone (strong Fe-staining) and siltstone. Breaking on Fe-stained facets. Some calcareous mineralizations. Angular and blocky.   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | 60.82            | < LOD   | < LOD    | 503.39  | < LOD   | < LOD   | < LOD  | 68.16    |
| 12SM55SB   | 72-78                     |                      | Dark olive gray with occasional black sandy gravel with silt. Gravel is weathered bedrock in 1-3cm clasts of hydro altered sandstone (strong Fe-staining) and siltstone. Breaking on Fe-stained facets. Some calcareous mineralizations. Silt is firm to hard, low plasticity, moist with very fine sand grains and black flecks. Silt appears to be in situ weathering of black friable shale.   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | 49.42            | < LOD   | < LOD    | 675.41  | < LOD   | < LOD   | < LOD  | 107.95   |
| 12SM55SB   | 78-84                     | 12SM55SB07           | Dark olive gray with occasional black sandy gravel with silt. Gravel is weathered bedrock in 1-3cm clasts of hydro altered sandstone (strong Fe-staining) and siltstone. Breaking on Fe-stained facets. Some calcareous mineralizations. Silt is firm to hard, low plasticity, moist with very fine sand grains and black flecks. Silt appears to be in situ weathering of black friable shale. Refusal at 84" on rocks, likely KG Group Bedrock. | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | 51.69            | < LOD   | < LOD    | 524.64  | < LOD   | 166.27  | < LOD  | 116.29   |
| 12SM56SB   | 0-3                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   |                            |                  |         |          |         |         |         |        |          |
| 12SM56SB   | 3-24                      |                      | Medium brown silt with sand. Sand is very fine grained. Silt has moderate plasticity, moist, occasional organics.   | Indeterminate. Possible loess. Abundant organic material. |   |                            | 8.89             | < LOD   | < LOD    | 141.73  | < LOD   | 3816.9  | < LOD  | < LOD    |
| 12SM56SB   | 24-48                     |                      | Medium gray to olive gray gravelly silt. Gravel is 1-3 cm angular sandstone and siltstone. Silt has medium plasticity, moist, soft.   | Indeterminate. Possible mixed Loess/KG soil               |   |                            | 9.51             | < LOD   | < LOD    | 581.04  | < LOD   | 1611.17 | 21.46  | 73.57    |
| 12SM56SB   | 48-54                     | 12SM56SB05           | Brown silty gravel with sand. Sand is medium grained. Gravel is 0.5-5cm, subrounded to angular sandstone and siltstone. Silt has medium plasticity and is moist.  | KG soil   | KG soil not demonstrably undisturbed. KG soil appears non-mineralized.      |                            | 9.46             | < LOD   | < LOD    | 182.71  | < LOD   | 1141.2  | < LOD  | 57.4     |
| 12SM57SB   | 0-4                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   |                            |                  |         |          |         |         |         |        |          |
| 12SM57SB   | 4-24                      |                      | Medium brown sandy silt with gravel. Gravel is 2-4 cm, angular to subrounded sandstone. Sand is very fine grained. Silt is wet, low plasticity, occasional organics and roots.  | KG soil   | KG soil not demonstrably undisturbed. KG soil appears non-mineralized.      | Wet                        | < LOD            | < LOD   | < LOD    | 155.12  | < LOD   | 3698.46 | < LOD  | 57.7     |
| 12SM57SB   | 24-48                     |                      | Light gray to medium brown silt with sand and gravel. Sand is very fine grained. Gravel is 1-2cm, angular to subrounded sandstone. Silt has brown Fe-staining, firm, low moisture, low plasticity, micaceous.   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears non-mineralized.      | Dry to moist               | < LOD            | < LOD   | < LOD    | 532.59  | < LOD   | 4311.25 | < LOD  | 84.68    |
| 12SM57SB   | 48-60                     | 12SM57SB05           | Same as above, except with increased gravel. Refusal at 60" due to gravel.  | KG soil   | KG soil not demonstrably undisturbed. KG soil appears non-mineralized.      | Dry to moist               | 16.33            | < LOD   | < LOD    | 727.55  | < LOD   | 4703.24 | 29.1   | 68.07    |
| 12SM58SB   | 0-12                      |                      | Organic mat (tundra)  | Organic mat (tundra)                                      |   |                            |                  |         |          |         |         |         |        |          |
| 12SM58SB   | 12-24                     | 12SM58SB02           | Medium brown sandy silt with gravel. Gravel is fine to 2 cm, subrounded sandstone. Sand is very fine to fine grained. Silt is very moist, very soft, no plasticity, organic-rich and roots.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist to wet               | 12               | < LOD   | < LOD    | 220.56  | < LOD   | 3302.73 | < LOD  | 65.57    |
| 12SM58SB   | 24-48                     |                      | Medium olive brown sandy silt with gravel. Gravel is fine to 2 cm, subrounded sandstone. Sand is very fine to fine grained. Silt is very wet, very soft, no plasticity. Perched water layer flooding borehole.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Very wet                   | 9.12             | < LOD   | < LOD    | 485.14  | < LOD   | 3084.85 | < LOD  | 65.04    |
| 12SM58SB   | 48-66                     |                      | Same as above   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Very wet                   | 8.65             | < LOD   | < LOD    | 556.51  | < LOD   | 3229.65 | < LOD  | 66.02    |
| 12SM58SB   | 66-72                     |                      | Same as above, except with increased 1-4cm gravel (30%). Refusal at 72" due to gravel.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               |                            | < LOD            | < LOD   | < LOD    | 507.01  | < LOD   | 3655.16 | < LOD  | 80.92    |
| 12SM59SB   | 0-4                       |                      | Organic mat (tundra)  | Organic mat (tundra)                                      |   | Moist                      |                  |         |          |         |         |         |        |          |
| 12SM59SB   | 4-12                      | 12SM59SB01           | Medium to dark brown silt with gravel. Very soft. Organic-rich. No plasticity. Loamy. Gravel (10%) is angular to blocky, sandstone, 2-4 cm.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | < LOD            | < LOD   | < LOD    | 182.1   | < LOD   | 2937.89 | < LOD  | 45.4     |
| 12SM59SB   | 12-24                     |                      | Medium brown gravelly silt. Gravel (40%) is 3-7 cm, angular to blocky sandstone and siltstone. Silt is soft to firm, none to low plasticity. Occasional organics.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | < LOD            | < LOD   | < LOD    | 265.43  | < LOD   | 2725.9  | < LOD  | 56.97    |
| 12SM59SB   | 24-36                     |                      | Same as above, except gravel is 5-8 cm, silt is loess-like, and increasing moisture.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist to wet               | 10.28            | < LOD   | < LOD    | 296.76  | < LOD   | 3555.54 | < LOD  | 77.35    |
| 12SM59SB   | 36-48                     |                      | No recovery   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist to wet               | 8.94             | < LOD   | < LOD    | 321.82  | < LOD   | 3364.65 | < LOD  | 55.78    |
| 12SM59SB   | 48-60                     | 12SM59SB05           | Light gray (occasional brown mottling) silt with trace gravel. Gravel is 1-3 cm, angular sandstone. Silt is low to medium plasticity, moist, soft to firm, brown/rust mottling appears to be root casts. Trace organics. Refusal at 60" due to large rock.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | < LOD            | < LOD   | < LOD    | 611.91  | < LOD   | 2812.06 | 23.07  | 61.05    |
| 12SM60SB   | 0-4                       |                      | Organic mat (tundra)  | Organic mat (tundra)                                      |   | Wet                        |                  |         |          |         |         |         |        |          |
| 12SM60SB   | 4-12                      |                      | Light brown sandy silt with gravel. Sand is fine to medium grained. Gravel is angular to blocky, sandstone, 1-4cm, occasional subblocky. Many roots. Abundant decomposing organics. Soft and loamy.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 14.14            | < LOD   | < LOD    | 302.61  | < LOD   | 2866.14 | < LOD  | 41.86    |
| 12SM60SB   | 12-24                     |                      | Light brown silty gravel with sand. Sand is fine grained. Gravel is 3-7cm, angular to platy, sandstone with occasional siltstone. Silt is organic rich, loamy.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 9.95             | < LOD   | < LOD    | 456.84  | < LOD   | 3209.89 | < LOD  | < LOD    |
| 12SM60SB   | 24-36                     |                      | Light brown gray gravelly silt with sand. Sand is very fine to fine grained. Gravel (30%) is platy, siltstone, occasional sandstone, 3-6 cm, occasional blocky sandstone. Silt is loess-like with more sand, none to low plasticity, soft.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | < LOD            | < LOD   | < LOD    | < LOD   | < LOD   | 4869.49 | < LOD  | 55.51    |
| 12SM60SB   | 36-48                     |                      | Same as above, except with increasing gravel (40%)  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 12.88            | < LOD   | < LOD    | 542.91  | < LOD   | 2454.86 | 22.1   | 100.57   |
| 12SM60SB   | 48-60                     |                      | Same as above, except with increasing sand. Loess-like silt is light gray with occasional red stained clasts, low plasticity, clasts occasionally subblocky.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 32.86            | < LOD   | < LOD    | 876.89  | < LOD   | 395.03  | 49.58  | < LOD    |
| 12SM60SB   | 60-72                     | 12SM60SB06           | Brown to dark brown silty gravel with sand. Gravel is angular to subblocky sandstone and siltstone, 1-4cm, fresh iron oxide 'facets'. Sand is fine grained. Firm.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 35.42            | < LOD   | < LOD    | 911.14  | < LOD   | 517.93  | 30.7   | 50.55    |
| 12SM60SB   | 72-84                     | 12SM60SB07           | Dark brown to very dark gray silty gravel with trace sand. Gravel is blocky to angular with occasional subrounded, strong siltstone to friable black shale, 0.5-4 cm, fresh facets. Refusal at 84" bgs as weathered bedrock transitions to bedrock.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 21.05            | < LOD   | < LOD    | 1078.76 | < LOD   | 418.78  | 43.05  | 60.42    |
| 12SM61SB   | 0-4                       |                      | Organic mat (tundra)  | Organic mat (tundra)                                      |   |                            |                  |         |          |         |         |         |        |          |
| 12SM61SB   | 4-10                      |                      | Medium brown sandy silt. Gravel is 2cm - <8cm (observed platy clast in shovel hole to 8" width), angular - blocky - platy, sandstone - siltstone, friable siltstone. Sand is fine to medium grained, quartz. Silt is low plasticity and moist. Occasional organics.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 11.61            | < LOD   | < LOD    | 353.02  | < LOD   | 3659.95 | < LOD  | 76.63    |
| 12SM61SB   | 10-16                     | 12SM61SB01           | Same as above, except with 40% gravel, 45% silt, and 15% sand.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 22.74            | < LOD   | < LOD    | 486.35  | < LOD   | 3911.35 | < LOD  | < LOD    |
| 12SM61SB   | 16-22                     |                      | Medium brown silty gravel with sand. Sand is fine grained. Gravel is subangular to subblocky, occasional platy, 1-10 cm, sandstone - siltstone. Trace organics.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 25.7             | < LOD   | < LOD    | 657.83  | < LOD   | 2548.12 | 24.59  | 43.53    |



Table E-1 (part 1) Additional Soil Characterization, Soil Type and XRF Data

| Station ID | Sample Depth (inches bgs) | Laboratory Sample ID | Field Lithological Description  | Interpreted Soil Type              | Comments Regarding Possible Usefulness for Background Soil Characterization  | Field Moisture Description | XRF Result (ppm) |         |          |        |         |         |        |          |
|------------|---------------------------|----------------------|---|------------------------------------|--|----------------------------|------------------|---------|----------|--------|---------|---------|--------|----------|
|            |                           |                      |   |                                    |  |                            | Arsenic          | Mercury | Antimony | Barium | Cadmium | Calcium | Cesium | Chromium |
| 12SM64SB   | 3-12                      |                      | Dark brown sandy silt with trace gravel. Gravel is fine. Sand is very fine to fine grained. Silt is organic-rich, abundant roots, very soft, no plasticity, loamy.  | Loess with abundant organic matter |  | Dry to moist               | 18.96            | < LOD   | < LOD    | < LOD  | < LOD   | 2201.82 | < LOD  | 47.94    |
| 12SM64SB   | 12-24                     |                      | Light gray to light brown silt with sand. Sand is very fine to fine grained. Silt is moderately moist, none to low-plasticity, soft, abundant roots, occasional organics. Grading to loess.   | Loess with abundant organic matter |  | Moist                      | 8.92             | < LOD   | < LOD    | 225.15 | < LOD   | 3071.55 | < LOD  | 90.31    |
| 12SM64SB   | 24-36                     |                      | Same as above, except sand grading to very fine grained. No roots.  | Loess                              |  | Moist                      | 12.27            | < LOD   | < LOD    | 283.35 | < LOD   | 2817.5  | < LOD  | 56.5     |
| 12SM64SB   | 36-48                     |                      | Same as above, except no brown silt, occasional fine grained sand, increasing moisture, and low plasticity.   | Loess                              |  | Moist to wet               | 10.49            | < LOD   | < LOD    | 316.22 | < LOD   | 3351.55 | < LOD  | 87.86    |
| 12SM64SB   | 48-60                     |                      | Light gray to light olive silt with sand. Low plasticity. Firm. Red brown staining along roots.   | Loess                              |  | Moist to wet               | 16.17            | < LOD   | < LOD    | 444.81 | < LOD   | 2993.07 | < LOD  | 80.2     |
| 12SM64SB   | 60-72                     |                      | Same as above, except with possible clay, medium plasticity, and less red brown staining along roots.   | Loess                              |  | Moist to wet               | 10.73            | < LOD   | < LOD    | 411.05 | < LOD   | 2586.96 | < LOD  | 90.53    |
| 12SM64SB   | 72-84                     |                      | Same as above, except it appears to contain a paleo moss horizon. Refusal at 84" due to rocks.  | Loess                              | Undisturbed KG soil likely present at bottom of soil boring, but no KG soil recovered in soil sample.  | Wet                        | < LOD            | < LOD   | < LOD    | 399.58 | < LOD   | 1345.06 | < LOD  | 70.59    |
| 12SM65SB   | 0-2                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)            |  | Dry to moist               |                  |         |          |        |         |         |        |          |
| 12SM65SB   | 2-12                      |                      | Medium olive brown silty sand. Silt 40%. Sand 60%, very fine to fine grained. Very loose. Organic rich with roots. Loamy.   | Loess with abundant organic matter |  | Dry to moist               | < LOD            | < LOD   | < LOD    | 175.8  | < LOD   | 3667.86 | < LOD  | 84.48    |
| 12SM65SB   | 12-24                     |                      | Medium olive gray silty sand. 45% silt. 55% sand, very fine. Loose. Occasional roots. Occasional Fe staining. Trace organics.   | Loess                              |  | Dry to moist               | < LOD            | < LOD   | < LOD    | 123.27 | < LOD   | 2983.54 | < LOD  | 58.88    |
| 12SM65SB   | 24-36                     |                      | Same as above, except 40% silt, 60% sand, increasing brown color.   | Loess                              |  | Dry to moist               | 13.68            | < LOD   | < LOD    | 153.99 | < LOD   | 3704.16 | < LOD  | 80.67    |
| 12SM65SB   | 36-48                     |                      | Same as above, except with occasional orange brown Fe-staining.   | Loess                              |  | Dry to moist               | 12.15            | < LOD   | < LOD    | 288.93 | < LOD   | 3248.78 | < LOD  | 66.6     |
| 12SM65SB   | 48-60                     |                      | Olive brown and orange gray sandy silt. Sand (40%) is very fine grained. Silt is soft to firm, none to low plasticity, and micaceous.   | Loess                              |  | Moist                      | < LOD            | < LOD   | < LOD    | 320.04 | < LOD   | 4010.05 | < LOD  | 88.5     |
| 12SM65SB   | 60-72                     |                      | Same as above, except low plasticity.   | Loess                              |  | Moist to wet               | 9.1              | < LOD   | < LOD    | 528.43 | < LOD   | 4244.71 | < LOD  | 79.65    |
| 12SM65SB   | 72-84                     |                      | Same as above, except there is a 1-2" lens of medium grained sand.  | Loess                              |  | Moist to wet               | < LOD            | < LOD   | < LOD    | 563.23 | < LOD   | 3034.46 | < LOD  | 69.16    |
| 12SM65SB   | 84-96                     |                      | Same as above, except increasing silt, and firm.  | Loess                              |  | Moist to wet               | 11.67            | < LOD   | < LOD    | 378.07 | < LOD   | 3495.05 | < LOD  | 94.62    |
| 12SM65SB   | 96-108                    |                      | Same as above, except it includes banding of red brown Fe-staining in fine grained sand showing mild concretion.  | Loess                              |  | Moist to wet               | 12.04            | < LOD   | < LOD    | 391.23 | < LOD   | 2691.26 | < LOD  | 70.15    |
| 12SM65SB   | 108-120                   |                      | Same as above, except with paleo tundra (moss and roots)  | Loess                              |  | Moist to wet               | 9.54             | < LOD   | < LOD    | 332.68 | < LOD   | 2770.76 | < LOD  | 68.14    |
| 12SM65SB   | 120-132                   |                      | Same as above, except with no paleo tundra  | Loess                              |  | Moist                      | 18.57            | < LOD   | < LOD    | 457.78 | < LOD   | 2595.82 | < LOD  | 100.42   |
| 12SM65SB   | 132-144                   | 12SM65SB12           | Same as above, except grading to silty sand with gravel. Sand is fine to coarse grained, possible quartz. Gravel is sandstone with strong red brown to gray brown Fe-staining, 0.5-26cm, subangular to blocky. Stiff. Maximum length of hand auger 12' bgs. | Mixed loess/KG soil                | Undisturbed KG soil likely present at bottom of soil boring, but only mixed loess/KG soil recovered in soil sample. KG soil appears mineralized. | Moist                      | 48.77            | < LOD   | < LOD    | 520.64 | < LOD   | 1283.74 | < LOD  | 95.96    |
| 12SM66SB   | 0-2                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)            |  | Dry to moist               |                  |         |          |        |         |         |        |          |
| 12SM66SB   | 2-12                      |                      | Light gray to olive gray sandy silt. Sand is very fine grained. Silt is soft, low moisture, no plasticity.  | Loess                              |  | Dry to moist               | < LOD            | < LOD   | < LOD    | 238.4  | < LOD   | 3085.37 | < LOD  | 78.21    |
| 12SM66SB   | 12-24                     |                      | 12" to 16" same as above. 16" to 20" highly organic silt with decomposing organic matter, roots, paleosol. 20" to 24" olive gray sandy silt. Sand is fine grained. Silt is soft with no plasticity.   | Loess/Paleosol/Loess               |  | Dry to moist               | < LOD            | < LOD   | < LOD    | 156.5  | < LOD   | 2639.92 | < LOD  | 83.57    |
| 12SM66SB   | 24-36                     |                      | Olive gray sandy silt. Sand is fine grained. Silt is soft with no plasticity.   | Loess                              |  | Dry to moist               | < LOD            | < LOD   | < LOD    | 242.04 | < LOD   | 3588.42 | < LOD  | 38.98    |
| 12SM66SB   | 36-48                     |                      | Same as above   | Loess                              |  | Moist                      | 10.18            | < LOD   | < LOD    | 255.92 | < LOD   | 3018.27 | < LOD  | 55.72    |
| 12SM66SB   | 48-60                     |                      | Same as above, except increasing moisture, low plasticity. 30% sand. 70% silt.  | Loess                              |  | Moist                      | 11.21            | < LOD   | < LOD    | 360.76 | < LOD   | 3779.23 | < LOD  | 66.89    |
| 12SM66SB   | 60-72                     |                      | Same as above, except occasional Fe-staining  | Loess                              |  | Moist                      | < LOD            | < LOD   | < LOD    | 456.62 | < LOD   | 3007.03 | < LOD  | 93.35    |
| 12SM66SB   | 72-84                     |                      | Same as above, except with increasing sand (40%) and occasional medium gravel.  | Loess                              |  | Moist                      | < LOD            | < LOD   | < LOD    | 507.15 | < LOD   | 2697.64 | < LOD  | 54.38    |
| 12SM66SB   | 84-96                     |                      | Same as above, except with decreasing very fine grained sand (30%).   | Loess                              |  | Moist                      | < LOD            | < LOD   | < LOD    | 397.64 | < LOD   | 3287.01 | < LOD  | 76.19    |
| 12SM66SB   | 96-108                    |                      | Same as above, except with decreasing very fine grained sand (10%), low to medium plasticity, and increased Fe-staining.  | Loess                              |  | Moist                      | 13.77            | < LOD   | < LOD    | 347.88 | < LOD   | 3077.08 | < LOD  | 77.52    |
| 12SM66SB   | 108-120                   |                      | Same as above, except with increasing very fine to medium grained sand (20%). Occasional Fe-stained medium brown concretions associated with sand grains.   | Loess                              |  | Moist                      | 9.14             | < LOD   | < LOD    | 395.4  | < LOD   | 3361.54 | < LOD  | 97.11    |
| 12SM66SB   | 120-132                   |                      | Same as above, Except with increasing red brown Fe-staining. Medium plasticity.   | Loess                              |  | Moist to wet               | 25.26            | < LOD   | < LOD    | 355.74 | < LOD   | 2015.84 | < LOD  | 51.17    |
| 12SM66SB   | 132-144                   |                      | Same as above, except with possible clay. Maximum length of hand auger 12' bgs.   | Loess                              | Undisturbed KG soil likely present below loess, but no KG soil encountered in soil boring.   | Moist to wet               | 10.8             | < LOD   | < LOD    | 238.53 | < LOD   | 2299.53 | < LOD  | 66.04    |

