PUBLIC WORKS ADMINISTRATION
Timothy J. LaPorte, P.E.
Public Works Director
400 West Gowe
Kent, WA 98032
Fax: 253-856-6500

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December 12, 2013

VIA HAND DELIVERY

Jerome B. Cruz
Site Manager
Toxics Cleanup Program
Northwest Regional Office
Washington Department of Ecology
3190 – 160th Avenue SE
Bellevue, Washington 98008

RE: Landsburg Mine Site - Comments in Opposition to the Proposed Draft Consent Decree, Draft Cleanup Action Plan, and Related Exhibits

Dear Dr. Cruz:

Enclosed please find for the Washington State Department of Ecology's consideration the City of Kent's Comments in Opposition to the Proposed Draft Consent Decree, Draft Cleanup Action Plan, Draft Compliance Monitoring Plan, and Related Exhibits for the Landsburg Mine Site—both in paper format (two duplicate copies) and in electronic format on disk (two duplicate disks).

As we have indicated in the past, the City of Kent is prepared to meet with Ecology at any time to discuss the Landsburg Mine Site. If such a meeting would assist Ecology in understanding the issues raised in the City's comments, please contact us.

We will appreciate your consideration of the City's comments.

Sincerely,

Timothy Laporte
Public Works Director

Enclosures—Kent's Comments (two paper copies; two disks)

KENT
WASHINGTON

PUBLIC WORKS ADMINISTRATION
Timothy J. LaPorte, P.E.
Public Works Director
400 West Gowe
Kent, WA 98032
Fax: 253-856-6500

PHONE: 253-856-5500

December 12, 2013

VIA CERTIFIED MAIL; RETURN RECEIPT REQUESTED

Washington State Department of Health
Office of Environmental Health, Safety,
and Toxicology
P.O. Box 47825
Olympia, Washington 98504-7825

RE: Landsburg Mine Site
Request for Department of Health Activities

Dear Sir or Madam:

I write on behalf of the City of Kent ("City") to request that the Washington State Department of Health's Office of Environmental Health, Safety and Toxicology undertake appropriate site investigation, consultation, and reporting actions regarding the Landsburg Mine Site (the "Site") located in Ravensdale, Washington as described in detail below.

The Site is currently the subject of activities under the oversight of the Washington State Department of Ecology ("Ecology") pursuant to Washington's Model Toxics Control Act ("MTCA") because enormous volumes of hazardous wastes historically were dumped into the former coal mine at the Site. Ecology recently sought public comments on a Proposed Draft Consent Decree for the Site, including a Draft Cleanup Action Plan, Draft Compliance Monitoring Plan, and Related Exhibits (the "Proposed Plan").

The City is very concerned about the Site and the Site's threat to nearby water resources. The Site is located immediately north and upgradient of the Rock Creek drainage, a tributary of the Cedar River, and less than one-half mile from the City's primary source of municipal water at Clark Springs. The Site also is just 500 feet south of the Cedar River, and many private wells or small community water supply systems are located in the immediate vicinity of the Site. We understand that the Department of Health has had some involvement with the Site in the past.

Enclosed please find the City of Kent's Comments in Opposition to the Proposed Draft Consent Decree, Draft Cleanup Action Plan, Draft Compliance Monitoring Plan, and Related Exhibits for the Landsburg Mine Site ("Kent's Comments")—both in paper format (two duplicate copies) and in electronic format on disk (two duplicate disks). These materials also have been submitted to Ecology, for Ecology's consideration as part of the MTCA process for the Site. Additional information about the Site and the Proposed Draft Consent Decree can be obtained from Ecology's website (at https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=60) and from Ecology's Site Manager (Jerome Cruz, 425-649-7094).

Pursuant to the role and responsibilities of the Office of Environmental Health, Safety and Toxicology, the City requests that the Department of Health consider the Proposed Plan, consider Kent's Comments, and engage in the following activities: (1) engage in a health consultation with the Agency for Toxic Substance and Disease Registry ("ATSDR") to review the Proposed Plan to determine if the Proposed Plan is sufficient to prevent or sufficiently mitigate the exposure to, or threat of exposure to, hazardous substances (including a leak or discharge of chemical or hazardous materials) that may pose a risk to public health and safety, and the compromise of vital water resources (including but not limited to the City's municipal water supply source and water system); (2) conduct a Site investigation of a threat of exposure to hazardous substances (including a leak or discharge of chemical or hazardous materials) that may pose a risk to public health and safety, and the compromise of vital water resources (including but not limited to the City's municipal water supply source and water system); (3) formally communicate in writing to Ecology the results of the Department of Health activities described above in items #1 and #2, for Ecology's consideration in the MTCA process for the Site; and (4) provide the results of these Department of Health activities to the City.

We will appreciate your efforts regarding this matter and look forward to your timely response.

Sincerely,

Timothy Laporte
Public Works Director

Enclosure—Kent's Comments (two paper copies; two disks)
cc: Jerome Cruz, Washington State Department of Ecology

LANDSBURG MINE SITE

THE CITY OF KENT'S COMMENTS IN OPPOSITION TO THE PROPOSED DRAFT CONSENT DECREE, DRAFT CLEANUP ACTION PLAN, DRAFT COMPLIANCE MONITORING PLAN, AND RELATED EXHIBITS (COLLECTIVELY THE "PROPOSED PLAN") FOR THE LANDSBURG MINE SITE

TABLE OF CONTENTS

I. INTRODUCTION.

The City of Kent ("Kent") and the Washington State Department of Ecology ("Ecology") historically have worked together successfully to protect Washington State's environment and natural resources—particularly our water resources. In many collaborative endeavors involving both Ecology and Kent, the agency always has held the City, citizens, private developers, and businesses in Kent to very high and rigorous standards. Ecology has diligently enforced applicable laws and regulations. Kent has supported and abided by Ecology's efforts and oversight. Based upon a long history of such experiences, Kent has expected Ecology to apply similar rigorous scrutiny and diligent oversight to the Landsburg Mine Site (the "Site"). Kent is hopeful that Ecology will maintain its own high standards and take into consideration the comments Kent respectfully submits to ensure the protection of water resources. Kent is very perplexed and troubled about Ecology's approach to the Site. Regretfully, Kent is compelled to express its deep concerns about the path Ecology proposes to follow to address the Site's environmental conditions.

Kent submits these comments in opposition to the Proposed Draft Consent Decree, Final Draft Cleanup Action Plan ("Final Draft CAP"), Draft Compliance Monitoring Plan ("DCMP"), and related exhibits (collectively the "Proposed Plan") for the Site.[1] The Proposed Plan for the Site fails to comply with the requirements of Washington's Model Toxics Control Act ("MTCA"), Chapter 70.105D RCW and applicable regulations, for the reasons described below and according to independent experts retained by Kent to evaluate Site issues.[2] Ecology's determinations and actions regarding the Site to date (including but not limited to Ecology's issuance of the Proposed Plan for public comment) also have violated Washington's Administrative Procedure Act ("APA"), Chapter 34.05 RCW, because Ecology's conduct has been arbitrary, capricious, and unlawful in that Ecology has failed to comply with MTCA and has acted, in part, by making misrepresentations to the public. If Ecology were to approve the Proposed Plan, Ecology's approval would again violate MTCA and APA, as well as violate Washington's laws regarding water resources, including the Water Resources Act of 1971, Chapter 90.54 RCW. Ecology's approval of the Proposed Plan also would violate the State of

[1] The proposed Consent Decree, Final Draft CAP, DCMP, and related exhibits are collectively referred to as the "Proposed Plan" in these comments, except where specificity requires particular reference to one of those documents. The Proposed Plan was issued for public comment by the Washington Department of Ecology ("Ecology") in early October, 2013, and is located in the Ecology Site File. Excerpts of the Proposed Plan are included in Attachment A to these comments. Materials distributed to the public by Ecology and used by Ecology to inform the public about the Proposed Plan are included in Attachment B to these comments. Kent's opposition and comments are directed to the entire Proposed Plan and all of its draft documents. The excerpts included in Attachment A are provided for ease of reference. Exclusion of portions of the Proposed Plan's documents from Attachment A should not be construed as indicating Kent's agreement with the contents of those excluded portions.

[2] Pertinent reports prepared by those independent experts (two different consulting firms) are attached to these comments, and their opinions are generally summarized in these comments below (additional details, and other specific observations and criticisms regarding the Proposed Plan, are set forth in the experts' reports). Attachment F to these comments contains the comments and opinions of Aspect Consulting regarding the Proposed Plan. Attachment G to these comments includes materials previously submitted by Kent to Ecology that included the reports of Udaloy Environmental Services regarding the inadequate Site investigation and related matters. Resumes demonstrating the qualifications of these independent experts are included in Attachments F and N. All of these materials are incorporated into these comments by reference.

Washington's non-discretionary duty as a trustee for water resources under Washington's Constitution and Washington's laws. The State has the duty to use the State's police powers to protect irreplaceable water resources, to guard the health of its residents, and to prevent foreseeable economic losses that could result from any migration of any hazardous substances from the Site to surrounding water resources.

A. The most significant fatal flaws in the Proposed Plan and in Ecology's previous Site determinations.

The Proposed Plan, and Ecology's Site determinations underlying the Proposed Plan, have many fatal flaws which violate MTCA, APA, and Washington's water laws. The most significant of those fatal flaws are the following:

- No Up-Front Installation and Testing of the Groundwater Containment System. The Proposed Plan is not protective of human health and the environment as required by MTCA because its inadequate "contingency plan" would not even attempt groundwater containment until after contaminated groundwater exceeding MTCA cleanup standards has migrated from the Site and degraded surrounding drinking water resources. The Proposed Plan actually anticipates, and would allow, such degradation—perhaps undiscovered for many years given the long durations between proposed monitoring events. The Proposed Plan must be revised to ensure the ability to respond immediately with an installed, tested, and robust Groundwater Containment System if contaminated groundwater threatens to migrate from the Site.

- Not Enforceable—No Defined Performance Standards, Timeframes, or Deadlines. The Proposed Plan abdicates Ecology's duty to oversee and enforce remedy implementation under MTCA because the Proposed Plan fails to define enforceable performance standards, timeframes, and deadlines—particularly for the "contingency plan" but for many other work activities. The Proposed Plan must be revised to allow (and require) Ecology's oversight and enforcement of the remedy's critical components. This significant flaw in the Proposed Plan was identified by Ecology's own counsel in 2012.

- System's Operational Trigger Would Allow Degradation of Water Resources. The Proposed Plan's "trigger" for initiating operation of the Contingent Groundwater Containment System is not protective as required by MTCA because the Proposed Plan would allow contaminated groundwater exceeding MTCA cleanup standards to migrate from the Site and degrade surrounding drinking water resources. The "triggers" for initiating operation and terminating operation of the System must be established at lower contaminant concentration levels.

- Provisions For Termination Of Monitoring, Maintenance, And Institutional Controls—Contrary to Ecology's Many Promises About "In Perpetuity" Monitoring. The Proposed Plan includes provisions for termination of monitoring, maintenance, and institutional controls in the future, contrary to many promises made to the public in the past by Ecology and the PLP Group, contrary to Ecology's current representations to the public

about the Proposed Plan, and contrary to objections of Ecology's own counsel. MTCA requires monitoring, maintenance, and institutional controls "in perpetuity."

- Monitoring Frequencies Not Protective. The Proposed Plan's monitoring frequencies are based upon speculation and unproven assumptions. Those frequencies (as long as five or even ten years between monitoring events) are not protective and do not comply with MTCA's requirements. Quarterly monitoring must be required "in perpetuity."

- Arbitrary And Capricious "Black Box Approach" Failed to Comply with MTCA. The unique (unprecedented?) "Black Box Approach" relied upon by Ecology for twenty years as the basis for Site determinations was arbitrary, capricious, and failed to comply with MTCA's requirements.[3]

- Arbitrary and Capricious Abandonment of "Black Box Approach" in Remedy Selection. After twenty years of arbitrary and capricious reliance upon the "Black Box Approach," Ecology has arbitrarily and capriciously abandoned that "approach" in remedy selection. Speculation, unproven assumptions, and misrepresentations are being misused to justify the Proposed Plan and to undermine the very conservative approach that Ecology promised would ensure a protective Site remedy. The Proposed Plan and Ecology's own October 2013 Fact Sheet describing the Proposed Plan repeats speculation that Ecology previously told the PLP Group must be deleted from the Proposed Plan because it was "just speculation."[4]

- Lack of Site Investigation and Waste Characterization Required by MTCA. The Site has not been investigated and the hazardous waste in the "Black Box" has not been characterized as required by MTCA. The Proposed Plan has been prepared: (1) without determining what hazardous wastes were dumped into the former mine; (2) without determining where the hazardous wastes are located; and (3) without determining how/where the hazardous wastes have moved (and will move) within the Site (and from the Site) to degrade surrounding water supplies.

- Failure to Remove Chlorinated Solvents Sludge in Violation of MTCA. The Proposed Plan would not remove any hazardous wastes from the Site, including easily accessible chlorinated solvents sludge located on the surface, in violation of MTCA and applicable regulations.

Many other deficiencies of the Proposed Plan are discussed below and in Aspect Consulting's Comments in Attachment F.

[3] The "Black Box Approach" is depicted in illustrations included in Attachment E to these comments.

[4] Ecology's October 2013 Fact Sheet and other materials distributed/used by Ecology to inform the public about the Proposed Plan are included in Attachment B to these comments. The "just speculation" assertion by Ecology's Site Manager is substantiated below and in materials included in Attachment K to these comments.

B. Ecology's approval of the Proposed Plan would violate Ecology's many past promises to the public about the Site.

If Ecology were to approve the Proposed Plan, Ecology would violate its many past promises to the public about Ecology's supposedly conservative approach to remedy selection for this Site. For example, after Ecology's many assurances over the past ten years about "in perpetuity" Site monitoring, the Proposed Plan has now abandoned the requirement of "in perpetuity" monitoring. The Proposed Plan expressly anticipates termination of monitoring, maintenance, and institutional controls in the future. Documents in the Ecology Site File reveal that Ecology's own counsel objected to the inclusion of those termination provisions in the Proposed Plan.[5]

Another example is the fact that Ecology has now abandoned its repeated promises that "[t]he remedy at the Site will conservatively assume that there is waste in the trench and mine [caverns]."[6] The Proposed Plan, and Ecology's October 2013 Fact Sheet describing the Proposed Plan, reveal that Ecology is not relying upon conservative assumptions.[7] Ecology is relying upon speculation, unproven assumptions, and misrepresentations about Site wastes and Site conditions to justify an unlawful and unprotective remedy.

C. Ecology is misrepresenting the Proposed Plan to the public with false and misleading statements.

Perhaps most troubling, Ecology is now misrepresenting the Proposed Plan to the public with false and misleading statements about Site conditions and critical components of the proposed remedy. In particular:

- Ecology's October 2013 Fact Sheet contains the false statement that "[t]he RI/FS investigated the nature and extent of contamination...at the Site."[8] The Proposed Plan also falsely describes the RI/FS as presenting "results of investigations into...the nature and extent of contamination...."[9] And, the Proposed Plan falsely describes the RI/FS as "consist[ing] of a comprehensive investigation of site environmental conditions...."[10] In reality, the nature and extent of contamination were not investigated—because the

[5] Ecology Email from Jerome Cruz to Douglas Morell and Bill Komol conveying comments from Dori Jaffe from the Washington State Attorney General's Office (July 2, 2012)(Ecology Site File)(included in Attachment K to these comments).

[6] Responsiveness Summary—Agreed Order Amendment, State Environmental Policy Act (SEPA) and Determination of Non-Significance (DNS) to Address Infrastructure for a Contingent Groundwater Treatment System—Landsburg Mine Site (Ecology, June 2006), p. 8 (Ecology Site File)(excerpt included in Attachment K to these comments).

[7] Ecology Fact Sheet for Landsburg Mine Site, "Consent Decree and Draft Cleanup Action Plan Now Available for Review" (October 2013)(Ecology Site File)(included in Attachment B to these comments).

[8] Ecology Fact Sheet for Landsburg Mine Site, "Consent Decree and Draft Cleanup Action Plan Now Available for Review" (October 2013), p. 6 (Ecology Site File)(included in Attachment B to these comments).

[9] Final Draft CAP, p. 1 (included in Attachment A to these comments).

[10] Proposed Draft Consent Decree, p. 10; Final Draft CAP, p. 7 (both in Ecology Site File)(both included in Attachment A to these comments).

"Black Box Approach" to the Site adopted by Ecology in 1993 left the former mine's contents (where the hazardous wastes reside) uninvestigated and uncharacterized. Nowhere in Ecology's October 2013 Fact Sheet or in the Proposed Plan is the "Black Box Approach" even revealed (much less explained) to the public.

- Ecology's October 2013 Fact Sheet contains the false statement that "[S]oil sampling conducted in...the northern areas of the trench showed no contamination."[11] To the contrary, no soil sampling ever occurred in the trench (anywhere).[12] And, to the contrary, sampling of chlorinated solvents sludge in the northern trench did reveal exceedances "of Method A Soil Cleanup Levels under [MTCA] for ethylbenzene (20 ppm), methylene chloride (0.5 ppm), PCBs (1 ppm), toluene (40 ppm), 1,1,1-trichloroethane (20 ppm), and total xylenes (20 ppm)."[13]

- Ecology's October 2013 Fact Sheet contains the false statement that "[t]here is no known threat to the Clark Springs water supply from the Site based on over 20 years of investigations and monitoring."[14] Even the Proposed Plan acknowledges the risk to that water supply.[15] And, Ecology's false statement clearly demonstrates that Ecology has now abandoned its many assurances that "[t]he remedy at the Site will conservatively assume that there is waste in the trench and mine [caverns]."[16]

- Ecology's October 2013 Fact Sheet contains misleading information about the Proposed Plan's monitoring plan. A bold text question asks: "How often are the monitoring wells at the Site tested?" Ecology's response states: "Presently, the wells are being sampled

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[11] Ecology Fact Sheet for Landsburg Mine Site, "Consent Decree and Draft Cleanup Action Plan Now Available for Review" (October 2013), p. 7 (Ecology Site File)(included in Attachment B to these comments).

[12] Landsburg Phase I Remedial Investigation/Feasibility Study (RI/FS) Work Plan, Golder Associates, Inc. (November 18, 1992), pp. 22-23 and Figure 2-2 (Ecology Site File)(excerpts included in Attachment K to these comments).

[13] Report on the Landsburg Mine Drum Removal Project Prepared by Burlington Environmental, Inc. (December 10, 1991), pp. 11, 14 (Ecology Site File SIT5.1.2)(included in Attachment K to these comments).

[14] Ecology Fact Sheet for Landsburg Mine Site, "Consent Decree and Draft Cleanup Action Plan Now Available for Review" (October 2013), p. 9 (Ecology Site File)(included in Attachment B to these comments).

[15] Final Draft CAP, p. 16 (Ecology Site File)(included in Attachment A to these comments)("The Clark Springs facility is approximately 2,500 feet from Portal #3. It is not likely that these wells would be impacted; however there is a slight potential for contaminant migration from the southern end of the trenches."). The words "not likely" and "slight" are inappropriate speculation. In any event, as discussed below, the "Black Box Approach" was supposed to assume the worst case scenario—that is, the risk to surrounding drinking water resources, including Clark Springs.

[16] Responsiveness Summary—Agreed Order Amendment, State Environmental Policy Act (SEPA) and Determination of Non-Significance (DNS) to Address Infrastructure for a Contingent Groundwater Treatment System—Landsburg Mine Site (Ecology, June 2006), p. 8 (Ecology Site File)(excerpts included in Attachment K to these comments). See also, Ecology Presentation Materials for Landsburg Mine Brief Overview of the Site and Status Update Since 2008 (May 2011), p. 4 (Ecology Site File SIT7.15)(included in Attachment K to these comments)("Cleanup Approach—Conservative stance that wastes are still there and remediation will proceed.").

twice a year – in the spring (typically high groundwater levels) and fall (typically low groundwater levels)."[17] However, the Fact Sheet fails to reveal to the public that the Proposed Plan would over time drastically reduce the frequency of monitoring from twice per year to intervals of many years between monitoring events (i.e., five and even ten years between such events, depending upon well locations and sampling parameters).[18] Thus, the Ecology Fact Sheet misleads the public into erroneously believing that the Proposed Plan will have twice-yearly monitoring frequencies that are determined by seasonal conditions. The actual, unprotective proposed monitoring requirements are buried in complicated, unclear, and confusing documents. The proposed monitoring requirements have no seasonal basis.

- Ecology's October 2013 Fact Sheet misleadingly states that the Proposed Plan requires "Applying institutional controls on land and groundwater use" and "Monitoring groundwater indefinitely." The Fact Sheet fails to reveal the Proposed Plan's termination provisions for monitoring, maintenance, and institutional controls.[19]

- Ecology's Website currently posts "General Questions and Answers About Landsburg Mine Site" that repeat the October 2013 Ecology Fact Sheet's misleading text about institutional controls and groundwater monitoring quoted above. The Ecology Website fails to reveal the Proposed Plan's termination provisions for monitoring, maintenance, and institutional controls.[20]

- On October 24, 2013, Ecology sponsored a public meeting "to provide information about the proposed cleanup actions and other documents for Landsburg Mine Site." Ecology's Site Manager made an oral presentation to the public meeting using slides that indicated the "Proposed Remediation System" includes "Groundwater monitoring indefinitely." A Kent representative attending the public meeting asked Ecology's representatives to explain how "monitoring indefinitely" differs from Ecology's previous promises about "monitoring in perpetuity." Ecology's representative responded that the Proposed Plan requires monitoring both "indefinitely" and "in perpetuity." Ecology's representatives failed to reveal at the October 24, 2013, public meeting the Proposed Plan's termination provisions for monitoring, maintenance, and institutional controls.

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[17] Ecology Fact Sheet for Landsburg Mine Site, "Consent Decree and Draft Cleanup Action Plan Now Available for Review" (October 2013), p. 10 (emphasis provided)(Ecology Site File)(included in Attachment B to these comments).

[18] Final Draft CAP, p. 40 (Ecology Site File)(included in Attachment A to these comments).

[19] Ecology Fact Sheet for Landsburg Mine Site, "Consent Decree and Draft Cleanup Action Plan Now Available for Review" (October 2013), p. 8 (Ecology Site File)(included in Attachment B to these comments).

[20] Ecology Website section dedicated to the Landsburg Mine Site, accessible at: http://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=60 (Ecology Site File)(and included in Attachment B to these comments).

The public deserves to know the truth about the Proposed Plan. The public should not be misled about the Site conditions, the fact that Site investigation was very limited, or the fact that the Proposed Plan will not protect the Site and surrounding drinking water resources "in perpetuity." The public should not be misled by speculation and unproven assumptions about the Proposed Plan's critical components that fail to comply with MTCA's requirements.

D. Ecology must reject the Proposed Plan.

As discussed in detail below, the Proposed Plan has been prepared without adequate investigation of the Site and without any characterization of the hazardous wastes in the Site. All previous Site determinations by Ecology have been based upon a unique (unprecedented?) "Black Box Approach" to the Conceptual Site Model that is arbitrary and capricious. But Ecology has now arbitrarily and capriciously abandoned the "Black Box Approach" relied upon for the past 20 years of Site decisions and activities. Instead of relying upon the "Black Box Approach's" supposedly conservative assumptions about the unknowns lurking within uninvestigated "Black Box" (and the remedy components necessary to address those unknowns), the Proposed Plan improperly relies upon speculation and unproven assumptions. The result is a Proposed Plan that fails to comply with MTCA's requirements to provide a reasonable assurance of protectiveness of human health and the environment. The result also is a series of unlawful, arbitrary, and capricious acts by Ecology in violation of MTCA and APA. Ecology's approval of the Proposed Plan would be yet another unlawful, arbitrary, and capricious act, as well as a violation of Washington's water laws. Such approval also would be an abuse of the State of Washington's non-discretionary duty under Washington's Constitution to use the State's police powers to protect irreplaceable water resources, to guard the health of its residents, and to prevent economic losses that could result from any migration of any hazardous substances from the Site to surrounding water resources.

Ecology should reject the Proposed Plan, and instead require the Site investigation, waste characterization, and other analyses required by MTCA before selecting a remedy in accordance with the requirements of MTCA, applicable regulations, APA, and water laws. Alternatively, without waiver of any of Kent's contentions about the unlawfulness of previous events and the Proposed Plan, Ecology should reject the Proposed Plan, and instead require the revisions to the Proposed Plan described below in Section III, IV, VI, VII, VIII, as well as in Aspect Consulting's Comments included in in Attachment F to the comments. Those revisions are absolutely necessary to provide the protectiveness required by MTCA, and to comply with APA and water law requirements. Those revisions also are absolutely necessary for the State, as the trustee of water resources, to exercise its non-discretionary duty to protect irreplaceable drinking water resources near the Site from foreseeable injury.

II. SITE HISTORY.

A. The former Mine's location and the water resources surrounding the Site.

The Landsburg Mine Site (the "Site") is the location of a former underground coal mine in a hill near Ravensdale, Washington (approximately twenty miles southeast of Seattle). The

Cedar River is located just 500 feet north of the former mine. An aquifer is located between the Site and the river – that aquifer is a source of drinking water for several homes. Only 300 feet south of the former mine's south portal is the shallow unconfined aquifer of the Rock Creek drainage area, a tributary of the Cedar River. That aquifer feeds Kent's primary source of municipal water at Clark Springs, located less than one-half (1/2) mile down-gradient from the former mine. That aquifer also is a source of drinking water for many homes. The Clark Springs facility currently produces four to six million gallons of drinking water each day for Kent's residents, visitors, and businesses. Kent is Washington's sixth largest city, with a population exceeding 120,000 people (and growing). Clark Springs and Kent's water supplies are among its most precious and irreplaceable resources.

Within the immediate area surrounding the Site there are approximately 130 homes using at least 76 groundwater wells (private wells or small community water supply systems) that provide more than 200 people their drinking water.[21] The surface waters near the Site, including the Cedar River and Rock Creek, contain salmon protected by the Endangered Species Act. Maps depicting the Site and the surrounding water resources are included in Attachment C to these comments.

Kent's primary interest in the Site is to ensure that the enormous volumes of hazardous wastes historically dumped in the former mine do not contaminate the groundwater surrounding the Site--especially Kent's nearby water supply source at Clark Springs. Kent is concerned about the integrity of its water supplies and the future health of its water users. Kent is also concerned that any migration of any hazardous substances into the Rock Creek watershed would stigmatize Kent's water supply, and would cause concern among Kent's water users. Such circumstances would be very problematic (perhaps catastrophic), and would likely cause significant economic loss. Kent believes that the State of Washington has a non-discretionary duty under the circumstances to protect against any such migration (at any chemical concentrations) in order to protect the quality of water supplies, to protect the health of its citizens, and to prevent foreseeable economic loss.

B. The historical mining activities caused surface trenches and subsurface caverns.

The former mining activities removed coal from three adjacent (essentially parallel) seams running through the hillside. After the first two seams were tapped out, mining proceeded in the third seam (known as the "Rogers Seam") from 1959 until 1975. The Rogers Seam was a vertical coal deposit about sixteen feet wide, running roughly north and south. The mined section of the seam is about one (1) mile in length, and the mining occurred down to depths of 750 feet below the ground surface. The coal was extracted by causing the coal seam to cave into the mine "workings" below. Then the coal was collected and hauled to the surface through "portals" at the north and south ends of the seam. As a result of the caving and excavating,

[21] Final Draft CAP, p. 18 (Ecology Site Record)(included in Attachment A to these comments). The Final Draft CAP indicates the number of wells is "approximate," and evidently no well survey has been accomplished since the 1990s. The number and location of neighborhood wells should be confirmed. As indicated in Section XI below, Kent has requested that the Washington State Department of Health undertake appropriate Site investigation, consultations, and reporting actions pursuant to its role and responsibilities to protect water resources.

subsidence trenches were created on the land surface above the mine. Those surface trenches collectively are approximately three-quarters (3/4) of one mile long, and the trenches vary in width (60 to 100 feet wide) and depth (20 to 60 feet deep). The caving and excavating also created subsurface caverns extending hundreds of feet down into the hill as the mining proceeded deeper and deeper into the ground. It is believed that the some or all of the mine caverns collapsed over time, after mining operations ceased—but that has not been confirmed by any investigation. Much of the former mine filled with groundwater after mining stopped (the mine "workings" and caverns had to be dewatered during mining operations that dug down below the water table). An illustration depicting a cross-section of the former mine is included in Attachment D to these comments.

C. Hazardous wastes from many industrial and other sources were dumped into the trenches and likely drained down into the former mine.

The trenches at the Site were used in the 1960s and 1970s for disposal of enormous amounts of hazardous waste. According to the Final Draft CAP:

> "...[the dumping included] various industrial waste materials, construction materials, and land-clearing debris....Industrial wastes were contained in drums or dumped directly from tanker trucks. Based upon invoice records from [the mine owner/operator Palmer Coking Coal Company], an estimated 4,500 drums of waste and about 200,000 gallons of oily wastewater and sludges were disposed into the trenches. Available documented interviews with waste haulers indicate that wastes included paint wastes, solvents, metal sludges, and oily water and sludge...."[22]

In reality, it is unknown how much industrial waste was dumped into the trenches over many years. The waste volumes described in the Final Draft CAP likely underestimate significantly the volume of hazardous materials dumped at the Site. Evidently the numbers are based upon cryptic, likely incomplete, accounting records kept by the mining company--Palmer Coking Coal Company. It is generally very difficult to determine accurately the specific contents or amounts of wastes dumped at such rural and remote locations many years ago. If the "estimated 4,500 drums" (55 gallons each) were full, that would total 247,500 gallons. Added to the "about 200,000 gallons of oily wastewater and sludges," that would yield nearly one-half (1/2) million (500,000) gallons of hazardous waste dumped into the Site. Thus, even based on the limited information available, enormous amounts of hazardous waste were dumped into the surface trenches and likely drained down into the former mine's caverns over many years.