Note: XRF results are for non-dried samples. See Field Moisture Description for qualitative observations of moisture content of sample.

Key:

- ' = feet
- " = inches
- bgs = Below ground surface
- cm = centimeter
- Fe = iron
- ID = Identification
- KG soil = Kuskokwim Group bedrock-derived soil
- XRF = X-ray fluorescence spectrometry
- < LOD = Less than the XRF instrument level of detection
- ppm = Parts per million.
- XRF = X-ray fluorescence

Table E-1 (part 2) Additional Soil Characterization, Soil Type and XRF Data

| Station ID | Sample Depth (inches bgs) | Laboratory Sample ID | Field Lithological Description  | Interpreted Soil Type                                     | Comments Regarding Possible Usefulness for Background Soil Characterization | Field Moisture Description | XRF Result (ppm) |        |          |       |           |            |        |           |
|------------|---------------------------|----------------------|---|---|---|----------------------------|------------------|--------|----------|-------|-----------|------------|--------|-----------|
|            |                           |                      |   |   |   |                            | Cobalt           | Copper | Iron     | Lead  | Manganese | Molybdenum | Nickel | Palladium |
| 12SM51SB   | 0-4                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   |                            |                  |        |          |       |           |            |        |           |
| 12SM51SB   | 4-24                      |                      | Medium gray gravelly silt with sand. Sand is very fine to medium grained. Gravel is angular to blocky to subblocky, 0.5-3cm, sandstone and siltstone. Silt is moist, soft to firm, no plasticity, occasional organics, occasional Fe-staining.  | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | 153.14           | 47.79  | 17547.61 | < LOD | 281.26    | < LOD      | < LOD  | < LOD     |
| 12SM51SB   | 24-48                     |                      | Same as above, except less gravel and sand, low plasticity. Appears to be possible loess mixed with gravel.   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | < LOD            | < LOD  | 17081.1  | 11.66 | 261.12    | < LOD      | < LOD  | < LOD     |
| 12SM51SB   | 48-72                     | 12SM51SB06           | Grading from above to light gray to brown gravelly silt. Gravel is 0.5-4cm, angular to subrounded sandstone (orange brown) and siltstone. Silt is firm, low plasticity, occasional Fe-staining, occasional roots and organics. Refusal at 72" bgs due to gravel.                                      | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          |                            | < LOD            | < LOD  | 18519.57 | < LOD | 320.98    | < LOD      | < LOD  | < LOD     |
| 12SM52SB   | 0-4                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   |                            |                  |        |          |       |           |            |        |           |
| 12SM52SB   | 4-24                      | 12SM52SB02           | Brown sandy silt. Sand is very fine grained. Silt is very silt, no plasticity, organic-rich, loamy.   | Indeterminate. Possible loess. Abundant organic material. |   |                            | < LOD            | < LOD  | 18588.86 | < LOD | 322.96    | < LOD      | < LOD  | < LOD     |
| 12SM52SB   | 24-48                     |                      | Same as above, except includes roots.   | Indeterminate. Possible loess. Abundant organic material. |   |                            | 195.83           | < LOD  | 19849.18 | < LOD | 369.62    | < LOD      | < LOD  | < LOD     |
| 12SM52SB   | 48-72                     |                      | Light gray silt with sand. Sand is very fine grained. Silt is low to medium plasticity, low moisture, firm, root casts, Fe-staining.  | Indeterminate. Possible loess.                            |   | Dry to moist               | < LOD            | < LOD  | 20862.48 | 11.93 | 408.96    | < LOD      | < LOD  | < LOD     |
| 12SM52SB   | 72-96                     |                      | Same as above   | Indeterminate. Possible loess.                            |   | Dry to moist               | < LOD            | < LOD  | 16009.01 | < LOD | 270.67    | < LOD      | < LOD  | < LOD     |
| 12SM52SB   | 96-120                    | 12SM52SB10           | Olive gray to dark gray with occasional brown mottling (Fe-staining) gravelly silt with sand. Gravel is angular to subrounded, fine to 2cm sandstone and siltstone. Sand is fine grained. Silt is firm to stiff, low plasticity, moist. Possible grading of loess to KG Group soil.                   | Indeterminate. Possible mixed loess and KG soil.          |   | Moist                      | < LOD            | < LOD  | 14252.71 | < LOD | 179.86    | < LOD      | < LOD  | < LOD     |
| 12SM52SB   | 120-132                   | 12SM52SB11           | Dark gray gravel with silt and sand. Sand is medium to coarse grained. Gravel is angular to blocky altered sandstone and siltstone, fine to 3cm, Fe-staining, occasional calcareous mineralization. Low moisture.   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Dry to moist               | < LOD            | 52.15  | 54975.18 | < LOD | 868.14    | < LOD      | 93.83  | < LOD     |
| 12SM53SB   | 0-4                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   |                            |                  |        |          |       |           |            |        |           |
| 12SM53SB   | 4-24                      |                      | Olive gray silt. Very soft. Very low moisture. No plasticity. Organic-rich. Roots. Loamy.   | Indeterminate. Possible loess. Abundant organic material. |   | Dry to moist               | < LOD            | 29.01  | 18717.36 | < LOD | 345.25    | < LOD      | < LOD  | < LOD     |
| 12SM53SB   | 24-48                     |                      | Same as above, except slightly micaceous and less organics.   | Indeterminate. Possible loess. Abundant organic material. |   | Dry to moist               | < LOD            | < LOD  | 18691.92 | < LOD | 319.36    | < LOD      | < LOD  | < LOD     |
| 12SM53SB   | 48-72                     |                      | Medium gray to olive gray silt with trace sand. Sand is very fine grained. Silt is firm, occasional Fe-staining, low plasticity, low moisture.  | Indeterminate. Possible loess.                            |   | Dry to moist               | < LOD            | < LOD  | 20635.18 | < LOD | 432.58    | < LOD      | < LOD  | < LOD     |
| 12SM53SB   | 72-96                     |                      | Same as above, except increased moisture.   | Indeterminate. Possible loess.                            |   | Moist                      | < LOD            | < LOD  | 20810.1  | < LOD | 291.49    | < LOD      | < LOD  | < LOD     |
| 12SM53SB   | 96-120                    | 12SM53SB10           | Dark gray and brown with orange Fe-staining gravelly silt with sand. Sand is fine to medium grained. Gravel is 1-4cm, subrounded to subblocky sandstone and siltstone, occasional red-brown sand grains. Silt is firm and moist. Refusal at 120" bgs due to gravel.                                   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears non-mineralized.      | Moist                      | < LOD            | 35.35  | 35338.89 | < LOD | 235.17    | < LOD      | < LOD  | < LOD     |
| 12SM54SB   | 0-4                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   |                            |                  |        |          |       |           |            |        |           |
| 12SM54SB   | 4-24                      |                      | Medium brown to olive brown silt. Very soft, no plasticity, low moisture, organic-rich, occasional roots, loamy.  | Indeterminate. Possible loess. Abundant organic material. |   | Dry to moist               | < LOD            | < LOD  | 20299.2  | < LOD | 363.17    | < LOD      | < LOD  | < LOD     |
| 12SM54SB   | 24-48                     |                      | Olive gray with occasional brown Fe-staining silt with trace sand. Sand is very fine. Low plasticity, firm, low moisture, Fe-staining with organics.  | Indeterminate. Possible loess.                            |   | Dry to moist               |                  |        |          |       |           |            |        |           |
| 12SM54SB   | 48-72                     |                      | Same as above   | Indeterminate. Possible loess.                            |   | Dry to moist               | < LOD            | < LOD  | 17447.4  | < LOD | 283.42    | < LOD      | < LOD  | < LOD     |
| 12SM54SB   | 72-96                     |                      | Same as above, except with root casts and bubbles, increased moisture and plasticity.   | Indeterminate. Possible loess.                            |   | Moist                      | < LOD            | 40.83  | 21393.78 | < LOD | 408.19    | < LOD      | < LOD  | < LOD     |
| 12SM54SB   | 84-120                    |                      | Same as above, except with trace gravel to 2cm and increased moisture.  | Mixed loess/KG soil                                       |   | Moist                      | < LOD            | 38.2   | 18713.44 | 10.44 | 468.18    | < LOD      | < LOD  | < LOD     |
| 12SM54SB   | 120-126                   | 12SM54SB11           | Olive gray gravelly silt with sand. Sand is fine to medium grained. Gravel is 1-3 cm, angular to rounded sandstone and siltstone, altered, occasional calcareous mineralization, occasional Fe-stained sand grains. Silt is firm, low plasticity, moist. Refusal at 126" bgs due to gravel.           | KG soil   | KG soil not demonstrably undisturbed. KG soil appears non-mineralized.      | Moist                      | < LOD            | < LOD  | 32597.23 | 18.54 | 618.63    | < LOD      | < LOD  | < LOD     |
| 12SM55SB   | 0-2                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   | Moist                      |                  |        |          |       |           |            |        |           |
| 12SM55SB   | 2-12                      |                      | Olive brown sandy silt. Sand (30%) is very fine to fine grained. Silt is soft, no plasticity, moist, with organics and roots.   | Indeterminate. Possible loess. Abundant organic material. |   | Moist                      | 160.43           | < LOD  | 14576.07 | < LOD | 170.02    | < LOD      | < LOD  | < LOD     |
| 12SM55SB   | 12-24                     |                      | Same as above, except with occasional Fe-staining and trace gravel (2-3cm).   | Mixed loess/KG soil                                       |   | Moist                      | < LOD            | < LOD  | 16184.34 | < LOD | 272.26    | < LOD      | < LOD  | < LOD     |
| 12SM55SB   | 24-36                     |                      | Olive brown gray gravelly silty sand. Gravel (30%) is fine to 3cm, angular to blocky sandstone and siltstone. Sand (40%) is very fine to medium grained. 30% silt. Trace organics.  | Mixed loess/KG soil                                       |   | Moist                      | < LOD            | < LOD  | 15674.3  | 12.17 | 431.03    | < LOD      | < LOD  | < LOD     |
| 12SM55SB   | 36-48                     | 12SM55SB04           | Transition from above to sandy gravelly silt. Gravel is fine to 4cm platy siltstone and angular to blocky sandstone. Sand is fine to coarse grained. Silt is firm with low plasticity. Occasional organics. Occasional orange brown Fe-staining associated with sand grains.                          | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | < LOD            | < LOD  | 46017.64 | < LOD | 403.98    | < LOD      | < LOD  | < LOD     |
| 12SM55SB   | 48-60                     |                      | Same as above, except with more larger sized gravel, silt has low to moderate plasticity, and increased Fe-staining.  | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | < LOD            | < LOD  | 34743.3  | 18.16 | 866.47    | < LOD      | 103.88 | < LOD     |
| 12SM55SB   | 60-66                     |                      | Dark olive gray to brown silty gravelly sand. Sand is fine to medium grained. Silt has low plasticity. Gravel is weathered bedrock in 1-6cm clasts of hydro altered sandstone (strong Fe-staining) and siltstone. Breaking on Fe-stained facets. Some calcareous mineralizations. Angular and blocky. | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | 525.55           | 50.46  | 61306.32 | < LOD | 777.07    | < LOD      | < LOD  | < LOD     |