In 1991, at Ecology's request, 116 of the most accessible hazardous waste drums were removed from two areas in the surface trenches. "Samples taken from the recovered drums indicate that this material consisted of a wide range of organic and inorganic industrial waste, including paint-waste, PCBs, cyanide, metals and oily sludge."[23] According to a description of

[22] Final Draft CAP, p. 6 (Ecology Site File)(included in Attachment A to these comments).
[23] Ecology's Landsburg Mine Site Cleanup Update Fact Sheet (March 1996), p. 3 (Ecology Site File)(included in Attachment K to these comments).

the analytical results from the sampling, the drums contained hexavalent chrome, phenolics, chlorinated solvents, oxidizers, lead, chromium, and cadmium.[24]

Of the thirteen (13) drums removed from one area, "[t]en [10] were open top drums without lids lying on their sides with some of their contents spilled onto the ground." The other three were described as: (a) ruptured (but containing some sludge), (b) "basically empty" (evidently its contents had drained out), and (c) "contain[ing] green solids." All of those drums had multiple holes or punctures.[25] The 103 drums removed from the second area in the trenches were described as follows:

> "All of the top layer of drums and part of the second [layer] had bullet holes or angular punctures made with a chisel or other sharp object. Initial assessment of the pile revealed that many of the drums were crushed or deformed, especially those near the bottom of the pile. About 10% of the drums contained liquids, the rest were sludgey solids."[26]

With the 1991 removal of only 116 drums, the rest of the "estimated 4,500 drums" remain in the Site – that would be approximately 4,384 drums. The Proposed Plan would leave all of them there—not one drum, or any of their contents, would be removed. The condition of the drums in 1991 revealed that they had generally been punctured or crushed, with their contents spilling into the surface trenches. Over time, what remains of the steel drums will rust away, leaving the hazardous wastes uncontained and migrating down into the soils, groundwater, and caverns of the former mine below.

During the drum removal project, a "sludge pond" near one of the drum areas was discovered and preliminarily investigated. According to the resulting report:

> "Sludge material in the "pond" appears to be paint waste, petroleum products, and resins. There are different layers in the material which suggests multiple episodes of dumping of various products. [Four] Core samples were collected with a hand auger to visually inspect the various layers of sludge. They range from light to dark brown with occasional black streaks and greenish tints. The depth of material is about 4 feet and the total volume is estimated to be between 65 and 70 cubic yards....The sludge in the "pond"...exceeds Method A Soil Cleanup Levels under [MTCA] for ethylbenzene (20 ppm), methylene chloride (0.5 ppm), PCBs (1 ppm), toluene (40 ppm), 1,1,1-trichloroethane (20 ppm), and total xylenes (20 ppm)."[27]

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[24] Report on the Landsburg Mine Drum Removal Project Prepared by Burlington Environmental, Inc. (December 10, 1991), p. 12 (Ecology Site File SIT5.1.2)(included in Attachment K to these comments).
[25] Report on the Landsburg Mine Drum Removal Project Prepared by Burlington Environmental, Inc. (December 10, 1991), p. 5 (Ecology Site File SIT5.1.2)(included in Attachment K to these comments).
[26] Report on the Landsburg Mine Drum Removal Project Prepared by Burlington Environmental, Inc. (December 10, 1991), p. 7 (Ecology Site File SIT5.1.2)(included in Attachment K to these comments).
[27] Report on the Landsburg Mine Drum Removal Project Prepared by Burlington Environmental, Inc. (December 10, 1991), pp. 11, 14 (Ecology Site File SIT5.1.2)(included in Attachment K to these comments).

Under the Proposed Plan, that easily accessible contaminated sludge on the trench surface would not be removed—it would be covered and remain in place, leaving a very significant threat to groundwater. The Proposed Plan purports to justify leaving the sludge in place by relying upon speculation that the trenches may be unstable and that it may be unsafe to remove the sludge (or any other wastes). But, in 1991, a 30-ton crane was positioned near the sludge area in order to remove the drums described above that were located in the sludge and adjacent to the sludge area.[28] The previous sludge sampling and drum removal demonstrates that the sludge is easily accessible for removal. Furthermore, the Proposed Plan would remove nearby trees and large shrubs from the trenches prior to backfilling. As discussed below, leaving the sludge in place at the Site violates MTCA and applicable regulations and would be required at any other MTCA site according to Aspect Consulting.[29]

Ecology has determined that the hazardous wastes dumped at the Site originated from many industrial and other sources. Relying upon MTCA, Ecology has named some "Potentially Liable Persons" ("PLPs") from a list of suspected disposal companies, including the following parties who formed the "Landsburg Mine Site PLP Group" (the "PLP Group"):[30]

- Browning-Ferris Industries of Illinois, Inc. which merged with National Disposal, Inc. (a transporter of industrial wastes to the Site). These companies and related entities are, or were, in the business of gathering and transporting wastes for disposal.

- Time Oil Company, as a generator of industrial wastes disposed of at the Site. Time Oil Company, now known as TOC Holdings Co., is a wholesaler and retailer of gasoline and petroleum products.

- PACCAR, Inc., as a generator of industrial wastes transported to the Site by an entity called Valley Disposal. PACCAR, Inc. is a manufacturer of trucks.

- Burlington Environmental, Inc., as the successor corporation to Chemical Processors, Inc. (a generator of industrial wastes disposed of at the Site) and as the parent corporation of Resource Recovery Corporation (a transporter of industrial wastes to the Site). Chemical Processors, Inc. and Resource Recovery Corporation were in the business of gathering hazardous wastes from many different sources for disposal. These companies are no longer in business, and their liabilities for the Site's environmental conditions evidently were extinguished in a bankruptcy proceeding involving Philip Services Corporation

[28] Report on the Landsburg Mine Drum Removal Project Prepared by Burlington Environmental, Inc. (December 10, 1991), pp. 7-8 (Ecology Site File SIT5.1.2)(included in Attachment L to these comments).
[29] Aspect Consulting's Comments, p. 11 (included in Attachment F to these comments).
[30] The other members of the PLP Group are current landowners of the Site (the former mine owner/operator Palmer Coking Coal Company, LLP and Plum Creek Timberlands, L.P.) and a former owner of portions of the Site which owned those portions at the time industrial waste disposal was occurring (the BNSF Railway Company). See Proposed Draft Consent Decree, Section V (Ecology Site File)(included in Attachment A to these comments).

("PSC") several years ago. PSC evidently succeeded to all of those defunct entities liabilities, and is now free from any Site liabilities.[31]

PACCAR, Inc. and Time Oil Company evidently generated their own hazardous wastes from their truck manufacturing and gasoline/petroleum operations, respectively. However, the other entities (and apparently many others) evidently gathered a wide variety of hazardous wastes from numerous industries and other sources that have not been identified. Some other industrial waste disposal companies were identified by Ecology as targets for PLP status, but apparently Ecology lacked evidence to designate them as PLPs or chose not to do so. Like most old dump sites, information is very sketchy about the past activities at the Site. Disposal companies kept poor records (or destroyed their records) about the hazardous wastes they dumped in an era before stricter environmental regulation of waste disposal. Many transporters and generators were "fly by night" operations that disappeared or went out of business. As a result, the origins and compositions of much of the hazardous wastes dumped at the Site are generally unknown.

D. The Site investigation did not sample or characterize the hazardous wastes at the Site because the "Black Box Approach" to the Conceptual Site Model adopted by Ecology in 1993 supposedly assumes the worst case and supposedly requires a very conservative approach to remedy selection.

Other than the four samples taken from the surface sludge pond in 1991 during the drum removal project, the investigation of the Site did not sample or characterize any of the hazardous wastes known to be remaining somewhere in the trench, soils, groundwater, and/or former mine caverns. The hazardous wastes and the disposal areas were not investigated during the Site's remedial investigation ("RI") because contamination was presumed to be located in the mine caverns.[32] As described by the PLP Group's technical consultant in 2004: "The approach taken during the RI/FS was to treat the coal mine as a 'black box' that assumes soils and groundwater in the Rogers coal mine are impacted....The [then-existing preliminary] DCAP clearly assumes that media in the Rogers coal mine contain hazardous substances at concentrations above MTCA levels until proven otherwise."[33] The rationale for leaving the "Black Box" uninvestigated was stated as follows from the 1992 work plan for the remedial investigation:

> "The major decision for determining off-site migration is whether the [mine] can be considered a 'Black Box' (the term 'Black Box' is used to describe a undefined system where internal characterization is difficult) or would require characterization. As-built drawings of the mine [caverns] exist and have been summarized in the conceptual model.... Characterization of the nature and extent

[31] In 2003, PSC, the parent corporation of Burlington Environmental, Inc., filed for Chapter 11 bankruptcy reorganization and subsequently entered into a settlement with Ecology regarding the Site. See Ecology's Request for Public Comments on Proposed Philip Services Corporation Consent Decree (November 2003); Landsburg Mine Site Philip Services Consent Decree and Settlement Agreement (Ecology Site File SIT5.3).

[32] Landsburg Phase I Remedial Investigation/Feasibility Study (RI/FS) Work Plan, Golder Associates, Inc. (November 18, 1992), p. 6 (Ecology Site File)(excerpts included in Attachment K to these comments).

[33] Responses to Comments from the City of Kent Prepared by Golder Associates, Inc. (July 6, 2004), p. 9 (Ecology Site File)(excerpts included in Attachment K to these comments).

> of contamination present within the mine [caverns] may be technically difficult. Waste liquids may have infiltrated into the mine [caverns] following disposal, when the mine was active and dewatered. Solvents could have accumulated in cavities within the mine. When the mining operations were halted and the mine [caverns] became inundated [i.e., filled with water], any lighter-than-water solvents, which were present, would float and be trapped within any remaining roof cavities. An attempt to characterize contamination within the mine may result in little benefit to refining the conceptual model and reducing uncertainty. An important consideration, if the decision is made to attempt mine characterization, is the difficulty in drilling and sealing boreholes through open [caverns] and voids. An exploratory borehole program could open new avenues for contaminants to migrate within the mine."[34]

So, in 1993, Ecology adopted the "Black Box Approach," and the "Black Box" was left uninvestigated in the RI/FS performed between 1993 and 1996.[35] To compensate for this lack of critical Site information, the "Black Box Approach" is supposed to: (a) assume the worst case about the hazardous wastes located somewhere inside the "Black Box;" (b) anticipate the worst case scenario in which contaminated groundwater leaks out from the "Black Box" to pollute surrounding drinking water resources; and (c) require a very conservative remedy that will protect against those worst case scenarios.

Since the approval of the conceptual site model for the RI/FS in 1993, Ecology has specifically and repeatedly relied upon the "Black Box Approach" to justify Ecology's determinations regarding the Site. For example in Ecology's words (as of 1996): "Regardless of the information available, the remedy at the site will be protective because it conservatively assumes that waste remains in the mine workings....Ecology does not plan on selecting a remedy which depends upon knowledge of past events....As long as the relevant pathways of chemicals potentially exiting the mine are adequately characterized and monitored for early warning of a release, evaluation of remedial approach is not compromised by incomplete characterization of the waste."[36]

In 2004, Ecology again relied upon the "Black Box" approach underlying the RI/FS and emphasized that "...Ecology has determined that the more invasive characterization of the disposed wastes in the trench is unwarranted."[37] In Ecology's words (as of 2006): "Thus, the remedy at the site will conservatively assume that there is waste in the trench and mine

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[34] Landsburg Phase I Remedial Investigation/Feasibility Study (RI/FS) Work Plan Prepared by Golder Associates, Inc. (November 18, 1992), pp. 5-6 (Ecology Site File)(excerpts included in Attachment K to these comments).

[35] The "Black Box Approach" is depicted in illustrations included in Attachment E to these comments.

[36] Ecology's Responsiveness Summary for Public Comments on the Remedial Investigation and Feasibility Study for the Landsburg Mine Site (November 1996), pp. 5, 7, 11 (Ecology Site File SIT7.14)(excerpts included in Attachment K to these comments).

[37] Ecology's "Summary and Recommendations on Issues of Additional Investigation at the Landsburg Mine site in Ravensdale" enclosed in Ecology's Letter from J. Cruz to D. Morrell of Golder Associates, Inc. (December 30, 2004), pp. 5-6 (Ecology Site File)(excerpts included in Attachment K to these comments).

workings."[38] In Ecology's words (as of 2011): "Cleanup Approach—Conservative stance that wastes are still there and remediation will proceed."[39] As a result, the hazardous wastes known to be in the "Black Box" have not been characterized to confirm their locations and chemical compositions. The groundwater located within and beneath the known disposal area has never been sampled. Potential groundwater flow paths through and beneath the known disposal area have not been evaluated. Instead, supposedly relying upon very conservative assumptions, the Site investigation has focused upon studying "around" the "Black Box" with some groundwater monitoring at just a few limited locations that only partially intercept some of the many groundwater pathways at the Site.

E. Groundwater flows, earthquakes, or caverns collapsing in the former mine could cause contaminated groundwater to migrate and degrade drinking water resources surrounding the Site at any time.

Dynamic forces changing the Site's groundwater pathways (such as earthquakes or additional cavern collapses) clearly could cause contaminated groundwater to suddenly migrate from the former mine at any time. Such migration may already have occurred and gone undetected. The Proposed Plan observes that the Site's surrounding area has been "displaced by numerous faults."[40] At least one huge fault cuts right across the Site, and the known hazardous waste dumping occurred immediately north and south of that fault. The earth movement which historically caused the fault shifted the coal seam approximately 75 feet laterally. "The fault extends vertically through all four levels of the [mine]...."[41] Indeed, the fact that the former mine's coal deposit is itself now vertical, but was originally created horizontally way back in time, reveal the area's violent and disruptive history.

This geologic evidence demonstrates that the Site is threatened by the real risk of seismic events that could strike the Site and/or region at any time, and inevitably will do so at some point in the future. Significant regional seismic events, even those distant from the Site, pose significant risks to Site conditions. And, Site disruption could occur even without seismic intervention—the 1992 RI/FS work plan and the Proposed Plan themselves point to the danger of the former mine's instability and potential for collapse as justifications both for leaving the "Black Box" uninvestigated and for rejecting an excavation/disposal remedy.[42] As discussed below, the Proposed Plan fails to protect sufficiently against threats posed to the "Black Box," its unknown contents, and to the water supplies surrounding the Site.

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[38] Ecology's Responsiveness Summary for Agreed Order Amendment, State Environmental Policy Act (SEPA) and Determination of Non-Significance (DNS) to Address Infrastructure for a Contingent Groundwater Treatment System for the Landsburg Mine Site (June 2006), p. 8 (Ecology Site File SIT8.5.2)(excerpts included in Attachment K to these comments).

[39] Ecology Presentation Materials for Landsburg Mine Brief Overview of the Site and Status Update Since 2008 (May 2011), pp. 4-5 (Ecology Site File SIT7.15)(included in Attachment K to these comments).

[40] Final Draft CAP, p. 10 (Ecology Site File)(included in Attachment A to these comments).

[41] Final Draft CAP, p. 10 (Ecology Site File)(included in Attachment A to these comments).

[42] Landsburg Phase I Remedial Investigation/Feasibility Study (RI/FS) Work Plan Prepared by Golder Associates, Inc. (November 18, 1992), pp. 5-6 (Ecology Site File)(excerpts included in Attachment K to these comments); Final Draft CAP, pp. 8, 12, 29, 30 (Ecology Site File)(included in Attachment A to these comments).

III. THE PROPOSED PLAN FAILS TO COMPLY WITH MTCA'S REQUIREMENTS IN MANY WAYS—THE "CONTINGENCY PLAN'S" MOST SIGNIFICANT FATAL FLAWS.

A. The Proposed Plan is not protective as required by MTCA because its inadequate "contingency plan" would not even attempt groundwater containment until after contaminated groundwater exceeding MTCA cleanup standards has migrated from the Site and degraded surrounding drinking water resources. The Site remedy must include the ability to respond immediately with an installed, tested, and robust groundwater containment system if contaminated groundwater threatens to migrate from the Site.

The Proposed Plan includes a misnamed "Contingent Groundwater Treatment System" with inappropriate emphasis upon the treatment of contaminated groundwater extracted from the Site. The appropriate name would be the "Contingent Groundwater Containment System" because its primary objective would be hydraulic containment at the Site (i.e., prevention of contaminated groundwater migration from the Site to surrounding properties and water resources).

The Proposed Plan anticipates that, if and when contaminated groundwater is detected in certain monitoring wells, the contingency response action will be groundwater pumping to achieve hydraulic containment. However, the Proposed Plan fails to require up-front design, approval, permitting, construction, and testing of the Contingent Groundwater Containment System. Instead, the plan anticipates that all of the many activities necessary to achieve hydraulic containment would wait until after contaminated groundwater migration is detected (if hazardous substances happen to be detected by the limited monitoring network, with many long years of intervals between monitoring events). If and when detection occurs, the Proposed Plan speculates (i.e., merely hopes) that all of those many activities can be accomplished in "a relatively short time"[43] (also described as "quickly").[44] The Proposed Plan fails to provide a complete list of the activities necessary to install and operate the System, and fails to describe how all of those activities would be achieved. In Aspect Consulting's opinion, the Proposed Plan is unrealistic in its mere hope that all of the design, approval, permitting, construction, and hydraulic containment can be accomplished in "a relatively short time."[45]

The Ecology Site File and the Proposed Plan itself reveal that Ecology and the PLP Group themselves are very skeptical that the "contingency plan" can be accomplished "in a relatively short time." Concern about future implementation delays caused by the numerous approvals and permits that must be obtained motivated the PLP Group to insist that text be inserted into the Final Draft CAP stating "Ecology will assist in obtaining permission to place the remainder of the effluent discharge pipeline along the S.E. Summit-Landsburg Road right-of-

[43] Final Draft CAP, p. 3 (Ecology Site Record)(included in Attachment A to these comments).
[44] Proposed Draft Consent Decree Exhibit E, Part C, p. C-2 (Ecology Site File)(included in Attachment A to these comments.
[45] Aspect Consulting's Comments, e.g., pp. 2-3, 14-15, 21-25 (included in Attachment F to these comments).

way or the adjacent King County open space land that is located along the road right-of-way."[46] Indeed, Ecology has repeatedly acknowledged that delays in permitting and approvals could present significant problems for the "contingency plan." This was the primary rationale for the first efforts in 2008 to install preliminary (and inadequate) "contingency plan infrastructure."[47] And this remains the primary rationale for the Proposed Plan's additional (and inadequate) preliminary "infrastructure" for the "contingency plan."[48] It is evident that neither Ecology nor the PLP Group really believe that the Contingent Groundwater Containment System can be installed quickly and easily as misrepresented in the Proposed Plan and in the Ecology's statements to the public.

Furthermore, the Proposed Plan relies upon pure speculation and unproven assumptions that hydraulic containment can even be achieved at the Site. Absolutely no Site studies have addressed hydraulic containment or what would be required to achieve containment. The hydrogeology of the "Black Box" never has been investigated. As such, there is a complete lack of understanding of groundwater pumping rates or the time necessary to achieve containment. These matters are addressed in more detail in the Aspect Consulting Comments.[49]

The failure to require up-front design, approval, construction, and testing of the Contingent Groundwater Containment System is a fatal flaw in the Proposed Plan. It will be too late to address all of these matters, and everyone really knows it will take a long time to do so, after contaminated groundwater exceeding MTCA cleanup levels has migrated from the "Black Box." In order to be protective (as required by MTCA) and to provide the conservatism (supposedly required by the "Black Box Approach") the Final CAP must require up-front installation and testing of the Contingent Groundwater Containment System--including a demonstration of its ability to extract groundwater and to achieve groundwater containment.[50] Immediate response will be necessary if contaminated groundwater threatens to migrate in (and out of) the Site.

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[46] Proposed Draft Consent Decree Exhibit E, Part C, p. C-6 (Ecology Site File)(included in Attachment A to these comments).

[47] Responsiveness Summary—Agreed Order Amendment, State Environmental Policy Act (SEPA) and Determination of Non-Significance (DNS) to Address Infrastructure for a Contingent Groundwater Treatment System—Landsburg Mine Site (Ecology, June 2006), pp. 18-19 (Ecology Site File)(excerpts included in Attachment K to these comments); Final Draft CAP, p. 3 (Ecology Site Record)(included in Attachment A to these comments).

[48] Final Draft CAP, p. 3 (Ecology Site Record)(included in Attachment A to these comments).

[49] Aspect Consulting's Comments, e.g., pp. 2-5, 14-15, 21-25 (included in Attachment F to these comments).

[50] Aspect Consulting agrees that the treatment component of the System can wait until the specific contaminants at issue are known. If the rest of the System is in place, tested, proven, and ready for operation, the treatment component can be addressed quickly. Aspect Consulting's Comments, p. 3 (included in Attachment F to these comments).

B. The Proposed Plan abdicates Ecology's duty to enforce remedy implementation under MTCA because the Proposed Plan fails to define enforceable performance standards, timeframes, and deadlines. The Proposed Plan must be revised to allow (and require) Ecology's oversight and enforcement of the remedy's critical components as Ecology's own counsel insisted in 2012.

Another fatal flaw in the Proposed Plan is its lack of any defined and enforceable performance standards for achieving hydraulic containment at the Site. The Proposed Plan speculates about an anecdotally-based 40 gallons-per-minute pumping rate for the Contingent Groundwater Containment System, but the Proposed Plan fails to require any specific rate of extraction. Furthermore, the Proposed Plan fails to delineate any performance standards for demonstrating hydraulic containment (i.e., what specifically must occur and where). These matters are addressed in more detail in Aspect Consulting's Comments, including the need for up-front installation and testing of the System in order to ascertain the necessary performance standards for operation.[51]

As discussed above, the Proposed Plan fails to require up-front installation of the Contingent Groundwater Containment System, but perhaps even more significantly, the Proposed Plan fails to define any specific timeframes or deadlines for the eventual design, approval, permitting, construction, testing, or operation of the System. See Proposed Draft Consent Decree, Exhibit C ("Schedule").[52] Instead, as discussed above, the Proposed Plan merely speculates and hopes that all of those many activities can be accomplished in "a relatively short time"[53] (also described as "quickly").[54] That is the completely meaningless and open-ended timeline at the heart of the "contingency plan." And, the Proposed Plan does not identify or describe those many activities. These deficiencies in the Proposed Plan must be addressed by requiring up-front installation of the System, with defined timeframes and deadlines for clearly identified milestones and comprehensively identified tasks (design, all approvals, all permits, all agreements, construction, testing, etc.).

The Proposed Plan also fails to delineate any enforceable timeframes and deadlines for: (a) initiating operation of the Contingent Groundwater Containment System when it is needed (i.e., starting to pump when "triggered" by detection of contaminants in the groundwater at the Site); and (b) achieving hydraulic containment once operation is initiated. The Final CAP must include enforceable deadlines for start-up (within one (1) week of the "trigger," as Ecology previously indicated would be required) and for hydraulic containment (within one (1) month of the "trigger"). The Proposed Plan includes no such information despite prior assurances from

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[51] Aspect Consulting's Comments, e.g., pp. 2-4, 14-15, 21-25 (included in Attachment F to these comments).

[52] Proposed Draft Consent Decree, Exhibit C ("Schedule")(Ecology Site File)(included in Attachment A to these comments). No such timeframes or deadlines are required by the Proposed Plan's other documents (e.g, the Final Draft CAP, DCMP, and other plans in the Proposed Consent Decree's Exhibit E--all included in Attachment A to these comments).

[53] Final Draft CAP, p. 3 (Ecology Site Record)(included in Attachment A to these comments).

[54] Proposed Draft Consent Decree Exhibit E, Part C, p. C-2 (Ecology Site Record)(included in Attachment A to these comments).

Ecology that it would.[55] No such information is provided in the Proposed Plan, which is a fatal flaw in the "contingency plan." These matters are addressed in more detail in Aspect Consulting's Comments.[56]

It is particularly shocking that the Proposed Plan omits critically necessary timelines and deadlines because Ecology's own counsel pointed out this deficiency in comments provided to Ecology and the PLP Group on July 2, 2012.[57] Ecology's counsel provided a critique of the inadequacies of a draft of the Proposed Draft Consent Decree's Exhibit C (the "Schedule") that included thirteen (13) bulleted items discussing numerous omissions and flaws in the draft schedule. The criticism included, "I don't understand why this is only a construction schedule. Why isn't it a scope of work and schedule for the entire project from start to finish?" Specific criticism of the "contingency plan" was included as follows (emphasis provided):

> "No mention of the contingency plan—the cap maintenance schedule, infrastructure maintenance, fence removal. These are all key items that should be included in an overall schedule. The O&M plan states that a treatment technology O&M will be submitted if contingency is triggered, this should be included in the schedule. Right now, there is no schedule for the contingency plan. The schedule should include deadlines to submit the engineering reports, construction plans, O&M plan for the contingency. I realize they won't be 'exact dates' they will be more like '60 days after the conformation [sic] samples indicate that we've reached 0.5 of the cleanup level'"[58]

Numerous deficiencies in the schedule identified by Ecology's counsel were not fixed—those deficiencies remain in the Proposed Plan. Beyond the "contingency plan" there are many

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[55] In 2008, the PLP Group submitted responses to Ecology's review comments on a 2002 draft cleanup action plan, in which the PLP Group stated: "The emergency groundwater capture and pump-back system could be installed and operational in less than a month." Ecology responded, "Ecology suggests a response time within a week to get the needed groundwater capture system in place and operating." The 2008 exchange of comments by the PLP Group and Ecology were summarized in a document entitled "Technical and Administrative Comments on the March 20, 2002 draft of the Landsburg Mine Consent Decree and Exhibits" that was enclosed in Ecology's Letter from Jerome B. Cruz, Ecology's Site Manager to Douglas Morell, Golder Associates (August 5, 2008)(Ecology Site File SIT5.2.3)(attached to these comments in Attachment K). In particular, see page 12 of the enclosure. Subsequently, Ecology's October 7, 2008 letter to the City stated that the CAP would include the time to initiate groundwater extraction for containment. Ecology's Letter from Robert W. Warren, Section Manager, Toxics Cleanup Program, Northwest Regional Office, to Larry Blanchard, Public Works Director, City of Kent (October 7, 2008), p. 2 (Ecology Site File)(attached to these comments in Attachment K). Ecology's January 25, 2010 email to the PLP Group and Kent stated that the DCAP will incorporate "appropriate response times to initiate groundwater pumping or containment, treatment, and safe disposal at the portal wells if Contingency Plans are triggered at the site...." Email from Jerome Cruz to several recipients entitled "Ecology's decision on long term groundwater monitoring frequency at Landsburg Mine Site, Ravensdale" (January 25, 2010)(Ecology Site File)(attached to these comments in Attachment K).

[56] Aspect Consulting's Comments, e.g., pp. 2-5, 14-15, 21-25 (included in Attachment F to these comments).

[57] Ecology Email from Jerome Cruz to Douglas Morell and Bill Kombol conveying comments from Dori Jaffe from the Washington State Attorney General's Office (July 2, 2012)(Ecology Site File)(included in Attachment K to these comments).

[58] Ecology Email from Jerome Cruz to Douglas Morell and Bill Kombol conveying comments from Dori Jaffe from the Washington State Attorney General's Office (July 2, 2012)(Ecology Site File)(included in Attachment K to these comments).

other instances of missing deadlines in the Proposed Plan (e.g., monitoring, data reporting, emergency monitoring after seismic events, etc.). Many of those missing deadlines were identified by Ecology's counsel, but were not included in the Proposed Plan. The Final CAP's schedule needs to be specific, detailed, comprehensive for all required activities, and easily located in one place in the Final CAP (the schedule to be included as Exhibit C).

Without clearly defined performance standards, timelines, and deadlines, the Contingent Groundwater Containment System cannot be implemented "quickly" by the PLP Group, and the Proposed Plan cannot be overseen or enforced by Ecology as required by MTCA. In order for Ecology to exercise its enforcement powers under RCW 70.105D.050, enforceable timelines/deadlines must be established. WAC 173-340-380(1)(a)(v) requires that a CAP include the schedule for its implementation. If Ecology approves the Proposed Plan as drafted, Ecology will abdicate its duty to enforce remedy implementation under MTCA.

C. The Proposed Plan's "trigger" for initiating operation of the Contingent Groundwater Containment System is not protective as required by MTCA because the Proposed Plan would allow contaminated groundwater to migrate from the Site and degrade surrounding drinking water resources, potentially for many years before its discovery. The "triggers" for initiating operation and terminating System operation must be established at lower contaminant concentration levels.