Table E-1 (part 2) Additional Soil Characterization, Soil Type and XRF Data

| Station ID | Sample Depth (inches bgs) | Laboratory Sample ID | Field Lithological Description  | Interpreted Soil Type                                     | Comments Regarding Possible Usefulness for Background Soil Characterization | Field Moisture Description | XRF Result (ppm) |        |          |       |           |            |        |           |
|------------|---------------------------|----------------------|---|---|---|----------------------------|------------------|--------|----------|-------|-----------|------------|--------|-----------|
|            |                           |                      |   |   |   |                            | Cobalt           | Copper | Iron     | Lead  | Manganese | Molybdenum | Nickel | Palladium |
| 12SM55SB   | 66-72                     |                      | Dark olive gray to brown silty gravelly sand. Sand is fine to medium grained. Silt has low plasticity. Gravel is weathered bedrock in 1-6cm clasts of hydro altered sandstone (strong Fe-staining) and siltstone. Breaking on Fe-stained facets. Some calcareous mineralizations. Angular and blocky.   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | < LOD            | 52.6   | 32773.8  | < LOD | 538.1     | < LOD      | 99.26  | < LOD     |
| 12SM55SB   | 72-78                     |                      | Dark olive gray with occasional black sandy gravel with silt. Gravel is weathered bedrock in 1-3cm clasts of hydro altered sandstone (strong Fe-staining) and siltstone. Breaking on Fe-stained facets. Some calcareous mineralizations. Silt is firm to hard, low plasticity, moist with very fine sand grains and black flecks. Silt appears to be in situ weathering of black friable shale.   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | 177.51           | 62.07  | 21496.06 | 15.18 | 676.48    | < LOD      | < LOD  | < LOD     |
| 12SM55SB   | 78-84                     | 12SM55SB07           | Dark olive gray with occasional black sandy gravel with silt. Gravel is weathered bedrock in 1-3cm clasts of hydro altered sandstone (strong Fe-staining) and siltstone. Breaking on Fe-stained facets. Some calcareous mineralizations. Silt is firm to hard, low plasticity, moist with very fine sand grains and black flecks. Silt appears to be in situ weathering of black friable shale. Refusal at 84" on rocks, likely KG Group Bedrock. | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | < LOD            | 55.99  | 17346.24 | < LOD | 237.17    | < LOD      | < LOD  | < LOD     |
| 12SM56SB   | 0-3                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   |                            |                  |        |          |       |           |            |        |           |
| 12SM56SB   | 3-24                      |                      | Medium brown silt with sand. Sand is very fine grained. Silt is has moderate plasticity, moist, occasional organics.  | Indeterminate. Possible loess. Abundant organic material. |   |                            | 149.84           | < LOD  | 13113.28 | < LOD | 90.41     | < LOD      | < LOD  | < LOD     |
| 12SM56SB   | 24-48                     |                      | Medium gray to olive gray gravelly silt. Gravel is 1-3cm angular sandstone and siltstone. Silt has medium plasticity, moist, soft.  | Indeterminate. Possible mixed Loess/KG soil               |   |                            | 197.88           | 34.18  | 21354.03 | < LOD | 568.91    | < LOD      | < LOD  | < LOD     |
| 12SM56SB   | 48-54                     | 12SM56SB05           | Brown silty gravel with sand. Sand is medium grained. Gravel is 0.5-5cm, subrounded to angular sandstone and siltstone. Silt has medium plasticity and is moist.  | KG soil   | KG soil not demonstrably undisturbed. KG soil appears non-mineralized.      |                            | < LOD            | < LOD  | 11100.99 | 11.24 | 562.24    | 8.38       | < LOD  | < LOD     |
| 12SM57SB   | 0-4                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   |                            |                  |        |          |       |           |            |        |           |
| 12SM57SB   | 4-24                      |                      | Medium brown sandy silt with gravel. Gravel is 2-4cm, angular to subrounded sandstone. Sand is very fine grained. Silt is wet, low plasticity, occasional organics and roots.   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears non-mineralized.      | Wet                        | < LOD            | < LOD  | 11710.59 | < LOD | 159.92    | < LOD      | < LOD  | < LOD     |
| 12SM57SB   | 24-48                     |                      | Light gray to medium brown silt with sand and gravel. Sand is very fine grained. Gravel is 1-2cm, angular to subrounded sandstone. Silt has brown Fe-staining, firm, low moisture, low plasticity, micaceous.   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears non-mineralized.      | Dry to moist               | 158.6            | < LOD  | 16157.88 | < LOD | 311.83    | < LOD      | < LOD  | < LOD     |
| 12SM57SB   | 48-60                     | 12SM57SB05           | Same as above, except with increased gravel. Refusal at 60" due to gravel.  | KG soil   | KG soil not demonstrably undisturbed. KG soil appears non-mineralized.      | Dry to moist               | 718.96           | 46.29  | 43768.48 | 15.36 | 762.23    | < LOD      | < LOD  | < LOD     |
| 12SM58SB   | 0-12                      |                      | Organic mat (tundra)  | Organic mat (tundra)                                      |   |                            |                  |        |          |       |           |            |        |           |
| 12SM58SB   | 12-24                     | 12SM58SB02           | Medium brown sandy silt with gravel. Gravel is fine to 2 cm, subrounded sandstone. Sand is very fine to fine grained. Silt is very moist, very soft, no plasticity, organic-rich and roots.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist to wet               | < LOD            | < LOD  | 16773.93 | < LOD | 278.58    | < LOD      | < LOD  | < LOD     |
| 12SM58SB   | 24-48                     |                      | Medium olive brown sandy silt with gravel. Gravel is fine to 2 cm, subrounded sandstone. Sand is very fine to fine grained. Silt is very wet, very soft, no plasticity. Perched water layer flooding borehole.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Very wet                   | 159.9            | < LOD  | 19684.03 | < LOD | 351.79    | < LOD      | < LOD  | < LOD     |
| 12SM58SB   | 48-66                     |                      | Same as above   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Very wet                   | < LOD            | 35.53  | 22704.46 | < LOD | 241.71    | < LOD      | < LOD  | < LOD     |
| 12SM58SB   | 66-72                     |                      | Same as above, except with increased 1-4cm gravel (30%). Refusal at 72" due to gravel.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               |                            | < LOD            | 33.92  | 18627.47 | 14.25 | 321.05    | < LOD      | < LOD  | < LOD     |
| 12SM59SB   | 0-4                       |                      | Organic mat (tundra)  | Organic mat (tundra)                                      |   | Moist                      |                  |        |          |       |           |            |        |           |
| 12SM59SB   | 4-12                      | 12SM59SB01           | Medium to dark brown silt with gravel. Very soft. Organic-rich. No plasticity. Loamy. Gravel (10%) is angular to blocky, sandstone, 2-4cm.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | < LOD            | < LOD  | 16661.37 | 11.82 | 267.29    | < LOD      | < LOD  | < LOD     |
| 12SM59SB   | 12-24                     |                      | Medium brown gravelly silt. Gravel (40%) is 3-7cm, angular to blocky sandstone and siltstone. Silt is soft to firm, none to low plasticity. Occasional organics.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 157.24           | < LOD  | 16641.44 | < LOD | 283.31    | < LOD      | < LOD  | < LOD     |
| 12SM59SB   | 24-36                     |                      | Same as above, except gravel is 5-8cm, silt is loess-like, and increasing moisture.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist to wet               | < LOD            | < LOD  | 16287.61 | < LOD | 311.06    | < LOD      | < LOD  | < LOD     |
| 12SM59SB   | 36-48                     |                      | No recovery   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist to wet               | < LOD            | < LOD  | 16602.59 | < LOD | 361.57    | < LOD      | < LOD  | < LOD     |
| 12SM59SB   | 48-60                     | 12SM59SB05           | Light gray (occasional brown mottling) silt with trace gravel. Gravel is 1-3cm, angular sandstone. Silt is low to medium plasticity, moist, soft to firm, brown/rust mottling appears to be root casts. Trace organics. Refusal at 60" due to large rock.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | < LOD            | 39.27  | 13653.02 | 12.13 | 296.06    | < LOD      | < LOD  | < LOD     |
| 12SM60SB   | 0-4                       |                      | Organic mat (tundra)  | Organic mat (tundra)                                      |   | Wet                        |                  |        |          |       |           |            |        |           |
| 12SM60SB   | 4-12                      |                      | Light brown sandy silt with gravel. Sand is fine to medium grained. Gravel is angular to blocky, sandstone, 1-4cm, occasional subblocky. Many roots. Abundant decomposing organics. Soft and loamy.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | < LOD            | < LOD  | 20440.87 | < LOD | 255.11    | < LOD      | < LOD  | < LOD     |
| 12SM60SB   | 12-24                     |                      | Light brown silty gravel with sand. Sand is fine grained. Gravel is 3-7cm, angular to platy, sandstone with occasional siltstone. Silt is organic rich, loamy.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | < LOD            | < LOD  | 17298.15 | 11.28 | 284.76    | < LOD      | < LOD  | < LOD     |
| 12SM60SB   | 24-36                     |                      | Light brown gray gravelly silt with sand. Sand is very fine to fine grained. Gravel (30%) is platy, siltstone, occasional sandstone, 3-6cm, occasional blocky sandstone. Silt is loess-like with more sand, none to low plasticity, soft.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | < LOD            | < LOD  | 17210.09 | < LOD | 282.17    | < LOD      | < LOD  | < LOD     |
| 12SM60SB   | 36-48                     |                      | Same as above, except with increasing gravel (40%)  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | < LOD            | < LOD  | 22088.61 | < LOD | 397.82    | < LOD      | < LOD  | < LOD     |
| 12SM60SB   | 48-60                     |                      | Same as above, except with increasing sand. Loess-like silt is light gray with occasional red stained clasts, low plasticity, clasts occasionally subblocky.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | < LOD            | 43.63  | 62629.96 | 16.52 | 1456.34   | < LOD      | < LOD  | < LOD     |
| 12SM60SB   | 60-72                     | 12SM60SB06           | Brown to dark brown silty gravel with sand. Gravel is angular to subblocky sandstone and siltstone, 1-4cm, fresh iron oxide 'facets'. Sand is fine grained. Firm.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | < LOD            | 56.08  | 51842.03 | < LOD | 925.53    | < LOD      | < LOD  | < LOD     |
| 12SM60SB   | 72-84                     | 12SM60SB07           | Dark brown to very dark gray silty gravel with trace sand. Gravel is blocky to angular with occasional subrounded, strong siltstone to friable black shale, 0.5-4cm, fresh facets. Refusal at 84" bgs as weathered bedrock transitions to bedrock.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 415.54           | 72.83  | 61331.75 | 26.41 | 936.08    | < LOD      | < LOD  | < LOD     |
| 12SM61SB   | 0-4                       |                      | Organic mat (tundra)  | Organic mat (tundra)                                      |   |                            |                  |        |          |       |           |            |        |           |
| 12SM61SB   | 4-10                      |                      | Medium brown sandy silt. Gravel is 2cm - <8cm (observed platy clast in shovel hole to 8" width), angular - blocky - platy, sandstone - siltstone, friable siltstone. Sand is fine to medium grained, quartz. Silt is low plasticity and moist. Occasional organics.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | < LOD            | < LOD  | 20733.15 | 10.23 | 477.54    | < LOD      | < LOD  | < LOD     |
| 12SM61SB   | 10-16                     | 12SM61SB01           | Same as above, except with 40% gravel, 45% silt, and 15% sand.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | < LOD            | < LOD  | 20157.93 | < LOD | 470.38    | < LOD      | < LOD  | < LOD     |
| 12SM61SB   | 16-22                     |                      | Medium brown silty gravel with sand. Sand is fine grained. Gravel is subangular to subblocky, occasional platy, 1-10 cm, sandstone - siltstone. Trace organics.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 298.01           | < LOD  | 28567.69 | 14.01 | 503.11    | < LOD      | < LOD  | < LOD     |





Table E-1 (part 2) Additional Soil Characterization, Soil Type and XRF Data

| Station ID | Sample Depth (inches bgs) | Laboratory Sample ID | Field Lithological Description  | Interpreted Soil Type              | Comments Regarding Possible Usefulness for Background Soil Characterization  | Field Moisture Description | XRF Result (ppm) |        |          |       |           |            |        |           |
|------------|---------------------------|----------------------|---|------------------------------------|--|----------------------------|------------------|--------|----------|-------|-----------|------------|--------|-----------|
|            |                           |                      |   |                                    |  |                            | Cobalt           | Copper | Iron     | Lead  | Manganese | Molybdenum | Nickel | Palladium |
| 12SM64SB   | 3-12                      |                      | Dark brown sandy silt with trace gravel. Gravel is fine. Sand is very fine to fine grained. Silt is organic-rich, abundant roots, very soft, no plasticity, loamy.  | Loess with abundant organic matter |  | Dry to moist               | < LOD            | < LOD  | 12360.07 | < LOD | 231.64    | 7.36       | < LOD  | < LOD     |
| 12SM64SB   | 12-24                     |                      | Light gray to light brown silt with sand. Sand is very fine to fine grained. Silt is moderately moist, none to low-plasticity, soft, abundant roots, occasional organics. Grading to loess.   | Loess with abundant organic matter |  | Moist                      | 169.18           | < LOD  | 19669.5  | < LOD | 389.98    | < LOD      | < LOD  | < LOD     |
| 12SM64SB   | 24-36                     |                      | Same as above, except sand grading to very fine grained. No roots.  | Loess                              |  | Moist                      | < LOD            | < LOD  | 17009.9  | < LOD | 319.86    | < LOD      | < LOD  | < LOD     |
| 12SM64SB   | 36-48                     |                      | Same as above, except no brown silt, occasional fine grained sand, increasing moisture, and low plasticity.   | Loess                              |  | Moist to wet               | 165.84           | 42.95  | 13787.64 | < LOD | 241.31    | < LOD      | < LOD  | < LOD     |
| 12SM64SB   | 48-60                     |                      | Light gray to light olive silt with sand. Low plasticity. Firm. Red brown staining along roots.   | Loess                              |  | Moist to wet               | < LOD            | < LOD  | 16612.19 | < LOD | 244.74    | < LOD      | < LOD  | < LOD     |
| 12SM64SB   | 60-72                     |                      | Same as above, except with possible clay, medium plasticity, and less red brown staining along roots.   | Loess                              |  | Moist to wet               | < LOD            | < LOD  | 9903.81  | 11.1  | 114.21    | < LOD      | < LOD  | < LOD     |
| 12SM64SB   | 72-84                     |                      | Same as above, except it appears to contain a paleo moss horizon. Refusal at 84" due to rocks.  | Loess                              | Undisturbed KG soil likely present at bottom of soil boring, but no KG soil recovered in soil sample.  | Wet                        | < LOD            | < LOD  | 8494.31  | < LOD | 180.39    | < LOD      | < LOD  | < LOD     |
| 12SM65SB   | 0-2                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)            |  | Dry to moist               |                  |        |          |       |           |            |        |           |
| 12SM65SB   | 2-12                      |                      | Medium olive brown silty sand. Silt 40%. Sand 60%, very fine to fine grained. Very loose. Organic rich with roots. Loamy.   | Loess with abundant organic matter |  | Dry to moist               | < LOD            | < LOD  | 18259.42 | < LOD | 265.41    | < LOD      | < LOD  | < LOD     |
| 12SM65SB   | 12-24                     |                      | Medium olive gray silty sand. 45% silt. 55% sand, very fine. Loose. Occasional roots. Occasional Fe staining. Trace organics.   | Loess                              |  | Dry to moist               | 132.6            | < LOD  | 13711.38 | < LOD | 216.42    | < LOD      | < LOD  | < LOD     |
| 12SM65SB   | 24-36                     |                      | Same as above, except 40% silt, 60% sand, increasing brown color.   | Loess                              |  | Dry to moist               | 198.41           | < LOD  | 18147.88 | < LOD | 285.3     | < LOD      | < LOD  | < LOD     |
| 12SM65SB   | 36-48                     |                      | Same as above, except with occasional orange brown Fe-staining.   | Loess                              |  | Dry to moist               | < LOD            | < LOD  | 23638.09 | < LOD | 445.17    | < LOD      | < LOD  | < LOD     |
| 12SM65SB   | 48-60                     |                      | Olive brown and orange gray sandy silt. Sand (40%) is very fine grained. Silt is soft to firm, none to low plasticity, and micaceous.   | Loess                              |  | Moist                      | < LOD            | < LOD  | 16176.87 | < LOD | 353.53    | < LOD      | < LOD  | < LOD     |
| 12SM65SB   | 60-72                     |                      | Same as above, except low plasticity.   | Loess                              |  | Moist to wet               | < LOD            | 36.35  | 17141.31 | < LOD | 270.63    | < LOD      | < LOD  | < LOD     |
| 12SM65SB   | 72-84                     |                      | Same as above, except there is a 1-2" lens of medium grained sand.  | Loess                              |  | Moist to wet               | < LOD            | < LOD  | 12891.7  | < LOD | 287       | < LOD      | < LOD  | < LOD     |
| 12SM65SB   | 84-96                     |                      | Same as above, except increasing silt, and firm.  | Loess                              |  | Moist to wet               | < LOD            | < LOD  | 14562.01 | < LOD | 297.68    | < LOD      | < LOD  | < LOD     |
| 12SM65SB   | 96-108                    |                      | Same as above, except it includes banding of red brown Fe-staining in fine grained sand showing mild concretion.  | Loess                              |  | Moist to wet               | < LOD            | < LOD  | 13667.43 | 17.02 | 178.05    | < LOD      | < LOD  | < LOD     |
| 12SM65SB   | 108-120                   |                      | Same as above, except with paleo tundra (moss and roots)  | Loess                              |  | Moist to wet               | 156.27           | < LOD  | 13709.06 | 10.91 | 180.21    | < LOD      | < LOD  | < LOD     |
| 12SM65SB   | 120-132                   |                      | Same as above, except with no paleo tundra  | Loess                              |  | Moist                      | 173.56           | 30.31  | 14465.56 | < LOD | 397.57    | < LOD      | < LOD  | < LOD     |
| 12SM65SB   | 132-144                   | 12SM65SB12           | Same as above, except grading to silty sand with gravel. Sand is fine to coarse grained, possible quartz. Gravel is sandstone with strong red brown to gray brown Fe-staining, 0.5-26cm, subangular to blocky. Stiff. Maximum length of hand auger 12' bgs. | Mixed loess/KG soil                | Undisturbed KG soil likely present at bottom of soil boring, but only mixed loess/KG soil recovered in soil sample. KG soil appears mineralized. | Moist                      | 170.57           | < LOD  | 19490.51 | 10.93 | 422.98    | < LOD      | < LOD  | < LOD     |
| 12SM66SB   | 0-2                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)            |  | Dry to moist               |                  |        |          |       |           |            |        |           |
| 12SM66SB   | 2-12                      |                      | Light gray to olive gray sandy silt. Sand is very fine grained. Silt is soft, low moisture, no plasticity.  | Loess                              |  | Dry to moist               | < LOD            | < LOD  | 13656    | < LOD | 214.35    | < LOD      | < LOD  | < LOD     |
| 12SM66SB   | 12-24                     |                      | 12" to 16" same as above. 16" to 20" highly organic silt with decomposing organic matter, roots, paleosol. 20" to 24" olive gray sandy silt. Sand is fine grained. Silt is soft with no plasticity.   | Loess/Paleosol/Loess               |  | Dry to moist               | < LOD            | < LOD  | 13777.35 | < LOD | 181.97    | < LOD      | < LOD  | < LOD     |
| 12SM66SB   | 24-36                     |                      | Olive gray sandy silt. Sand is fine grained. Silt is soft with no plasticity.   | Loess                              |  | Dry to moist               | 194.54           | < LOD  | 15919.83 | < LOD | 292.59    | < LOD      | < LOD  | < LOD     |
| 12SM66SB   | 36-48                     |                      | Same as above   | Loess                              |  | Moist                      | < LOD            | < LOD  | 16676.94 | < LOD | 421.65    | < LOD      | < LOD  | < LOD     |
| 12SM66SB   | 48-60                     |                      | Same as above, except increasing moisture, low plasticity. 30% sand. 70% silt.  | Loess                              |  | Moist                      | < LOD            | < LOD  | 14710.78 | < LOD | 364.39    | < LOD      | < LOD  | < LOD     |
| 12SM66SB   | 60-72                     |                      | Same as above, except occasional Fe-staining  | Loess                              |  | Moist                      | < LOD            | 35.16  | 14914.9  | 14.71 | 341.17    | < LOD      | < LOD  | < LOD     |
| 12SM66SB   | 72-84                     |                      | Same as above, except with increasing sand (40%) and occasional medium gravel.  | Loess                              |  | Moist                      | < LOD            | < LOD  | 10721.13 | 11.77 | 127.31    | < LOD      | < LOD  | < LOD     |
| 12SM66SB   | 84-96                     |                      | Same as above, except with decreasing very fine grained sand (30%).   | Loess                              |  | Moist                      | < LOD            | < LOD  | 13020.18 | 15.14 | 167.89    | < LOD      | < LOD  | < LOD     |
| 12SM66SB   | 96-108                    |                      | Same as above, except with decreasing very fine grained sand (10%), low to medium plasticity, and increased Fe-staining.  | Loess                              |  | Moist                      | 148.95           | < LOD  | 16606.14 | < LOD | 168.94    | < LOD      | < LOD  | < LOD     |
| 12SM66SB   | 108-120                   |                      | Same as above, except with increasing very fine to medium grained sand (20%). Occasional Fe-stained medium brown concretions associated with sand grains.   | Loess                              |  | Moist                      | < LOD            | < LOD  | 18776.99 | < LOD | 215.79    | < LOD      | < LOD  | < LOD     |
| 12SM66SB   | 120-132                   |                      | Same as above, Except with increasing red brown Fe-staining. Medium plasticity.   | Loess                              |  | Moist to wet               | 175.52           | < LOD  | 21734.17 | < LOD | 223.59    | < LOD      | < LOD  | < LOD     |
| 12SM66SB   | 132-144                   |                      | Same as above, except with possible clay. Maximum length of hand auger 12' bgs.   | Loess                              | Undisturbed KG soil likely present below loess, but no KG soil encountered in soil boring.   | Moist to wet               | < LOD            | 39.54  | 15296.95 | 10.16 | 180.57    | < LOD      | < LOD  | < LOD     |

Note: XRF results are for non-dried samples. See Field Moisture Description for qualitative observations of moisture content of sample.

Key:

- ' = feet
- " = inches
- bgs = Below ground surface
- cm = centimeter
- Fe = iron
- ID = Identification
- KG soil = Kuskokwim Group bedrock-derived soil
- XRF = X-ray fluorescence spectrometry
- < LOD = Less than the XRF instrument level of detection
- ppm = Parts per million.
- XRF = X-ray fluorescence

Table E-1 (part 3) Additional Soil Characterization, Soil Type and XRF Data

| Station ID | Sample Depth (inches bgs) | Laboratory Sample ID | Field Lithological Description  | Interpreted Soil Type                                     | Comments Regarding Possible Usefulness for Background Soil Characterization | Field Moisture Description | XRF Result (ppm) |          |          |          |        |           |        |           |
|------------|---------------------------|----------------------|---|---|---|----------------------------|------------------|----------|----------|----------|--------|-----------|--------|-----------|
|            |                           |                      |   |   |   |                            | Potassium        | Rubidium | Scandium | Selenium | Silver | Strontium | Sulfur | Tellurium |
| 12SM51SB   | 0-4                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   |                            |                  |          |          |          |        |           |        |           |
| 12SM51SB   | 4-24                      |                      | Medium gray gravelly silt with sand. Sand is very fine to medium grained. Gravel is angular to blocky to subblocky, 0.5-3cm, sandstone and siltstone. Silt is moist, soft to firm, no plasticity, occasional organics, occasional Fe-staining.  | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | 9828.85          | 53.01    | < LOD    | < LOD    | < LOD  | 115.74    | < LOD  | < LOD     |
| 12SM51SB   | 24-48                     |                      | Same as above, except less gravel and sand, low plasticity. Appears to be possible loess mixed with gravel.   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | 8530.38          | 46.75    | < LOD    | < LOD    | < LOD  | 120.7     | < LOD  | < LOD     |
| 12SM51SB   | 48-72                     | 12SM51SB06           | Grading from above to light gray to brown gravelly silt. Gravel is 0.5-4cm, angular to subrounded sandstone (orange brown) and siltstone. Silt is firm, low plasticity, occasional Fe-staining, occasional roots and organics. Refusal at 72" bgs due to gravel.                                      | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          |                            | 10160.33         | 48.59    | < LOD    | < LOD    | < LOD  | 131.75    | < LOD  | < LOD     |
| 12SM52SB   | 0-4                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   |                            |                  |          |          |          |        |           |        |           |
| 12SM52SB   | 4-24                      | 12SM52SB02           | Brown sandy silt. Sand is very fine grained. Silt is very silt, no plasticity, organic-rich, loamy.   | Indeterminate. Possible loess. Abundant organic material. |   |                            | 7553.69          | 42.06    | < LOD    | < LOD    | < LOD  | 125.75    | < LOD  | < LOD     |
| 12SM52SB   | 24-48                     |                      | Same as above, except includes roots.   | Indeterminate. Possible loess. Abundant organic material. |   |                            | 7576.71          | 40.07    | < LOD    | < LOD    | < LOD  | 134.37    | < LOD  | < LOD     |
| 12SM52SB   | 48-72                     |                      | Light gray silt with sand. Sand is very fine grained. Silt is low to medium plasticity, low moisture, firm, root casts, Fe-staining.  | Indeterminate. Possible loess.                            |   | Dry to moist               | 8459.13          | 39.26    | < LOD    | < LOD    | < LOD  | 124.49    | < LOD  | < LOD     |
| 12SM52SB   | 72-96                     |                      | Same as above   | Indeterminate. Possible loess.                            |   | Dry to moist               | 7870.19          | 39.19    | 31.88    | < LOD    | < LOD  | 137.86    | < LOD  | < LOD     |
| 12SM52SB   | 96-120                    | 12SM52SB10           | Olive gray to dark gray with occasional brown mottling (Fe-staining) gravelly silt with sand. Gravel is angular to subrounded, fine to 2cm sandstone and siltstone. Sand is fine grained. Silt is firm to stiff, low plasticity, moist. Possible grading of loess to KG Group soil.                   | Indeterminate. Possible mixed loess and KG soil.          |   | Moist                      | 9894.44          | 42.57    | < LOD    | < LOD    | < LOD  | 119.5     | < LOD  | < LOD     |
| 12SM52SB   | 120-132                   | 12SM52SB11           | Dark gray gravel with silt and sand. Sand is medium to coarse grained. Gravel is angular to blocky altered sandstone and siltstone, fine to 3cm, Fe-staining, occasional calcareous mineralization. Low moisture.   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Dry to moist               | 9024.49          | 60.48    | < LOD    | < LOD    | < LOD  | 163.05    | < LOD  | < LOD     |
| 12SM53SB   | 0-4                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   |                            |                  |          |          |          |        |           |        |           |
| 12SM53SB   | 4-24                      |                      | Olive gray silt. Very soft. Very low moisture. No plasticity. Organic-rich. Roots. Loamy.   | Indeterminate. Possible loess. Abundant organic material. |   | Dry to moist               | 7808.36          | 37.16    | < LOD    | < LOD    | < LOD  | 123.44    | < LOD  | < LOD     |
| 12SM53SB   | 24-48                     |                      | Same as above, except slightly micaceous and less organics.   | Indeterminate. Possible loess. Abundant organic material. |   | Dry to moist               | 7191.3           | 38.52    | < LOD    | < LOD    | < LOD  | 123.49    | < LOD  | < LOD     |
| 12SM53SB   | 48-72                     |                      | Medium gray to olive gray silt with trace sand. Sand is very fine grained. Silt is firm, occasional Fe-staining, low plasticity, low moisture.  | Indeterminate. Possible loess.                            |   | Dry to moist               | 9217.39          | 45.7     | < LOD    | < LOD    | < LOD  | 130.86    | < LOD  | < LOD     |
| 12SM53SB   | 72-96                     |                      | Same as above, except increased moisture.   | Indeterminate. Possible loess.                            |   | Moist                      | 8754.69          | 46.18    | 31.9     | < LOD    | < LOD  | 129.44    | < LOD  | < LOD     |
| 12SM53SB   | 96-120                    | 12SM53SB10           | Dark gray and brown with orange Fe-staining gravelly silt with sand. Sand is fine to medium grained. Gravel is 1-4cm, subrounded to subblocky sandstone and siltstone, occasional red-brown sand grains. Silt is firm and moist. Refusal at 120" bgs due to gravel.                                   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears non-mineralized.      | Moist                      | 8990.4           | 43.66    | < LOD    | < LOD    | < LOD  | 81.88     | < LOD  | < LOD     |
| 12SM54SB   | 0-4                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   |                            |                  |          |          |          |        |           |        |           |
| 12SM54SB   | 4-24                      |                      | Medium brown to olive brown silt. Very soft, no plasticity, low moisture, organic-rich, occasional roots, loamy.  | Indeterminate. Possible loess. Abundant organic material. |   | Dry to moist               | 7061.57          | 40.13    | < LOD    | < LOD    | < LOD  | 118.2     | < LOD  | < LOD     |
| 12SM54SB   | 24-48                     |                      | Olive gray with occasional brown Fe-staining silt with trace sand. Sand is very fine. Low plasticity, firm, low moisture, Fe-staining with organics.  | Indeterminate. Possible loess.                            |   | Dry to moist               |                  |          |          |          |        |           |        |           |
| 12SM54SB   | 48-72                     |                      | Same as above   | Indeterminate. Possible loess.                            |   | Dry to moist               | 9270.42          | 39.51    | < LOD    | < LOD    | < LOD  | 122.79    | < LOD  | < LOD     |
| 12SM54SB   | 72-96                     |                      | Same as above, except with root casts and bubbles, increased moisture and plasticity.   | Indeterminate. Possible loess.                            |   | Moist                      | 8605.75          | 41.45    | 36.63    | < LOD    | < LOD  | 117.52    | < LOD  | < LOD     |
| 12SM54SB   | 84-120                    |                      | Same as above, except with trace gravel to 2cm and increased moisture.  | Mixed loess/KG soil                                       |   | Moist                      | 9232.71          | 43.81    | < LOD    | < LOD    | < LOD  | 126.68    | < LOD  | < LOD     |
| 12SM54SB   | 120-126                   | 12SM54SB11           | Olive gray gravelly silt with sand. Sand is fine to medium grained. Gravel is 1-3 cm, angular to rounded sandstone and siltstone, altered, occasional calcareous mineralization, occasional Fe-stained sand grains. Silt is firm, low plasticity, moist. Refusal at 126" bgs due to gravel.           | KG soil   | KG soil not demonstrably undisturbed. KG soil appears non-mineralized.      | Moist                      | 8434.56          | 50.57    | < LOD    | < LOD    | < LOD  | 88.75     | < LOD  | < LOD     |
| 12SM55SB   | 0-2                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   | Moist                      |                  |          |          |          |        |           |        |           |
| 12SM55SB   | 2-12                      |                      | Olive brown sandy silt. Sand (30%) is very fine to fine grained. Silt is soft, no plasticity, moist, with organics and roots.   | Indeterminate. Possible loess. Abundant organic material. |   | Moist                      | 6012.86          | 36.93    | < LOD    | < LOD    | < LOD  | 101.02    | < LOD  | < LOD     |
| 12SM55SB   | 12-24                     |                      | Same as above, except with occasional Fe-staining and trace gravel (2-3cm).   | Mixed loess/KG soil                                       |   | Moist                      | 6567.17          | 36.87    | < LOD    | < LOD    | < LOD  | 92.45     | < LOD  | < LOD     |
| 12SM55SB   | 24-36                     |                      | Olive brown gray gravelly silty sand. Gravel (30%) is fine to 3cm, angular to blocky sandstone and siltstone. Sand (40%) is very fine to medium grained. 30% silt. Trace organics.  | Mixed loess/KG soil                                       |   | Moist                      | 5084.49          | 51.23    | 20.24    | < LOD    | < LOD  | 90.43     | < LOD  | < LOD     |
| 12SM55SB   | 36-48                     | 12SM55SB04           | Transition from above to sandy gravelly silt. Gravel is fine to 4cm platy siltstone and angular to blocky sandstone. Sand is fine to coarse grained. Silt is firm with low plasticity. Occasional organics. Occasional orange brown Fe-staining associated with sand grains.                          | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | 3716.3           | 39.71    | < LOD    | < LOD    | < LOD  | 60.45     | < LOD  | < LOD     |
| 12SM55SB   | 48-60                     |                      | Same as above, except with more larger sized gravel, silt has low to moderate plasticity, and increased Fe-staining.  | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | 5675.2           | 36.17    | < LOD    | < LOD    | < LOD  | 67.34     | < LOD  | < LOD     |
| 12SM55SB   | 60-66                     |                      | Dark olive gray to brown silty gravelly sand. Sand is fine to medium grained. Silt has low plasticity. Gravel is weathered bedrock in 1-6cm clasts of hydro altered sandstone (strong Fe-staining) and siltstone. Breaking on Fe-stained facets. Some calcareous mineralizations. Angular and blocky. | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | 6495.7           | 56.31    | < LOD    | < LOD    | < LOD  | 67.66     | < LOD  | < LOD     |