In addition to waiting until it is too late to install the System, the Proposed Plan would wait until it is too late to "trigger" the System's operation. The Proposed Plan would delay operation until after detection (and then resampling) of contaminants exceeding MTCA cleanup levels at an arbitrary "compliance boundary" of the Site.[59] In other words, the Proposed Plan would allow highly contaminated groundwater to migrate off-Site into surrounding drinking water resources before containment would even be attempted. That off-Site migration could occur for many years given the long intervals between sampling events (discussed below in Section IV(B). The Proposed Plan anticipates that degradation of off-Site water resources will be allowed to occur as part of the "contingency plan." Ecology should not approve a plan allowing degradation of irreplaceable drinking water resources. These matters are addressed in more detail in the Aspect Consulting Comments, including specific "triggers" for the Contingent Groundwater Containment System's operation and shut-down. [60]

Note that many other less significant (but very important) flaws in the Proposed Plan's "contingency plan" are addressed in Aspect Consulting's Comments.[61]

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[59] Section VI(E) of these comments addresses the Proposed Plan's improper designation of an arbitrary "compliance boundary" and "Groundwater Protection Area" improperly relying upon "conditional points of compliance" to designate "compliance" monitoring wells that fail to comply with MTCA's requirements.

[60] Aspect Consulting's Comments, e.g., pp. 4-5, 14-15, 21-25 (included in Attachment F to these comments).

[61] Aspect Consulting's Comments (included in Attachment F to these comments).

IV. THE PROPOSED PLAN FAILS TO COMPLY WITH MTCA'S REQUIREMENTS IN MANY WAYS—THE PLANS FOR MONITORING, MAINTENANCE, AND INSTITUTIONAL CONTROLS MOST SIGNFICANT FATAL FLAWS.

A. The proposed plan includes provisions for termination of monitoring, maintenance, and institutional controls in the future, contrary to many promises made to the public in the past by Ecology and the PLP Group, contrary to Ecology's current representations about the Proposed Plan, and contrary to the objections of Ecology's own counsel. MTCA requires monitoring, maintenance, and institutional controls "in perpetuity."

Ecology has already determined that groundwater monitoring (and thus maintenance activities) must continue "in perpetuity" at the Site, and has repeatedly promised the public that monitoring will continue forever. However, the Proposed Plan expressly includes provisions for termination of monitoring and maintenance in the future. [62] The Proposed Consent Decree also anticipates that institutional controls may be terminated in the future.[63] Thus, the Proposed Plan's provisions about these critical matters directly contradict the many promises made by Ecology and the PLP Group over the past ten years about "in perpetuity" protection at the Site. Those many promises have included the following occasions documented by the Ecology Site File (emphases provided):[64]

- February 2, 2004 – An Ecology letter to the PLP Group's consultant (copied to Kent) indicated: "As stated by the PLP [Group at a meeting on November 21, 2003], the wells will be monitored in perpetuity...."[65]

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[62] Final Draft CAP, p. 38 (Ecology Site File)(included in Attachment A to these comments). Monitoring/maintenance termination provisions appear many times in the Proposed Plan. See, e.g., Proposed Consent Decree, Section VI(A), p. 12; Final Draft CAP, pp. 31-32, 38; DCMP, p. A-7; Final Draft Operation and Maintenance Plan, p. B-3 (this particular draft plan indicates that inspections will stop upon "completion of the post-closure period" without any delineation or description of that period)(Ecology Site File)(all included in Attachment A to these comments).

[63] Proposed Consent Decree, both Exhibits F ("Restrictive Covenant"), Environmental Covenant, Section 6 ("The Owner of the Property reserves the right under WAC 173-340-440 to record an instrument that provides that this Covenant shall no longer limit use of the Property or be of any further force or effect."))(Ecology Site File)(included in Attachment A to these comments). In the Final Draft CAP, p. 43 (included in Attachment A to these comments), the text mischaracterizes the Proposed Consent Decree's institutional control requirements by stating "Site use restrictions will remain in force indefinitely." The term "indefinitely" is vague and ambiguous—the term "in perpetuity" adopted long ago by Ecology and the PLP Group must be used for clarity.

[64] All of the materials cited below in which Ecology and the PLP Group repeatedly promised the public for almost ten years that monitoring will occur "in perpetuity" are included in Attachment K to these comments. All of these materials are in the Ecology Site File—primarily in SIT7.9 (all of these materials are included in Attachment J to these comments).

[65] Ecology Letter from Jerome B. Cruz, Site Manager, Toxics Cleanup Program, Northwest Regional Office to Douglas Morell, Golder Associates Inc. (February 2, 2004), p. 2 (Ecology Site File)(included in Attachment J to these comments).

- September 29, 2004 – At an Ecology-sponsored technical meeting attended by Ecology, the PLP Group, and Kent, the PLP Group's presentation included three separate slides promising that groundwater monitoring would occur "in perpetuity."[66]

- February 7, 2006 – At an Ecology-sponsored public meeting regarding proposed Site activities, Ecology distributed a "questions and answers" handout that stated on page 5: "Once the cleanup action is complete we will monitor in perpetuity." Ecology also made an oral presentation expressly representing to the public that monitoring will be required "in perpetuity."[67]

- June 2006 – Ecology issued a "Responsiveness Summary" for the public comment process on a proposed agreed order amendment for Site activities that confirmed Ecology's representations to the public at the February 7, 2006, public meeting when asked: "What is your long-term plan for this infrastructure? Will this be in place until the problem is solved?" Ecology's response was: "Once the cleanup action is complete, we will monitor in perpetuity."[68]

- September 2008 – Ecology prepared presentation slides for a Landsburg Mine Site "Background and Status Update" that described one of six components of the "Proposed Remediation System" as "In-Perpetuity Groundwater Monitoring."[69]

- September 22, 2008 – Ecology's Director (Jay Manning at that time) met with Kent's representatives at the office of State Representative David Upthegrove's office to discuss the Site. Ecology Director Manning assured Kent and Representative Upthegrove of Ecology's commitment to "in perpetuity" monitoring and preparedness, and indicated the PLPs will "never get off the hook" under the final cleanup action plan.

- October 7, 2008 – Ecology confirmed Director Manning's September 22, 2008, promises in a letter to Kent stating that the Site's draft cleanup action plan will have seven elements described in that letter, including "In-Perpetuity Groundwater Monitoring."[70]

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[66] PLP Group's Presentation Materials for Ecology Technical Meeting (September 29, 2004), pp. 7, 29, and 47 (Ecology Site File SIT7.9)(excerpts included in Attachment J to these comments).

[67] Ecology's Questions and Answers Handout at Public Meeting Regarding Proposed Landsburg Mine Infrastructure Installation (February 7, 2006), p. 5 (Ecology Site File SIT7.9)(excerpts included in Attachment J to these comments).

[68] Ecology's Responsiveness Summary for Agreed Order Amendment, State Environmental Policy Act (SEPA) and Determination of Non-Significance (DNS) to Address Infrastructure for a Contingent Groundwater Treatment System for the Landsburg Mine Site (June 2006), p. 36 (Ecology Site File SIT8.5.2)(excerpts included in Attachment J to these comments).

[69] Ecology Presentation Materials for Landsburg Mine Background and Status Update (September 2008), p. 32 (Ecology Site File SIT7.9)(excerpts included in Attachment J to these comments).

[70] Ecology Letter from Robert W. Warren, Section Manager, Toxics Cleanup Program, Northwest Regional Office to Larry Blanchard, Public Works Director, City of Kent (October 7, 2008), p. 2 (Ecology Site File)(included in Attachment J to these comments).

- November 25, 2008 – Ecology's Site Manager attended a meeting of the Cedar River Council, to make a presentation regarding "Landsburg Mine Clean-Up Action Plan Update" using a slide entitled "Cleanup Approach" that included "groundwater monitoring in perpetuity."[71]

- January 25, 2010 – An Ecology letter to the PLP Group's consultant (also transmitted to Kent representatives) described Ecology's determinations regarding "[t]he long term monitoring scheme to be implemented at the subject site…provided in Table A below." That Table A was entitled "'In Perpetuity' Frequencies at all Site Wells."[72]

- May 2011 –Ecology's Site Manager attended a meeting of the Greater Maple Valley Area Council, to make a presentation regarding "Landsburg Mine Site, Ravendale—Brief Overview of the Site and Status Update Since 2008" using three different slides containing the words "in perpetuity monitoring." One slide was entitled "Cleanup Approach" that included "groundwater monitoring in perpetuity." A second slide set forth "In Perpetuity" monitoring "Frequencies at all Site Wells." The third slide summarized the "Timetable" for "Landsburg Mine Site Remediation" that concluded with "Compliance Monitoring (in perpetuity)."[73]

After all of these many promises about "in perpetuity" monitoring made by Ecology over the past ten years, the Proposed Plan has now abandoned the concept of "in perpetuity" monitoring. Ecology has not fulfilled its repeated promises to the public (and to Kent) that "in perpetuity" monitoring will be required at the Site. And, Ecology's recent statements to the public about the Proposed Plan have misrepresented the actual requirements of the Proposed Plan providing for termination of monitoring, maintenance, and institutional controls in the future:[74]

- The October 2013 Ecology Fact Sheet ("Consent Decree and Draft Cleanup Action Plan Now Available for Review") states that the Proposed Plan requires "Applying institutional controls on land and groundwater use" and "Monitoring groundwater indefinitely." The Fact Sheet fails to reveal the Proposed Plan's termination provisions for monitoring, maintenance, and institutional controls.[75]

- Ecology's Website currently posts "General Questions and Answers About Landsburg Mine Site" that repeat the October 2013 Ecology Fact Sheet text about institutional

[71] Ecology Presentation Materials for Cedar River Council Meeting (November 25, 2008), pp. 4 and 5 (Ecology Site File SIT7.9)(included in Attachment J to these comments)(excerpts included in Attachment K to these comments).
[72] Ecology Letter from Jerome B. Cruz, Site Manager, Toxics Cleanup Program, Northwest Regional Office to Douglas Morell, Golder Associates Inc. (January 25, 2010), p. 2 (Ecology Site File)(included in Attachment J to these comments).
[73] Ecology Presentation Materials for Landsburg Mine Brief Overview of the Site and Status Update Since 2008 (May 2011), pp. 4 and 5 (Ecology Site File SIT7.15)(included in Attachment J to these comments).
[74] All of the materials cited below are included in Attachment B to these comments. All of these materials are in the Ecology Site File and/or on the Ecology Website.
[75] Ecology Fact Sheet for Landsburg Mine Site, "Consent Decree and Draft Cleanup Action Plan Now Available for Review" (October 2013), p. 8 (emphasis provided) (Ecology Site File)(included in Attachment B to these comments).

controls and groundwater monitoring quoted above. The Ecology Website fails to reveal the Proposed Plan's termination provisions for monitoring, maintenance, and institutional controls.[76]

- On October 24, 2013, Ecology sponsored a public meeting "to provide information about the proposed cleanup actions and other documents for Landsburg Mine Site." Ecology's Site Manager made an oral presentation to the public meeting using slides that indicated the "Proposed Remediation System" includes "Groundwater monitoring indefinitely." A Kent representative attending the public meeting asked Ecology's representatives to explain how "monitoring indefinitely" differs from "monitoring in perpetuity." Ecology's representative responded that the Proposed Plan requires monitoring both "indefinitely" and "in perpetuity." Ecology's representatives failed to reveal at the October 24, 2013, public meeting the Proposed Plan's termination provisions for monitoring, maintenance, and institutional controls.

- It should be noted here that Ecology's new word (as of October 2013) used to describe Site monitoring (i.e., "indefinitely") has a distinctly different meaning than "in perpetuity." According to the Oxford English Dictionary (emphases provided), "indefinitely" means "[w]ithout definition...indeterminately, vaguely" while "perpetuity" means "endless."

Thus, Ecology's promises to the public have transformed from monitoring will be required "in perpetuity" (i.e., "endlessly") to monitoring will be required "indefinitely" (i.e., "vaguely"), to the Proposed Plan's monitoring requirements "mean both." But the Proposed Plan does not say "indefinitely," in its critical provisions, it certainly does not say "in perpetuity," and it certainly does not include both of those concepts. The Proposed Plan expressly includes provisions for termination of monitoring, maintenance, and institutional controls in the future.

The Proposed Plan's text to define the duration of monitoring and maintenance anticipates termination of those essential activities in the future:

"Long-term confirmational groundwater monitoring and Site inspections and maintenance will continue until residual hazardous substance concentrations no longer exceed cleanup or remediation levels as described in the CAP resulting from either (1) the application of new remediation technologies currently unavailable or (2) other circumstances or conditions that affect residual concentrations such that they no longer pose a risk to human health or the environment." [77]

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[76] Ecology Website section dedicated to the Landsburg Mine Site, accessible at: http://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=60 (and included in Attachment B to these comments).

[77] Final Draft CAP, p. 38 (Ecology Site File)(included in Attachment A to these comments). Note that the Proposed Draft Consent Decree contains essentially the same text to describe requirements for maintenance of the proposed soil cap over the hazardous wastes in the trenches. Proposed Draft Consent Decree, Section I(A)(4), p. 3 (Ecology Site File)(included in Attachment A to these comments).

The Ecology Site File reveals that Ecology's own counsel repeatedly objected to the inclusion of this termination provision in the numerous documents comprising the Proposed Plan. In comments provided to Ecology and the PLP Group on July 2, 2012, Ecology's counsel stated (emphasis provided):

> "I have a problem with this statement (and will highlight it in every document that contains the same sentence). [In that instance, the sentence was: "Maintain the cap until residual hazardous substance concentrations no longer exceed cleanup or remediation levels under MTCA."] The contaminated soil under the cap will never meet cleanup standards since you are containing it. So this statement is wholly inaccurate. This is where you need to say that you will maintain the cap indefinitely (or in perpetuity or until you are told by ecology that you don't need to anymore)"[78]

Ecology's counsel's objection to the "wholly inaccurate statement" was repeated at least twice in the context of the draft document's provisions regarding confirmational monitoring, including: "You never attain cleanup standards since you are containing the contamination under the cap. This is an inaccurate statement. You will be performing this monitoring indefinitely...It is my understanding that confirmational monitoring will be indefinite. This needs to be clearly stated." And yet, the "wholly inaccurate statement" remains in various critical provisions in the Proposed Plan's documents, providing for termination of monitoring and maintenance requirements.

As discussed in Aspect Consulting's Comments, the Proposed Plan's containment remedy must be monitored and maintained "in perpetuity" because the wastes will remain there forever.[79] As counsel for Ecology observed in asserting her objections, the provisions for termination set forth in the Proposed Plan are inapplicable to the Site's circumstances and cannot be achieved. In addition, those conditions are very troubling in their vagueness and ambiguity. MTCA requires monitoring and maintenance "in perpetuity." The Proposed Plan fails to comply with MTCA's requirements and must be revised. Ecology must not abandon its past promises to protect the Site and surrounding water resources forever, and should not reject its own counsel's advice.

The Proposed Consent Decree also anticipates that institutional controls may be terminated in the future.[80] Institutional controls must remain "in perpetuity" for the same reasons that monitoring and maintenance can never be terminated—under the containment remedy and "Black Box Approach," the elimination of institutional controls is impossible. WAC 173-340-440. The Proposed Draft Consent Decree and exhibits must be revised to impose these requirements clearly and without ambiguity.

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[78] Ecology Email from Jerome Cruz to Douglas Morell and Bill Kombol conveying comments from Dori Jaffe from the Washington State Attorney General's Office (July 2, 2012)(Ecology Site File)(included in Attachment K to these comments).

[79] Aspect Consulting's Comments, e.g., pp. 5-7 (included in Attachment F to these comments).

[80] Proposed Draft Consent Decree, both Exhibits F ("Restrictive Covenant"), Environmental Covenant, Section 6 (Ecology Site File)(included in Attachment A to these comments)("The Owner of the Property reserves the right under WAC 173-340-440 to record an instrument that provides that this Covenant shall no longer limit use of the Property or be of any further force or effect.").

B. The Proposed Plan's monitoring frequencies are based upon speculation and unproven assumptions. Those frequencies are not protective and do not comply with MTCA's requirements.

The Proposed Plan provides for groundwater monitoring that decreases in frequency over time, eventually allowing incredibly long intervals up to 5-years and even 10-years between sampling events, depending upon the chemistry parameters and the well locations. The Proposed Plan mistakenly points to BIOSCREEN contaminant transport modeling results to justify the proposed monitoring frequencies.[81]

As discussed in detail in Aspect Consulting's Comments, the Proposed Plan's monitoring frequencies: (1) are not sufficiently protective; (2) do not satisfy MTCA's requirements; (3) undermine the supposedly conservative "Black Box Approach" described in these comments; and (4) cannot be justified by BIOSCREEN modeling because it relies upon speculation and numerous unproven assumptions about Site conditions and the wastes at issue. Aspect Consulting's Comments contain their opinions regarding these matters and set forth the more protective monitoring frequencies necessary to provide the protectiveness required by MTCA. More frequent monitoring, not less, is a necessary consequence of the incomplete Site investigation and "Black Box Approach."[82]

Aspect Consulting opines that a reasonably protective long-term monitoring program compliant with MTCA's requirements should sample quarterly (i.e., four times per year) for chemicals that move quickly in groundwater (VOCs, etc.), at all sampling locations. Chemicals that move more slowly in groundwater (metals, SVOCs, pesticides) should be the subject of sampling and analyses every two years (at the northern wells) and every five years (at the southern wells). The Aspect Consulting Comments also address requirements for more frequent monitoring in circumstances where contaminants are detected (immediately, within seven (7) days, and then as determined by Ecology based upon an investigation), and when the operation of the Contingent Groundwater Containment System is "triggered." Aspect Consulting also opines that the PCB analyses anticipated by the Proposed Plan can be deleted from its requirements because analyses for other chemistry can be relied upon instead.[83]

Frequency of monitoring is a critical issue because groundwater moves very quickly at the Site. It has been estimated that groundwater travels the short distance (less than 1/2 mile) from the south portal of the mine to the Clark Springs water facility in approximately 13 to 40 days.[84] Thus, quarterly sampling is necessary to detect chemicals that could move from the mine to Clark Springs very quickly. Waiting five years or even ten years between sampling events would not be protective—contaminated groundwater could migrate out to degrade surrounding

[81] Final Draft CAP, pp. 38-39; DCMP, pp. A-7 and A-8 and Table A-1 (Ecology Site File)(included in Attachment A to these comments).
[82] Aspect Consulting's Comments, e.g., pp. 7-8, 17, 30-31 (included in Attachment F to these comments).
[83] Aspect Consulting's Comments, pp. 27-33, 36 (included in Attachment F to these comments).
[84] City of Kent Letter to Ecology (January 29, 2009)(enclosing hydrogeologist's time travel calculation)(Ecology Site File)(included in Attachment G to these comments).

water resources for years before it is even detected (if it is detected by the limited monitoring wells).

Note that other important flaws in the Proposed Plan's monitoring program are addressed in Aspect Consulting's Comments[85] and briefly summarized below in Section VI.

V. ECOLOGY ARBITRARILY AND CAPRICIOUSLY ADOPTED THE "BLACK BOX APPROACH" FOR ECOLOGY'S TWENTY YEARS OF SITE DETERMINATIONS. ECOLOGY HAS NOW ARBITRARILY AND CAPRICIOUSLY ABANDONED THAT APPROACH IN REMEDY SELECTION, AND IS NOW JUSTIFYING THE PROPOSED PLAN WITH FALSE AND MISLEADING STATEMENTS.

A. The "Black Box Approach" failed to comply with MTCA's requirements.

As discussed above in Section II(D), Ecology has relied upon the "Black Box Approach" since 1993, for twenty years of Site determinations. According to Aspect Consulting, the "Black Box Approach" is unique. The approach may be unprecedented. If there is any precedent for the approach, Ecology should reveal it specifically and in some significant detail when responding to these comments. If a "Black Box Approach" has been used anywhere by Ecology previously, it is highly unlikely that the circumstances involved a site where the primary drinking water supply for a city of 120,000 people is located immediately down-gradient from the "Black Box." In any event, the adoption of the "Black Box Approach" by Ecology for this Site and all subsequent Ecology Site determinations relying upon that approach were arbitrary and capricious decisions.

The "Black Box Approach" is an extraordinary inappropriate approach to a hazardous waste site because MTCA requires that field investigations be performed to "adequately characterize the areal and vertical distribution and concentration of hazardous substances" in soil and groundwater. WAC 173-340-350 (7)(c)(iii). The thorough investigation required by MTCA to determine the nature and extent of contamination and to evaluate potential impacts to human health and the environment have not been accomplished at the Site. Aspect Consulting opines that the "Black Box Approach" cannot be reconciled with the requirements of MTCA and applicable regulations, including WAC 173-340-350 (MTCA's requirement that investigation be accomplished "to collect data necessary to adequately characterize the site for the purpose of developing and evaluating cleanup alternatives."),[86] among other regulations also discussed below in Sections VI(B) and VI(C). Thus, the "Black Box Approach" and all of Ecology's determinations based upon that approach fail to comply with MTCA.

[85] Aspect Consulting's Comments (included in Attachment F to these comments).
[86] Aspect Consulting's Comments, e.g., pp. 8-12 (included in Attachment F to these comments).

B. After twenty years of arbitrary and capricious reliance upon the "Black Box Approach," the Proposed Plan and Ecology have arbitrarily and capriciously abandoned that approach in remedy selection. Speculation, unproven assumptions, and misrepresentations are being misused to justify the Proposed Plan and to undermine the very conservative approach that Ecology promised the public would ensure a protective remedy.

Having based the Site's Conceptual Site Model, the RI/FS, and all other previous Site determinations upon the "Black Box Approach," the Proposed Plan and Ecology have now abandoned the "Black Box Approach's" supposedly conservative and protective core assumptions. Ecology has adopted, relied upon, advertised, and now abandoned the "Black Box Approach." The Proposed Plan repeatedly misuses speculation and unproven assumptions to undermine the "Black Box Approach" and to undermine the very conservative approach that Ecology promised would be used to frame a protective remedy.

The Proposed Plan is fundamentally inconsistent with the "Black Box Approach" that Ecology and the PLP Group relied upon to severely limit Site investigation and to completely forego hazardous waste characterization. According to past Ecology determinations regarding the Site, the purportedly limited ability to accomplish Site investigation and waste characterization was supposed to be overcome by very conservatively framing a remedy that would assume the worst in the unknown depths of the mine. For example, Ecology has stated that "Ecology does not plan on selecting a remedy which depends upon knowledge of past events."[87] Ecology also has assured the public that "the FS conservatively assume[d] that a significant volume of waste is present"[88] and "[t]he remedy at the Site will conservatively assume that there is waste in the trench and mine [caverns]."[89]

However, in remedy selection, Ecology actions (and representations to the public) now abandon Ecology's past promises about all of those conservative assumptions and a protective Site remedy. It is very revealing that Ecology's October 2013 Fact Sheet does not repeat any similar assurances about supposedly conservative assumptions. Instead, the Proposed Plan and Ecology's October 2013 Fact Sheet are replete with speculation, unproven assumptions, and misrepresentations about Site conditions inside the "Black Box" that are misused to justify the inadequate and unprotective components of the Proposed Plan.[90] Among many examples of such speculation, unproven assumptions, and misrepresentations are the following:

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[87] Responsiveness Summary for Public Comments on the Remedial Investigation and Feasibility Study for the Landsburg Mine Site (Ecology, November 1996), p. 7 (Ecology Site File)(excerpts included in Attachment K to these comments).

[88] Responsiveness Summary for Public Comments on the Remedial Investigation and Feasibility Study for the Landsburg Mine Site (Ecology, November 1996), p. 11 (Ecology Site File)(excerpts included in Attachment K to these comments).

[89] Responsiveness Summary—Agreed Order Amendment, State Environmental Policy Act (SEPA) and Determination of Non-Significance (DNS) to Address Infrastructure for a Contingent Groundwater Treatment System—Landsburg Mine Site (Ecology, June 2006), p. 8 (Ecology Site File)(excerpts included in Attachment K to these comments).

[90] Ecology Fact Sheet for Landsburg Mine Site, "Consent Decree and Draft Cleanup Action Plan Now Available for Review" (October 2013)(Ecology Site File)(included in Attachment B to these comments).

- Speculation About Hazardous Waste Dumping Locations; Ecology Misrepresentations To The Public About Conservative Assumptions And About Knowledge Regarding Waste In The "Black Box." The Proposed Plan speculatively asserts that the previous hazardous waste disposal and "any potential remaining wastes appear to be confined to the northern half of the trenches"[91] but investigation has not been sufficient to confirm that speculation. According to Ecology, wastes are supposed to be assumed, not mischaracterized as "potential." Moreover, the Proposed Plan relies upon that speculation about waste location as if it were confirmed fact to locate the proposed cap and groundwater monitoring wells. Incredibly, Ecology's October 2013 Fact Sheet eliminates the speculation of the Proposed Plan quoted above about the trenches, and definitively states "Based upon Site work and previous investigations, the wastes are located only in the northern trench...." Even more incredibly, Ecology's October 2013 Fact Sheet in at least two instances goes on to question the very presence of waste in the "Black Box. The first instance is its statement "the wastes are...possibly within the former mine beneath this area of the trench, but have not spread."[92] The second instance is its statement "[soil sampling] and other data from the RI/FS would indicate that the contamination is confined to the northern trench area and possibly the portion of the mine beneath this zone."[93] Having repeatedly assured the public that Ecology's selected "remedy at the Site will conservatively assume that there is waste in the trench and mine [caverns]," Ecology has now abandoned that critically important conservative assumption. And, Ecology has misrepresented the information known about the contents of the "Black Box." Ecology cannot truthfully represent to the public that wastes in the mine "have not spread." The "Black Box" was not investigated, and it is not known whether wastes have spread or not.

- Speculation About the "Unlikely" Detection of Contaminated Groundwater And About Why Groundwater Contamination Has Not Been Detected (Yet) At The Site. The Proposed Plan repeatedly speculates that it is "unlikely" that contaminated groundwater will be detected at the Site in order to convey the false impression that the Site really does not even need the Proposed Plan and, especially, the "contingency plan" for groundwater containment (emphasis provided): "The Compliance Monitoring Plan document also contains a contingency treatment plan in the unlikely event that groundwater treatment may be required at a future date at the Site."[94]

- Speculations About Why Groundwater Contamination Has Not Been Detected (Yet) At The Site. Ecology's October 2013 Fact Sheet expands upon the Proposed Plan's

[91] Final Draft CAP, p. 9 (emphasis provided)(Ecology Site File)(included in Attachment A to these comments).
[92] Ecology Fact Sheet for Landsburg Mine Site, "Consent Decree and Draft Cleanup Action Plan Now Available for Review" (October 2013), p. 2 (emphasis provided) (Ecology Site File)(included in Attachment B to these comments).
[93] Ecology Fact Sheet for Landsburg Mine Site, "Consent Decree and Draft Cleanup Action Plan Now Available for Review" (October 2013), p. 7 (emphasis provided) (Ecology Site File)(included in Attachment B to these comments).
[94] Final Draft CAP, pp. 2, 37 (Ecology Site File)(included in Attachment A to these comments).

speculations about historical events and frames those speculations in text that conveys the misimpression that those speculations are definitive facts:

"Q: Why has groundwater contamination not been detected at this site?
A: In the 1996 Remedial Investigation, four possible reasons were proposed. They include *[note how the following text asserts definitive facts that have not been investigated or proven]*:
1) Wastes disposed in the trench are no longer present, either because they were consumed in the fires that were known to have occurred, or they already discharged to Cedar River through the mined-out Rogers Seam.[95]
2) The chemicals from the wastes were absorbed in place by the leftover coal in the abandoned mine, effectively immobilizing them.
3) Some of the drums were either empty when disposed of or filled with relatively non-reactive or harmless substances. Much of the 200,000 gallons of oily wastewater would have had very low concentrations of chemicals, based on the description from invoice records.
4) Wastes are still contained within intact drums and have not yet been discharged."[96]

By using the word "possible" only once in the beginning of the answer quoted above, and then asserting all four of the speculative possibilities in separate sentences describing them as definitive facts, Ecology's Fact Sheet conveys the misimpression to the public that those events/circumstances are known to have occurred or exist. None of those events/circumstances are known, none have been confirmed by investigation, and they should not be used to minimize Site risks posed by known hazardous waste disposal into the mine. Ecology repeatedly promised the public that "Ecology does not plan on selecting a remedy which depends upon knowledge of past events."[97] But, Ecology's October 2013 Fact sheet demonstrates the very opposite—Ecology has in fact relied upon speculation about past events to justify the Proposed Plan, thereby abandoning the "Black Box Approach" and abandoning its conservative assumptions about past events and wastes remaining in the uninvestigated "Black Box." Incredibly, as discussed in more detail below, the Ecology Fact Sheet's speculation about fires consuming wastes was expressly criticized by Ecology's Site Manager as "just speculation" when the PLP Group included the fire theory in a draft of the DCAP.