Table E-1 (part 3) Additional Soil Characterization, Soil Type and XRF Data

| Station ID | Sample Depth (inches bgs) | Laboratory Sample ID | Field Lithological Description  | Interpreted Soil Type                                     | Comments Regarding Possible Usefulness for Background Soil Characterization | Field Moisture Description | XRF Result (ppm) |          |          |          |        |           |        |           |
|------------|---------------------------|----------------------|---|---|---|----------------------------|------------------|----------|----------|----------|--------|-----------|--------|-----------|
|            |                           |                      |   |   |   |                            | Potassium        | Rubidium | Scandium | Selenium | Silver | Strontium | Sulfur | Tellurium |
| 12SM55SB   | 66-72                     |                      | Dark olive gray to brown silty gravelly sand. Sand is fine to medium grained. Silt has low plasticity. Gravel is weathered bedrock in 1-6cm clasts of hydro altered sandstone (strong Fe-staining) and siltstone. Breaking on Fe-stained facets. Some calcareous mineralizations. Angular and blocky.   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | 5194.52          | 45.61    | < LOD    | < LOD    | < LOD  | 63.28     | < LOD  | < LOD     |
| 12SM55SB   | 72-78                     |                      | Dark olive gray with occasional black sandy gravel with silt. Gravel is weathered bedrock in 1-3cm clasts of hydro altered sandstone (strong Fe-staining) and siltstone. Breaking on Fe-stained facets. Some calcareous mineralizations. Silt is firm to hard, low plasticity, moist with very fine sand grains and black flecks. Silt appears to be in situ weathering of black friable shale.   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | 7464.49          | 68.77    | < LOD    | < LOD    | < LOD  | 58.6      | < LOD  | < LOD     |
| 12SM55SB   | 78-84                     | 12SM55SB07           | Dark olive gray with occasional black sandy gravel with silt. Gravel is weathered bedrock in 1-3cm clasts of hydro altered sandstone (strong Fe-staining) and siltstone. Breaking on Fe-stained facets. Some calcareous mineralizations. Silt is firm to hard, low plasticity, moist with very fine sand grains and black flecks. Silt appears to be in situ weathering of black friable shale. Refusal at 84" on rocks, likely KG Group Bedrock. | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | 4041.05          | 47.89    | 22.86    | < LOD    | < LOD  | 71.49     | < LOD  | < LOD     |
| 12SM56SB   | 0-3                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   |                            |                  |          |          |          |        |           |        |           |
| 12SM56SB   | 3-24                      |                      | Medium brown silt with sand. Sand is very fine grained. Silt is has moderate plasticity, moist, occasional organics.  | Indeterminate. Possible loess. Abundant organic material. |   |                            | 6461.02          | 34.93    | < LOD    | < LOD    | < LOD  | 89.67     | < LOD  | < LOD     |
| 12SM56SB   | 24-48                     |                      | Medium gray to olive gray gravelly silt. Gravel is 1-3cm angular sandstone and siltstone. Silt has medium plasticity, moist, soft.  | Indeterminate. Possible mixed Loess/KG soil               |   |                            | 9227.07          | 49.04    | < LOD    | < LOD    | < LOD  | 79.92     | < LOD  | < LOD     |
| 12SM56SB   | 48-54                     | 12SM56SB05           | Brown silty gravel with sand. Sand is medium grained. Gravel is 0.5-5cm, subrounded to angular sandstone and siltstone. Silt has medium plasticity and is moist.  | KG soil   | KG soil not demonstrably undisturbed. KG soil appears non-mineralized.      |                            | 4838.13          | 38.73    | < LOD    | < LOD    | < LOD  | 65.82     | < LOD  | < LOD     |
| 12SM57SB   | 0-4                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   |                            |                  |          |          |          |        |           |        |           |
| 12SM57SB   | 4-24                      |                      | Medium brown sandy silt with gravel. Gravel is 2-4cm, angular to subrounded sandstone. Sand is very fine grained. Silt is wet, low plasticity, occasional organics and roots.   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears non-mineralized.      | Wet                        | 8210.95          | 37.64    | < LOD    | < LOD    | < LOD  | 85.31     | < LOD  | < LOD     |
| 12SM57SB   | 24-48                     |                      | Light gray to medium brown silt with sand and gravel. Sand is very fine grained. Gravel is 1-2cm, angular to subrounded sandstone. Silt has brown Fe-staining, firm, low moisture, low plasticity, micaceous.   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears non-mineralized.      | Dry to moist               | 8507.81          | 43.83    | < LOD    | < LOD    | < LOD  | 112.63    | < LOD  | < LOD     |
| 12SM57SB   | 48-60                     | 12SM57SB05           | Same as above, except with increased gravel. Refusal at 60" due to gravel.  | KG soil   | KG soil not demonstrably undisturbed. KG soil appears non-mineralized.      | Dry to moist               | 8067.42          | 42.28    | < LOD    | < LOD    | < LOD  | 108.63    | < LOD  | < LOD     |
| 12SM58SB   | 0-12                      |                      | Organic mat (tundra)  | Organic mat (tundra)                                      |   |                            |                  |          |          |          |        |           |        |           |
| 12SM58SB   | 12-24                     | 12SM58SB02           | Medium brown sandy silt with gravel. Gravel is fine to 2 cm, subrounded sandstone. Sand is very fine to fine grained. Silt is very moist, very soft, no plasticity, organic-rich and roots.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist to wet               | 6527.03          | 34.93    | < LOD    | < LOD    | < LOD  | 76.77     | < LOD  | < LOD     |
| 12SM58SB   | 24-48                     |                      | Medium olive brown sandy silt with gravel. Gravel is fine to 2 cm, subrounded sandstone. Sand is very fine to fine grained. Silt is very wet, very soft, no plasticity. Perched water layer flooding borehole.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Very wet                   | 9096.24          | 39.61    | < LOD    | < LOD    | < LOD  | 93.47     | < LOD  | < LOD     |
| 12SM58SB   | 48-66                     |                      | Same as above   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Very wet                   | 9240.17          | 47.86    | < LOD    | < LOD    | < LOD  | 98.45     | < LOD  | < LOD     |
| 12SM58SB   | 66-72                     |                      | Same as above, except with increased 1-4cm gravel (30%). Refusal at 72" due to gravel.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               |                            | 10290.87         | 45.49    | < LOD    | < LOD    | < LOD  | 103.13    | < LOD  | < LOD     |
| 12SM59SB   | 0-4                       |                      | Organic mat (tundra)  | Organic mat (tundra)                                      |   | Moist                      |                  |          |          |          |        |           |        |           |
| 12SM59SB   | 4-12                      | 12SM59SB01           | Medium to dark brown silt with gravel. Very soft. Organic-rich. No plasticity. Loamy. Gravel (10%) is angular to blocky, sandstone, 2-4cm.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 6845.65          | 33.32    | < LOD    | < LOD    | < LOD  | 77.55     | < LOD  | < LOD     |
| 12SM59SB   | 12-24                     |                      | Medium brown gravelly silt. Gravel (40%) is 3-7cm, angular to blocky sandstone and siltstone. Silt is soft to firm, none to low plasticity. Occasional organics.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 6321.67          | 35.57    | < LOD    | < LOD    | < LOD  | 82.89     | < LOD  | < LOD     |
| 12SM59SB   | 24-36                     |                      | Same as above, except gravel is 5-8cm, silt is loess-like, and increasing moisture.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist to wet               | 7106.17          | 37.91    | < LOD    | < LOD    | < LOD  | 83.48     | < LOD  | < LOD     |
| 12SM59SB   | 36-48                     |                      | No recovery   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist to wet               | 7363.66          | 36.58    | < LOD    | < LOD    | < LOD  | 91.24     | < LOD  | < LOD     |
| 12SM59SB   | 48-60                     | 12SM59SB05           | Light gray (occasional brown mottling) silt with trace gravel. Gravel is 1-3cm, angular sandstone. Silt is low to medium plasticity, moist, soft to firm, brown/rust mottling appears to be root casts. Trace organics. Refusal at 60" due to large rock.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 7012.52          | 42.99    | < LOD    | < LOD    | < LOD  | 99.59     | < LOD  | < LOD     |
| 12SM60SB   | 0-4                       |                      | Organic mat (tundra)  | Organic mat (tundra)                                      |   | Wet                        |                  |          |          |          |        |           |        |           |
| 12SM60SB   | 4-12                      |                      | Light brown sandy silt with gravel. Sand is fine to medium grained. Gravel is angular to blocky, sandstone, 1-4cm, occasional subblocky. Many roots. Abundant decomposing organics. Soft and loamy.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 6392.38          | 38.07    | < LOD    | < LOD    | < LOD  | 81.84     | < LOD  | < LOD     |
| 12SM60SB   | 12-24                     |                      | Light brown silty gravel with sand. Sand is fine grained. Gravel is 3-7cm, angular to platy, sandstone with occasional siltstone. Silt is organic rich, loamy.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 6999.18          | 39.52    | 28.35    | < LOD    | < LOD  | 96.31     | < LOD  | < LOD     |
| 12SM60SB   | 24-36                     |                      | Light brown gray gravelly silt with sand. Sand is very fine to fine grained. Gravel (30%) is platy, siltstone, occasional sandstone, 3-6cm, occasional blocky sandstone. Silt is loess-like with more sand, none to low plasticity, soft.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 7385.3           | 40.02    | < LOD    | < LOD    | < LOD  | 105.77    | < LOD  | < LOD     |
| 12SM60SB   | 36-48                     |                      | Same as above, except with increasing gravel (40%)  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 8061.36          | 42.84    | < LOD    | < LOD    | < LOD  | 74.85     | < LOD  | < LOD     |
| 12SM60SB   | 48-60                     |                      | Same as above, except with increasing sand. Loess-like silt is light gray with occasional red stained clasts, low plasticity, clasts occasionally subblocky.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 5272.52          | 47.1     | < LOD    | < LOD    | < LOD  | 74.73     | < LOD  | < LOD     |
| 12SM60SB   | 60-72                     | 12SM60SB06           | Brown to dark brown silty gravel with sand. Gravel is angular to subblocky sandstone and siltstone, 1-4cm, fresh iron oxide 'facets'. Sand is fine grained. Firm.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 9812.88          | 63.87    | < LOD    | < LOD    | < LOD  | 70.23     | < LOD  | < LOD     |
| 12SM60SB   | 72-84                     | 12SM60SB07           | Dark brown to very dark gray silty gravel with trace sand. Gravel is blocky to angular with occasional subrounded, strong siltstone to friable black shale, 0.5-4cm, fresh facets. Refusal at 84" bgs as weathered bedrock transitions to bedrock.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 10262.13         | 75.8     | < LOD    | < LOD    | < LOD  | 72.1      | < LOD  | < LOD     |
| 12SM61SB   | 0-4                       |                      | Organic mat (tundra)  | Organic mat (tundra)                                      |   |                            |                  |          |          |          |        |           |        |           |
| 12SM61SB   | 4-10                      |                      | Medium brown sandy silt. Gravel is 2cm - <8cm (observed platy clast in shovel hole to 8" width), angular - blocky - platy, sandstone - siltstone, friable siltstone. Sand is fine to medium grained, quartz. Silt is low plasticity and moist. Occasional organics.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 7461.26          | 43.22    | < LOD    | < LOD    | < LOD  | 97.64     | < LOD  | < LOD     |
| 12SM61SB   | 10-16                     | 12SM61SB01           | Same as above, except with 40% gravel, 45% silt, and 15% sand.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 7721.38          | 42.66    | < LOD    | < LOD    | < LOD  | 108.27    | < LOD  | < LOD     |
| 12SM61SB   | 16-22                     |                      | Medium brown silty gravel with sand. Sand is fine grained. Gravel is subangular to subblocky, occasional platy, 1-10 cm, sandstone - siltstone. Trace organics.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 6545.6           | 42.73    | < LOD    | < LOD    | < LOD  | 100.32    | < LOD  | < LOD     |



Table E-1 (part 3) Additional Soil Characterization, Soil Type and XRF Data

| Station ID | Sample Depth (inches bgs) | Laboratory Sample ID | Field Lithological Description  | Interpreted Soil Type              | Comments Regarding Possible Usefulness for Background Soil Characterization  | Field Moisture Description | XRF Result (ppm) |          |          |          |        |           |        |           |
|------------|---------------------------|----------------------|---|------------------------------------|--|----------------------------|------------------|----------|----------|----------|--------|-----------|--------|-----------|
|            |                           |                      |   |                                    |  |                            | Potassium        | Rubidium | Scandium | Selenium | Silver | Strontium | Sulfur | Tellurium |
| 12SM64SB   | 3-12                      |                      | Dark brown sandy silt with trace gravel. Gravel is fine. Sand is very fine to fine grained. Silt is organic-rich, abundant roots, very soft, no plasticity, loamy.  | Loess with abundant organic matter |  | Dry to moist               | 3553.8           | 31.44    | < LOD    | < LOD    | < LOD  | 80.75     | < LOD  | < LOD     |
| 12SM64SB   | 12-24                     |                      | Light gray to light brown silt with sand. Sand is very fine to fine grained. Silt is moderately moist, none to low-plasticity, soft, abundant roots, occasional organics. Grading to loess.   | Loess with abundant organic matter |  | Moist                      | 4405.52          | 33.17    | < LOD    | < LOD    | < LOD  | 117.16    | < LOD  | < LOD     |
| 12SM64SB   | 24-36                     |                      | Same as above, except sand grading to very fine grained. No roots.  | Loess                              |  | Moist                      | 4709.05          | 36.43    | < LOD    | < LOD    | < LOD  | 107.66    | < LOD  | < LOD     |
| 12SM64SB   | 36-48                     |                      | Same as above, except no brown silt, occasional fine grained sand, increasing moisture, and low plasticity.   | Loess                              |  | Moist to wet               | 5036.87          | 40.67    | < LOD    | < LOD    | < LOD  | 119.6     | < LOD  | < LOD     |
| 12SM64SB   | 48-60                     |                      | Light gray to light olive silt with sand. Low plasticity. Firm. Red brown staining along roots.   | Loess                              |  | Moist to wet               | 5064.48          | 39.34    | < LOD    | < LOD    | < LOD  | 108.78    | < LOD  | < LOD     |
| 12SM64SB   | 60-72                     |                      | Same as above, except with possible clay, medium plasticity, and less red brown staining along roots.   | Loess                              |  | Moist to wet               | 5146.2           | 44.52    | 33.3     | < LOD    | < LOD  | 115.85    | < LOD  | < LOD     |
| 12SM64SB   | 72-84                     |                      | Same as above, except it appears to contain a paleo moss horizon. Refusal at 84" due to rocks.  | Loess                              | Undisturbed KG soil likely present at bottom of soil boring, but no KG soil recovered in soil sample.  | Wet                        | 2601.35          | 35       | < LOD    | < LOD    | < LOD  | 83.35     | < LOD  | < LOD     |
| 12SM65SB   | 0-2                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)            |  | Dry to moist               |                  |          |          |          |        |           |        |           |
| 12SM65SB   | 2-12                      |                      | Medium olive brown silty sand. Silt 40%. Sand 60%, very fine to fine grained. Very loose. Organic rich with roots. Loamy.   | Loess with abundant organic matter |  | Dry to moist               | 4226.11          | 37.2     | < LOD    | < LOD    | < LOD  | 120.18    | < LOD  | < LOD     |
| 12SM65SB   | 12-24                     |                      | Medium olive gray silty sand. 45% silt. 55% sand, very fine. Loose. Occasional roots. Occasional Fe staining. Trace organics.   | Loess                              |  | Dry to moist               | 4936.71          | 38.99    | 32.84    | < LOD    | < LOD  | 109.31    | < LOD  | < LOD     |
| 12SM65SB   | 24-36                     |                      | Same as above, except 40% silt, 60% sand, increasing brown color.   | Loess                              |  | Dry to moist               | 4846.66          | 41.4     | < LOD    | < LOD    | < LOD  | 129.28    | < LOD  | < LOD     |
| 12SM65SB   | 36-48                     |                      | Same as above, except with occasional orange brown Fe-staining.   | Loess                              |  | Dry to moist               | 4405.75          | 36.72    | < LOD    | < LOD    | < LOD  | 119.3     | < LOD  | < LOD     |
| 12SM65SB   | 48-60                     |                      | Olive brown and orange gray sandy silt. Sand (40%) is very fine grained. Silt is soft to firm, none to low plasticity, and micaceous.   | Loess                              |  | Moist                      | 5129.77          | 38.8     | < LOD    | < LOD    | < LOD  | 121.07    | < LOD  | < LOD     |
| 12SM65SB   | 60-72                     |                      | Same as above, except low plasticity.   | Loess                              |  | Moist to wet               | 5253.18          | 38.69    | < LOD    | < LOD    | < LOD  | 122.01    | < LOD  | < LOD     |
| 12SM65SB   | 72-84                     |                      | Same as above, except there is a 1-2" lens of medium grained sand.  | Loess                              |  | Moist to wet               | 5411.56          | 42.15    | < LOD    | < LOD    | < LOD  | 116.88    | < LOD  | < LOD     |
| 12SM65SB   | 84-96                     |                      | Same as above, except increasing silt, and firm.  | Loess                              |  | Moist to wet               | 5572.1           | 34.46    | < LOD    | < LOD    | < LOD  | 124.25    | < LOD  | < LOD     |
| 12SM65SB   | 96-108                    |                      | Same as above, except it includes banding of red brown Fe-staining in fine grained sand showing mild concretion.  | Loess                              |  | Moist to wet               | 4641.78          | 38.76    | < LOD    | < LOD    | < LOD  | 101.9     | < LOD  | < LOD     |
| 12SM65SB   | 108-120                   |                      | Same as above, except with paleo tundra (moss and roots)  | Loess                              |  | Moist to wet               | 4844.95          | 39.29    | < LOD    | < LOD    | < LOD  | 101.53    | < LOD  | < LOD     |
| 12SM65SB   | 120-132                   |                      | Same as above, except with no paleo tundra  | Loess                              |  | Moist                      | 6013.56          | 43.84    | < LOD    | < LOD    | < LOD  | 101.05    | < LOD  | < LOD     |
| 12SM65SB   | 132-144                   | 12SM65SB12           | Same as above, except grading to silty sand with gravel. Sand is fine to coarse grained, possible quartz. Gravel is sandstone with strong red brown to gray brown Fe-staining, 0.5-26cm, subangular to blocky. Stiff. Maximum length of hand auger 12' bgs. | Mixed loess/KG soil                | Undisturbed KG soil likely present at bottom of soil boring, but only mixed loess/KG soil recovered in soil sample. KG soil appears mineralized. | Moist                      | 5210.43          | 48.21    | < LOD    | < LOD    | < LOD  | 84.51     | < LOD  | < LOD     |
| 12SM66SB   | 0-2                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)            |  | Dry to moist               |                  |          |          |          |        |           |        |           |
| 12SM66SB   | 2-12                      |                      | Light gray to olive gray sandy silt. Sand is very fine grained. Silt is soft, low moisture, no plasticity.  | Loess                              |  | Dry to moist               | 4472.57          | 37.17    | 29.06    | < LOD    | < LOD  | 116.29    | < LOD  | < LOD     |
| 12SM66SB   | 12-24                     |                      | 12" to 16" same as above. 16" to 20" highly organic silt with decomposing organic matter, roots, paleosol. 20" to 24" olive gray sandy silt. Sand is fine grained. Silt is soft with no plasticity.   | Loess/Paleosol/Loess               |  | Dry to moist               | 4059.11          | 35.36    | < LOD    | < LOD    | < LOD  | 92.34     | < LOD  | < LOD     |
| 12SM66SB   | 24-36                     |                      | Olive gray sandy silt. Sand is fine grained. Silt is soft with no plasticity.   | Loess                              |  | Dry to moist               | 4431.9           | 35.42    | < LOD    | < LOD    | < LOD  | 114.68    | < LOD  | < LOD     |
| 12SM66SB   | 36-48                     |                      | Same as above   | Loess                              |  | Moist                      | 4499             | 40.13    | < LOD    | < LOD    | < LOD  | 119.3     | < LOD  | < LOD     |
| 12SM66SB   | 48-60                     |                      | Same as above, except increasing moisture, low plasticity. 30% sand. 70% silt.  | Loess                              |  | Moist                      | 5588.88          | 36.78    | < LOD    | < LOD    | < LOD  | 113.53    | < LOD  | < LOD     |
| 12SM66SB   | 60-72                     |                      | Same as above, except occasional Fe-staining  | Loess                              |  | Moist                      | 5095.15          | 38.8     | < LOD    | < LOD    | < LOD  | 121.28    | < LOD  | < LOD     |
| 12SM66SB   | 72-84                     |                      | Same as above, except with increasing sand (40%) and occasional medium gravel.  | Loess                              |  | Moist                      | 5564.59          | 46.07    | < LOD    | < LOD    | < LOD  | 116.04    | < LOD  | < LOD     |
| 12SM66SB   | 84-96                     |                      | Same as above, except with decreasing very fine grained sand (30%).   | Loess                              |  | Moist                      | 4772.66          | 39.37    | < LOD    | < LOD    | < LOD  | 124.87    | < LOD  | < LOD     |
| 12SM66SB   | 96-108                    |                      | Same as above, except with decreasing very fine grained sand (10%), low to medium plasticity, and increased Fe-staining.  | Loess                              |  | Moist                      | 4929.6           | 40.1     | < LOD    | < LOD    | < LOD  | 115.82    | < LOD  | < LOD     |
| 12SM66SB   | 108-120                   |                      | Same as above, except with increasing very fine to medium grained sand (20%). Occasional Fe-stained medium brown concretions associated with sand grains.   | Loess                              |  | Moist                      | 4850.59          | 37.57    | < LOD    | < LOD    | < LOD  | 105.1     | < LOD  | < LOD     |
| 12SM66SB   | 120-132                   |                      | Same as above, Except with increasing red brown Fe-staining. Medium plasticity.   | Loess                              |  | Moist to wet               | 3235.12          | 35.27    | < LOD    | < LOD    | < LOD  | 86.16     | < LOD  | < LOD     |
| 12SM66SB   | 132-144                   |                      | Same as above, except with possible clay. Maximum length of hand auger 12' bgs.   | Loess                              | Undisturbed KG soil likely present below loess, but no KG soil encountered in soil boring.   | Moist to wet               | 4606.31          | 38.4     | < LOD    | < LOD    | < LOD  | 94.2      | < LOD  | < LOD     |

Note: XRF results are for non-dried samples. See Field Moisture Description for qualitative observations of moisture content of sample.

Key:

- ' = feet
- " = inches
- bgs = Below ground surface
- cm = centimeter
- Fe = iron
- ID = Identification
- KG soil = Kuskokwim Group bedrock-derived soil
- XRF = X-ray fluorescence spectrometry
- < LOD = Less than the XRF instrument level of detection
- ppm = Parts per million.
- XRF = X-ray fluorescence

Table E-1 (part 4) Additional Soil Characterization, Soil Type and XRF Data

| Station ID | Sample Depth (inches bgs) | Laboratory Sample ID | Field Lithological Description  | Interpreted Soil Type                                     | Comments Regarding Possible Usefulness for Background Soil Characterization | Field Moisture Description | XRF Result (ppm) |       |          |          |         |          |       |           |
|------------|---------------------------|----------------------|---|---|---|----------------------------|------------------|-------|----------|----------|---------|----------|-------|-----------|
|            |                           |                      |   |   |   |                            | Thorium          | Tin   | Titanium | Tungsten | Uranium | Vanadium | Zinc  | Zirconium |
| 12SM51SB   | 0-4                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   |                            |                  |       |          |          |         |          |       |           |
| 12SM51SB   | 4-24                      |                      | Medium gray gravelly silt with sand. Sand is very fine to medium grained. Gravel is angular to blocky to subblocky, 0.5-3cm, sandstone and siltstone. Silt is moist, soft to firm, no plasticity, occasional organics, occasional Fe-staining.  | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | < LOD            | < LOD | 3761.32  | < LOD    | < LOD   | 108.08   | 57.77 | 256.81    |
| 12SM51SB   | 24-48                     |                      | Same as above, except less gravel and sand, low plasticity. Appears to be possible loess mixed with gravel.   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | < LOD            | < LOD | 3486.31  | < LOD    | < LOD   | < LOD    | 52.73 | 247.86    |
| 12SM51SB   | 48-72                     | 12SM51SB06           | Grading from above to light gray to brown gravelly silt. Gravel is 0.5-4cm, angular to subrounded sandstone (orange brown) and siltstone. Silt is firm, low plasticity, occasional Fe-staining, occasional roots and organics. Refusal at 72" bgs due to gravel.                                      | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          |                            | 10.28            | < LOD | 3983.36  | < LOD    | < LOD   | 107.84   | 54.43 | 256.59    |
| 12SM52SB   | 0-4                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   |                            |                  |       |          |          |         |          |       |           |
| 12SM52SB   | 4-24                      | 12SM52SB02           | Brown sandy silt. Sand is very fine grained. Silt is very silt, no plasticity, organic-rich, loamy.   | Indeterminate. Possible loess. Abundant organic material. |   |                            | < LOD            | < LOD | 2808.1   | < LOD    | < LOD   | 111.23   | 51.63 | 233.51    |
| 12SM52SB   | 24-48                     |                      | Same as above, except includes roots.   | Indeterminate. Possible loess. Abundant organic material. |   |                            | 8.93             | < LOD | 2840.53  | < LOD    | < LOD   | < LOD    | 57.76 | 284.44    |
| 12SM52SB   | 48-72                     |                      | Light gray silt with sand. Sand is very fine grained. Silt is low to medium plasticity, low moisture, firm, root casts, Fe-staining.  | Indeterminate. Possible loess.                            |   | Dry to moist               | < LOD            | < LOD | 3381.7   | < LOD    | < LOD   | < LOD    | 58.22 | 290.93    |
| 12SM52SB   | 72-96                     |                      | Same as above   | Indeterminate. Possible loess.                            |   | Dry to moist               | < LOD            | < LOD | 3126.51  | < LOD    | < LOD   | < LOD    | 42.7  | 349.5     |
| 12SM52SB   | 96-120                    | 12SM52SB10           | Olive gray to dark gray with occasional brown mottling (Fe-staining) gravelly silt with sand. Gravel is angular to subrounded, fine to 2cm sandstone and siltstone. Sand is fine grained. Silt is firm to stiff, low plasticity, moist. Possible grading of loess to KG Group soil.                   | Indeterminate. Possible mixed loess and KG soil.          |   | Moist                      | < LOD            | < LOD | 3885.24  | < LOD    | 12.51   | 134.11   | 69.33 | 249.34    |
| 12SM52SB   | 120-132                   | 12SM52SB11           | Dark gray gravel with silt and sand. Sand is medium to coarse grained. Gravel is angular to blocky altered sandstone and siltstone, fine to 3cm, Fe-staining, occasional calcareous mineralization. Low moisture.   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Dry to moist               | 10.36            | < LOD | 2715.29  | < LOD    | < LOD   | < LOD    | 114.5 | 172.88    |
| 12SM53SB   | 0-4                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   |                            |                  |       |          |          |         |          |       |           |
| 12SM53SB   | 4-24                      |                      | Olive gray silt. Very soft. Very low moisture. No plasticity. Organic-rich. Roots. Loamy.   | Indeterminate. Possible loess. Abundant organic material. |   | Dry to moist               | 8.84             | < LOD | 2884.94  | < LOD    | < LOD   | < LOD    | 37.96 | 258.93    |
| 12SM53SB   | 24-48                     |                      | Same as above, except slightly micaceous and less organics.   | Indeterminate. Possible loess. Abundant organic material. |   | Dry to moist               | 15.14            | < LOD | 2722.28  | < LOD    | < LOD   | < LOD    | 47.83 | 265.49    |
| 12SM53SB   | 48-72                     |                      | Medium gray to olive gray silt with trace sand. Sand is very fine grained. Silt is firm, occasional Fe-staining, low plasticity, low moisture.  | Indeterminate. Possible loess.                            |   | Dry to moist               | 11.04            | < LOD | 3199.71  | < LOD    | < LOD   | 124.08   | 66.95 | 284.38    |
| 12SM53SB   | 72-96                     |                      | Same as above, except increased moisture.   | Indeterminate. Possible loess.                            |   | Moist                      | < LOD            | < LOD | 3245.72  | < LOD    | < LOD   | 106.83   | 50.56 | 256.49    |
| 12SM53SB   | 96-120                    | 12SM53SB10           | Dark gray and brown with orange Fe-staining gravelly silt with sand. Sand is fine to medium grained. Gravel is 1-4cm, subrounded to subblocky sandstone and siltstone, occasional red-brown sand grains. Silt is firm and moist. Refusal at 120" bgs due to gravel.                                   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears non-mineralized.      | Moist                      | < LOD            | < LOD | 3016.65  | < LOD    | < LOD   | 155.81   | 69.92 | 194.14    |
| 12SM54SB   | 0-4                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   |                            |                  |       |          |          |         |          |       |           |
| 12SM54SB   | 4-24                      |                      | Medium brown to olive brown silt. Very soft, no plasticity, low moisture, organic-rich, occasional roots, loamy.  | Indeterminate. Possible loess. Abundant organic material. |   | Dry to moist               | < LOD            | < LOD | 2512.75  | < LOD    | < LOD   | 90.88    | 54.96 | 264.4     |
| 12SM54SB   | 24-48                     |                      | Olive gray with occasional brown Fe-staining silt with trace sand. Sand is very fine. Low plasticity, firm, low moisture, Fe-staining with organics.  | Indeterminate. Possible loess.                            |   | Dry to moist               |                  |       |          |          |         |          |       |           |
| 12SM54SB   | 48-72                     |                      | Same as above   | Indeterminate. Possible loess.                            |   | Dry to moist               | < LOD            | < LOD | 3377.2   | < LOD    | < LOD   | < LOD    | 48.34 | 305.7     |
| 12SM54SB   | 72-96                     |                      | Same as above, except with root casts and bubbles, increased moisture and plasticity.   | Indeterminate. Possible loess.                            |   | Moist                      | < LOD            | < LOD | 3225.26  | < LOD    | < LOD   | 129.39   | 42.59 | 251.9     |
| 12SM54SB   | 84-120                    |                      | Same as above, except with trace gravel to 2cm and increased moisture.  | Mixed loess/KG soil                                       |   | Moist                      | < LOD            | < LOD | 3086.36  | < LOD    | < LOD   | < LOD    | 52.08 | 288.58    |
| 12SM54SB   | 120-126                   | 12SM54SB11           | Olive gray gravelly silt with sand. Sand is fine to medium grained. Gravel is 1-3 cm, angular to rounded sandstone and siltstone, altered, occasional calcareous mineralization, occasional Fe-stained sand grains. Silt is firm, low plasticity, moist. Refusal at 126" bgs due to gravel.           | KG soil   | KG soil not demonstrably undisturbed. KG soil appears non-mineralized.      | Moist                      | 10.92            | < LOD | 3367.56  | < LOD    | < LOD   | 131.13   | 91.38 | 206.51    |
| 12SM55SB   | 0-2                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   | Moist                      |                  |       |          |          |         |          |       |           |
| 12SM55SB   | 2-12                      |                      | Olive brown sandy silt. Sand (30%) is very fine to fine grained. Silt is soft, no plasticity, moist, with organics and roots.   | Indeterminate. Possible loess. Abundant organic material. |   | Moist                      | < LOD            | < LOD | 3233.64  | < LOD    | < LOD   | 99.2     | 44.4  | 270.27    |
| 12SM55SB   | 12-24                     |                      | Same as above, except with occasional Fe-staining and trace gravel (2-3cm).   | Mixed loess/KG soil                                       |   | Moist                      | < LOD            | < LOD | 3225.25  | < LOD    | < LOD   | < LOD    | 43.26 | 224.94    |
| 12SM55SB   | 24-36                     |                      | Olive brown gray gravelly silty sand. Gravel (30%) is fine to 3cm, angular to blocky sandstone and siltstone. Sand (40%) is very fine to medium grained. 30% silt. Trace organics.  | Mixed loess/KG soil                                       |   | Moist                      | < LOD            | < LOD | 2585.3   | < LOD    | < LOD   | 109.33   | 47.94 | 268.5     |
| 12SM55SB   | 36-48                     | 12SM55SB04           | Transition from above to sandy gravelly silt. Gravel is fine to 4cm platy siltstone and angular to blocky sandstone. Sand is fine to coarse grained. Silt is firm with low plasticity. Occasional organics. Occasional orange brown Fe-staining associated with sand grains.                          | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | 11.06            | < LOD | 1694.45  | < LOD    | < LOD   | 107.32   | 78.91 | 171.01    |
| 12SM55SB   | 48-60                     |                      | Same as above, except with more larger sized gravel, silt has low to moderate plasticity, and increased Fe-staining.  | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | < LOD            | < LOD | 2789.05  | < LOD    | < LOD   | 107.01   | 65.49 | 182.25    |
| 12SM55SB   | 60-66                     |                      | Dark olive gray to brown silty gravelly sand. Sand is fine to medium grained. Silt has low plasticity. Gravel is weathered bedrock in 1-6cm clasts of hydro altered sandstone (strong Fe-staining) and siltstone. Breaking on Fe-stained facets. Some calcareous mineralizations. Angular and blocky. | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | 14.67            | < LOD | 2305.17  | < LOD    | < LOD   | 162.75   | 102.2 | 179.18    |