- Speculation About Trench Voids, Instability, and Safety. The Proposed Plan speculates about the possible presence of voids in the bottoms of the trenches and the possibility of unstable trench sidewalls: "It is believed that [collapsed sandstone sidewall] slabs could

[95] The Final Draft CAP repeats this speculation about historical fires consuming Site wastes. Final Draft CAP, p. 9 (emphasis provided) (Ecology Site File)(included in Attachment A to these comments).
[96] Ecology Fact Sheet for Landsburg Mine Site, "Consent Decree and Draft Cleanup Action Plan Now Available for Review" (October 2013), p. 7 (emphasis provided) (Ecology Site File)(included in Attachment B to these comments).
[97] Responsiveness Summary for Public Comments on the Remedial Investigation and Feasibility Study for the Landsburg Mine Site (Ecology, November 1996), p. 7 (Ecology Site File)(included in Attachment K to these comments).

mask underlying voids....Voids may also remain at great depth due to the incomplete collapse of the [mine caverns]....Using an approximate method of analysis, the overall volume of remaining voids was estimated to be less than 10%. Although it is likely that a majority of trench bottom subsidence has already occurred, it is prudent to allow for further subsidence when evaluating and designing any remedial measures....[n]o evidence of sidewall instability was observed [in assessing the sidewalls]. However, slabbing/failure...may occur if material is removed from the bottoms of the trenches or if further subsidence occurs."[98] Ecology's October 2013 Fact Sheet repeats this speculation in a more conclusory statement to justify the inadequate Site investigation (but without revealing or explaining the "Black Box Approach" and without reference to any conservative assumptions): "The mine workings may contain empty spaces and consist of collapsed rubble from bedrock and extracted coal remnants, making it a dangerous space to work in."[99] All of this speculation becomes the basis of the supposed "fact" underlying the Proposed Plan that it would be unsafe to investigate or remove any wastes from the trenches and other areas of the "Black Box" (but, as discussed below in the context of the chlorinated solvents sludge issue, the Proposed Plan would remove trees and large brush from the trenches near that sludge).[100]

- Speculation About Hydrogeology in the "Black Box." The Proposed Plan speculates about the hydrogeology within the "Black Box" without adequate investigation to support the speculation (e.g., lateral groundwater flows away from the mine "are considered negligible," "discharge from the mine appears to occur at either end," "[a] groundwater divide appears to be present with the trenches," "[t]here is some uncertainty with respect to the location of this divide..."[101] Despite all of the speculation, uncertainty and very limited information, the Proposed Plan inappropriately concludes that "the [groundwater] divide occurs within the southern portion of the Site" and that "[a]ll groundwater flow beneath the subsidence trenches that were utilized for waste disposal is toward the north."[102] As Aspect Consulting has observed in their comments: "In our opinion, the current information is not conclusive as to whether a groundwater divide is present in the southern portion of the mine. There are no monitoring wells currently, nor proposed in the Proposed Plan] completed within the mine workings beneath the trenches that were used for waste disposal; therefore groundwater elevations and groundwater quality in that most important portion of the Site are completely unknown."[103]

- Speculation and Unproven Assumptions Used in "BIOSCREEN" Modeling to Frame the Groundwater Monitoring Program. As discussed above, and in Aspect Consulting's Comments, the Proposed Plan mistakenly relies upon "BIOSCREEN" contaminant

[98] Final Draft CAP, p. 12 (emphasis provided)(Ecology Site File)(included in Attachment A to these comments).
[99] Ecology Fact Sheet for Landsburg Mine Site, "Consent Decree and Draft Cleanup Action Plan Now Available for Review" (October 2013), p. 7 (emphasis provided) (Ecology Site File)(included in Attachment B to these comments).
[100] Final Draft CAP, p. 33 (Ecology Site File)(included in Attachment A to these comments).
[101] Final Draft CAP, p. 11 (emphasis provided) (Ecology Site File)(included in Attachment A to these comments).
[102] Final Draft CAP, p. 11 (Ecology Site File)(included in Attachment A to these comments).
[103] Aspect Consulting's Comments, e.g., pp. 16-17, 21 (included in Attachment F to these comments).

transport modeling to purport to justify the long intervals (many years) between groundwater monitoring events. The model relies upon speculation and unproven assumptions in the absence of Site data, and thus is a mathematical simulation of a "Black Box" conceptual model. Aspect Consulting describes the modeling as "garbage in = garbage out."[104]

- Speculation and Unproven Assumptions about Disposal Facilities and Opposition to Use of Those Facilities. As discussed above, the Proposed Plan relies upon speculation unproven assumptions about the equipment and facilities necessary to dispose of the extracted and treated groundwater. That is, the proposed "contingency plan" simply assumes (hopes) that the existing "downstream" sewer system (previously designed and installed only to serve the needs of the nearby junior high school and school expansion) will have sufficient capacity to handle both the school district's needs and the extracted groundwater at the same time. Indeed, Tahoma School District No. 409 has expressed objections that the sewer line anticipated to be used for the Site's contingency plan "was not designed for usage beyond the schools' needs." Furthermore, the school district has stated it is "opposed to any use of the sewer line that would potentially limit or otherwise affect [the planned construction of another school] on the 38-acre site [adjacent to the existing junior high school]." The school district also seeks compensation for the use of the sewer line paid for by the district, but the Proposed Plan includes no requirement for such compensation and no deadline for resolving the likely contentious issue (resolution will not happen "quickly"). These issues likely will delay, if not prohibit, implementation of the "contingency plan."[105]

- Misleading Information About the Proposed Plan's Monitoring Plan. Ecology's 2013 Fact Sheet contains a bold text question that asks: "How often are the monitoring wells at the Site tested?" Ecology's response states: "Presently, the wells are being sampled twice a year – in the spring (typically high groundwater levels) and fall (typically low groundwater levels)."[106] However, the Fact Sheet fails to reveal to the public that the Proposed Plan would over time drastically reduce the frequency of monitoring from twice per year to intervals of many years between monitoring events (i.e., five and even ten years between such events, depending upon well locations and sampling parameters). Thus, the Ecology Fact Sheet misleads the public into erroneously believing that the Proposed Plan will have twice-yearly monitoring frequencies that are determined by seasonal conditions. The actual, unprotective proposed monitoring requirements are buried in complicated, unclear, and confusing documents. The proposed monitoring requirements have no seasonal basis.

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[104] Aspect Consulting's Comments, e.g., pp. 7-8 (included in Attachment F to these comments).

[105] Ecology's Responsiveness Summary—Agreed Order Amendment, State Environmental Policy Act (SEPA) and Determination of Non-Significance (DNS) to Address Infrastructure for a Contingent Groundwater Treatment System—Landsburg Mine Site (Ecology, June 2006), p. 14 (Ecology Site File)(excerpts attached in Attachment K to these comments).

[106] Ecology Fact Sheet for Landsburg Mine Site, "Consent Decree and Draft Cleanup Action Plan Now Available for Review" (October 2013), p. 10 (emphasis provided)(Ecology Site File)(included in Attachment B to these comments).

C. The Proposed Plan and Ecology assert false and misleading statements about the very limited Site data and Site conditions.

In addition to the speculation and unproven assumptions set forth above, the Proposed Plan and Ecology's October 2013 Fact Sheet are based upon some egregiously false and misleading statements about the very limited Site data and Site conditions, including the following:

- The Proposed Plan falsely describes the RI/FS as presenting "results of investigations into...the nature and extent of contamination...."[107] Ecology's October 2013 Fact Sheet repeats the false statement that "[t]he RI/FS investigated the nature and extent of contamination...at the Site."[108] In reality, the nature and extent of contamination were not investigated—because the "Black Box Approach" left the mine's contents (where the contamination resides) uninvestigated and uncharacterized.

- The Proposed Plan falsely describes the RI/FS as "consist[ing] of a comprehensive investigation of site environmental conditions...."[109]

- The Proposed Plan asserts that "[t]here are no contaminants of concern for soils outside of the trenches" and falsely asserts that "[w]ithin the trenches [several hazardous substances] exceeded MTCA Method B standards during the early 1990s in an area confined to the northern portion of the trenches where waste disposal is thought to have occurred in the past."[110] The latter statement is false because it is not "thought" that waste disposal occurred there—it is known to be a confirmed fact. Ecology's October 2013 Fact Sheet repeats the assertion about soil conditions outside the trenches but incredibly adds a false statement about conditions inside the trenches, as follows: "Soil sampling conducted in and outside of the northern areas of the trench and the portal areas showed no contamination. This and other data from the RI/FS would indicate that the contamination is confined to the northern trench area and possibly the portion of the mine beneath this zone."[111] Contrary to Ecology's representations, no soil sampling ever occurred in the trench (anywhere). But, in fact, sampling of chlorinated solvents sludge soils in the northern trench did reveal exceedances "of Method A Soil Cleanup Levels under [MTCA] for ethylbenzene (20 ppm), methylene chloride (0.5 ppm), PCBs (1 ppm), toluene (40 ppm), 1,1,1-trichloroethane (20 ppm), and total xylenes (20 ppm)."[112] The Proposed Plan over-states (and the Ecology Fact Sheet both over-states and falsely

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[107] Final Draft CAP, p. 1 (emphasis provided)(Ecology Site File)(included in Attachment A to these comments).
[108] Ecology Fact Sheet for Landsburg Mine Site, "Consent Decree and Draft Cleanup Action Plan Now Available for Review" (October 2013), p. 6 (emphasis provided)(Ecology Site File)(included in Attachment B to these comments).
[109] Final Draft CAP, p. 7 (emphasis provided)(Ecology Site File)(included in Attachment A to these comments).
[110] Final Draft CAP, p. 15 (emphasis provided)(Ecology Site File)(included in Attachment A to these comments).
[111] Ecology Fact Sheet for Landsburg Mine Site, "Consent Decree and Draft Cleanup Action Plan Now Available for Review" (October 2013), p. 7 (Ecology Site File)(included in Attachment B to these comments).
[112] Report on the Landsburg Mine Drum Removal Project Prepared by Burlington Environmental, Inc. (December 10, 1991), pp. 11, 14 (Ecology Site File SIT5.1.2)(included in Attachment K to these comments).

describes) the very limited soil sampling outside the trenches.[113] The extremely limited Site soil sampling is described in detail in the 1996 RI/FS Report.[114] If the Proposed Plan and Ecology Fact Sheet were accurate and truthful, they would state that soil chemistry has not been discovered outside the trenches because the investigation only sampled in very limited areas near the trench rim and the portals. Vast areas of the huge Site (and the "Black Box") were left uninvestigated—the extent of soil contamination at the Site is not known.

- The Speculation About Fires Consuming Site Wastes Quoted in the Previous Section V(B) (page 33) was Repeated Twice in Ecology's October 2013 Ecology Fact Sheet, After Ecology's Site Manager Criticized the Inclusion of Such Speculation in a Draft Document Prepared by the PLP Group. The speculation quoted above about fires consuming Site wastes was repeated elsewhere in Ecology's Fact Sheet.[115] However, in January of 2013, Ecology's Site Manager criticized the inclusion of such text in a draft of the DCAP, saying: "The fires that occurred were documented, but to say anything more is just speculation as far as I'm concerned. I found no investigations or data to support the contention that a significant portion of the wastes burned off."[116] In essence, Ecology is misrepresenting the Proposed Plan to the public by asserting speculation about Site conditions that Ecology expressly rejected in the past.

- Likewise, the Proposed Plan asserts the misleading over-statement that "based on groundwater sampling results, there are no contaminants in the groundwater directly attributable to waste disposed of in the trenches at the Site."[117] This assertion is misleading because it completely ignores the fact that groundwater in the mine beneath the areas of hazardous waste disposal--the "Black Box" locations where groundwater contamination is most likely--have never been investigated.

Collectively, these and other speculations, unproven assumptions, and false and misleading statements undermine the very conservative approach that was supposed to be used to frame the components of a Site remedy given the "Black Box Approach" to the Conceptual Site Model. The Proposed Plan and Ecology's October 2013 Fact Sheet demonstrate that Ecology has approved, advertised, relied upon, and now abandoned the "Black Box Approach" in remedy selection. The Proposed Plan and Ecology's October 2013 Fact Sheet demonstrate that Ecology has failed in its promise to the public that "[t]he remedy at the Site will conservatively assume

[113] In another section of the Draft Final CAP, the Proposed Plan acknowledges that soil sampling at the Site has been limited to "the rim perimeters of the trenches and downslope of Portal #3." Draft Final CAP, p. 8 (Ecology Site File)(included in Attachment A to these comments).
[114] Remedial Investigation and Feasibility Study for the Landsburg Mine Site, Volume I, Golder Associates (February 1996), pp. 2.8 and 2.9, Table 2-3, Figure 2-5, Figure 3-4, Table 5-6, Table 5-7, Table 5-8, and Table 5-9 (Ecology Site File SIT3.8). See also Aspect Consulting's Comments, e.g., p. 18 (included in Attachment F to these comments).
[115] Ecology Fact Sheet for Landsburg Mine Site, "Consent Decree and Draft Cleanup Action Plan Now Available for Review" (October 2013), p. 5 (Ecology Site File)(included in Attachment B to these comments).
[116] Ecology Email from Jerome Cruz to Doug Morell conveying comments regarding a draft DCAP dated January 16, 2013 (January 25, 2013)(Ecology Site File)(included in Attachment K to these comments).
[117] Draft Final CAP, p. 15 (Ecology Site File)(included in Attachment A to these comments).

that there is waste in the trench and mine [caverns]."[118] And Ecology's October 2013 Fact Sheet demonstrates that false and misleading statements are being used to justify the flawed Proposed Plan that fails to comply with MTCA's requirements.

D. Ecology's reliance upon past groundwater data to justify the Proposed Plan is misplaced and clearly demonstrates Ecology's abandonment of the "Black Box Approach" in remedy selection.

Ecology's October 2013 Fact Sheet inappropriately and misleadingly points to past groundwater data to justify the Proposed Plan. Without revealing the "Black Box Approach" or any of the significant limitations upon past Site investigations, Ecology's Fact Sheet repeatedly emphasizes that "over 20 years" of groundwater monitoring have not yet detected chemistry leaking from the hazardous wastes in the Site. Ecology's Fact Sheet does not reveal that groundwater inside the "Black Box" has not been sampled—ever. Ecology's Fact Sheet does not reveal the limitations of the past groundwater monitoring, such as the fact that it only addresses a limited few of many groundwater pathways at the Site. Instead, Ecology and the Proposed Plan keep pointing to historical monitoring results to justify the Proposed Plan and its fatally flawed "contingency plan." But such reliance upon those monitoring results for remedy selection purposes is completely misplaced.

Given the incomplete investigation of the Site's hydrogeology, and as addressed in Aspect Consulting's Comments,[119] there can be no confidence that all pathways of contaminant migration in groundwater have been identified and monitored. Contaminated groundwater may still be trapped in the former mine, but neither the waste contents nor the hydrogeology (migration pathways) of the "Black Box" have been investigated. It is possible that the groundwater monitoring accomplished so far has completely missed the detection of contaminated groundwater migration in (and out of) the Site. There are only eleven groundwater sampling points around the "Black Box," covering only small portions of the Site that has a perimeter extending over two miles.[120] The sampling points are at different elevations below ground surface, and do not begin to comprehensively cover all potential groundwater pathways. Groundwater flows in very complex ways, especially when naturally complex groundwater pathways have been significantly altered by many decades of mining excavation and then the subsequent collapse of mine caverns. Indeed, Ecology has repeatedly acknowledged that this is "a complex site."[121] In such a complex (and uninvestigated) environment, groundwater flows could, at any time, encounter pockets of hazardous wastes and leak out from the former mine.

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[118] Responsiveness Summary—Agreed Order Amendment, State Environmental Policy Act (SEPA) and Determination of Non-Significance (DNS) to Address Infrastructure for a Contingent Groundwater Treatment System—Landsburg Mine Site (Ecology, June 2006), p. 8 (Ecology Site File)(excerpts included in Attachment K to these comments).

[119] Aspect Consulting's Comments, e.g., 16-17, 21 (included in Attachment F to these comments).

[120] The existing groundwater monitoring wells, and those anticipated for installation by the Proposed Cleanup, are depicted on Figure A-7 of the DCMP (Ecology Site File)(included in Attachment A to these comments).

[121] See, e.g., Ecology's Responsiveness Summary for Public Comments on the Remedial Investigation and Feasibility Study for the Landsburg Mine Site (November 1996), p. 16 (Ecology Site File)(excerpts included in Attachment K to these comments).

To paraphrase a well-used adage: "past groundwater results do not guarantee future groundwater conditions" in the circumstances of this unique Site.

In any event, Ecology's repeated reliance upon past groundwater data is perhaps the most clear and convincing evidence that Ecology has in fact abandoned the "Black Box Approach" in remedy selection. The "Black Box Approach" was supposed to conservatively assume that contaminated groundwater could migrate out of the "Black Box" at any time in the future. Historical groundwater data are completely irrelevant to that assumption, and must be disregarded. Reliance upon those historical data for remedy selection cannot be reconciled with Ecology's past promises to require a protective remedy "in perpetuity" while "conservatively assum[ing] that there is a waste in the trench and mine [caverns]."

VI. THE PROPOSED PLAN FAILS TO COMPLY WITH MTCA'S REQUIREMENTS IN MANY OTHER SIGNIFICANT WAYS (E.G. LACK OF SITE INVESTIGATION AND WASTE CHARACTERIZATION; FAILURE TO REMOVE CHLORINATED SOLVENTS SLUDGE; FAILURE TO MAKE CONTAINMENT REMEDY DETERMINATIONS; IMPROPER DESIGNATION OF AN ARBITRARY "COMPLIANCE BOUNDARY" FOR A "GROUNDWATER PROTECTION AREA;" INADEQUATE MONITORING REQUIREMENTS AND WELLS; AMONG OTHER DEFICIENCIES).

A. The Proposed Plan relies upon inadequate information, speculation, and unproven assumptions about the history and consequences of hazardous waste dumping into the former mine.

Ecology has confirmed that enormous amounts of hazardous waste were dumped into the mine in the 1960s and 1970s. However, Ecology does not know how much waste was dumped, what hazardous substances those wastes contained, or exactly where the dumping occurred at the Site. Instead of fully investigating the history and facts, Ecology has relied upon information provided by the PLP Group (some of the parties responsible for the hazardous waste dumping), some historical accounting records (that likely were incomplete), and speculation about the Site's history (described in detail above). As a result, the Proposed Plan is based upon inadequate information and speculation, as demonstrated by the Final Draft CAP's summary of the Site's history:

> "Based upon available information, these trenches [caused by coal mining] were used in the late 1960s to the late 1970s for disposal of various industrial waste materials, construction materials, and land-clearing debris. Materials were disposed of in the northern portion of the trenches from the Summit-Landsburg Road shown in Figure 4. Industrial wastes were contained in drums or dumped directly from tanker trucks. Based on invoice records from [Palmer Coking Coal Company—the mine owner/operator], an estimated 4,500 drums of waste and about 200,000 gallons of oily wastewater and sludges were disposed into the trenches. Available documented interviews with waste haulers indicate that

wastes included paint wastes, solvents, metal sludges, and oily water and sludge (Ecology 1990). It is expected that many of the drums were only partially full."[122]

Thus, the Proposed Plan itself concedes that information is incomplete. Furthermore, the text of the Final Draft CAP includes inappropriate speculation that seeks to minimize the extent of hazardous waste dumping at the Site. Such inappropriate speculation and minimization is replete throughout all of the Proposed Plan's documents, as well as the 1996 RI/FS Report upon which the Proposed Plan is based.[123] For example, there is:

- Speculation that available "invoice records" documenting hazardous waste dumping at the Site were complete.
- Speculation that dumping was limited to an area in the north section of the mine.
- Speculation that all hazardous wastes were consumed by fires.
- Speculation that all hazardous wastes were flushed out through the north and south ends of the mine and are gone.
- Speculation that the chemistry in the wastes are immobilized by remaining coal deposits.
- Speculation that the groundwater in the mine is somehow hydraulically separate or isolated from the surrounding regional aquifer.
- Speculation that the hazardous waste has not impacted groundwater.

But, none of these speculations have ever been confirmed through investigation of the Site or by studies designed to confirm reality. And, as discussed above, Ecology relies upon many of these speculations in its October 2013 Fact Sheet to mislead the public about the Proposed Plan. It is wholly inappropriate, and inconsistent with a "Black Box" approach, to rely upon speculation and unproven assumptions about historical events to justify the Proposed Plan.

B. The Site has not been investigated and the hazardous waste in the "Black Box" has not been characterized as required by MTCA. The Proposed Plan has been prepared: (1) without determining what hazardous wastes were dumped into the former mine; (2) without determining where the hazardous wastes are located; and (3) without determining how/where the hazardous wastes have moved (and will move) within the Site (and from the Site) to degrade surrounding drinking water resources.

Given the inadequate information about the history and extent of hazardous waste dumping at the Site, Ecology should have required a thorough investigation of the Site's

[122] Final Draft CAP, p. 6 (emphasis provided)(Ecology Site File)(included in Attachment A to these comments).
[123] Final Report to Washington State Department of Ecology—Remedial Investigation and Feasibility Study for the Landsburg Mine Site (February 1996)(Ecology Site File SIT3.8).

conditions through soil and groundwater sampling to fully characterize the wastes located in the former mine. Instead of relying upon information about hazardous waste disposal provided by the PLP Group, Ecology should have pursued facts about the Site conditions only available through Site sampling and scientific analysis. However, thorough Site investigation and waste characterization has never occurred, as acknowledged by the Final Draft CAP:

> "The approach taken during the [Remedial Investigation] was to focus environmental sampling efforts on potential pathways of contaminants leaving the Site and not on wastes that may be present within the trenches itself. Investigation of wastes in the trenches was limited due to physical constraints, dangers, and difficulties associated with taking samples in the trenches."[124]

Kent has previously (and repeatedly) expressed to Ecology its concerns that the Site has not been investigated and characterized in accordance with MTCA requirements. The City hereby incorporates by reference its previous submissions to Ecology regarding the lack of Site investigation and characterization. Some of those submissions are attached to these comments in Attachment G, see e.g.:

- City of Kent and Udaloy Environmental Services Comments on the Landsburg Mine Studies (May 27, 2004).[125]
- City of Kent Request of a Supplemental Remedial Investigation for the Landsburg Mine Cleanup Site (October 6, 2004).
- City of Kent and Udaloy Environmental Services Evaluation of Chlorinated Solvents Occurring as DNAPL and Recommendations for Supplemental Remedial Investigations to Address the Landsburg Mine Site (November 8, 2004).
- City of Kent Comments Regarding Landsburg Mine Draft Cleanup Action Plan Dated 2002 (June 21, 2006).

In addition to Kent, other municipalities concerned about protecting their water resources near the Site have previously objected to the inadequacy of the Site investigation. Some of those submissions to Ecology are attached to these comments in Attachment H:

- City of Renton Letter to Ecology (October 7, 2004).
- Covington Water District Letter to Ecology (October 14, 2004).
- King County Water and Land Resources Division Letter to Ecology (December 10, 2004).

[124] Final Draft CAP, p. 8 (emphasis provided)(Ecology Site File)(included in Attachment A to these comments).
[125] A current resume for Anne Udaloy, L.H.G. is attached as Attachment N to these comments.

The inadequate Site investigation and failure to characterize the hazardous wastes alone are fatal flaws in the Proposed Plan. MTCA and applicable regulations require that investigation be accomplished "to collect data necessary to adequately characterize the site for the purpose of developing and evaluating cleanup alternatives." WAC 173-340-350. This has not occurred. Furthermore, in circumstances such as this Site the Final CAP "shall include the following:...[w]here the cleanup action involves on-site containment, specification of the types, levels, and amounts of hazardous substances remaining on site and the measures that will be used to prevent migration and contact with those substances...." WAC 173-340-380(1)(emphasis provided). Such specification cannot be included in the Proposed Plan because the inadequate investigation has not revealed the types, levels, or amounts of hazardous substances remaining in the Site. Accordingly, the requirements of MTCA have not been met. Two independent consulting firms agree with this conclusion, as set forth in Attachments F and G.

C. The Proposed Plan would not remove any hazardous wastes from the Site, including easily accessible chlorinated solvents sludge located on the surface that must be removed to comply with MTCA.

The "sludge pond" described above was estimated to contain approximately 65 to 70 cubic yards of hazardous waste material confirmed to contain chlorinated solvents and other hazardous substances. The sludge is on the surface, and apparently extends only a few feet deep. However, the Proposed Cleanup would leave that "free product" in place, and would not remove any hazardous wastes from anywhere in the Site.

As discussed in Aspect Consulting's Comments, there is no impracticability determination set forth in the Proposed Plan to justify leaving "free product" in place, and such a determination cannot be made.[126] The chlorinated solvent sludge pond at the surface of the Area 2 trench must be removed as required by MTCA. The sludge was sampled and analyses revealed "...a variety of F-listed solvents, namely methylene chloride (1690 ppm), trichlorofluoromethane (299 ppm), 1,1,2-trichlorotrifluoroethane (216 ppm), 1,1,1-trichloroethane (317 ppm), trichloroethene (1530 ppm), toluene (141 ppm), ethylbenzene (270 ppm), and total xylenes (1320 ppm). In addition, the sample contained 67,000 ppm TPH and 4.9 ppm PCBs (Arochlor 1254)."[127]

In 1991, a 30-ton crane was positioned near the sludge area in order to remove some drums containing wastes that were located in the sludge and adjacent to the sludge area.[128] This previous sludge sampling and drum removal demonstrates that the sludge is easily accessible for removal. Furthermore, the Proposed Plan calls for removing trees and large shrubs from the trenches prior to backfilling. Clearly, the chlorinated solvent sludge can be safely removed,

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[126] Aspect Consulting's Comments, e.g., pp. 11 (included in Attachment F to these comments).

[127] Report on the Landsburg Mine Drum Removal Project August 20 to October 30, 1991, Burlington Environmental, Inc. (December 10, 1991), p. 14 (Ecology Site File SIT5.1.2)(included in Attachment K to these comments).

[128] Report on the Landsburg Mine Drum Removal Project August 20 to October 30, 1991, Burlington Environmental, Inc. (December 10, 1991), pp. 7-8 (Ecology Site File SIT5.1.2)(included in Attachment K to these comments).

particularly from Area 2 where the trench is very shallow. MTCA requires removal of free product to the extent practicable to do so. WAC 173-340-360(2)(c)(ii)(A). According to Aspect Consulting, removal of such chlorinated solvent sludge would routinely be required in remedies for other MTCA sites.[129] Past Site activities and the Proposed Plan both demonstrate the practicability of sludge removal; therefore leaving the sludge in place violates MTCA's requirements. If proper Site investigation were to be completed, it is likely that other easily accessible hazardous wastes would be located in the trenches. They also should be removed.

D. Ecology has failed to make, and cannot make, the determinations required by MTCA to approve a containment remedy that leaves all hazardous waste in place at the Site forever.

In circumstances such as this Site, MTCA and its regulations require that the Cleanup Action Plan ("CAP") "shall include the following:...[w]here the cleanup action involves on-site containment, specification of the types, levels, and amounts of hazardous substances remaining on site and the measures that will be used to prevent migration and contact with those substances...." WAC 173-340-380(1)(emphasis provided). Such specification cannot be included in the CAP for this Site because the inadequate investigation has not revealed the types, levels, or amounts of hazardous substances remaining in the Site.[130]

E. Ecology has failed to make, and cannot make, the determinations required by MTCA to approve an arbitrarily determined "compliance boundary" for a "Groundwater Protection Area" using "conditional points of compliance." The Proposed Plan improperly designates "compliance" monitoring wells located very far from the known hazardous waste disposal areas (all monitoring wells at the Site must be designated as "compliance" monitoring wells to be protective).

The Proposed Cleanup would significantly undermine the protectiveness of the monitoring program (and the response to groundwater contamination anticipated by the "contingency plan" discussed above) by designating a "compliance boundary" (for a "Groundwater Protection Area" depicted in the Proposed Draft Consent Decree's Exhibit F, Figure 2).[131] That "compliance boundary" would be arbitrarily aligned with the external boundaries of real property currently owned by the landowner PLP (Palmer Coking Coal Company), creating a wide perimeter around the known hazardous waste disposal areas.[132] As Aspect Consulting observes, the "Groundwater Protection Area's" arbitrary configuration is demonstrated by the fact that its southwest corner has a "carved out" section and runs immediately adjacent to the former mine's south portal. Thus, southern portions of the former mine underneath that "carved out" section are arbitrarily not included in the "Groundwater

[129] Aspect Consulting's Comments, e.g., pp. 11 (included in Attachment F to these comments).
[130] Aspect Consulting's Comments, e.g., pp. 11, 34 (included in Attachment F to these comments).
[131] Proposed Draft Consent Decree, Exhibit F, Figure 2 (Ecology Site File)(included in Attachment A to these comments).
[132] DCMP, Part A, pp. A-3 and A-4, and Figure A-6 (Ecology Site File)(included in Attachment A to these comments).

Protection Area." See Aspect Consulting's Comments regarding this issue.[133] The lines have been drawn for mere convenience, based upon real property ownership—not based upon any criteria or technical considerations reflecting environmental protectiveness. Indeed, internal Ecology correspondence as wells as emails exchanged by Ecology and the PLP Group during negotiations over the "Groundwater Protection Area's" scope reveal that there was an arbitrary compromise on the boundaries.[134]

The Proposed Cleanup also undermines the protectiveness of the monitoring program by distinguishing between designated "compliance" monitoring wells and "sentinel" wells. With one exception, the "compliance" monitoring wells are those located farthest away from the areas where hazardous wastes were known to be dumped at the Site. Proposed "sentinel" wells would be closer to the waste areas (but not very close). Under the Proposed Plan's scheme, "compliance" wells would be locations where cleanup standards must be met but "sentinel" locations would not have to meet MTCA's cleanup standards.

These proposed designations are critically important because MTCA requires that:

> "For groundwater, the point of compliance is the point or points where the groundwater cleanup levels established under [WAC 173-340-720(3), (4), (5), or (6)] must be attained for a site to be in compliance with the cleanup standards. Groundwater cleanup levels shall be attained in all groundwaters from the point of compliance to the outer boundary of the hazardous substance plume."[135]

And, MTCA requires that "[t]he standard point of compliance shall be established throughout the site from the uppermost level of the saturated zone extending vertically to the lowest most depth which could potentially be affected by the site." WAC 173-340-720(8)(b)(emphasis provided). However, in exceptional circumstances, MTCA allows for the designation of a conditional point of compliance:

> "Where is can be demonstrated under WAC 173-340-350 through 173-340-390 that it is not practicable to meet the cleanup level throughout the site within a reasonable restoration time frame, [Ecology] may approve a conditional point of compliance that shall be as close as practicable to the source of hazardous substances, and except as provided under (d) of this subsection, not to exceed the property boundary. Where a conditional point of compliance is proposed, the person responsible for undertaking the cleanup action shall demonstrate that all practicable methods of treatment are to be used in the site cleanup."[136]

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[133] Aspect Consulting's Comments, e.g., p. 42 (included in Attachment F to these comments).