Table E-1 (part 4) Additional Soil Characterization, Soil Type and XRF Data

| Station ID | Sample Depth (inches bgs) | Laboratory Sample ID | Field Lithological Description  | Interpreted Soil Type                                     | Comments Regarding Possible Usefulness for Background Soil Characterization | Field Moisture Description | XRF Result (ppm) |       |          |          |         |          |       |           |
|------------|---------------------------|----------------------|---|---|---|----------------------------|------------------|-------|----------|----------|---------|----------|-------|-----------|
|            |                           |                      |   |   |   |                            | Thorium          | Tin   | Titanium | Tungsten | Uranium | Vanadium | Zinc  | Zirconium |
| 12SM55SB   | 66-72                     |                      | Dark olive gray to brown silty gravelly sand. Sand is fine to medium grained. Silt has low plasticity. Gravel is weathered bedrock in 1-6cm clasts of hydro altered sandstone (strong Fe-staining) and siltstone. Breaking on Fe-stained facets. Some calcareous mineralizations. Angular and blocky.   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | < LOD            | < LOD | 2283.56  | < LOD    | < LOD   | 98.99    | 88.25 | 176.52    |
| 12SM55SB   | 72-78                     |                      | Dark olive gray with occasional black sandy gravel with silt. Gravel is weathered bedrock in 1-3cm clasts of hydro altered sandstone (strong Fe-staining) and siltstone. Breaking on Fe-stained facets. Some calcareous mineralizations. Silt is firm to hard, low plasticity, moist with very fine sand grains and black flecks. Silt appears to be in situ weathering of black friable shale.   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | < LOD            | < LOD | 2926.65  | < LOD    | < LOD   | 145.78   | 65.19 | 132.73    |
| 12SM55SB   | 78-84                     | 12SM55SB07           | Dark olive gray with occasional black sandy gravel with silt. Gravel is weathered bedrock in 1-3cm clasts of hydro altered sandstone (strong Fe-staining) and siltstone. Breaking on Fe-stained facets. Some calcareous mineralizations. Silt is firm to hard, low plasticity, moist with very fine sand grains and black flecks. Silt appears to be in situ weathering of black friable shale. Refusal at 84" on rocks, likely KG Group Bedrock. | KG soil   | KG soil not demonstrably undisturbed. KG soil appears mineralized.          | Moist                      | 10.59            | < LOD | 1573.11  | < LOD    | < LOD   | 105.96   | 79.26 | 134.21    |
| 12SM56SB   | 0-3                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   |                            |                  |       |          |          |         |          |       |           |
| 12SM56SB   | 3-24                      |                      | Medium brown silt with sand. Sand is very fine grained. Silt is has moderate plasticity, moist, occasional organics.  | Indeterminate. Possible loess. Abundant organic material. |   |                            | < LOD            | < LOD | 3065.71  | < LOD    | < LOD   | < LOD    | 28.54 | 247.58    |
| 12SM56SB   | 24-48                     |                      | Medium gray to olive gray gravelly silt. Gravel is 1-3cm angular sandstone and siltstone. Silt has medium plasticity, moist, soft.  | Indeterminate. Possible mixed Loess/KG soil               |   |                            | 10.22            | < LOD | 3638.52  | < LOD    | < LOD   | 111.48   | 68.85 | 235.78    |
| 12SM56SB   | 48-54                     | 12SM56SB05           | Brown silty gravel with sand. Sand is medium grained. Gravel is 0.5-5cm, subrounded to angular sandstone and siltstone. Silt has medium plasticity and is moist.  | KG soil   | KG soil not demonstrably undisturbed. KG soil appears non-mineralized.      |                            | 7.89             | < LOD | 1832.97  | < LOD    | < LOD   | < LOD    | 27.39 | 147.51    |
| 12SM57SB   | 0-4                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)                                   |   |                            |                  |       |          |          |         |          |       |           |
| 12SM57SB   | 4-24                      |                      | Medium brown sandy silt with gravel. Gravel is 2-4cm, angular to subrounded sandstone. Sand is very fine grained. Silt is wet, low plasticity, occasional organics and roots.   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears non-mineralized.      | Wet                        | < LOD            | < LOD | 3616.87  | < LOD    | < LOD   | 106.23   | 35.65 | 252.52    |
| 12SM57SB   | 24-48                     |                      | Light gray to medium brown silt with sand and gravel. Sand is very fine grained. Gravel is 1-2cm, angular to subrounded sandstone. Silt has brown Fe-staining, firm, low moisture, low plasticity, micaceous.   | KG soil   | KG soil not demonstrably undisturbed. KG soil appears non-mineralized.      | Dry to moist               | < LOD            | < LOD | 3525.24  | < LOD    | < LOD   | < LOD    | 43.68 | 275.7     |
| 12SM57SB   | 48-60                     | 12SM57SB05           | Same as above, except with increased gravel. Refusal at 60" due to gravel.  | KG soil   | KG soil not demonstrably undisturbed. KG soil appears non-mineralized.      | Dry to moist               | < LOD            | < LOD | 3936.11  | < LOD    | < LOD   | < LOD    | 69.36 | 237.5     |
| 12SM58SB   | 0-12                      |                      | Organic mat (tundra)  | Organic mat (tundra)                                      |   |                            |                  |       |          |          |         |          |       |           |
| 12SM58SB   | 12-24                     | 12SM58SB02           | Medium brown sandy silt with gravel. Gravel is fine to 2 cm, subrounded sandstone. Sand is very fine to fine grained. Silt is very moist, very soft, no plasticity, organic-rich and roots.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist to wet               | 8.21             | < LOD | 3745.65  | < LOD    | < LOD   | < LOD    | 48.74 | 245.75    |
| 12SM58SB   | 24-48                     |                      | Medium olive brown sandy silt with gravel. Gravel is fine to 2 cm, subrounded sandstone. Sand is very fine to fine grained. Silt is very wet, very soft, no plasticity. Perched water layer flooding borehole.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Very wet                   | 8.07             | < LOD | 3731.11  | < LOD    | < LOD   | 144.65   | 54.27 | 260.98    |
| 12SM58SB   | 48-66                     |                      | Same as above   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Very wet                   | 8.45             | < LOD | 3442.25  | < LOD    | < LOD   | < LOD    | 53.12 | 221.5     |
| 12SM58SB   | 66-72                     |                      | Same as above, except with increased 1-4cm gravel (30%). Refusal at 72" due to gravel.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               |                            | 14.22            | < LOD | 3623.45  | < LOD    | < LOD   | 110.53   | 68.59 | 217.86    |
| 12SM59SB   | 0-4                       |                      | Organic mat (tundra)  | Organic mat (tundra)                                      |   | Moist                      |                  |       |          |          |         |          |       |           |
| 12SM59SB   | 4-12                      | 12SM59SB01           | Medium to dark brown silt with gravel. Very soft. Organic-rich. No plasticity. Loamy. Gravel (10%) is angular to blocky, sandstone, 2-4cm.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | < LOD            | < LOD | 3292.16  | < LOD    | < LOD   | 146.53   | 34.61 | 211.8     |
| 12SM59SB   | 12-24                     |                      | Medium brown gravelly silt. Gravel (40%) is 3-7cm, angular to blocky sandstone and siltstone. Silt is soft to firm, none to low plasticity. Occasional organics.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | < LOD            | < LOD | 3303.54  | < LOD    | < LOD   | < LOD    | 51.61 | 278.39    |
| 12SM59SB   | 24-36                     |                      | Same as above, except gravel is 5-8cm, silt is loess-like, and increasing moisture.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist to wet               | < LOD            | < LOD | 3406.43  | < LOD    | < LOD   | < LOD    | 37.71 | 299.3     |
| 12SM59SB   | 36-48                     |                      | No recovery   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist to wet               | 10.04            | < LOD | 3283.84  | < LOD    | < LOD   | 167.55   | 54.16 | 260.81    |
| 12SM59SB   | 48-60                     | 12SM59SB05           | Light gray (occasional brown mottling) silt with trace gravel. Gravel is 1-3cm, angular sandstone. Silt is low to medium plasticity, moist, soft to firm, brown/rust mottling appears to be root casts. Trace organics. Refusal at 60" due to large rock.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | < LOD            | < LOD | 2649.66  | < LOD    | < LOD   | 90       | 43.01 | 234.44    |
| 12SM60SB   | 0-4                       |                      | Organic mat (tundra)  | Organic mat (tundra)                                      |   | Wet                        |                  |       |          |          |         |          |       |           |
| 12SM60SB   | 4-12                      |                      | Light brown sandy silt with gravel. Sand is fine to medium grained. Gravel is angular to blocky, sandstone, 1-4cm, occasional subblocky. Many roots. Abundant decomposing organics. Soft and loamy.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | < LOD            | < LOD | 2982.16  | < LOD    | < LOD   | 96.62    | 37.93 | 267.54    |
| 12SM60SB   | 12-24                     |                      | Light brown silty gravel with sand. Sand is fine grained. Gravel is 3-7cm, angular to platy, sandstone with occasional siltstone. Silt is organic rich, loamy.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | < LOD            | < LOD | 2738.69  | < LOD    | < LOD   | 118.58   | 68.61 | 336.38    |
| 12SM60SB   | 24-36                     |                      | Light brown gray gravelly silt with sand. Sand is very fine to fine grained. Gravel (30%) is platy, siltstone, occasional sandstone, 3-6cm, occasional blocky sandstone. Silt is loess-like with more sand, none to low plasticity, soft.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 11.36            | < LOD | 3303.15  | < LOD    | < LOD   | 107.02   | 49.64 | 390.57    |
| 12SM60SB   | 36-48                     |                      | Same as above, except with increasing gravel (40%)  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | < LOD            | < LOD | 2927.28  | < LOD    | 13.05   | 126.62   | 62.23 | 284.57    |
| 12SM60SB   | 48-60                     |                      | Same as above, except with increasing sand. Loess-like silt is light gray with occasional red stained clasts, low plasticity, clasts occasionally subblocky.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | < LOD            | < LOD | 2098.05  | < LOD    | < LOD   | 106.07   | 90.06 | 180.07    |
| 12SM60SB   | 60-72                     | 12SM60SB06           | Brown to dark brown silty gravel with sand. Gravel is angular to subblocky sandstone and siltstone, 1-4cm, fresh iron oxide 'facets'. Sand is fine grained. Firm.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 10.68            | < LOD | 2856.86  | < LOD    | < LOD   | 137.82   | 117   | 164.08    |
| 12SM60SB   | 72-84                     | 12SM60SB07           | Dark brown to very dark gray silty gravel with trace sand. Gravel is blocky to angular with occasional subrounded, strong siltstone to friable black shale, 0.5-4cm, fresh facets. Refusal at 84" bgs as weathered bedrock transitions to bedrock.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 13.87            | < LOD | 2917.6   | < LOD    | < LOD   | 125.81   | 98.6  | 150.73    |
| 12SM61SB   | 0-4                       |                      | Organic mat (tundra)  | Organic mat (tundra)                                      |   |                            |                  |       |          |          |         |          |       |           |
| 12SM61SB   | 4-10                      |                      | Medium brown sandy silt. Gravel is 2cm - <8cm (observed platy clast in shovel hole to 8" width), angular - blocky - platy, sandstone - siltstone, friable siltstone. Sand is fine to medium grained, quartz. Silt is low plasticity and moist. Occasional organics.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 9.03             | < LOD | 3684.65  | < LOD    | < LOD   | < LOD    | 49.1  | 339.84    |
| 12SM61SB   | 10-16                     | 12SM61SB01           | Same as above, except with 40% gravel, 45% silt, and 15% sand.  | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | 10.77            | < LOD | 3760.9   | < LOD    | < LOD   | < LOD    | 54.5  | 340.15    |
| 12SM61SB   | 16-22                     |                      | Medium brown silty gravel with sand. Sand is fine grained. Gravel is subangular to subblocky, occasional platy, 1-10 cm, sandstone - siltstone. Trace organics.   | KG soil   | KG soil appears undisturbed. KG soil appears non-mineralized.               | Moist                      | < LOD            | < LOD | 3249.62  | < LOD    | < LOD   | 138.93   | 69.48 | 255.49    |





Table E-1 (part 4) Additional Soil Characterization, Soil Type and XRF Data

| Station ID | Sample Depth (inches bgs) | Laboratory Sample ID | Field Lithological Description  | Interpreted Soil Type              | Comments Regarding Possible Usefulness for Background Soil Characterization  | Field Moisture Description | XRF Result (ppm) |       |          |          |         |          |       |           |
|------------|---------------------------|----------------------|---|------------------------------------|--|----------------------------|------------------|-------|----------|----------|---------|----------|-------|-----------|
|            |                           |                      |   |                                    |  |                            | Thorium          | Tin   | Titanium | Tungsten | Uranium | Vanadium | Zinc  | Zirconium |
| 12SM64SB   | 3-12                      |                      | Dark brown sandy silt with trace gravel. Gravel is fine. Sand is very fine to fine grained. Silt is organic-rich, abundant roots, very soft, no plasticity, loamy.  | Loess with abundant organic matter |  | Dry to moist               | < LOD            | < LOD | 2014.55  | < LOD    | < LOD   | < LOD    | 24.85 | 205.05    |
| 12SM64SB   | 12-24                     |                      | Light gray to light brown silt with sand. Sand is very fine to fine grained. Silt is moderately moist, none to low-plasticity, soft, abundant roots, occasional organics. Grading to loess.   | Loess with abundant organic matter |  | Moist                      | 9.39             | < LOD | 2416.13  | < LOD    | < LOD   | < LOD    | 52.7  | 270.21    |
| 12SM64SB   | 24-36                     |                      | Same as above, except sand grading to very fine grained. No roots.  | Loess                              |  | Moist                      | < LOD            | < LOD | 2499.92  | < LOD    | < LOD   | < LOD    | 39.89 | 268.66    |
| 12SM64SB   | 36-48                     |                      | Same as above, except no brown silt, occasional fine grained sand, increasing moisture, and low plasticity.   | Loess                              |  | Moist to wet               | 8                | < LOD | 2262.87  | < LOD    | < LOD   | < LOD    | 48.99 | 254.4     |
| 12SM64SB   | 48-60                     |                      | Light gray to light olive silt with sand. Low plasticity. Firm. Red brown staining along roots.   | Loess                              |  | Moist to wet               | < LOD            | < LOD | 2477.41  | < LOD    | < LOD   | 97.47    | 32.97 | 286.72    |
| 12SM64SB   | 60-72                     |                      | Same as above, except with possible clay, medium plasticity, and less red brown staining along roots.   | Loess                              |  | Moist to wet               | 9.99             | < LOD | 2546.98  | < LOD    | < LOD   | 105.5    | 43.22 | 272.19    |
| 12SM64SB   | 72-84                     |                      | Same as above, except it appears to contain a paleo moss horizon. Refusal at 84" due to rocks.  | Loess                              | Undisturbed KG soil likely present at bottom of soil boring, but no KG soil recovered in soil sample.  | Wet                        | < LOD            | < LOD | 1460.38  | < LOD    | < LOD   | < LOD    | 39.25 | 219.74    |
| 12SM65SB   | 0-2                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)            |  | Dry to moist               |                  |       |          |          |         |          |       |           |
| 12SM65SB   | 2-12                      |                      | Medium olive brown silty sand. Silt 40%. Sand 60%, very fine to fine grained. Very loose. Organic rich with roots. Loamy.   | Loess with abundant organic matter |  | Dry to moist               | < LOD            | < LOD | 2611.16  | < LOD    | < LOD   | 100      | 40.18 | 415.28    |
| 12SM65SB   | 12-24                     |                      | Medium olive gray silty sand. 45% silt. 55% sand, very fine. Loose. Occasional roots. Occasional Fe staining. Trace organics.   | Loess                              |  | Dry to moist               | 7.99             | < LOD | 2209.15  | < LOD    | < LOD   | 93.38    | 38.31 | 255.21    |
| 12SM65SB   | 24-36                     |                      | Same as above, except 40% silt, 60% sand, increasing brown color.   | Loess                              |  | Dry to moist               | 10.91            | < LOD | 2046.33  | < LOD    | < LOD   | < LOD    | 48.82 | 272.15    |
| 12SM65SB   | 36-48                     |                      | Same as above, except with occasional orange brown Fe-staining.   | Loess                              |  | Dry to moist               | < LOD            | < LOD | 2256.68  | < LOD    | < LOD   | < LOD    | 40.49 | 274.7     |
| 12SM65SB   | 48-60                     |                      | Olive brown and orange gray sandy silt. Sand (40%) is very fine grained. Silt is soft to firm, none to low plasticity, and micaceous.   | Loess                              |  | Moist                      | 9.04             | < LOD | 2463.25  | < LOD    | < LOD   | 91.46    | 52.21 | 259.85    |
| 12SM65SB   | 60-72                     |                      | Same as above, except low plasticity.   | Loess                              |  | Moist to wet               | < LOD            | < LOD | 2828.4   | < LOD    | < LOD   | < LOD    | 40.28 | 287.95    |
| 12SM65SB   | 72-84                     |                      | Same as above, except there is a 1-2" lens of medium grained sand.  | Loess                              |  | Moist to wet               | 8.11             | < LOD | 2034.57  | < LOD    | < LOD   | 101.61   | 42.1  | 214.78    |
| 12SM65SB   | 84-96                     |                      | Same as above, except increasing silt, and firm.  | Loess                              |  | Moist to wet               | 9.19             | < LOD | 2617.72  | < LOD    | < LOD   | < LOD    | 48.49 | 261.12    |
| 12SM65SB   | 96-108                    |                      | Same as above, except it includes banding of red brown Fe-staining in fine grained sand showing mild concretion.  | Loess                              |  | Moist to wet               | < LOD            | < LOD | 2438.63  | < LOD    | < LOD   | 130.7    | 41.86 | 308.02    |
| 12SM65SB   | 108-120                   |                      | Same as above, except with paleo tundra (moss and roots)  | Loess                              |  | Moist to wet               | 8.84             | < LOD | 2245.38  | < LOD    | < LOD   | 98.61    | 44.94 | 281.06    |
| 12SM65SB   | 120-132                   |                      | Same as above, except with no paleo tundra  | Loess                              |  | Moist                      | 10.39            | < LOD | 2721.37  | < LOD    | < LOD   | < LOD    | 49.11 | 240.09    |
| 12SM65SB   | 132-144                   | 12SM65SB12           | Same as above, except grading to silty sand with gravel. Sand is fine to coarse grained, possible quartz. Gravel is sandstone with strong red brown to gray brown Fe-staining, 0.5-26cm, subangular to blocky. Stiff. Maximum length of hand auger 12' bgs. | Mixed loess/KG soil                | Undisturbed KG soil likely present at bottom of soil boring, but only mixed loess/KG soil recovered in soil sample. KG soil appears mineralized. | Moist                      | 10.11            | < LOD | 2525.66  | < LOD    | < LOD   | 108.32   | 48.23 | 209.44    |
| 12SM66SB   | 0-2                       |                      | Organic mat (disturbed)   | Organic mat (disturbed)            |  | Dry to moist               |                  |       |          |          |         |          |       |           |
| 12SM66SB   | 2-12                      |                      | Light gray to olive gray sandy silt. Sand is very fine grained. Silt is soft, low moisture, no plasticity.  | Loess                              |  | Dry to moist               | < LOD            | < LOD | 2364.81  | < LOD    | < LOD   | 84.73    | 40.26 | 256.95    |
| 12SM66SB   | 12-24                     |                      | 12" to 16" same as above. 16" to 20" highly organic silt with decomposing organic matter, roots, paleosol. 20" to 24" olive gray sandy silt. Sand is fine grained. Silt is soft with no plasticity.   | Loess/Paleosol/Loess               |  | Dry to moist               | < LOD            | < LOD | 2633.26  | < LOD    | < LOD   | < LOD    | 36.35 | 227.3     |
| 12SM66SB   | 24-36                     |                      | Olive gray sandy silt. Sand is fine grained. Silt is soft with no plasticity.   | Loess                              |  | Dry to moist               | 8.36             | < LOD | 1991.8   | < LOD    | < LOD   | 89.29    | 49.49 | 262.09    |
| 12SM66SB   | 36-48                     |                      | Same as above   | Loess                              |  | Moist                      | < LOD            | < LOD | 1701.62  | < LOD    | < LOD   | 83.46    | 40.75 | 222.14    |
| 12SM66SB   | 48-60                     |                      | Same as above, except increasing moisture, low plasticity. 30% sand. 70% silt.  | Loess                              |  | Moist                      | < LOD            | < LOD | 2392.84  | < LOD    | < LOD   | 103.19   | 31.86 | 259.77    |
| 12SM66SB   | 60-72                     |                      | Same as above, except occasional Fe-staining  | Loess                              |  | Moist                      | 9.29             | < LOD | 2224.97  | < LOD    | < LOD   | < LOD    | 40.33 | 275.24    |
| 12SM66SB   | 72-84                     |                      | Same as above, except with increasing sand (40%) and occasional medium gravel.  | Loess                              |  | Moist                      | < LOD            | < LOD | 6736.09  | < LOD    | < LOD   | < LOD    | 44.82 | 230.15    |
| 12SM66SB   | 84-96                     |                      | Same as above, except with decreasing very fine grained sand (30%).   | Loess                              |  | Moist                      | < LOD            | < LOD | 2175.08  | < LOD    | < LOD   | 81.8     | 43.62 | 257.87    |
| 12SM66SB   | 96-108                    |                      | Same as above, except with decreasing very fine grained sand (10%), low to medium plasticity, and increased Fe-staining.  | Loess                              |  | Moist                      | < LOD            | < LOD | 2659.52  | < LOD    | < LOD   | 110.37   | 50.19 | 238.6     |
| 12SM66SB   | 108-120                   |                      | Same as above, except with increasing very fine to medium grained sand (20%). Occasional Fe-stained medium brown concretions associated with sand grains.   | Loess                              |  | Moist                      | 7.95             | < LOD | 2942.6   | < LOD    | < LOD   | 135.29   | 47.43 | 320.08    |
| 12SM66SB   | 120-132                   |                      | Same as above, Except with increasing red brown Fe-staining. Medium plasticity.   | Loess                              |  | Moist to wet               | < LOD            | < LOD | 1869.25  | < LOD    | < LOD   | < LOD    | 30.03 | 213.29    |
| 12SM66SB   | 132-144                   |                      | Same as above, except with possible clay. Maximum length of hand auger 12' bgs.   | Loess                              | Undisturbed KG soil likely present below loess, but no KG soil encountered in soil boring.   | Moist to wet               | 10.15            | < LOD | 2928.58  | < LOD    | < LOD   | 106.16   | 30.77 | 234       |

Note: XRF results are for non-dried samples. See Field Moisture Description for qualitative observations of moisture content of sample.