[134] Internal Ecology Email from Ching-Pi Wang to Jerome Cruz regarding Assigning a buffer zone prohibiting redevelopment on south portal (March 11, 2013)(Ecology Site File)(included in Attachment K to these comments); Email from Andy Fitz (Washington State Attorney General's Office) to Joshua Lipsky (PLP Group), Ching-Pi Wang, and Jerome Cruz regarding Landburg CD, CAP, Environmental Covenants, & FA Trust (June 3, 2013)(Ecology Site File)(included in Attachment K to these comments); Email from Andy Fitz (Washington State Attorney General's Office) to Joshua Lipsky (PLP Group) regarding South Portal engineering measures (June 10, 2013)(Ecology Site File)(included in Attachment K to these comments).

[135] WAC 173-340-720(8)(a).

[136] WAC 173-340-720(8)(c).

The Proposed Plan establishes such conditional points of compliance for the Site, but fails to set forth the determinations required by the applicable regulations, quoted above. Indeed, those determinations cannot be made by Ecology. Given the "Black Box Approach" to the Site, no data or information exists to make such demonstrations--the "Black Box" has not been investigated to gather the necessary information. Consistent with WAC 173-340-720(8)(b), the standard point of compliance must be established throughout the Site at all monitoring wells (including all "sentinel" monitoring wells).[137]

F. The Proposed Plan Fails to require adequate post-earthquake emergency groundwater monitoring and Site inspection (such monitoring needs appropriate criteria and requirements and deadlines).

As discussed above and in Aspect Consulting's Comments, earthquakes are among the most serious risks to threaten the Site, and to cause contaminated groundwater to migrate from the former mine into the surrounding water resources. The Proposed Plan acknowledges the need to address earthquake risks with special monitoring requirements, but the Proposed Plan includes inadequate and incomplete measures.[138] As indicated elsewhere in these comments, a huge fault runs right through the Site where the hazardous wastes were dumped. In the event of a strong seismic event potentially impacting the Site, emergency response action must be required. Such response action should include inspection of groundwater monitoring wells (to ensure all wells continue to function) and frequent monitoring to assess groundwater conditions. Aspect Consulting opines that such monitoring should occur within two (2) weeks, and monthly for one (1) year after a seismic event. And, the "trigger" for the response should be carefully defined with all appropriate actions and deadlines clearly established.[139] In addition, the requirements should anticipate the unpredictability of emergency events, and the Final CAP should expressly describe Ecology's power and discretion to require emergency groundwater monitoring and Site investigations in any appropriate circumstances.

G. The Proposed Plan would not require installation of groundwater monitoring wells to provide data regarding the hydraulic consequences of backfilling and capping portions of the trenches (such wells must be installed to verify speculation and assumptions about the effectiveness of the proposed containment cap).

The Proposed Cleanup would provide for capping part of the trenches, and assumes the cap will divert surface water infiltration and thus impact groundwater's directional flows. However, the Proposed Cleanup would fail to require data gathering to assess the hydraulic consequences of the proposed cap's installation. As recommended by Aspect Consulting, two cap performance monitoring wells must be installed inside the proposed cap area to verify

[137] And, as discussed below in Sections VI(H), (I), and (K), the monitoring well system should be expanded beyond that provided by the Proposed Plan to include two monitoring wells inside the proposed cap area (near the hazardous waste disposal areas) and to address the northern discharge pathway from the Site.
[138] Aspect Consulting's Comments, e.g. p. 28 (included in Attachment F to these comments).
[139] Aspect Consulting's Comments, e.g. p. 28 (included in Attachment F to these comments).

speculation and assumptions about the effectiveness of the cap and its impacts upon groundwater flows underneath the cap. Instead, the Proposed Plan would include the installation of one monitoring well outside the cap area, to the south (it is called a "Dual South Sentinel/Cap Effectiveness Well"). Aspect Consulting has concluded that one well in that location is not sufficient and the Proposed Plan would not provide the necessary data to evaluate the effectiveness of the cap—two (2) cap performance monitoring wells should be installed beneath the proposed cap, both north and south of the "rock bridge" in the Site.[140]

H. The Proposed Plan apparently would not require the installation of new groundwater monitoring wells until after the trenches are backfilled and capped (installation must occur prior to trench backfilling to provide baseline data before construction disrupts the site's conditions).

The timing for installation of new groundwater monitoring wells is inconsistently described in the Proposed Plan, and apparently they would not be installed until after the trenches are backfilled and capped.[141] Aspect Consulting has opined that the new wells must be installed prior to trench backfilling, as Ecology indicated would be required in its letter dated January 2010 to Golder Associates.[142] This will provide data regarding conditions existing before and after the installation of the cap.

I. The Proposed plan would omit an important chemical from the laboratory analyses required for the groundwater monitoring program (given the dumping of chlorinated solvent wastes at the site, analyses must include 1,4-dioxane, a highly mobile compound typically found in chlorinated solvents).

Given that the Site is known to contain chlorinated solvent wastes, Aspect Consulting has opined that 1,4-dioxane needs to be added to the sampling and analysis requirements of the groundwater monitoring program. 1,4-dioxane is a highly mobile compound typically found with chlorinated solvents.[143]

J. The Proposed Plan would install new groundwater monitoring wells to the north of the mine in the wrong locations (those wells should be installed where they will intercept groundwater flowing from the Mine to the Cedar River watershed).

Aspect Consulting has opined that the Proposed Plan's two new groundwater monitoring wells to be installed north of the mine should be relocated or, if not relocated, an additional well

[140] Aspect Consulting's Comments, e.g. p. 25 (included in Attachment F to these comments).
[141] See, e.g., Final Draft CAP, p. 35 ("This sentinel well will be installed after the CAP is finalized and remedial actions are completed.")(Ecology Site File)(included in Attachment A to these comments).
[142] Aspect Consulting's Comments, e.g. pp. 25-26 (included in Attachment F to these comments); Ecology Letter from Jerome B. Cruz, Site Manager, Toxics Cleanup Program, Northwest Regional Office to Douglas Morell, Golder Associates Inc. (January 25, 2010), p. 2 (Ecology Site File)(included in Attachment J to these comments).
[143] Aspect Consulting's Comments, e.g. p. 30 (included in Attachment F to these comments).

must be installed to intercept groundwater discharging from the north end of the mine to the Cedar River watershed.[144]

K. The Proposed Plan omits any requirement to inform interested parties (other than Ecology) in the event that monitoring detects contaminated groundwater migrating from the former mine (Kent, and perhaps other neighbors, must be notified and the requirement to do so must be clear)(and requirements should be imposed for the posting of all Site data to a publicly accessible website).

The Proposed Plan requirements provide that Ecology must be provided with Site data as required by WAC 173-340-840(5),[145] and must be notified of chemistry detected through groundwater monitoring at the Site.[146] However, the Final Consent Decree requirements must also provide that other interested parties (including Kent) will be notified of critically important events and will have access to Site data. According to MTCA: "Because releases of hazardous substances can adversely affect the health and welfare of the public, the environment, and property values, it is in the public interest that affected communities be notified of where releases of hazardous substances have occurred and what is being done to clean them up."[147] Furthermore, according to the WAC: "It is the policy of [Ecology] to make information about releases or threatened releases available to owners, operators or other persons with potential liability for a site in order to encourage them to conduct prompt remedial action. It is also the policy of [Ecology] to make the same information available to interested members of the general public so they can follow the progress of site cleanup in the state." WAC 173-340-130(2)(emphasis provided). This is also required due to Ecology's "interagency coordination" obligations under MTCA, which provide, in part:

> "If [Ecology] is conducting remedial actions or requiring remedial actions under an order or decree, [Ecology] shall ensure appropriate local, state, and federal agencies and tribal governments are kept informed and, as appropriate, involved in the development and implementation of remedial actions. The department may require a potentially liable person to undertake this responsibility."[148]

The Final CAP should expressly require the electronic website posting of all Site data in real time as data is provided to Ecology (on Ecology's website or some other appropriate website). This arrangement would make all Site data readily accessible to Kent and the public. Such electronic posting of Site data would be an economical means of data distribution, and its costs should be covered by the PLP Group and/or via the PLP Group's reimbursement of Ecology's oversight costs as required by the Proposed Consent Decree's terms. The Final CAP also should require that the PLP Group alert both Ecology and Kent immediately as soon as any detection exceeding 0.5 of a cleanup level is verified in any Site monitoring well.

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[144] Aspect Consulting's Comments, e.g. pp. 26-27 (included in Attachment F to these comments).
[145] Proposed Draft Consent Decree, Section X, p. 17 (Ecology Site File)(included in Attachment A to these comments).
[146] Final Draft CAP, p. 41 (Ecology Site File)(included in Attachment A to these comments).
[147] RCW 70.105D.010(6).
[148] WAC 173-340-130(7).

In the unique circumstances of this Site, it is critical that Kent be informed when any chemistry is detected at the Site. This is necessary for Kent to mobilize an appropriate response to the situation. For example, Kent would immediately perform water quality sampling at its Clark Springs facility and other nearby locations. Depending upon the circumstances, other neighbors may need to be alerted to Site conditions too. The Final CAP must include such requirements.

VII. THE PROPOSED DRAFT CONSENT DECREE'S FINANCIAL ASSURANCE PROVISION FAILS TO COMPLY WITH MTCA'S REQUIREMENTS AND FAILS TO ENSURE THAT RESPONSIBLE PARTIES AND FUNDING WILL BE AVAILABLE TO PERFORM SITE ACTIVITIES, IMPLEMENT THE "CONTINGENCY PLAN," AND PROTECT THE ENVIRONMENT "IN PERPETUITY."

The Proposed Draft Consent Decree's Section XXI ("Financial Assurances") indicates:

> "Defendants have submitted to Ecology for review and approval an estimate of the costs that they will incur in carrying out the terms of this Decree, including operation and maintenance, and compliance monitoring. Ecology approves the initial estimate dated September 17, 2012, which is in the amount of $775,000 for purposes of establishing an initial financial assurance amount."

The proposed financial assurance violates WAC 173-340-440(11)'s requirements: "Financial assurances shall be of sufficient amount to cover all costs associated with the operation and maintenance of the cleanup action, including institutional controls, compliance monitoring, and corrective measures." The Proposed Plan omits many such costs, resulting in a low, inadequate cost estimate. The final Consent Decree must be revised to align its cost estimate with all such costs of the Final CAP.

Ecology has provided the September 17, 2012, financial assurance cost estimate to Kent's counsel pursuant to a public records request—see Attachment L to these comments. The basis for the cost estimate calculations have not been revealed by Ecology in that spreadsheet. But it is very clear that the $775,000 cost estimate would not be sufficient to implement the Proposed Plan, because it covers only estimated Site monitoring and maintenance costs. The information provided does not reveal how many years of monitoring and maintenance are included in the $775,000 cost estimate. The amount fails to include any costs of the design, approval, permitting, installation, and operation of the Contingent Groundwater Containment System—all part of an anticipated "corrective measure" that is part of the proposed cleanup action. Given the uncertainties of a future that extends "in perpetuity," and the purpose of financial assurance, it is essential that all costs of the Contingent Groundwater Containment System be included in the financial assurance amount. To leave that system out of the financial assurance estimate would be clearly erroneous given the terms of WAC 173-340-440(11), and would defeat the

fundamental purpose of financial assurance. If any aspect of the Site's remedy needs financial assurance to ensure that it can and will be implemented, it is the "contingency plan."[149]

In addition to the complete (and cautiously estimated) costs of the full "contingency plan," financial assurance also should include estimated costs of the five-year reviews and Ecology oversight required by the Proposed Draft Consent Decree. For a Site that so uniquely relies upon a "contingency plan" and essential protections "in perpetuity," financial assurance is critical and must be addressed very carefully and conservatively. After all, one of the very few designated PLPs has already gone bankrupt and will not be available to address Site liabilities in the future. Others may follow, and "in perpetuity" is a very long time.

VIII. THE PROPOSED CONSENT DECREE HAS MANY OTHER FLAWED, FALSE, MISLEADING, AND INAPPROPRIATE PROVISIONS.

The following provisions of the Proposed Draft Consent Decree must be revised (listed in the order as they appear in the document):

Section I ("Introduction")(A)(4), p. 3; and Section VI ("Work to be Performed")(A), third bullet, p. 12. These are two more instances of the "wholly inaccurate" text to which Ecology's own counsel repeatedly objected in comments provided to Ecology and the PLP Group on July 2, 2012.[150] Ecology's counsel stated (emphasis provided):

> "I have a problem with this statement (and will highlight it in every document that contains the same sentence). [In that instance, the sentence was: "Maintain the cap until residual hazardous substance concentrations no longer exceed cleanup or remediation levels under MTCA."] The contaminated soil under the cap will never meet cleanup standards since you are containing it. So this statement is wholly inaccurate. This is where you need to say that you will maintain the cap indefinitely (or in perpetuity or until you are told by ecology that you don't need to anymore)"[151]

The text must be revised to indicate that soil cap maintenance will be required "in perpetuity."

Section I ("Introduction")(A)(5), p. 3; Section VI ("Work to be Performed")(A), third bullet, p. 12. The text must be revised to clarify that up-front design, approval, permitting, installation, and testing of the Contingent Groundwater Containment System will be part of the required

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[149] Documents from the Ecology Site File produced by Ecology on December 4, 2013, appear to indicate that the PLP Group and Ecology have negotiated, or are in the process of negotiating, a financial assurance trust agreement for handling funds to be used for Site activities. Those documents appear to indicate that those funds also will be limited to estimated Site monitoring costs. Because those arrangements are directly relevant to financial assurance requirements, those arrangements should be revealed to the public. Ecology should seek full funding of a trust to address all aspects of the Final CAP activities, including all possible costs of any "contingency plan," five-year reviews, and Ecology oversight.

[150] See Section IV(A) of these comments, above.

[151] Ecology Email from Jerome Cruz to Douglas Morell and Bill Kombol conveying comments from Dori Jaffe from the Washington State Attorney General's Office (July 2, 2012)(Ecology Site File)(included in Attachment K to these comments).

remedial action. The text must also be revised to indicate that groundwater monitoring will be required "in perpetuity."

Section IV ("Definitions")(A) and (B), p. 6. As indicated above in these comments, the definitions of the Site and Groundwater Protection Area are arbitrarily determined, and should not be subject to conditional points of compliance.

Section V ("Findings of Fact")(G), p. 8. These so-called findings of fact are replete with speculation, especially the completely baseless assertion that "It is expected that many of the drums were only partially full." Such speculation should not be a "finding of fact," and its inclusion in the Proposed Draft Consent Decree is yet another demonstration that Ecology has arbitrarily and capriciously abandoned the "Black Box Approach."

Section V ("Findings of Fact")(H), p. 8. This finding describes the fact that drinking water for area residences is supplied by groundwater. The text omits any reference to other very significant water resources surrounding the Site, including the Cedar River, Rock Creek, and the Clark Springs facility.

Section V ("Findings of Fact")(L), p. 10 (emphasis provided). The text repeats the false assertion regarding "The RI/FS, which consisted of a comprehensive investigation of the Site's environmental conditions...." See comments above in Section V(C). If Ecology is intent upon relying upon the "Black Box Approach," it must be clearly described here in order to reveal its unique approach to the public and the Court. The text also is misleading in its description of soil testing and Site conditions. See comments above in Section V(C).

Section VI ("Work to be Performed")(A)(6), p. 13; Section VI ("Work to be Performed")(B), p. 14; Section XVI ("Extension of Schedule"), pp. 22-24. As discussed in Section III(B), the "anticipated schedule" supposedly "outlined" in the Proposed Plan is wholly inadequate and failed to correct many deficiencies identified by Ecology's own counsel. As such, the terms of Section XVI cannot be enforced or applied to the circumstances, and Ecology cannot exercise its oversight duties or enforcement obligations under MTCA.

Section VI ("Work to be Performed")(A)(7), p. 14. The text must be revised to provide that monitoring will be required "in perpetuity."

Section VI ("Work to be Performed")(A)(8), p. 14. The text erroneously refers to the "completion of the remedial action, which cannot occur given the terms of the containment remedy and the "Black Box Approach."

Section VI ("Work to be Performed")(A)(9), p. 14. The text must be revised to clarify that up-front design, approval, permitting, installation, and testing of the Contingent Groundwater Containment System will be part of the required remedial action. The text must also be revised to indicate that groundwater monitoring will be required "in perpetuity." The last sentence of this text misleadingly asserts a "goal" that is contradicted by the Proposed Plan--the sentence says the "system's goal is to contain, treat, and safely dispose of impacted groundwater in a

timely manner to prevent migration beyond the conditional compliance boundary for groundwater." As discussed above in Section III(A), the Proposed Plan expressly anticipates that contaminated groundwater exceeding MTCA cleanup levels will migrate off-Site (perhaps for many years) before containment is even attempted—at least initially, migration is expressly anticipated and it will not be prevented (and may never be prevented if the "contingency plan" fails to achieve containment).

Section X ("Sampling, Data Submittal, and Availability"), pp. 17-18. As discussed above in Sections III(B) and VI(K), deadlines for data submissions should be established and all Site data should be posted to a publicly accessible website in real time. Note that the terms already require submission of all Site data in electronic format.

Section XVIII ("Covenant Not to Sue"); Section XIX ("Contribution Protection"), pp. 25-26. Given the Proposed Plan's reliance upon a "contingency plan," the geographically defined covenant and contribution protection are overly broad and prematurely granted. As discussed above in Section VI(E), the "Groundwater Protection Area's" boundaries have been arbitrarily determined. The benefits conveyed by these provisions of the Proposed Draft Consent Decree are provided without any remedial action activities on the part of the Defendants beyond the "Cap Protection Area." These benefits are also provided without any financial assurance that the Defendants will perform any work beyond that "Cap Protection Area" (see comments above in Section VII). If the "contingency plan" approach to the Site is to be pursued, the covenant and contribution protection should be similarly contingent upon performance of the anticipated "contingency plan." Also note that the covenant's reopener provision (B)(4) erroneously refers to "the reasonable restoration time frame set forth in the CAP." There is no such restoration time frame given the containment remedy and the "Black Box Approach."

Section XX ("Land Use Restrictions"), pp. 27-28. As discussed above in Section VI(E), the "Groundwater Protection Area" has been arbitrarily bounded by real property lines. Note that Exhibits F-1 and F-2 described here are mislabeled in the Proposed Plan, and must be revised to delete provisions anticipation the termination of restrictive covenants and institutional controls (see Section IV(A)). Provisions also need to be added which would require the expansion of institutional controls and the "Groundwater Protection Area" in the event that contaminated groundwater migrates off-Site.

Section XXI ("Financial Assurances"), p. 28. As discussed above in Section VII—the financial assurance amount and terms violate WAC 173-340-440(11)'s requirements.

Section XXIII ("Compliance with Applicable Laws"), p. 29. As discussed above in Section III, the requirements for designing, approving, permitting, installing, and testing the Contingent Groundwater Containment System have not been defined clearly and completely in the Proposed Plan's documents. The referenced technical memorandum dated August 4, 2010, attached as Exhibit G to the Proposed Draft Consent Decree, is incomplete and insufficient to outline the requirements.

IX. APPROVAL OF THE PROPOSED PLAN WOULD BE CONTRARY TO ECOLOGY'S ASSURANCES TO THE PUBLIC THAT ECOLOGY WILL PROTECT AND PRESERVE IRREPLACEABLE WATER RESOURCES.

The comments set forth above demonstrate that the Proposed Plan is a fatally flawed approach to addressing the enormous amounts of hazardous wastes dumped into the mine. There has been very little Site investigation (and no characterization of the Site's hazardous wastes). The "Black Box" remains filled with the unknown. The Proposed Plan is advertised by Ecology as a "cleanup"[152] but that is misleading to the public—absolutely nothing will be "cleaned up" at the Site via the proposed containment remedy. The Proposed Plan would not remove any of the wastes—the hazardous substances will remain in the mine forever. Forever is a long time—will the Landsburg Mine Site PLP Group be around forever to deal with the consequences of that "Black Box"? One of the members of the PLP Group already has gone bankrupt.[153] Who will be around to actually design, obtain permits, obtain approvals, construct, operate, maintain, and pay for the Contingent Groundwater Containment System if that part of the Proposed Plan is left to an uncertain future? The System must be installed and tested now, while financially solvent PLPs still exist and are subject to Ecology's enforcement powers.

The fatally flawed approach of the Proposed Plan is contrary to Ecology's many assurances to the public that Ecology will protect and preserve irreplaceable water resources. Ecology touts numerous "initiatives" costing hundreds of millions of dollars that are supposed to protect and preserve water resources (e.g., the "Urban Waters Initiative," or "Puget Sound Initiative" or "Water Smart Washington" or a multitude of watershed planning, assessment, and improvement projects), not to mention protection of the endangered species that inhabit our waters.[154] On Ecology's website, under the heading "Managing Our Water—Providing clean, sufficient & reliable water supplies into the future," Ecology assures the public:

> "Clean, abundant water was once taken for granted in Washington state as a free, unlimited resource. Today, after more than a century of population growth and climate change we know our water resources are not unlimited and certainly not free.
>
> Population growth and associated development increase the demand for clean, abundant water and increase pollution problems.
>
> Ecology's water programs are working closely with Washington communities to clean up and protect water quality in Washington. They also work to ensure the state has clean,

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[152] E.g., Ecology Fact Sheet for Landsburg Mine Site, "Consent Decree and Draft Cleanup Action Plan Now Available for Review" (October 2013), p. 1 (Ecology Site File)(included in Attachment B to these comments).
[153] In 2003, Philip Services Corporation, the parent corporation of Burlington Environmental, Inc., filed for Chapter 11 bankruptcy reorganization and subsequently entered into a settlement with Ecology regarding the Site. See Ecology's Request for Public Comments on Proposed Philip Services Corporation Consent Decree (November 2003); Landsburg Mine Site Philip Services Consent Decree and Settlement Agreement (Ecology Site File SIT5.3).
[154] See Washington Department of Ecology Website, accessible at http://www.ecy.wa.gov (and included in Attachment I to these comments).

adequate water supplies that meet current and future drinking water needs, commercial and agricultural uses, and to sustain fish and the natural environment.

We remain committed to protecting and enhancing the quantity and quality of our water resources even in challenging economic times. Ecology embraces local partnerships and citizen involvement in our efforts to ensure a water smart future in the 21st century."[155]

Ecology's supposed commitment to protecting and enhancing water resources cannot be reconciled with the Proposed Plan. Here, we have the Landsburg Mine Site surrounded by pure, clean water flowing out of the Cascade foothills. Hundreds of thousands of people drink and rely upon that water every day. Endangered species live in both the Cedar River and in Rock Creek, just below the old mine. The hazardous waste in the Site threatens those precious resources--forever. Just one earthquake or relatively minor earth movement could break the "Black Box" and cause migration of hazardous substances into the surrounding aquifers. Kent wants to keep its water supplies clean—not have to "clean up" in the future, after disaster strikes. The water surrounding the Site will only become more precious in the future, given population growth, climate change, and degraded water supplies elsewhere. Now is the time to require truly protective measures at the Site that are consistent with Ecology's representations to the public.

X. APPROVAL OF THE PROPOSED PLAN WOULD VIOLATE THE STATE OF WASHINGTON'S NON-DISCRETIONARY DUTY AS A TRUSEEE TO USE ITS POLICE POWERS TO PROTECT IRREPLACEABLE WATER RESOURCES, TO GUARD THE HEALTH OF ITS RESIDENTS, AND TO PREVENT FORESEEABLE ECONOMIC LOSSES THAT COULD RESULT FROM ANY MIGRATION OF ANY HAZARDOUS SUBSTANCES FROM THE SITE TO SURROUNDING WATER RESOURCES.

According to the Attorney General of the State of Washington:

"Like most other states, Washington has declared, both in its Constitution and in statute, that water is a public resource held in trust for the people. This principle is the foundation of the state's authority to define both the substance and the process of obtaining the right to use water. The state regulates water as a public resource and as an outgrowth of the state's "police power" to protect the general health and welfare."[156]

Using this police power established by the Washington State Constitution and statutory authority, the State as the "trustee" of water resources has established a comprehensive system of regulation to address water rights, permitting, quality, protection, and cleanup. The management and regulation of waters of the State are an exercise of the police powers of the State. *Peterson v. Department of Ecology*, 92 Wash. 2d 306, 596 P.2d 285 (1979).

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[155] Washington Department of Ecology Website, accessible at http://www.ecy.wa.gov/managingwater/index.html (and included in Attachment I to these comments).

[156] "An Introduction to Washington Water Law," Office of Washington's Attorney General (January 2000), p. 2. This document is accessible via the Washington Department of Ecology's Website at http://www.ecy.wa.gov/pubs/0011012.pdf (and an excerpt is included in Attachment I to these comments).

In the Water Resources Act of 1971, Chapter 90.54 RCW, the State Legislature "set forth fundamentals of water resource policy for the state to insure [sic] that waters of the state are protected and fully utilized for the greatest benefit to the people of the state of Washington and, in relation thereto, to provide direction to the department of ecology, other state agencies and officials, and local governments in carrying out water and related resources programs."[157] The Water Resources Act of 1971 sets forth the general fundamentals for water management, including two very critical provisions for the circumstances of this Site:

- RCW 90.54.020(3) – "The quality of the natural environment shall be protected and, where possible, enhanced as follows..."

- RCW 90.54.020(b) – "Waters of the state shall be of high quality....wastes and other materials shall not be allowed to enter such waters which will reduce the existing quality thereof, except in those situations where it is clear that overriding considerations of the public interest will be served."

- RCW 90.54.020(5) – "Adequate and safe supplies of water shall be preserved and protected in potable condition to satisfy human domestic needs."

It is the duty of the State's agencies (particularly Ecology and the Department of Health) to advance policies, actions and statutes that implement the above fundamentals, among others.

The State's Department of Ecology has the responsibility to address water rights and cleanups impacting water quality. The State's Department of Health ("DOH") has the responsibility to address drinking water regulations and to keep water supplies safe. The two agencies have the obligation to work together to protect water resources and public health:

> "Where feasible, the department [of health] and the state board of health shall consult with the department of ecology in order that, to the fullest extent possible, agencies concerned with the preservation of life and health and agencies concerned with the protection of the environment may integrate their efforts and endorse policies in common."[158]

Thus, it is the duty of Ecology and DOH to consult and collaborate in protecting water resources by investigating and assessing issues pertinent to their respective jurisdictions. Such consultations occur regularly. See e.g., Letter Health Consultation, Masterpark Site (AKA SeaTac Development Site) prepared by the Washington State Department of Health, Agency for Toxic Substance and Disease Registry (DOH 334-210) addressed to Jerome Cruz (Ecology) by Barbara Trejo (DOH) (August 6, 2009). In that circumstance, DOH reviewed a draft agreed order prepared under Ecology's oversight for an RI/FS and DCAP preparation, concluding: (a) reported data failed to support conclusions about the nature and extent of soil contamination; (b) neither the lateral nor the vertical extent of site groundwater contamination in the regional

[157] RCW 90.54.010(2).
[158] RCW 43.70.310.

aquifer had been determined; (c) only one additional down gradient monitoring well was planned to the west of the property at issue – that plan was insufficient, and additional monitoring wells needed to be installed to the northeast, north, northwest, and south to define the lateral extent of the plume in the shallow portion of the regional aquifer; (d) some deeper monitoring wells were necessary to assess the vertical extent of the contamination; and (e) there were other significant deficiencies in the draft agreed order, in the views of DOH. A similar assessment and consultation should be accomplished regarding the Proposed Plan.

As the "trustee" of water resources, the State has a duty to exercise its police power to protect such resources from harm and to prevent foreseeable injuries or losses arising from the application of the State's regulatory authorities. Ecology and DOH must proceed very carefully to protect both water resources and water rights from impairment as Ecology and DOH perform their duties.

In the circumstances of the Landsburg Mine Site, where migration of hazardous substances from the Site could have very significant impacts to public and private water supplies, the State should take very special care to ensure that the Site's remedy will keep those water supplies safe—forever. This means much more than tolerating migrations of hazardous substances from the Site (as anticipated by the Proposed Plan), even if those migrations would not render water supplies undrinkable or exceed MTCA cleanup standards. As discussed above, the Proposed Plan would allow far worse than those scenarios – it expressly anticipates degradation of off-Site water supplies by groundwater migration exceeding MTCA cleanup standards.

In the circumstances of the Site, the area of the Rock Creek watershed encompassing Kent's Clark Springs facility meets "Critical Aquifer Recharge Area" ("CARA") criteria pursuant to the King County critical area ordinance and WAC 365-190-100. The CARA (including portions of the Site) also is protected as a "Wellhead Protection Area" applicable to Clark Springs pursuant to the Safe Water Drinking Act and the wellhead protection program administered by DOH (see map of the Clark Springs Wellhead Protection Area in Attachment C to these comments). Kent prepared the Clark Springs Water Supply System Habitat Conservation Plan with the National Marine Fisheries Service and the United States Fish and Wildlife Service pursuant the federal Endangered Species Act ("ESA") for the protection of both the municipal water supplies and important aquatic species in the watershed, including salmonids. Given these very special circumstances, Ecology and DOH have even greater duties of care in assessing, overseeing, and enforcing actions subject to their respective regulatory jurisdictions to protect these critical water and natural resources.

Accordingly, the State must anticipate the foreseeable injuries and losses that could arise if any hazardous substances (at any chemical concentrations) reach the aquifers surrounding the Site. Such circumstances obviously would be very problematic, and would likely cause significant economic losses. Response activities would likely be necessary to assure a concerned public that their drinking water would be safe. But, even so, a stigmatized water supply could cause the need for replacement water supplies or could cause residents and businesses to relocate

(or to decide not to move to Kent in the first place). As Ecology observes on its website under the heading "How Water Supports Washington Jobs":

> "Perhaps nothing is as critical in shaping the quality of life in Washington state than securing the future of our water resources. In one way or another, everything we value depends on access to clean water."[159]

Ecology supports that statement with several examples of how water is critical to economic development, including the following:

> "Conservative estimate value of water in NE Washington from Sullivan Lake project: [1] 5,000 acre-feet of municipal water could facilitate future residential development in the area worth $754 million, increasing the property tax base by providing water for up to 12,500 homes[;] [2] 5,000 acre-feet of agricultural water used for crop irrigation could generate $2.1 million in additional direct value each year."[160]

Indeed, Kent is committed to protecting the quality of life in Kent, the health of its citizens, the quality of its water resources, and its future economic development opportunities. The State has the authority and the non-discretionary duty as trustee to protect from impairment those water resources and Kent's water rights. Approval of the Proposed Plan would violate the State's duties under the State's water laws, Constitution, and other applicable laws. If the Proposed Plan is approved by the State, and if bad things happen, the City will look to the State to address the resulting circumstances.

XI. KENT HAS REQUESTED THAT THE WASHINGTON STATE DEPARTMENT OF HEALTH UNDERTAKE APPROPRIATE SITE INVESTIGATION, CONSULTATION, AND REPORTING ACTIONS PURSUANT TO ITS ROLE AND RESPONSIBILITIES TO PROTECT WATER RESOURCES.

Consistent with the preceding Section X, Kent has provided Ecology with a copy of its letter dated December 12, 2013, to DOH. A copy of that letter also is included in Attachment O to these comments.

XII. KENT RESERVES THE RIGHT TO SUPPLEMENT THESE COMMENTS TO ADDRESS ECOLOGY SITE FILE MATERIALS AND INFORMATION VERY RECENTLY PRODUCED (AND NOT YET PRODUCED) BY ECOLOGY.

On October 28, 2012, counsel for Kent submitted a public records request to review the Ecology Site File, including all recent correspondence. Counsel for Kent subsequently visited Ecology's Bellevue office twice, to review and to obtain materials from the Ecology Site File, and to discuss with Ecology's records personnel their efforts to obtain and produce recent

[159] Washington Department of Ecology's Website, accessible at http://www.ecy.wa.gov/managingwater/jobs.html (and attached in Attachment I to these comments).
[160] Washington Department of Ecology's Website, accessible at http://www.ecy.wa.gov/managingwater/jobs.html (and attached in Attachment I to these comments).

materials and correspondence regarding the Site. Throughout November and early December, counsel for Kent engaged in numerous telephone and email communications with Ecology's records personnel about Ecology's efforts to overcome challenges in making the correspondence available.

On December 4, 2013 (only eight (8) days prior to the close of the public comment period on the Proposed Plan), Ecology's records personnel posted to an Ecology FTP website many hundreds of emails and attachments comprising an enormous amount of information. It has not been possible for Kent and its counsel to adequately review the voluminous materials produced by Ecology on December 4. Furthermore, Ecology has indicated that its response to the outstanding public records request is incomplete. Relevant correspondence from Ecology is included in Attachment M to these comments.

Based upon the circumstances described above, and the current incompleteness of Ecology's response to the outstanding records request, Kent reserves the right to supplement these comments as may be appropriate in the future.

XIII. CONCLUSION.

For the reasons discussed above and in the attached comments and materials provided by independent experts, the Proposed Plan is fatally flawed and fails to comply with the requirements of MTCA and applicable regulations. Ecology's determinations and actions regarding the Site to date (including but not limited to Ecology's issuance of the Proposed Plan for public comment) also have violated the APA because Ecology's conduct has been arbitrary, capricious, and unlawful (in that Ecology has failed to comply with MTCA and has acted, in part, by making misrepresentations to the public). If Ecology were to approve the Proposed Plan, Ecology's approval would again violate MTCA and APA. And, such approval would be contrary to the advice of Ecology's own counsel in several significant respects. Ecology's approval of the Proposed Plan also would be an abuse of the State of Washington's non-discretionary duty as a trustee for water resources under Washington's Constitution and Washington's laws. The State has the duty to use the State's police powers to protect irreplaceable water resources, to guard the health of its residents, and to prevent foreseeable economic losses that could result due to any migration of any hazardous substances from the Site to surrounding water resources.

XIV. ATTACHMENTS.

A. Excerpts of the Proposed Plan's Documents

1. Proposed Draft Consent Decree Text
2. Exhibit A – Site Description
3. Exhibit B – Draft Cleanup Action Plan (without appendices B and C)
4. Exhibit C – Draft Schedule

5. Exhibit E – Draft Plans

Part A – Compliance Monitoring Plan (without appendices)

Part B – Operation and Maintenance Plan

Part C – Contingent Groundwater Extraction and Treatment System Plan

6. Exhibit F (#1) – Draft Restrictive Covenant

7. Exhibit F (#2) – Draft Restrictive Covenant

8. Exhibit G – Draft Remedial Action Permits

B. Ecology's October 2013 Materials Regarding The Proposed Plan

1. Ecology Fact Sheet (October 2013)

2. Ecology Public Meeting Presentation Materials (October 24, 2013)

3. Ecology Website Materials (Current)

C. Maps of Landsburg Mine Site and Surrounding Water Resources

D. Landsburg Mine Cross-Section Illustration

E. "Black Box" Illustrations

F. Aspect Consulting's Comments Regarding The Proposed Plan

G. Previous Submittals to Ecology by Kent and Kent's Independent Experts Regarding The Site (Chronological Order)

1. City of Kent and Udaloy Environmental Services Comments on the Landsburg Mine Studies (May 27, 2004)

2. City of Kent Landsburg Mine Technical Meeting Presentation to Ecology (September 29, 2004)

3. City of Kent Request of a Supplemental Remedial Investigation for the Landsburg Mine Cleanup Site (October 6, 2004)

4. City of Kent and Udaloy Environmental Services Evaluation of Chlorinated Solvents Occurring as DNAPL and Recommendations for Supplemental Remedial Investigations to Address the Landsburg Mine Site (November 8, 2004)

5. City of Kent Comments Regarding Landsburg Mine Draft Cleanup Action Plan Dated 2002 (June 21, 2006)

6. City of Kent Letter Providing Time Travel Memorandum (January 29, 2009)

7. City of Kent Transmittal of Aspect Consulting's Comments on PLP Group's BIOSCREEN Modeling Results and Proposed Monitoring Frequencies (November 9, 2009)

8. City of Kent Transmittal of Aspect Consulting's Analysis of Proposed Wells to be Installed (November 12, 2009)

9. City of Kent Letter Regarding Ecology Letter Dated January 21, 2010 – Ecology Decision Regarding Proposed Groundwater Monitoring Program (March 5, 2010)

H. Past Letters to Ecology About Landsburg Mine Site From Interested Parties (Chronological Order)

1. City of Renton Letter to Ecology (October 7, 2004

2. Covington Water District Letter to Ecology (October 14, 2004)

3. King County Water Land Resources Division Letter to Ecology (December 10, 2004)

4. King County Executive Letter to Ecology (February 15, 2006)

5. Soos Creek Water & Sewer District Letter to King County (March 8, 2006)

I. Materials from Ecology's Website Regarding Water Resources, Water Initiatives, and the State's Duties as Trustee of Water Resources

J. Ecology and PLP Group Materials and Letters Promising The Public That Monitoring "In Perpetuity" Will Be Required At The Site (Chronological Order)

1. Ecology Letter from Jerome B. Cruz, Site Manager, Toxics Cleanup Program, Northwest Regional Office to Douglas Morell, Golder Associates Inc. (February 2, 2004), p. 2

2. PLP Group's Presentation Materials for Ecology Technical Meeting (September 29, 2004), pp. 7, 29, and 47

3. Ecology's Questions and Answers Handout at Public Meeting Regarding Proposed Landsburg Mine Infrastructure Installation (February 7, 2006), p. 5

4. Ecology's Responsiveness Summary for Agreed Order Amendment, State Environmental Policy Act (SEPA) and Determination of Non-Significance (DNS) to Address Infrastructure for a Contingent Groundwater Treatment System for the Landsburg Mine Site (June 2006), p. 36

5. Ecology Presentation Materials for Landsburg Mine Background and Status Update (September 2008), p. 32

6. Ecology Letter from Robert W. Warren, Section Manager, Toxics Cleanup Program, Northwest Regional Office to Larry Blanchard, Public Works Director, City of Kent (October 7, 2008), p. 2

7. Ecology Presentation Materials for Cedar River Council Meeting (November 25, 2008), pp. 4 and 5

8. Ecology Letter from Jerome B. Cruz, Site Manager, Toxics Cleanup Program, Northwest Regional Office to Douglas Morell, Golder Associates Inc. (January 25, 2010), p. 2

9. Ecology Presentation Materials for Landsburg Mine Brief Overview of the Site and Status Update Since 2008 (May 2011), pp. 4 and 5

K. Additional Historical Materials from Ecology's Landsburg Mine Site File (Chronological Order)

L. Financial Assurance Cost Estimate Provided by Ecology

M. Correspondence Regarding Ecology's Production of Site File Materials and Correspondence

N. Anne Udaloy, L.H.G.'s Resume

O. City of Kent's Letter Regarding the Site to Washington State's Department of Health (December 12, 2013)

ATTACHMENT A

EXCERPTS OF THE PROPOSED PLAN'S DOCUMENTS

1. Proposed Draft Consent Decree Text
2. Exhibit A – Site Description
3. Exhibit B – Final Draft CAP (without appendices B and C)
4. Exhibit C – Draft Schedule
5. Exhibit E – Draft Plans

    Part A – Compliance Monitoring Plan (without appendices)

    Part B – Operation and Maintenance Plan

    Part C – Contingent Groundwater Extraction and Treatment System Plan
6. Exhibit F (#1) – Draft Restrictive Covenant
7. Exhibit F (#2) – Draft Restrictive Covenant
8. Exhibit G – Draft Remedial Action Permits

STATE OF WASHINGTON
KING COUNTY SUPERIOR COURT

STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY, Plaintiff, v. PALMER COKING COAL COMPANY, LLP; PACCAR INC; PLUM CREEK TIMBERLANDS , L.P.; BROWNING-FERRIS INDUSTRIES OF ILLINOIS, INC.; TOC HOLDINGS CO.; THE BNSF RAILWAY COMPANY, Defendants.	NO. _____ CONSENT DECREE

TABLE OF CONTENTS

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I. INTRODUCTION

A. The mutual objective of the State of Washington, Department of Ecology (Ecology) and Palmer Coking Coal Company, LLP; PACCAR Inc; Plum Creek Timberlands Company, L.P.; Browning-Ferris Industries of Illinois, Inc.; TOC Holdings Co.; and the BNSF Railway Company (collectively, Defendants) under this Decree is to provide for remedial action at a facility where there has been a release or threatened release of hazardous substances. This Decree requires Defendants to undertake the following remedial actions:

1. Backfill a portion of the trenches as required for capping (*See* CAP, Exhibit B);

2. Allow the backfill to consolidate;

3. Place a low-permeability soil cap over the backfill of the trenches (areas 7, 8, and 9), including grading and surface water management (*See* CAP, Exhibit B);

4. Maintain the soil cap until residual hazardous substance concentrations no longer exceed cleanup or remediation levels under the Model Toxics Control Act (MTCA) as described in the Cleanup Action Plan (CAP) resulting from either (1) the application of new remediation technologies currently unavailable or (2) other circumstances or conditions that affect residual concentrations such that they no longer pose a risk to human health or the environment;

5. Implement and maintain institutional controls, groundwater monitoring and any instituted contingency plan (*See* CAP, Exhibit B).

Ecology has determined that these actions are necessary to protect human health and the environment.

B. The Complaint in this action is being filed simultaneously with this Decree. An Answer has not been filed, and there has not been a trial on any issue of fact or law in this case. However, the Parties wish to resolve the issues raised by Ecology's Complaint. In addition, the

Parties agree that settlement of these matters without litigation is reasonable and in the public interest, and that entry of this Decree is the most appropriate means of resolving these matters.

C. By signing this Decree, the Parties agree to its entry and agree to be bound by its terms.

D. By entering into this Decree, the Parties do not intend to discharge non-settling parties from any liability they may have with respect to matters alleged in the Complaint. The Parties retain the right to seek reimbursement, in whole or in part, from any liable persons for sums expended under this Decree.

E. This Decree shall not be construed as proof of liability or responsibility for any releases of hazardous substances or cost for remedial action nor an admission of any facts; provided, however, that Defendants shall not challenge the authority of the Attorney General and Ecology to enforce this Decree.

F. The Court is fully advised of the reasons for entry of this Decree, and good cause having been shown:

Now, therefore, it is HEREBY ORDERED, ADJUDGED, AND DECREED as follows:

II. JURISDICTION

A. This Court has jurisdiction over the subject matter and over the Parties pursuant to the Model Toxics Control Act (MTCA), Chapter 70.105D RCW.

B. Authority is conferred upon the Washington State Attorney General by RCW 70.105D.040(4)(a) to agree to a settlement with any potentially liable person (PLP) if, after public notice and any required hearing, Ecology finds the proposed settlement would lead to a more expeditious cleanup of hazardous substances. RCW 70.105D.040(4)(b) requires that such a settlement be entered as a consent decree issued by a court of competent jurisdiction.

C. Ecology has determined that a release or threatened release of hazardous substances has occurred at the Site that is the subject of this Decree.

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D. Ecology has given notice to Defendants of Ecology's determination that Defendants are PLPs for the Site, as required by RCW 70.105D.020(21) and WAC 173-340-500.

E. The actions to be taken pursuant to this Decree are necessary to protect public health and the environment.

F. This Decree has been subject to public notice and comment.

G. Ecology finds that this Decree will lead to a more expeditious cleanup of hazardous substances at the Site in compliance with the cleanup standards established under RCW 70.105D.030(2)(e) and chapter 173-340 WAC.

H. Defendants have agreed to undertake the actions specified in this Decree and consent to the entry of this Decree under MTCA.

III. PARTIES BOUND

This Decree shall apply to and be binding upon the Parties to this Decree, their successors and assigns. The undersigned representative of each Party hereby certifies that he or she is fully authorized to enter into this Decree and to execute and legally bind such Party to comply with this Decree. Defendants agree to undertake all actions required by the terms and conditions of this Decree. No change in ownership or corporate status shall alter Defendants' responsibility under this Decree. Defendants shall provide a copy of this Decree to all agents, contractors, and subcontractors retained to perform the Work required by this Decree, and shall ensure that all work undertaken by such agents, contractors, and subcontractors complies with this Decree.

IV. DEFINITIONS

Unless otherwise specified herein, all definitions in RCW 70.105D.020 and WAC 173-340-200 shall control the meanings of the terms in this Decree.

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A. Site: The Site is referred to as the Landsburg Mine Site, and is generally located approximately 1.5 miles northwest of Ravensdale, Washington, in a rural area of southeast King County. The Site is more particularly described in the Site Diagram (Exhibit A). For purposes of the Covenant Not to Sue (Section XVIII), Contribution Protection (Section XIX), and Land Use Restrictions (Section XX) only, the Site shall include the Groundwater and Portal Protection Area as depicted in Exhibit A to this Decree. The Site constitutes a Facility under RCW 70.105D.020(5).

B. Groundwater and Portal Protection Area: The Groundwater and Portal Protection Area is the area in which institutional controls will be implemented to prevent withdrawal of groundwater for purposes other than remediation, and to prevent access to the north and south portals.

C Parties or Party: Refers to Ecology and Defendants.

D. Defendants: Refers to Palmer Coking Coal Company, LLP; PACCAR Inc; Plum Creek Timberlands Company, L.P.; Browning-Ferris Industries of Illinois, Inc.; TOC Holdings Co.; and the BNSF Railway Company.

E. Consent Decree or Decree: Refers to this Consent Decree and each of the exhibits to this Decree. All exhibits are integral and enforceable parts of this Consent Decree. The terms "Consent Decree" or "Decree" shall include all exhibits to this Consent Decree.

F. Work or Work to be Performed: Refers to work described in Section VI.

V. FINDINGS OF FACT

Ecology makes the following findings of fact without any express or implied admissions of such facts by Defendants.

A. The Site consists of portions of a former underground coal mine located approximately 1.5 miles northwest of Ravensdale in a rural area of southeast King County,

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Washington. The Site is situated directly south and east of SE Summit-Landsburg Road, and north of SE Kent-Kangley Road.

B. The Site is located within Sections 24 and 25, Township 22 North, Range 6 East, W.M. King County, Washington. The Site is more particularly defined in Exhibit A of this Consent Decree.

C. The Site occupies a parcel of land owned or formerly owned by Palmer Coking Coal Company, LLP (PCC) and by Plum Creek Timber Company, L.P., the predecessor in interest to Plum Creek Timberlands Company, L.P. The BNSF Railway Company also owned property within the Site. These parties are "owners" as defined by RCW 70.105D.020(17) and are therefore liable.

D. PACCAR Inc; Browning-Ferris Industries of Illinois, Inc.; and TOC Holdings Co. are liable parties for generating or transporting "hazardous wastes disposed of or treated at the facility." RCW 70.105D.040(c).

E. PCC and several earlier coal companies operated underground coal mines, known first as the Danville Mine and later collectively called the Landsburg Mine. The various Danville-Landsburg mines consisted of several coal seams known as the Frasier seam (furthest west), the Landsburg seam (furthest east), and the Rogers seam (middle coal seam). The Rogers seam was mined from 1959 until 1975. The northern half of the subsidence trenches above the Rogers seam is the area of the site (or waste disposal).

F. The mined section of the Rogers seam has a near vertical dip and consists of coal and interbedded shale approximately 16 feet wide. The mined section is about a mile in length. Mining occurred at depths up to 750 feet below the ground surface. Extraction was accomplished by causing the coal seam to cave into mine workings (locally called "booming") from which it was hauled to the surface. As a result of this caving, subsidence trenches developed on the land surface above the mine workings. The dimensions of the trenches vary

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from about 60 to 100 feet wide, between 20 to 60 feet in depth and about ¾ mile in length. The trenches are not continuous along the whole length of the Rogers seam, but are comprised of a series of separate subsided trench segments. Each trench section is separated by a wall of intact rock and coal (called a pillar wall).

G. Based on available information, these trenches were used in the late 1960s to the late 1970s for disposal of various industrial waste materials, construction materials, and land-clearing debris. Materials were disposed of in the northern portion of the trenches from the access road shown in Figure 4 of the CAP, attached as Exhibit B. Industrial wastes were contained in drums or dumped directly from tanker trucks. Based on invoice and dumping records from PCC, an estimated 4,500 drums of waste and about 200,000 gallons of oily wastewater and sludge were disposed into the trenches. Available documented interviews with waste haulers and truck drivers indicate that wastes included paint wastes, solvents, metal sludges, and oily water and sludge (Ecology 1990). It is expected that many of the drums were only partially full. Disposal of land clearing debris continued until the early 1980s after which all disposal activities ceased. Currently, the Site is secured by a fence and locked gates, which encloses the northern portion of the trenches.

H. The Site and most of the immediate surrounding area is used for forestry today. Apart from the Site, developments in the immediate surrounding area include a new junior high school, King County-owned open space lands, and approximately 130 rural residential dwellings. The school is located about 0.65 miles northwest of the Site. The nearest residences to the Site are to the southwest approximately 800 feet from the Site. Drinking water for area residences is supplied by groundwater, either through private wells or small community water supply systems. Domestic sewage disposal throughout the immediate surrounding area is provided by residential septic systems.

I. A number of gravel roads access the Site from public thoroughfares and trails run parallel to the east and west sides of the trenches. The primary access road to the Site begins near S.E. Summit-Landsburg Road and follows along the northern portion of the mine trenches. The Site is also accessed from S.E. Kent-Kangley Road and from S.E. 256th Street. Locked gates secure the Site at all of the access road entrances, and the portion of the trenches where disposal occurred is currently enclosed by a six-foot-tall chain link security fence. Dense vegetation covers the Site. Electrical transmission lines and a Bonneville Power Administration easement cross the southern portion of the Site in an east-west direction.

J. Several preliminary environmental investigations were performed at the Site. These have included a limited soil gas survey, sampling of area private wells, sampling surface water emanating from mine portals, and limited sampling of ponded surface water, drum contents and soils for a site hazard assessment. These investigations have detected hazardous substances in drum contents, adjacent soils, and ponded surface water within the trenches. Hazardous substances were not detected, however, in adjacent private or public water supply wells, mine portal groundwater discharge or soil gases.

K. In 1991, Ecology designated the Site a high priority for cleanup, and in late 1991 at Ecology's request, four of the Defendants or their predecessors implemented an Expedited Response Action (ERA) involving the removal of the most accessible drums from the trenches and construction of a fence to restrict access to the Site. The ERA involved the removal of over one hundred 55-gallon drums.

L. Following the removal of the drums, Ecology and the Defendants or their predecessors negotiated and entered into an Agreed Order (Ecology 1993) which directed the Defendants or their predecessors to conduct a Remedial Investigation/Feasibility Study (RI/FS) to evaluate the need for remedial action. This Agreed Order was amended on two separate occasions, in 1995 and again in 2005. On September 5, 2013, Ecology advised the PLPs that

they had completed all actions required under the Agreed Order. The scope of work for the RI was outlined in the *Landsburg Phase I Remedial Investigation/Feasibility Study (RI/FS) Work Plan* (Golder 1992) which was incorporated by reference into the Agreed Order. The RI/FS, which consisted of a comprehensive investigation of the Site's environmental conditions and evaluation of potential remedial alternatives for Site cleanup, was conducted by the Defendants or their predecessors over the period of mid-1993 to early-1996. The RI/FS described contamination at the Site as follows: within the trenches, chromium, lead, PCBs, bis-(2-ethylhexyl)phthalate, methylene chloride, trichloroethylene (TCE) and total petroleum hydrocarbons (TPH) exceeded Method B standards during the early 1990s in an area confined to the northern portion of the trenches where waste disposal is thought to have occurred in the past. Soil testing confirmed that contamination was not identified outside the northern portion of the trenches. Apart from soils located within the subsidence trenches in the area of known prior waste disposal activities, soil, groundwater, and surface water media in the Site do not exhibit concentrations of chemical constituents above naturally occurring background levels.

M. Interim groundwater monitoring of Site compliance wells (LMW-2 through LMW-11) was conducted periodically from 1994 to 2003, quarterly in 2004, and semi-annually from 2005 to the present. There have been no detections of contaminants that are attributable to contamination by waste materials during any of the interim groundwater monitoring events. Furthermore, the analytical results from the interim groundwater monitoring events over the years indicate no significant changes in groundwater conditions from those observed during the RI. The primary parameters detected in groundwater samples are metals that are naturally occurring. The method reporting limits and method detection limits for all analytes are at or below acceptable concentrations under the MTCA, with the exception of some metals which have a natural background level that is in excess of the MTCA due to the geochemical condition of the groundwater within the coal mine.

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N. Ecology provided all stakeholders an opportunity to participate in its evaluation of the remedial alternatives proposed under the RI/FS, completed in 1996, in full compliance with applicable MTCA criteria. Stakeholders commented on the preferred remedial alternative in the RI/FS. Ecology took all stakeholders' comments into consideration and concluded that the preferred remedial alternative identified in the RI/FS and more fully described in the CAP (Exhibit B) is the most appropriate remedial alternative to address hazardous substances at the Site and protect human health and the environment in the areas surrounding the Site.

VI. WORK TO BE PERFORMED

This Decree contains a program designed to protect human health and the environment from the known release, or threatened release, of hazardous substances or contaminants at, on, or from the Site.

A. The Defendants shall perform the work specified in detail in the CAP (Exhibit B) and the Schedule (Exhibit C). The remedy selected for the Site is to place a low-permeability soil cap over backfilled soils in the northern portion of the trenches. That portion of the trenches would be backfilled to approximate grade before capping. The most economical local source of suitable fill will be used; the selection of the source(s) of backfill for the trenches will be made during final design. The permeability of the capping soil shall be no higher than 10^{-6} cm/sec, thereby meeting the Minimum Functional Standard specifications in chapter 173-304 WAC. The work to be performed under the CAP generally includes: Backfill a portion of the trenches (areas 7, 8 and 9) as required for capping (*See* CAP, Exhibit B);

- Allow the backfill to consolidate;
- Place a low-permeability soil cap over the backfill of the trenches (areas 7, 8, and 9), including grading and surface water management (*See* CAP, Exhibit B);

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- Maintain the cap until residual hazardous substance concentrations no longer exceed cleanup or remediation levels under MTCA as described in the CAP resulting from either (1) the application of new remediation technologies currently unavailable or (2) other circumstances or conditions that affect residual concentrations such that they no longer pose a risk to human health or the environment; and
- Implement and maintain institutional controls, groundwater monitoring and any instituted contingency plan (*See* CAP, Exhibit B).

1. The area that would be capped (areas 7, 8, and 9) is shown on Figure 15 of the CAP. This delineation is based on the areas of documented and suspected waste disposal identified in the RI/FS. The cap would extend slightly beyond the trenches on both sides to provide anchor zones and "overhang." Fill material may extend into area 6 if necessary and as appropriate to provide a buttress to the narrow pillar wall separating areas 6 and 7.

2. Surface water runoff from the cap will be collected in drainage ditches and directed away from the cap. The cap will be sloped to optimize stability and encourage rainwater runoff so as to minimize rainwater infiltration to the maximum extent possible.

3. The cap design is shown as Option B on Figure 14 of the CAP and will include a top layer of vegetated soil to promote evapotranspiration and decrease the potential for erosion. No moisture conditioning is expected, and this soil would not be compacted, in order to provide a loose medium for establishing the vegetative cover. To establish vegetation, the topsoil would be seeded with grasses suitable for the local climate. The low-permeability soil cap will consist of 24 inches of compacted low-permeability soil beneath 6 inches of vegetated topsoil. The suitability of potential sources of cap material, in terms of both quality and quantity, will be identified in the

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engineering design report. Final haul road location and source material specifications will also be detailed in the engineering design report.

4. Installation of this cap will be performed using standard earth-moving equipment. Construction Quality Assurance will primarily consist of verifying the soil cap meets the permeability specification, as well as verifying cap thickness and grading. (*See* CAP, Exhibit B). Any settling after cap installation shall be repaired by filling, compacting and regrading in the same manner as in initial installation. The thickness of the cap will provide long-term protection against erosion. The planted vegetative cover will be mowed as needed.

5. Deed restrictions compliant with chapter 64.70 RCW will be instituted as provided in Section XX of this Decree to ensure that indefinite Site use restrictions remain in force regardless of the property owner, and to notify any prospective purchasers of the Site that there is the presence of subsurface waste. (*See* Environmental Covenants, Exhibits F-1 and F-2). Site use restrictions will prohibit using the Site for purposes incompatible with a waste site. For the selected remedy, these restrictions will prohibit penetrating the cap and any Site use that could damage the cap or significantly reduce its effectiveness. A locked fence surrounds areas of the Site (see Figure 4 of the CAP) and warning signs shall be posted to provide notice of the presence of a waste site to trespassers and recreational visitors. Groundwater use restrictions will be employed, as provided in Section XX of this Decree, to prevent exposure to groundwater near the Site and within and near the compliance boundary shown in Figure 11 of the CAP.

6. The CAP is attached to this Consent Decree as Exhibit B and describes the Work to be Performed in more detail and outlines the anticipated schedule for completion of the construction phase.

7. Compliance Monitoring will be conducted as specified in the Compliance Monitoring Plan, attached as Exhibit E, Part A, and in accordance with WAC 173-340-410. Compliance Monitoring consists of Protection Monitoring, Performance Monitoring, and Confirmational Monitoring.

8. The CAP also requires ongoing Operations and Maintenance (O&M) for completion of the remedial action, in accordance with WAC 173-340-400(4)(c). The O&M plan is attached to this Consent Decree as Exhibit E, Part B.

9. The Contingent Groundwater Extraction and Treatment System Plan (Exhibit E, Part C) will be implemented in the event concentrations of mine waste contaminants at compliance monitoring wells exceed remediation levels established in the Compliance Monitoring Plan (Exhibit E, Part A). This plan details the circumstances under which the groundwater extraction and treatment system for the Site must be installed and operated. If required, the groundwater extraction and treatment system's goal is to contain, treat, and safely dispose of impacted groundwater in a timely manner to prevent migration beyond the conditional compliance boundary for groundwater.

B. In order to implement the CAP, Defendants will prepare and submit for Ecology's review and approval all documents necessary to conduct the final clean up action. All deliverables identified in the CAP (Exhibit B) and Schedule (Exhibit C), once approved by Ecology, are hereby incorporated by reference and become an integral and enforceable part of this Decree.