Key:

- ' = feet
- " = inches
- bgs = Below ground surface
- cm = centimeter
- Fe = iron
- ID = Identification
- KG soil = Kuskokwim Group bedrock-derived soil
- XRF = X-ray fluorescence spectrometry
- < LOD = Less than the XRF instrument level of detection
- ppm = Parts per million.
- XRF = X-ray fluorescence

| Table E-2 Additional Soil Characterization Laboratory Analytical Sample Results | Station ID                  | SM51       | SM52       | SM52   | SM52       | SM52                                       | SM53       | SM54       | SM55       | SM55                                       | SM55       | SM56       | SM57       | SM58       | SM59       |
|---|-----------------------------|------------|------------|--|------------|--|------------|------------|------------|--|------------|------------|------------|------------|------------|
|   | Sample ID                   | 12SM51SB06 | 12SM52SB02 | 12SM52SB10                                       | 12SM52SB11 | 12SM908B01 (field duplicate of 12SM52SB11) | 12SM53SB10 | 12SM54SB11 | 12SM55SB04 | 12SM92SB01 (field duplicate of 12SM55SB04) | 12SM55SB07 | 12SM56SB05 | 12SM57SB05 | 12SM58SB02 | 12SM59SB01 |
|   | Depth Interval (inches bgs) | 48-72      | 4-24       | 96-120   | 120-132    | 120-132                                    | 90-120     | 120-126    | 36-48      | 36-48                                      | 78-84      | 48-54      | 48-60      | 12-24      | 4-12       |
|   | Soil Type                   | KG Soil    | KG Soil    | Indeterminate. Possible mixed loess and KG soil. | KG Soil    | KG Soil                                    | KG Soil    | KG Soil    | KG Soil    | KG Soil                                    | KG Soil    | KG Soil    | KG Soil    | KG Soil    | KG Soil    |
| Analyte   | Method                      |            |            |  |            |  |            |            |            |  |            |            |            |            |            |
| Total Inorganic Elements (mg/kg)  | SW846 6020                  | 14000 J    | 16000 J    | 14000 J  | 3050       | 3600 J                                     | 11000 J    | 14000 J    | 7400 J     | 11000 J                                    | 5300 J     | 13000 J    | 16000 J    | 18000 J    | 16000 J    |
| Aluminum  | SW846 6020                  | 3.7 J      | 0.56 J     | 0.71 J   | 83.8       | 72   | 0.71 J     | 0.44       | 0.56       | 0.66                                       | 6.6        | 0.66       | 0.57       | 1.3        | 2.8        |
| Antimony  | SW846 6020                  | 78         | 12         | 24   | 1930       | 2000                                       | 32         | 13         | 15         | 19   | 110        | 23         | 16         | 14         | 16         |
| Arsenic   | SW846 6020                  | 190 J      | 98 J       | 180 J  | 247        | 240  | 200 J      | 210        | 150        | 210  | 260        | 200        | 240        | 92         | 78         |
| Barium  | SW846 6020                  | 0.5        | 0.46       | 0.61   | 0.705      | 0.86                                       | 0.72       | 0.42       | 0.55       | 0.67                                       | 0.9        | 0.73       | 0.61       | 0.54       | 0.36       |
| Beryllium   | SW846 6020                  | 0.31 J     | 0.26 J     | 0.31 J   | 0.652      | 0.65 J                                     | 0.46 J     | 0.48 J     | 0.40 J     | 0.55 J                                     | 0.70 J     | 0.40 J     | 0.43 J     | 0.20 J     | 0.13 J     |
| Cadmium   | SW846 6020                  | 2700       | 2000       | 2400   | 1510       | 1500                                       | 2200       | 2700       | 1000       | 1200                                       | 1500       | 970        | 2300       | 840        | 730        |
| Calcium   | SW846 6020                  | 28 J       | 29 J       | 30 J   | 14.9       | 20   | 27 J       | 31         | 20         | 25   | 20         | 30         | 44         | 29         | 25         |
| Chromium  | SW846 6020                  | 11         | 12         | 10   | 20.2       | 25   | 20         | 15         | 9.3 J      | 20 J                                       | 22         | 21         | 17         | 19         | 7.6        |
| Cobalt  | SW846 6020                  | 35 J       | 18 J       | 40 J   | 65.1       | 64   | 50 J       | 34         | 54         | 55   | 110        | 56         | 38         | 29         | 18         |
| Copper  | SW846 6020                  | 26000      | 26000      | 26000  | 48200      | 62000                                      | 39000      | 30000      | 26000      | 33000                                      | 53000      | 35000      | 46000      | 34000      | 26000      |
| Iron  | SW846 6020                  | 11         | 9.1        | 11   | 13.9       | 14   | 12         | 11         | 10 J       | 14   | 23 J       | 16 J       | 11 J       | 11 J       | 8.9 J      |
| Lead  | SW846 6020                  | 4400 J     | 5000 J     | 4100 J   | 596        | 720  | 3100 J     | 4000       | 1900       | 2600                                       | 1000       | 2900       | 4500       | 3900       | 3100       |
| Magnesium   | SW846 6020                  | 460        | 330        | 330  | 962        | 1100                                       | 760        | 870        | 340 J      | 970 J                                      | 650        | 810        | 890        | 560        | 280        |
| Manganese   | SW846 7471A                 | 8.8 J      | 0.066 J    | 1.7 J  | 119 J      | 120 J                                      | 1.8 J      | 0.33 J     | 2.1 J      | 2.6 J                                      | 9.1 J      | 1.59       | 1.2 J      | 0.28 J     | 0.24 J     |
| Mercury   | SW846 6020                  | 35 J       | 27 J       | 31 J   | 66.4       | 77   | 51 J       | 40         | 37         | 44   | 99         | 38         | 34         | 32         | 20         |
| Nickel  | SW846 6020                  | 860 J      | 900 J      | 1000 J   | 935        | 1100 J                                     | 1100 J     | 930 J      | 1100 J     | 1300 J                                     | 2000 J     | 1600 J     | 1000 J     | 780 J      | 760 J      |
| Potassium   | SW846 6020                  | 0.95       | 0.83       | 1.2  | 1.28       | 1.3  | 1.3        | 1          | 1.2        | 1.4  | 1.9        | 1.3        | 1.1        | 0.96       | 0.84 J     |
| Selenium  | SW846 6020                  | 0.13 J     | 0.077 J    | 0.13 J   | 0.223      | 0.22                                       | 0.15 J     | 0.18 J     | 0.14 J     | 0.17 J                                     | 0.36       | 0.18 J     | 0.15 J     | 0.096 J    | 0.086 J    |
| Silver  | SW846 6020                  | 120        | 94 J       | 130  | 41.6 J     | 50 J                                       | 82 J       | 110        | 53 J       | 86 J                                       | 52 J       | 100 J      | 150        | 89 J       | 100 J      |
| Sodium  | SW846 6020                  | 0.14 J     | 0.15 U     | 0.14 U   | 0.509      | 0.54                                       | 0.14 U     | 0.14 U     | 0.14 U     | 0.17 J                                     | 0.16 J     | 0.16 J     | 0.16 U     | 0.14 U     | 0.16 U     |
| Thallium  | SW846 6020                  | 44 J       | 47 J       | 53 J   | 25.1       | 35   | 49 J       | 46         | 37         | 46   | 39         | 54         | 58         | 52         | 49         |
| Vanadium  | SW846 6020                  | 89 J       | 89 J       | 90 J   | 114        | 130  | 120 J      | 84         | 100        | 120  | 200        | 100        | 86         | 79         | 48         |
| Zinc  | SW846 6020                  |            |            |  |            |  |            |            |            |  |            |            |            |            |            |
| Total Organic Carbon (mg/kg)  | SW846 9060                  | 2800       | 10000      | 4200   | 6360       | 5800                                       | 5500       | 3200       | 3400       | 3500                                       | 5800       | 4300       | 3100       | 26000      | 37000      |
| Percent Moisture  | ASTM D 2216                 | 17         | 20         | 18   | 6.6        | 11   | 10         | 20         | 9.3        | 6.8  | 15         | 15         | 19         | 19         | 25         |
| Percent Solids  | ASTM D 2216                 | 83         | 80         | 82   | 93         | 89   | 90         | 80         | 91         | 93   | 85         | 85         | 81         | 81         | 75         |

|   |            |            |            |  |            |            |                                    |            |            |   |   |                     |
|---|------------|------------|------------|--|------------|------------|------------------------------------|------------|------------|---|---|---------------------|
| Table E-2 Additional Soil Characterization Laboratory Analytical Sample Results | SM59       | SM60       | SM60       | SM60                                       | SM61       | SM61       | SM62                               | SM62       | SM62       | SM63  | SM63  | SM65                |
|   | 12SM59SB05 | 12SM60SB06 | 12SM60SB07 | 12SM91SB01 (field duplicate of 12SM60SB07) | 12SM61SB01 | 12SM61SB05 | 12SM62SB01                         | 12SM62SB06 | 12SM62SB08 | 12SM63SB01  | 12SM63SB06  | 12SM65SB12          |
|   | 48-60      | 60-72      | 72-84      | 72-84                                      | 10-16      | 48-60      | 4-16                               | 64-72      | 90-96      | 4-12  | 60-72   | 132-144             |
|   | KG Soil    | KG Soil    | KG Soil    | KG Soil                                    | KG Soil    | KG Soil    | Loess with abundant organic matter | KG Soil    | KG Soil    | Indeterminate. Appears to be mixed loess and KG soils, possibly mixed during early mining/slucing operations. | Indeterminate. Appears to be mixed loess and KG soils, possibly mixed during early mining/slucing operations. | Mixed loess/KG soil |

| Analyte                                 | SM59    | SM60   | SM60    | SM60   | SM61    | SM61   | SM62    | SM62   | SM62   | SM63    | SM63   | SM65    |
|---|---------|--------|---------|--------|---------|--------|---------|--------|--------|---------|--------|---------|
| <b>Total Inorganic Elements (mg/kg)</b> |         |        |         |        |         |        |         |        |        |         |        |         |
| Aluminum                                | 18000 J | 4500 J | 4710    | 5400 J | 15000 J | 4900 J | 15000 J | 8700 J | 4100 J | 16000 J | 5000 J | 12000 J |
| Antimony                                | 0.36    | 0.88 J | 1.17 J  | 1.2    | 1.7 J   | 1.4    | 310     | 7.8 J  | 2.9 J  | 1.1     | 2.5    | 2.2     |
| Arsenic                                 | 12      | 37     | 49.9    | 45     | 24      | 36     | 230     | 130    | 130    | 9.7 J   | 150 J  | 150     |
| Barium                                  | 290     | 200 J  | 253 J   | 270    | 110 J   | 270    | 190     | 310 J  | 230 J  | 81      | 130    | 190     |
| Beryllium                               | 0.58    | 0.87   | 0.899   | 0.88   | 0.56    | 0.65   | 0.53    | 0.76   | 0.8    | 0.36    | 1.4    | 0.79    |
| Cadmium                                 | 0.24 J  | 0.67 J | 0.822   | 0.69 J | 0.17 J  | 0.81 J | 0.32 J  | 0.56 J | 0.84 J | 0.19 J  | 0.63 J | 0.53 J  |
| Calcium                                 | 1800    | 1200   | 1440    | 1400   | 750     | 2100   | 2300    | 1000   | 1500   | 1400    | 470    | 1900    |
| Chromium                                | 31      | 23 J   | 23.3 J  | 21     | 26 J    | 19     | 29      | 31 J   | 15 J   | 23      | 24     | 33      |
| Cobalt                                  | 8.1     | 21     | 29.1    | 23     | 13      | 18     | 11      | 24     | 22     | 8.4     | 33     | 19      |
| Copper                                  | 35      | 97 J   | 108     | 110    | 31 J    | 67     | 25      | 76 J   | 140 J  | 11 J    | 100 J  | 59      |
| Iron                                    | 21000   | 64000  | 61100   | 51000  | 31000   | 53000  | 25000   | 47000  | 32000  | 23000   | 77000  | 58000   |
| Lead                                    | 12 J    | 22 J   | 23.3    | 21     | 8.3 J   | 12 J   | 9.2 J   | 17 J   | 22 J   | 7.6 J   | 15 J   | 14 J    |
| Magnesium                               | 4700    | 830 J  | 956 J   | 1000   | 3100 J  | 870    | 4700    | 2000 J | 660 J  | 3700    | 570    | 2500    |
| Manganese                               | 270     | 880    | 1080    | 1000   | 490     | 2400   | 390     | 1300   | 790    | 270     | 1700   | 790     |
| Mercury                                 | 0.53 J  | 2.7 J  | 4.17    | 5.5 J  | 0.41 J  | 2.4 J  | 2.2 J   | 2.0 J  | 3.4 J  | 0.090 J | 2.4 J  | 3.9 J   |
| Nickel                                  | 30      | 81 J   | 130 J   | 94     | 31 J    | 67     | 27      | 82 J   | 79 J   | 20      | 80     | 52      |
| Potassium                               | 1300 J  | 1500 J | 1450    | 1700 J | 1000 J  | 1200 J | 1100 J  | 1200 J | 1700 J | 550 J   | 1000 J | 1100 J  |
| Selenium                                | 1       | 1.9    | 1.66    | 1.7    | 0.85    | 1.2    | 0.75    | 1.3    | 1.6    | 0.82    | 1.8    | 1.4     |
| Silver                                  | 0.19 J  | 0.42   | 0.32    | 0.35   | 0.10 J  | 0.2    | 0.12 J  | 0.15 J | 0.17 J | 0.090 J | 0.16 J | 0.21 J  |
| Sodium                                  | 160     | 48 J   | 51.2 J  | 50 J   | 120     | 39 J   | 130     | 49 J   | 52 J   | 53 J    | 47 U   | 74 J    |
| Thallium                                | 0.16 J  | 0.16 J | 0.177 J | 0.19 J | 0.15 U  | 0.12 U | 0.14 U  | 0.16 J | 0.16 J | 0.13 U  | 0.16 U | 0.14 J  |
| Vanadium                                | 56      | 43     | 44.5    | 41     | 46      | 33     | 48      | 51     | 32     | 41      | 44     | 55      |
| Zinc                                    | 86      | 170 J  | 203 J   | 200    | 70 J    | 110    | 64      | 140 J  | 180 J  | 54 J    | 160 J  | 120     |
| <b>Total Organic Carbon (mg/kg)</b>     |         |        |         |        |         |        |         |        |        |         |        |         |
| Total Organic Carbon                    | 3200    | 6000   | 110000  | 6900   | 13000   | 3500   | 11000   | 4400   | 5800   | 19000   | 5200   | 3100    |
| <b>Percent Moisture</b>                 |         |        |         |        |         |        |         |        |        |         |        |         |
| Percent Moisture                        | 20      | 12     | 10      | 10     | 21      | 2.4    | 18      | 11     | 5.9    | 12      | 18     | 20      |
| Percent Solids                          | 80      | 88     | 90      | 90     | 79      | 98     | 82      | 89     | 94     | 88      | 82     | 80      |

Key:  
 ASTM = American Society for Testing and Materials  
 bgs = Below ground surface  
 ID = Identification  
 J = The analyte was detected. The associated result is estimated.  
 KG soil = Kuskokwim Group bedrock-derived soil  
 mg/kg = Milligrams per kilogram (dry)