C. If there is an inconsistency between the Decree and any of the exhibits to the Decree regarding the Work to be performed, the terms and conditions of the exhibits shall apply. If there is an inconsistency between the CAP (Exhibit B) and any of the other exhibits to the Decree, the terms and conditions of the CAP shall apply.

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Olympia, WA 98504-0117
FAX (360) 586-6760

D. Defendants agree not to perform any remedial actions at the Site outside the scope of this Decree unless the Parties agree to modify the CAP (Exhibit B) to cover these actions. All work conducted by Defendants under this Decree shall be done in accordance with Chapter 173-340 WAC unless otherwise provided herein.

VII. DESIGNATED PROJECT COORDINATORS

The project coordinator for Ecology is:

Jerome Cruz, Site Manager
Northwest Regional Office
Toxics Cleanup Program
3190 160th Avenue SE
Bellevue, WA 98008
425-649-7094
jerome.cruz@ecy.wa.gov

The project coordinator for Defendants is:

Douglas Morell
Golder Associates Inc.
18300 NE Union Hill Road, Suite 200
Redmond, WA 98052-3333
425-883-0777
425-882-5498 (fax)
dmorell@golder.com

Each project coordinator shall be responsible for overseeing the implementation of this Decree. Ecology's project coordinator will be Ecology's designated representative for the Site. To the maximum extent possible, communications between Ecology and Defendants and all documents, including reports, approvals, and other correspondence concerning the activities performed pursuant to the terms and conditions of this Decree shall be directed through the project coordinators. The project coordinators may designate, in writing, working level staff contacts for all or portions of the implementation of the Work to be Performed required by this Decree.

Any of the Parties may change its respective project coordinator. Written notification shall be given to the other Party at least ten (10) calendar days prior to the change.

VIII. PERFORMANCE

All geologic and hydrogeologic work performed pursuant to this Decree shall be under the supervision and direction of a geologist licensed in the State of Washington or under the direct supervision of an engineer registered in the State of Washington, except as otherwise provided for by chapters 18.220 and 18.43 RCW.

All engineering work performed pursuant to this Decree shall be under the direct supervision of a professional engineer registered in the State of Washington, except as otherwise provided for by RCW 18.43.130.

All construction work performed pursuant to this Decree shall be under the direct supervision of a professional engineer or a qualified technician under the direct supervision of a professional engineer. The professional engineer must be registered in the State of Washington, except as otherwise provided for by RCW 18.43.130.

Any documents submitted containing geologic, hydrologic or engineering work shall be under the seal of an appropriately licensed professional as required by chapter 18.220 RCW or RCW 18.43.130.

Defendants shall notify Ecology in writing of the identity of any supervising engineer(s) and geologist(s), contractor(s) and subcontractor(s), and others to be used in carrying out the terms of this Decree, in advance of their involvement at the Site.

IX. ACCESS

Ecology, or any Ecology authorized representative, shall have full authority to enter and freely move about all property at the Site that Defendants either own, control, or have access rights to at all reasonable times for the purposes of, *inter alia*: inspecting records, operation logs, and contracts related to the Work being performed pursuant to this Decree; reviewing Defendants' progress in carrying out the terms of this Decree; conducting such tests or collecting such samples as Ecology may deem necessary; using a camera, sound recording, or other documentary type equipment to record work done pursuant to this Decree; and verifying the data submitted to Ecology by Defendants. Defendants shall make all reasonable

efforts to secure access rights for those properties within the Site not owned or controlled by Defendants where remedial activities or investigations will be performed pursuant to this Decree. Ecology, or any Ecology authorized representative, shall give Defendants' project coordinator reasonable notice before entering any Site property owned or controlled by Defendants unless an emergency prevents such notice. All Parties who access the Site pursuant to this Section IX shall comply with any applicable Health and Safety Plan(s). Ecology employees and their representatives shall not be required to sign any liability release or waiver as a condition of Site property access.

X. SAMPLING, DATA SUBMITTAL, AND AVAILABILITY

With respect to the implementation of this Decree, Defendants shall make the results of all sampling, laboratory reports, and/or test results generated by it or on its behalf available to Ecology. Pursuant to WAC 173-340-840(5), all sampling data shall be submitted to Ecology in both printed and electronic formats in accordance with Section XI (Progress Reports), Ecology's Toxics Cleanup Program Policy 840 (Data Submittal Requirements), and/or any subsequent procedures specified by Ecology for data submittal.

If requested by Ecology, Defendants shall allow Ecology and/or its authorized representative to take split or duplicate samples of any samples collected by Defendants pursuant to the implementation of this Decree. Defendants shall notify Ecology seven (7) days in advance of any sample collection or work activity at the Site. Ecology shall, upon request, allow Defendants and/or its authorized representative to take split or duplicate samples of any samples collected by Ecology pursuant to the implementation of this Decree, provided that doing so does not interfere with Ecology's sampling. Without limitation on Ecology's rights under Section IX (Access), Ecology shall notify Defendants prior to any sample collection activity unless an emergency prevents such notice.

In accordance with WAC 173-340-830(2)(a), all hazardous substance analyses shall be conducted by a laboratory accredited under Chapter 173-50 WAC for the specific analyses to be conducted, unless otherwise approved by Ecology.

XI. PROGRESS REPORTS

Defendants shall submit to Ecology written monthly Progress Reports during the construction phase of the Work to be Performed described in Section VI of this Decree that describe the actions taken during the previous month to implement the requirements of this Decree. After completion of the construction phase of the Work to be Performed described in Section VI of this Decree, the frequency of Defendants' submittal of Progress Reports shall be in compliance with Exhibit E, Part A (Compliance Monitoring Plan) attached to this Decree. The Progress Reports shall include the following:

A. A list of on-site activities that have taken place during the month;

B. Detailed description of any deviations from required tasks not otherwise documented in project plans or amendment requests;

C. Description of all deviations from the Schedule (Exhibit C) during the current month and any planned deviations in the upcoming month;

D. For any deviations in schedule, a plan for recovering lost time and maintaining compliance with the schedule;

E. All raw data (including laboratory analyses) received by Defendants during the past month and an identification of the source of the sample; and

F. A list of deliverables for the upcoming month if different from the schedule.

All Progress Reports shall be submitted by the tenth (10th) day of the month in which they are due after the effective date of this Decree. Unless otherwise specified, Progress Reports and any other documents submitted pursuant to this Decree shall be sent by certified mail, return receipt requested, to Ecology's project coordinator.

XII. RETENTION OF RECORDS

During the pendency of this Decree, and for ten (10) years from the date this Decree is no longer in effect as provided in Section XXVIII (Duration of Decree), Defendants shall preserve at least one (1) copy of records, final reports, documents, and underlying data in their possession relevant to the implementation of this Decree and shall insert a similar record retention requirement into all contracts with project contractors and subcontractors. The record retention requirements for contractors and subcontractors shall be satisfied by the retention of at least one (1) copy of the last draft or final version of any record, document or report prepared by such contractor(s) or subcontractor(s). Any records, reports or documents retained in accordance with this Section XII shall be retained in either hard copy or electronic form. Upon request of Ecology, Defendants shall make all non-privileged records available to Ecology and allow access for review within a reasonable time.

XIII. TRANSFER OF INTEREST IN PROPERTY

No voluntary conveyance or relinquishment of title, easement, leasehold, or other interest in any portion of the Site shall be consummated by Defendants without provision for continued operation and maintenance of any containment system, treatment system, and/or monitoring system installed or implemented pursuant to this Decree.

Prior to Defendants' transfer of any interest in all or any portion of the Site, and during the duration of this Decree as provided in Section XXVIII (Duration of Decree), Defendants shall provide a copy of this Decree to any prospective purchaser, lessee, transferee, assignee, or other successor in said interest; and, at least thirty (30) days prior to any transfer, Defendants shall notify Ecology of said transfer. Upon transfer of any interest, Defendants shall restrict uses and activities to those consistent with this Consent Decree and notify all transferees of the restrictions on the use of the property. Additionally, notwithstanding any sale, transfer, assignment, hypothecation or other disposition of any interest in all or any portion of the Site,

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during the duration of this Decree as provided in Section XXVIII (Duration of Decree), Defendants shall retain a right to access all or any portion of the Site, at all reasonable times, sufficient to enable such Defendants to effectively comply with the requirements of this Consent Decree.

XIV. RESOLUTION OF DISPUTES

A. In the event a dispute arises as to an approval, disapproval, proposed change, or other decision or action by Ecology's project coordinator, or an itemized billing statement under Section XXIV (Remedial Action Costs), the Parties shall utilize the dispute resolution procedure set forth below.

1. Upon receipt of Ecology's project coordinator's written decision, or the itemized billing statement, Defendants have fourteen (14) days within which to notify Ecology's project coordinator in writing of their objection to the decision or itemized statement.

2. The Parties' project coordinators shall then confer in an effort to resolve the dispute. If the project coordinators cannot resolve the dispute within fourteen (14) days, Ecology's project coordinator shall issue a written decision.

3. Defendants may then request regional management review of the decision. This request shall be submitted in writing to the Northwest Region Toxics Cleanup Program Section Manager within seven (7) days of receipt of Ecology's project coordinator's written decision.

4. Ecology's Regional Section Manager or the Regional Section Manager's delegatee shall conduct a review of the dispute and shall endeavor to issue a written decision regarding the dispute within thirty (30) days of Defendants' request for review.

5. If Defendants find Ecology's Regional Section Manager's decision unacceptable, Defendants may then request final management review of the decision. This request shall be submitted in writing to the Toxics Cleanup Program Manager within seven (7) days of receipt of the Regional Section Manager's decision.

6. Ecology's Toxics Cleanup Program Manager shall conduct a review of the dispute and shall endeavor to issue a written decision regarding the dispute within thirty (30) days of Defendants' request for review of the Regional Section Manager's decision. The Toxics Cleanup Program Manager's decision shall be Ecology's final decision on the disputed matter.

B. If Ecology's final written decision is unacceptable to Defendants, Defendants have the right to submit the dispute to the Court for resolution. The Parties agree that one judge should retain jurisdiction over this case and shall, as necessary, resolve any dispute arising under this Decree. In the event Defendants present an issue to the Court for review, the Court shall review the action or decision of Ecology on the basis of whether such action or decision was arbitrary and capricious, and render a decision based on such standard of review.

C. The Parties agree to only utilize the dispute resolution process in good faith and agree to expedite, to the extent possible, the dispute resolution process whenever it is used. Where either Party utilizes the dispute resolution process in bad faith or for purposes of delay, the other Party may seek sanctions.

D. Implementation of these dispute resolution procedures shall not provide a basis for delay of any activities required in this Decree, unless Ecology agrees in writing to a schedule extension or the Court so orders.

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XV. AMENDMENT OF DECREE

The project coordinators may agree to minor changes to the Work to be Performed without formally amending this Decree. Minor changes will be documented in writing by Ecology and one (1) copy shall be provided to each Defendant.

Substantial changes to the Work to be Performed shall require formal amendment of this Decree. This Decree may only be formally amended by a written stipulation among the Parties that is entered by the Court, or by order of the Court. Such amendment shall become effective upon entry by the Court. Agreement to amend the Decree shall not be unreasonably withheld by any Party.

Defendants shall submit a written request for amendment to Ecology for approval. Ecology shall indicate its approval or disapproval in writing and in a timely manner after the written request for amendment is received. If the amendment to the Decree is a substantial change, Ecology will provide public notice and opportunity for comment. Reasons for the disapproval of a proposed amendment to the Decree shall be stated in writing. If Ecology does not agree to a proposed amendment, the disagreement may be addressed through the dispute resolution procedures described in Section XIV (Resolution of Disputes).

XVI. EXTENSION OF SCHEDULE

A. An extension of schedule shall be granted only when a request for an extension is submitted in a timely fashion, generally at least thirty (30) days prior to expiration of the deadline for which the extension is requested, and good cause exists for granting the extension. All extensions shall be requested in writing. The request shall specify:

1. The deadline that is sought to be extended;
2. The length of the extension sought;
3. The reason(s) for the extension; and

4. Any related deadline or schedule that would be affected if the extension were granted.

B. The burden shall be on Defendants to demonstrate to the satisfaction of Ecology that the request for such extension has been submitted in a timely fashion and that good cause exists for granting the extension. Good cause may include, but may not be limited to:

1. Circumstances beyond the reasonable control and despite the due diligence of Defendants including delays caused by unrelated third parties or Ecology, such as (but not limited to) delays by Ecology in reviewing, approving, or modifying documents submitted by Defendants;

2. Acts of God, including fire, flood, blizzard, extreme temperatures, storm, or other unavoidable casualty such as an act of war or act of terrorism; or

3. Endangerment as described in Section XVII (Endangerment).

However, neither increased costs of performance of the terms of this Decree nor changed economic circumstances shall be considered circumstances beyond the reasonable control of Defendants.

C. Ecology shall act upon any written request for extension in a timely fashion. Ecology shall give Defendants written notification of any extensions granted pursuant to this Decree. A requested extension shall not be effective until approved by Ecology or, if required, by the Court. Unless the extension is a substantial change, it shall not be necessary to amend this Decree pursuant to Section XV (Amendment of Decree) when a schedule extension is granted.

D. An extension shall only be granted for such period of time as Ecology determines is reasonable under the circumstances. Ecology may grant schedule extensions exceeding ninety (90) days only as a result of:

1. Delays in the issuance of a necessary permit which was applied for in a timely manner;

2. Other circumstances deemed exceptional or extraordinary by Ecology; or

3. Endangerment as described in Section XVII (Endangerment).

XVII. ENDANGERMENT

In the event Ecology determines that any activity being performed at the Site is creating or has the potential to create a danger to human health or the environment, Ecology may direct Defendants to cease such activities for such period of time as it deems necessary to abate the danger. Defendants shall immediately comply with such direction.

In the event Defendants determine that any activity being performed at the Site is creating or has the potential to create a danger to human health or the environment, Defendants may cease such activities. Defendants shall notify Ecology's project coordinator as soon as possible, but no later than twenty-four (24) hours after making such determination or ceasing such activities. Upon Ecology's direction, Defendants shall provide Ecology with documentation of the basis for the determination or cessation of such activities. If Ecology disagrees with Defendants' cessation of activities, it may direct Defendants to resume such activities.

If Ecology concurs with or orders a work stoppage pursuant to this Section, Defendants' obligations with respect to the ceased activities shall be suspended until Ecology determines the danger is abated, and the time for performance of such activities, as well as the time for any other work dependent upon such activities, shall be extended, in accordance with Section XVI (Extension of Schedule), for such period of time as Ecology determines is reasonable under the circumstances.

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Nothing in this Decree shall limit the authority of Ecology, its employees, agents, or contractors to take or require appropriate action in the event of an emergency.

XVIII. COVENANT NOT TO SUE

A. Covenant Not to Sue: In consideration of Defendants' compliance with the terms and conditions of this Decree, Ecology covenants not to institute legal or administrative actions against Defendants regarding the release or threatened release of hazardous substances covered by this Decree. This covenant shall be effective on the date this Decree is entered by the Court.

This Decree covers only the Site, as defined in Section IV.A, and those hazardous substances, as described in the RI, FS, subsequent supplemental investigations and CAP, that Ecology knows or suspects are located at the Site as of the date of entry of this Decree. This Decree does not cover any other hazardous substance or area. Ecology retains all of its authority relative to any substance or area not covered by this Decree.

This Covenant Not to Sue shall have no applicability whatsoever to:

1. Criminal liability;
2. Liability for damages to natural resources; and
3. Any Ecology action, including cost recovery, against PLPs not a party to this Decree.

If factors not known at the time of entry of the settlement agreement are discovered and present a previously unknown threat to human health or the environment, Ecology may petition the Court to amend this Covenant Not to Sue.

B. Reopeners: Ecology specifically reserves the right to institute legal or administrative action against Defendants to require them to perform additional remedial actions at the Site and to pursue appropriate cost recovery, pursuant to RCW 70.105D.050 under the following circumstances:

1. Upon Defendants' failure to meet the requirements of this Decree, including, but not limited to, failure of the remedial action to meet the cleanup standards identified in the CAP (Exhibit B);

2. Upon Ecology's determination that remedial action beyond the terms of this Decree is necessary to abate an imminent and substantial endangerment to human health or the environment; or

3. Upon the availability of new information regarding factors previously unknown to Ecology, including the nature or quantity of hazardous substances at the Site, and Ecology's determination, in light of this information, that further remedial action is necessary at the Site to protect human health or the environment.

4. Upon Ecology's determination that additional remedial actions are necessary to achieve cleanup standards within the reasonable restoration time frame set forth in the CAP.

C. Except in the case of an emergency, prior to instituting legal or administrative action against Defendants pursuant to this Section, Ecology shall provide Defendants with thirty (30) calendar days notice of such action.

XIX. CONTRIBUTION PROTECTION

With regard to claims for contribution against Defendants, the Parties agree that Defendants are entitled to protection against claims for contribution for matters addressed in this Decree as provided by RCW 70.105D.040(4)(d). The matters addressed in this Decree are all remedial actions taken or to be taken and all remedial costs, including Ecology's oversight costs, incurred or to be incurred by Ecology or any other person with respect to the Site, as defined in Section IV.A and with respect to those hazardous substances, as described in the RI, FS, subsequent supplemental investigations and CAP, that Ecology knows or suspects are located at the Site as of the date of entry of this Decree.

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XX. LAND USE RESTRICTIONS

Defendants shall record an Environmental Covenant substantially in the form of Exhibit F-1 with the office of the King County Auditor within ten (10) days of Ecology's written approval of the As-Built Drawings for the low-permeability soil cap. The Environmental Covenant shall:

- include a legal description of the final locations of the "Cap Protection Area," the "Groundwater and Portal Protection Area," and, to the extent not already encompassed by the Groundwater and Portal Protection Area, the No-Build Buffer Areas, depicted in Figures 1, 2, 3, and 4 attached to the Environmental Covenant (Exhibit F-1); and
- restrict future uses of the Site (as defined in Section IV.A) within the "Cap Protection Area," the "Groundwater and Portal Protection Area," and, to the extent not already encompassed by use restrictions for the Groundwater and Portal Protection Are, restrict future uses within the No-Build Buffer Areas, according to the terms of the Environmental Covenant (Exhibit F-1).

Defendants shall provide Ecology with a copy of the recorded Environmental Covenant within thirty (30) days of the recording date.

Defendants shall also make good faith efforts to cause an Environmental Covenant substantially in the form of Exhibit F-2 to be recorded concurrent with the recording of the covenant substantially in the form of Exhibit F-1. The Environmental Covenant shall restrict future uses of the property designated in Exhibit F-2 according to the terms of Exhibit F-2. Defendants shall provide Ecology with a copy of the recorded Environmental Covenant within thirty (30) days of the recording date. If Defendants are unable to secure such covenant, Defendants shall provide notice to Ecology of their inability to secure such covenant within ten

(10) days of Ecology's written approval of the As-Built Drawings for the low-permeability soil cap, together with a description of their good faith efforts to secure such covenant.

XXI. FINANCIAL ASSURANCES

Pursuant to WAC 173-340-440(11), Defendants shall maintain sufficient and adequate financial assurance mechanisms to cover all costs associated with the operation and maintenance of the remedial action at the Site, including institutional controls, compliance monitoring, and corrective measures.

Defendants have submitted to Ecology for review and approval an estimate of the costs that they will incur in carrying out the terms of this Decree, including operation and maintenance, and compliance monitoring. Ecology approves the initial estimate dated September 17, 2012, which is in the amount of $775,000 for purposes of establishing an initial financial assurance amount. Within sixty (60) days of the effective date of this Decree, Defendants shall provide proof of financial assurances sufficient to cover all such costs in a form reasonably acceptable to Ecology.

Defendants shall adjust the financial assurance coverage and provide Ecology's project coordinator with documentation of the updated financial assurance for:

A. Inflation, annually, within thirty (30) days of the close of the calendar year; or if applicable, ninety (90) days after the close of Defendants' fiscal year if the financial test or corporate guarantee is used; and

B. Changes in cost estimates, within thirty (30) days of issuance of Ecology's approval of a modification or revision to the CAP that result in increases to the cost or expected duration of this Decree as provided in Section XXVIII (Duration of Decree). Any adjustments for inflation since the most recent preceding close of the calendar year shall be made concurrent with adjustments for changes in cost estimates.

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XXII. INDEMNIFICATION

Defendants agree to indemnify and save and hold the State of Washington, its employees, and agents harmless from any and all claims or causes of action for death or injuries to persons or for loss or damage to property to the extent arising from or on account of acts or omissions of Defendants, their officers, employees, agents, or contractors in entering into and implementing this Decree. However, Defendants shall not indemnify the State of Washington nor save nor hold its employees and agents harmless from any claims or causes of action to the extent arising out of the negligent acts or omissions of the State of Washington, or the employees or agents of the State, in entering into or implementing this Decree.

XXIII. COMPLIANCE WITH APPLICABLE LAWS

A. All actions carried out by Defendants pursuant to this Decree shall be done in compliance with all applicable federal, state, and local requirements, including requirements to obtain necessary permits, except as provided in RCW 70.105D.090. The permits or other federal, state or local requirements that the agency has determined may be applicable and that are known at the time of entry of this Decree are identified in the Technical Memorandum dated August 4, 2010 prepared by Golder Associates attached to this Decree as Exhibit G.

B. Pursuant to RCW 70.105D.090(1), Defendants are exempt from the procedural requirements of Chapters 70.94, 70.95, 70.105, 77.55, 90.48, and 90.58 RCW and of any laws requiring or authorizing local government permits or approvals. However, Defendants shall comply with the substantive requirements of such permits or approvals. The exempt permits or approvals and the applicable substantive requirements of those permits or approvals, as they are known at the time of entry of this Decree, have been identified in the Technical Memorandum dated August 4, 2010, prepared by Golder & Associates, Inc. attached to this Decree as Exhibit G.

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Defendants have a continuing obligation to determine whether additional permits or approvals addressed in RCW 70.105D.090(1) would otherwise be required for the remedial action under this Decree. In the event either Ecology or Defendants determine that additional permits or approvals addressed in RCW 70.105D.090(1) would otherwise be required for the remedial action under this Decree, it/they shall promptly notify the other Party/ies of this determination. Ecology shall determine whether Ecology or Defendants shall be responsible to contact the appropriate state and/or local agencies. If Ecology so requires, Defendants shall promptly consult with the appropriate state and/or local agencies and provide Ecology with written documentation from those agencies of the substantive requirements those agencies believe are applicable to the remedial action. Ecology shall make the final determination on the additional substantive requirements that must be met by Defendants and on how Defendants must meet those requirements. Ecology shall inform Defendants in writing of these requirements. Once established by Ecology, the additional requirements shall be enforceable requirements of this Decree. Defendants shall not begin or continue the remedial action potentially subject to the additional requirements until Ecology makes its final determination.

C. Pursuant to RCW 70.105D.090(2), in the event Ecology determines that the exemption from complying with the procedural requirements of the laws referenced in RCW 70.105D.090(1) would result in the loss of approval from a federal agency that is necessary for the State to administer any federal law, the exemption shall not apply and Defendants shall comply with both the procedural and substantive requirements of the laws referenced in RCW 70.105D.090(1), including any requirements to obtain permits.

XXIV. REMEDIAL ACTION COSTS

Defendants shall pay to Ecology costs incurred by Ecology pursuant to this Decree and consistent with WAC 173-340-550(2). These costs shall include work performed by Ecology

or its contractors for, or on, the Site under Chapter 70.105D RCW, including remedial actions and Decree preparation, negotiation, oversight and administration. These costs shall include work performed both prior to and subsequent to the entry of this Decree. Ecology's costs shall include costs of direct activities and support costs of direct activities as defined in WAC 173-340-550(2). Ecology has accumulated $27,333.78 in remedial action costs related to this Site as of December 31, 2012. Payment for this amount shall be submitted within thirty (30) days of the effective date of this Decree. For all costs incurred subsequent to December 31, 2012, Defendants shall pay the required amount within thirty (30) days of receiving from Ecology an itemized statement of costs that includes a summary of costs incurred, an identification of involved staff, and the amount of time spent by involved staff members on the project. A general statement of work performed will be provided with each statement. Itemized statements shall be prepared quarterly. Pursuant to WAC 173-340-550(4), failure to pay Ecology's costs within ninety (90) days of receipt of the itemized statement of costs will result in interest charges at the rate of twelve percent (12%) per annum, compounded monthly.

In addition to other available relief, pursuant to RCW 70.105D.055, Ecology has authority to recover unreimbursed remedial action costs by filing a lien against real property subject to the remedial actions.

XXV. IMPLEMENTATION OF REMEDIAL ACTION

If Ecology determines that Defendants have failed without good cause to implement the remedial action, in whole or in part, Ecology may, after notice to Defendants, perform any or all portions of the remedial action that remain incomplete. If Ecology performs all or portions of the remedial action because of Defendants' failure to comply with their obligations under this Decree, Defendants shall reimburse Ecology for the costs of doing such work in accordance with Section XXIV (Remedial Action Costs), provided that Defendants are not

obligated under this Section to reimburse Ecology for costs incurred for work inconsistent with or beyond the scope of this Decree.

Except where necessary to abate an emergency situation, Defendant shall not perform any remedial actions at the Site outside those remedial actions required by this Decree, unless Ecology concurs, in writing, with such additional remedial actions pursuant to Section XV. (Amendment of Decree).

XXVI. PERIODIC REVIEW

As remedial action, including groundwater monitoring, continues at the Site, the Parties agree to review the progress of remedial action at the Site, and to review the data accumulated as a result of monitoring the Site as often as is necessary and appropriate under the circumstances. At least every five (5) years after the initiation of remedial action at the Site the Parties shall meet to discuss the status of the Site and the need, if any, for further remedial action at the Site. At least ninety (90) days prior to each periodic review, Defendants shall submit a report to Ecology that documents whether human health and the environment are being protected based on the factors set forth in WAC 173-340-420(4). Ecology reserves the right to require further remedial action at the Site under appropriate circumstances by following the provisions of Section XV (Amendment of Decree). This provision shall remain in effect for the duration of this Decree as provided in Section XXVIII (Duration of Decree).

XXVII. PUBLIC PARTICIPATION

A Public Participation Plan (Exhibit D) is required for this Site. Ecology shall review any existing Public Participation Plan to determine its continued appropriateness and whether it requires amendment, or if no plan exists, Ecology shall develop a Public Participation Plan alone or in conjunction with Defendants.

Ecology shall maintain the responsibility for public participation at the Site. However, Defendants shall cooperate with Ecology, and shall:

A. If agreed to by Ecology, develop appropriate mailing list, prepare drafts of public notices and fact sheets at important stages of the remedial action, such as the submission of work plans, remedial investigation/feasibility study reports, cleanup action plans, and engineering design reports. As appropriate, Ecology will edit, submit to Defendants for comment, finalize, and distribute such fact sheets and prepare and distribute public notices of Ecology's presentations and meetings.

B. Notify Ecology's project coordinator prior to the preparation of all press releases and fact sheets, and before major meetings with the interested public and local governments. Likewise, Ecology shall notify Defendants prior to the issuance of all press releases and fact sheets, and before major meetings with the interested public and local governments. For all press releases, fact sheets, meetings, and other outreach efforts by Defendants that do not receive prior Ecology approval, Defendants shall clearly indicate to its audience that the press release, fact sheet, meeting, or other outreach effort was not sponsored or endorsed by Ecology.

C. When requested by Ecology, participate in public presentations on the progress of the remedial action at the Site. Participation may be through attendance at public meetings to assist in answering questions, or as a presenter.

D. When requested by Ecology, arrange and/or continue information repositories at the following locations:

1. Black Diamond Library, 24301 Roberts Drive, Black Diamond, Washington 98010

2. Ecology's Northwest Regional Office, 3190 160th Avenue SE, Bellevue, Washington 98008

At a minimum, copies of all public notices and fact sheets shall be promptly placed in these repositories. A copy of all documents related to this Site shall be maintained in the repository at Ecology's Northwest Regional Office in Bellevue, Washington.

XXVIII. DURATION OF DECREE

The remedial program required pursuant to this Decree shall be maintained and continued until Defendants have received written notification from Ecology that the requirements of this Decree have been satisfactorily completed. This Decree shall remain in effect until dismissed by the Court. When dismissed, Section XVIII (Covenant Not to Sue) and Section XIX (Contribution Protection) shall survive.

XXIX. CLAIMS AGAINST THE STATE

Defendants hereby agree that they will not seek to recover any costs accrued in implementing the remedial action required by this Decree from the State of Washington; and further, that Defendants will make no claim against the State Toxics Control Account or any local Toxics Control Account for any costs incurred in implementing this Decree. Except as provided above, however, Defendants expressly reserve their right to seek to recover any costs incurred in implementing this Decree from any other PLP. This Section does not limit or address funding that may be provided under Chapter 173-322 WAC.

XXX. EFFECTIVE DATE

This Decree is effective upon the date it is entered by the Court.

XXXI. WITHDRAWAL OF CONSENT

If the Court withholds or withdraws its consent to this Decree, it shall be null and void at the option of any Party and the accompanying Complaint shall be dismissed without costs and without prejudice. In such an event, no Party shall be bound by the requirements of this Decree.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

JAMES J. PENDOWSKI
Program Manager
Toxics Cleanup Program
(360) 407-7177

Date: _____

ROBERT W. FERGUSON
Attorney General

DOROTHY H . JAFFE, WSBA #34148
Assistant Attorney General
(360) 586-4637

Date: _____

PALMER COKING COAL COMPANY, LLP

By: William J. Lombard
Its: Manager

Date: Sept. 10, 2013

PACCAR INC

By: _____
Its:

Date: _____

PLUM CREEK TIMBERLANDS, L.P.

By: _____
Its:

Date: _____

BROWNING-FERRIS INDUSTRIES OF ILLINOIS, INC.

By: _____

ATTORNEY GENERAL OF WASHINGTON
Ecology Division
PO Box 40117
Olympia, WA 98504-0117
FAX (360) 586-6760

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

JAMES J. PENDOWSKI
Program Manager
Toxics Cleanup Program
(360) 407-7177

Date: _____

ROBERT W. FERGUSON
Attorney General

DOROTHY H . JAFFE, WSBA #34148
Assistant Attorney General
(360) 586-4637

Date: _____

PALMER COKING COAL COMPANY, LLP

By: _____
Its:

Date: _____

PACCAR INC

By: R.E. Bangert II
Its: Vice President

Date: _____

PLUM CREEK TIMBERLANDS, L.P.

By: _____
Its:

Date: _____

BROWNING-FERRIS INDUSTRIES OF ILLINOIS, INC.

By: _____

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

JAMES J. PENDOWSKI
Program Manager
Toxics Cleanup Program
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ROBERT W. FERGUSON
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DOROTHY H . JAFFE, WSBA #34148
Assistant Attorney General
(360) 586-4637

Date: _____

PALMER COKING COAL COMPANY, LLP

By: _____
Its:

Date: _____

PACCAR INC

By: _____
Its:

Date: _____

PLUM CREEK TIMBERLANDS, L.P.

By: James A. Kraft
Its: Jr. VP General Counsel

Date: 9/11/13

BROWNING-FERRIS INDUSTRIES OF ILLINOIS, INC.

By: _____

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

JAMES J. PENDOWSKI
Program Manager
Toxics Cleanup Program
(360) 407-7177

Date: _____

ROBERT W. FERGUSON
Attorney General

DOROTHY H . JAFFE, WSBA #34148
Assistant Attorney General
(360) 586-4637

Date: _____

PALMER COKING COAL COMPANY, LLP

By: _____
Its:

Date: _____

PACCAR INC

By: _____
Its:

Date: _____

PLUM CREEK TIMBERLANDS, L.P.

By: _____
Its:

Date: _____

BROWNING-FERRIS INDUSTRIES OF ILLINOIS, INC.

By: Timm. Benter

Its: Vice President

Date: 9/10/2013

THE BNSF RAILWAY COMPANY

_____

By: _____

Its:

Date: _____

TOC HOLDINGS CO.

_____

By: _____

Its:

Date: _____

ENTERED this _____ day of _____ 2013.

_____

JUDGE
King County Superior Court

4851-4609-4611, v. 1

Its:

Date: _____

THE BNSF RAILWAY COMPANY

By: ALLEN M. STEGNAN
Its: GENERAL DIRECTOR ENVIRONMENTAL

Date: 9/10/13

TOC HOLDINGS CO.

By: _____
Its:

Date: _____

ENTERED this _____ day of _____ 2013.

JUDGE
King County Superior Court

4851-4609-4611, v. 1

Its:

Date: _____

THE BNSF RAILWAY COMPANY

_____

By: _____

Its:

Date: _____

TOC HOLDINGS CO.

_____

By: Richard Gordon

Its: General Counsel

Date: 9/11/13

ENTERED this _____ day of _____ 2013.

_____

JUDGE
King County Superior Court

4851-4609-4611, v. 1

EXHIBIT A

SITE DESCRIPTION

Exhibit A
Table 1
Lansburg Mine Site Location Details

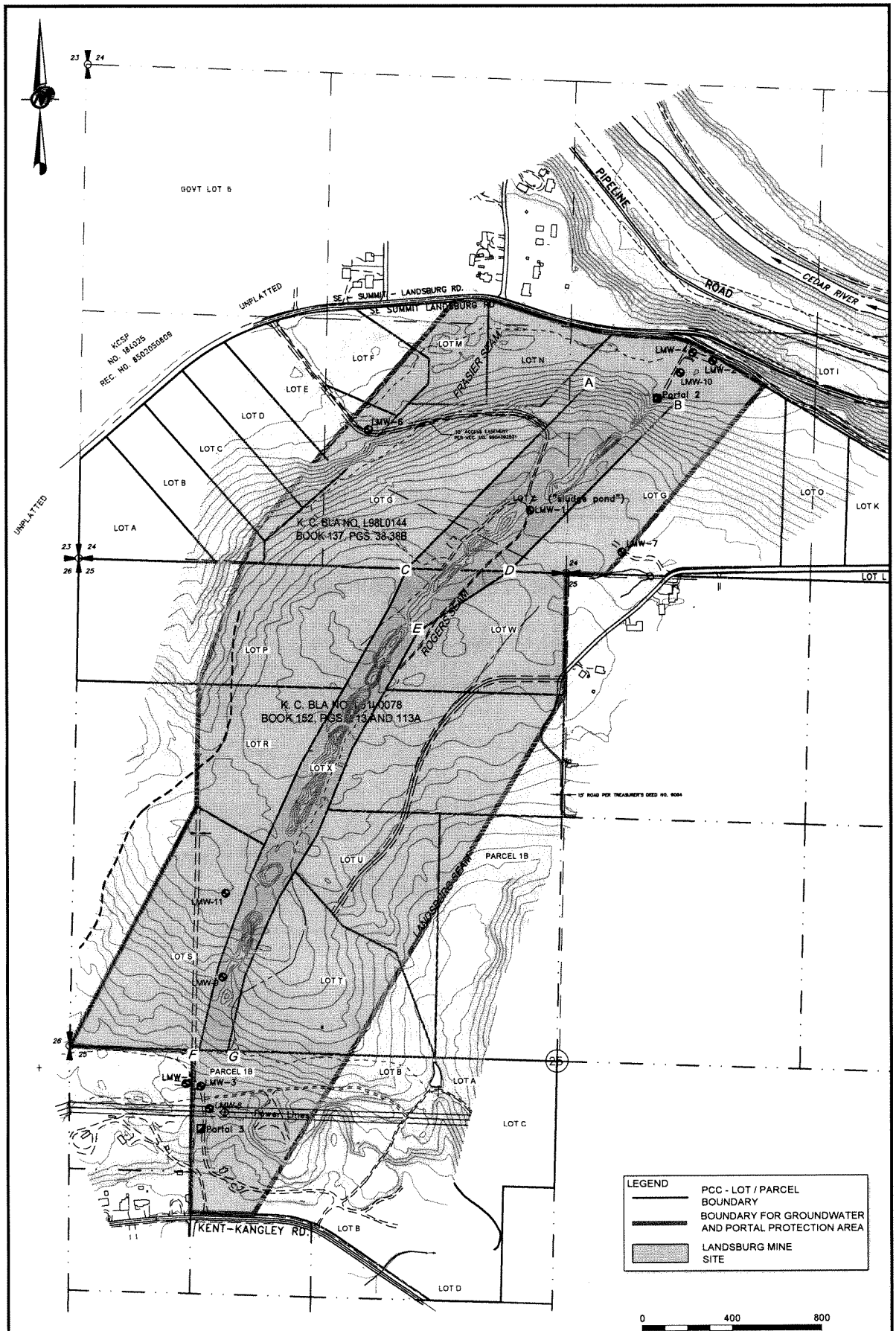
Landsburg Mine Site

Lot X **(Final site boundary will be determined from the As-Built drawing with the Cap and Storm Drain System Installation.)**

King County Tax Parcel # 242206-9126
Sections 24 & 25, Township 22 N, Range 6 E
BLA# L01L0078
Recording #20020516900007

Property Corner ID	X Coordinate	Y Coordinate
A	1715174.983	139002.5184
B	1715665.858	138929.9459
C	1714211.093	138028.2212
D	1714756.152	138010.4175
E	1714270.17	137690.6646
F	1713089.238	135444.1854
G	1713241.984	135438.8322

Horizontal Datum: NAD 83 Washington State Planes, North Zone, US Foot.



NOTE:
1. LETTERS AT LOT X PROPERTY CORNERS CORRESPOND TO THE COORDINATES IN TABLE 1
2. FINAL SITE BOUNDARY WILL BE DETERMINED FROM THE AS-BUILT DRAWING WITH CAP AND STORMWATER SYSTEM INSTALLATION.

FIGURE 1
SITE DIAGRAM
PALMER/LANDSBURG MINE/WA

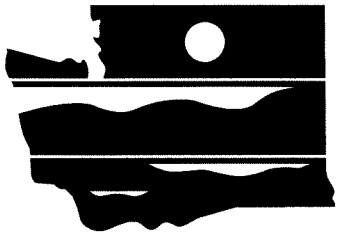
K:\CAD\Projects\1195\2\9231000x\002\R154\Exhibit A\923_1000_002_1.dwg | 1 SITE DIAGRAM | Mod: 07/31/2013, 08:29 | Plotted: 07/31/2013, 15:45 | aforcier

Golder Associates

EXHIBIT B

CLEANUP ACTION PLAN

Appendix A – Complete listing of Landsburg Mine Site ARARs
Appendix B – SEPA Checklist and Determination
Appendix C – Responsiveness Summary **(to be completed)**



FINAL DRAFT

CLEANUP ACTION PLAN

Landsburg Mine Site
MTCA Remediation Project
Ravensdale, Washington

July 31, 2013
Washington State Department of Ecology
Toxics Cleanup Program
Northwest Regional Office
3190 – 160th Avenue SE
Bellevue, Washington 98008

Table of Contents

List of Tables

List of Figures

List of Appendices

LIST OF ACRONYMS AND ABBREVIATIONS

ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
CAP	Cleanup Action Plan
cm/sec	centimeters per second
CQA	construction quality assurance
DCAP	Draft Cleanup Action Plan
DNR	Washington State Department of Natural Resources
DNS	Determination of Non-significance
Ecology	Washington State Department of Ecology
EDR	Environmental Data Resources
EPA	United States Environmental Protection Agency
ERA	Expedited Response Action
FCAP	Final Cleanup Action Plan
FID	flame ionization detector
FML	flexible membrane liner
FS	feasibility study
GCL	geosynthetic clay liner
LMW	Landsburg Monitoring Well
MCL	Maximum Contaminant Level
MFS	Minimum Functional Standards
mgd	millions of gallons per day
MSL	mean sea level
MTCA	Model Toxics Control Act
O&M	operation and maintenance
PCB	polychlorinated biphenyls
PCC	Palmer Coking Coal Company
PLP	Potentially Liable Party
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of the State of Washington
RI	remedial investigation
SEPA	State Environmental Policy Act
SHA	Site Hazard Assessment
SMCL	Secondary Maximum Contaminant Level
SVOC	semi-volatile organic compound
TCE	trichloroethene
TDS	total dissolved solids
TPH	total petroleum hydrocarbon
VOC	volatile organic compound
WAC	Washington Administrative Code
WDOH	Washington State Department of Health

1.0 INTRODUCTION

1.1 Purpose and Objectives

This document is the Cleanup Action Plan (CAP) for the Landsburg Mine site (Site) located near Ravensdale, Washington. The Site is defined in the Consent Decree and shown in Exhibit A to the Consent Decree. A CAP is required as part of the Site cleanup process under Chapter 173-340 WAC, Model Toxics Control Act (MTCA) Cleanup Regulations as amended February 12, 2001 and is Exhibit B to the Consent Decree. The purpose of the CAP is to identify the proposed cleanup action for the Site and to provide an explanatory document for public review. Specific items to be included as outlined in WAC 173-340-380, Cleanup Action Plan, consist of the following:

- A general description of the proposed cleanup action including compliance monitoring;
- A brief summary of other alternative cleanup actions evaluated in the Site's Remedial Investigation/Feasibility Study;
- Site cleanup levels and points of compliance for each hazardous substance and for each media of concern;
- The schedule for implementation of the cleanup action including, if known, restoration time frame;
- Required institutional controls and site use restrictions, if any, for the proposed cleanup action;
- Justification for selecting a cleanup action that uses cleanup technologies having a lower preference than higher representative cleanup technologies;
- Applicable state and federal laws for the proposed cleanup action, when these are known at this step of the cleanup process;
- A preliminary determination by Ecology that the proposed cleanup action will comply with sections 173-340-360 and –370; and
- Where the cleanup action involves on-site containment, specification of the types, levels, and amounts of hazardous substances remaining on site and the measures that will be utilized to prevent migration and contact with those substances.

1.2 Previous Work

The CAP presents a brief description and history of the Landsburg Mine. Results from applicable studies and reports are summarized to provide background information pertinent to the CAP. These studies and reports include, among others, the *Landsburg Phase I Remedial Investigation/Feasibility Study Work Plan* (Golder Associates 1992a), the *Conceptual Model of the Landsburg Mine Site* (Golder Associates 1992b), and the *Remedial Investigation and Feasibility Study for the Landsburg Mine Site* (Golder Associates Inc. 1996). Portions of the DCAP text are taken directly from these documents.

1.3 The CAP and the Cleanup Process

The CAP is one of a series of documents used by Ecology to monitor the progress of site investigation and cleanup. Figure 1 identifies documents required under the MTCA site cleanup process.

The Remedial Investigation/Feasibility Study (RI/FS) Report presents results of investigations into the geology and hydrogeology of a site, the nature and extent of contamination, the risks posed by that

contamination, and evaluates the feasibility and alternative methods of remediating a site. These investigations, assessments, and evaluations for the Landsburg Mine were performed according to an Ecology approved work plan, the *Landsburg Phase I Remedial Investigation/ Feasibility Study (RI/FS) Work Plan* (Golder 1992a). This work plan was incorporated into an Agreed Order (Order No. DE 983TC-N273 (Ecology 1993)) signed on July 21, 1993. The Agreed Order directed the Landsburg Mine Site Potentially Liable Parties (PLPs) to conduct the RI/FS. The PLPs for the Landsburg Site consist of Palmer Coking Coal Company, LLP; PACCAR Inc; Plum Creek Timberlands Company, L.P.; Browning-Ferris Industries of Illinois, Inc.; TOC Holdings Co.; and the BNSF Railway Company. The PLP Group completed the RI/FS and submitted the report to Ecology on February 1, 1996 for public review and comment.

Under the terms of the Agreed Order, the RI/FS was to be conducted. The RI/FS document that has been prepared for the Site, therefore, represents a complete and final RI and FS set of documents sufficient to enable Ecology to identify and evaluate cleanup alternatives. Public comments on the RI/FS, the Amendment to the Agreed Order and Ecology's comment responses were formally documented in the *Responsiveness Summary for the Landsburg Mine Site RI/FS* (Ecology 1996) completed in November, 1996. The RI/FS Report and the Responsiveness Summary are currently available for review at state repository locations. A Draft CAP was submitted to Ecology in 2002. This CAP is a revision that incorporates Ecology comments on the 2002 Draft CAP.

The CAP identifies the proposed cleanup action for the Site based on the site investigation results and remedial alternative evaluations presented in the RI/FS. Upon completion of a public comment period for the CAP, Ecology, after review and consideration of the comments received, will issue a Final Cleanup Action Plan. The Final CAP will then be incorporated as an exhibit into a Consent Decree , which is a legal agreement negotiated between Ecology and the PLP Group for implementing the remedial actions outlined in the Final CAP. The public will have an opportunity to comment on the Consent Decree before cleanup work begins.

The Compliance Monitoring Plan (Exhibit E, Part A to the Consent Decree) includes a program for protection monitoring to confirm that human health and the environment are adequately protected during construction and operation and maintenance periods of the cleanup action; performance monitoring to confirm cleanup standards or other performance standards have been attained; and confirmational monitoring to confirm the long-term effectiveness of the cleanup action. The Compliance Monitoring Plan document also contains a contingency treatment plan in the unlikely event that groundwater treatment may be required at a future date at the Site.

An Operation and Maintenance (O&M) Plan presents technical guidance to assure effective operations and maintenance under both normal and emergency conditions (Consent Decree, Exhibit E, Part B)

After the Final CAP is issued and before remedial actions begin, an Engineering Design Report (EDR) and Construction Plans and Specifications will provide the necessary technical drawings and

specifications to allow contractors to implement the methods described in the Final CAP for remediating the Site.

Remediation construction documentation includes as-built drawings and documentation that cleanup and/or performance standards required to be met during construction were attained, as well as any changes or modifications that were necessary during the course of implementing the remedial action.

1.3.1 Additional Investigations Since DCAP Submission

Since the completion of the RI/FS in 1996 and the submission of the DCAP in 2002, several additional investigations and routine monitoring events have been conducted at the Site. In May of 2004, a hydrogeologic investigation was completed at the south end of the Site (Golder 2004). This investigation was initiated to understand groundwater movement at the south end of the Rogers Seam Coal Mine (Rogers Seam). Two monitoring wells and a piezometer (LMW-8, LMW-9, and P-2) were installed. Well LMW-10 was installed during this investigation as well, although its location is at the north end of the Site. Static water level conditions in the month of May 2004 at the south end of the Site indicated that Portal #3 is an area where groundwater from the south end of the mine exits the mine. Furthermore, the water levels from LMW-3, LMW-5, and LMW-9 indicate that a groundwater divide exists and may be near the south end of the Rogers Seam. In May of 2005, SubTerra, Inc. completed the "Landsburg Mine Coal Mine Hazard Assessment" which was reviewed by the King County Department of Development and Environmental Services. A Notice of Availability of the Coal Mine Hazard Assessment Report was recorded at the King County recorder's office and noted on the title of the property.

In the late summer and fall of 2005 a deep monitoring well was installed to monitor the condition of the aquifer at the bottom elevation of the mine (Golder 2006). LMW-11 is a 700-foot monitoring well that is near the south end of the Rogers Seam. Monitoring the groundwater conditions in LMW-11 was intended to investigate whether contaminants were present at the bottom elevation of the mine resulting from historic mine dewatering and waste migrating along the bottom of the mine toward the south.

In order to provide a conservative remedy that is protective of human health and the environment, this DCAP includes a contingency for groundwater treatment in the event that concentrations of hazardous substances exceed applicable regulatory thresholds at the points of compliance identified in the DCAP. In the summer of 2008, the infrastructure components for the contingent groundwater treatment system were installed at the Site. The infrastructure was constructed ahead of time when it would be needed because it is considered the portion of the contingency plan that would take the most time to install (with regards to permitting). By having the infrastructure components installed ahead of time, if groundwater treatment becomes necessary at some future time, an appropriate modular treatment system can be efficiently installed at the Site and brought into operation in a relatively short time. The infrastructure that was constructed in 2008 included a gate access road, a treatment facility area pad surrounded by a security fence, underground power and telephone lines to the treatment pad, and a discharge pipe extending from the treatment facility pad to the west along Summit-Landsburg Road. The treatment

system itself will be designed, built, and operated only if groundwater from the Site exceeds the MTCA Cleanup Levels at the established points of compliance.

Interim groundwater monitoring was conducted periodically from 1994 to 2003, quarterly in 2004, and semi-annually from 2005 to the present. The analytical results from the interim groundwater monitoring events over the years indicate no significant changes in groundwater quality from that observed during the RI. The primary parameters detected in groundwater samples are metals that are naturally occurring and at concentrations consistent with background levels. All other analytes using EPA Methods 8260, 8270, 8081 and 8082 plus total petroleum hydrocarbons were either not detected or were at concentrations well below MTCA Cleanup Levels. The method reporting limits (MRLs) and method detection limits (MDLs) for all analytes are at or below acceptable concentrations under the MTCA, with the exception of some metals that are naturally elevated due to the location of the groundwater within the coal mine.

2.0 SITE DESCRIPTION AND HISTORY

2.1 Site Description

The Site-consists of a former underground coal mine located approximately 1.5 miles northwest of Ravensdale in a rural area of southeast King County, Washington. Figure 2 depicts the Site location. The Site is situated directly south and east of the S.E. Summit-Landsburg Road, and north of the S.E. Kent-Kangley Road. Downtown Seattle is approximately 20 miles to the northwest. The Cedar River passes within approximately 700 feet of the Site to the north. The location of the Site is shown in Figures 2 and 3. The topography of the Site and general Site features are depicted in Figure 4.

The Site occupies a single parcel of land owned by Palmer Coking Coal Company (PCC) and is located within sections 24 and 25, Township 22 N., Range 6 E. The Site is defined in Exhibit A of the Consent Decree. A defined Study Area for the Site, prescribed by Ecology for the purposes of the RI/FS, is depicted in Figure 3. Along the mine site footprint are a series of subsidence trenches (the trenches) extending from the north approximately 4,200 feet to the south. In general, the Study Area was intended to include the area within an approximately one-half mile radius of the Rogers Seam (Golder 1992a).

The Site and most of the immediate surrounding land is used for forestry today. Apart from the Site, the developments in the Study Area include a new junior high school and rural residential dwellings (about 130 residences) within the Study Area. The school is located about 0.65 miles northwest of the Site. The nearest residences to the Site are to the southwest approximately 800 feet from the Site. Drinking water for area residences is supplied by groundwater, either through private wells or small community water supply systems. Domestic sewage disposal throughout the Study Area is provided by residential septic systems. Water and sewer service is provided to the junior high school from utility lines extending west from Four Corners in Maple Valley.

Several gravel roads access the Site from public thoroughfares and trails run parallel to the east and west sides of the trenches. The primary access road to the Site begins near S.E. Summit-Landsburg Road and follows along the northern portion of the mine trenches. Another access road begins near where S.E. 256th Street bends to the south and continues onto the Site to the mine trenches where waste was disposed. A third gravel road begins across the street from the Tahoma Junior High School along S.E. Summit-Landsburg Road and provides access to LMW-11. A fourth access road begins at Kent-Kangley Road and allows access to neighboring houses and Portal #3. Locked gates secure the Site at all of the access road entrances, and the portion of the trenches where disposal occurred is currently enclosed by a 6 foot tall chain link security fence. Dense vegetation covers the Site. Electrical transmission lines and a Bonneville Power Administration property easement cross the southern portion of the Site in an east-west direction.

The Landsburg Mine property is situated atop a gently sloping hill, which reaches a maximum elevation of approximately 800 feet above mean sea level (MSL) near the central portion of the Site. This hill slopes steeply downwards towards the S.E. Summit-Landsburg Road and Cedar River at the Site's northern end, and more gradually downwards toward the Kent-Kangley Road and Rock Creek drainage at the southern end. The Site is bounded to the east by a somewhat larger hill, which rises to a maximum elevation of approximately 940 feet MSL.

2.2 Site History

PCC operated an underground coal mine, known as the Landsburg Mine, from the late 1930s until approximately 1975. The Landsburg Mine consisted of two adjacent coal seams: the Landsburg Seam and the Rogers Seam. Mining began in the Landsburg Seam in the late 1930s and continued until 1959. In 1959, mining of the Landsburg Seam ceased and mining began on the Rogers Seam. The Rogers Seam was mined from 1959 until 1975. The two seams are separated by about 600 feet. In addition to these two seams, mining has also been conducted at the nearby Frasier seam in an area historically called Danville. This seam, located approximately 800 feet northwest of the Rogers Seam, was mined intermittently from the late 1800s to the mid-1940s.

The mined section of the Rogers Seam has a near vertical dip and consists of coal and interbedded shale approximately 16 feet wide. The mined section is about a mile in length. Mining occurred at depths up to 750 feet below the ground surface. Mining was accomplished by causing the coal seam to cave into mine workings (locally called "booming") from which it was hauled to the surface. As a result of this caving, subsidence trenches developed on the land surface above the mine workings. The dimensions of the trenches vary from about 60 to 100 feet wide, between 20 to 60 feet in depth and about 3/4 mile in length. The trenches are not continuous along the whole length of the Rogers Seam, but are instead comprised of a series of separate subsided trench segments. Each trench section is separated by a wall of intact rock (called a pillar wall).

Based on available information, these trenches were used in the late 1960s to the late 1970s for disposal of various industrial waste materials, construction materials, and land-clearing debris. Materials were disposed of in the northern portion of the trenches from the Summit-Landsburg Road shown in Figure 4. Industrial wastes were contained in drums or dumped directly from tanker trunks. Based on invoice records from PCC, an estimated 4,500 drums of waste and about 200,000 gallons of oily wastewater and sludges were disposed into the trenches. Available documented interviews with waste haulers indicate that wastes included paint wastes, solvents, metal sludges, and oily water and sludge (Ecology 1990). It is expected that many of the drums were only partially full. Disposal of land clearing debris continued until the early 1980s when all waste disposal stopped. Currently, this portion of the Site is secured by a fence and locked gates, which enclose the northern portion of the trenches. Figure 4 depicts the current Site features and topography.

Several preliminary environmental investigations were performed at the Site. These include a limited soil gas survey (Applied Geotechnology 1990), sampling of area private wells (WDOH 1992), sampling surface water emanating from mine portals (Geraghty and Miller 1990), and limited sampling of ponded surface water, drum contents and soils for a site hazard assessment (SHA) (Ecology and Environment 1991). These investigations detected hazardous substances in drum contents, adjacent soils, and ponded surface water within the trenches. Hazardous substances were not detected, however, in adjacent private or public water supply wells, mine portal groundwater discharge or soil gases.

In 1991, Ecology designated the Site a high priority for cleanup, and in late 1991 at Ecology's request, four of the PLPs implemented an Expedited Response Action (ERA) involving the removal of the most accessible drums from the trenches and construction of a fence to restrict access to the Site. The ERA involved the removal of over one hundred 55-gallon drums (Landsburg PLP Steering Committee 1991).

Following the removal of the drums, Ecology and the PLP Group negotiated and entered into an Agreed Order (Ecology 1993) which directed the PLP Group to conduct an RI/FS to evaluate the need for remedial action. The scope of work for the RI was outlined in the *Landsburg Phase I Remedial Investigation/Feasibility Study (RI/FS) Work Plan* (Golder 1992a) which was incorporated by reference into an Agreed Order. The RI/FS, which consisted of a comprehensive investigation of site environmental conditions and evaluations of potential remedial alternatives for site cleanup, was conducted by the PLP Group over the period of mid-1993 to early 1996. The performance of the RI/FS and results are described below.

3.0 SUMMARY OF ENVIRONMENTAL ISSUES

3.1 Methods of Investigation

The approach taken during the RI was to focus environmental sampling efforts on potential pathways of contaminants leaving the Site and not on wastes that may be present within the trenches itself. Investigation of wastes in the trenches was limited due to physical constraints, dangers, and difficulties associated with taking samples in the trenches. As such, data collection activities conducted under the RI included the following primary tasks:

- **Air Monitoring.** A series of air surveys was conducted down the centerline of the trenches to monitor for the presence of organic vapors, which could be associated with waste disposal.
- **Source Characterization in Rogers Seam (Geophysical Investigation).** A magnetometer survey was conducted along the centerline of the Rogers Seam trenches to identify areas of potential buried waste.
- **Well Survey.** A well survey was conducted to identify private and public wells within the Study Area, and to support the selection (in consultation with the State Departments of Health and Ecology) of wells for quarterly sampling.
- **Monitoring Well Drilling and Installation.** Eleven new monitoring wells (LMW-1 through -11) were installed at the Site (see Figure 5). Wells LMW-2/4 and LMW-3/5 consisted of nested well pairs installed within the coal at each end of the trenches at the points of expected mine groundwater discharge. LMW-1 was installed at the suspected location of a fault and tunnel connecting offset portions of the Rogers Seam. Wells LMW-6 and -7 were installed in adjacent coal seams (Frasier and Landsburg Seams) to provide indications of water quality typical of adjacent coal seams. Well LMW-8 was installed to monitor groundwater discharging from the southern Portal #3. Well LMW-9 was installed to further monitor the flow of groundwater in the southern extent of the Rogers Seam. LMW-10 was installed to further monitor groundwater discharge from the Rogers Seam on the northern end of the Site. LMW-11 was installed to investigate groundwater at the bottom of the mine. Angled drilling methods were used at the LMW-4 and LMW-7 well locations to intercept the vertical coal seam.
- **Quarterly Monitoring of Surface Water and Groundwater.** Surface water associated with Rogers Seam portals #2 and #3, and groundwater from the seven on-site monitoring wells and 14 selected area privately-owned wells (see Figure 5) were sampled for chemical analysis over four rounds of quarterly sampling. The samples were submitted for a broad range of chemical tests including metals and cyanide analyses, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), and general chemical parameters. Fourth round sampling was conducted on a reduced set of wells.
- **Interim Groundwater Monitoring.** Groundwater from ten on-site monitoring wells (LMW-2 through LMW-11) has been sampled for chemical analysis on a semi-annual basis since 2005. All sampling activities are conducted in accordance to the *Draft Interim Groundwater Monitoring Plan, Landsburg Mine Site* (Golder, 1997). The samples were submitted for analysis of VOCs, SVOCs, PCBs, metals, pesticides, and petroleum hydrocarbons. Groundwater sample results from each of the semi-annual events have indicated no significant changes in groundwater conditions from those observed during the RI.
- **Surface Soil Sampling.** Surface soils around the rim perimeters of the trenches and downslope of Portal #3 were sampled for chemical analysis.
- **Topographic Survey and Geodetic Control.** Using aerial photogrammetry techniques, a topographic base map of the Site was prepared to 2 foot contours. Horizontal control

was established based on the Washington State Plane Coordinate System as required under MTCA.

- **Geologic Reconnaissance.** Geologic reconnaissance activities consisted of limited geologic mapping to confirm the understanding of surficial geology presented in the Conceptual Model (Golder 1992), and the excavation of backhoe test pits to examine subsurface lithology in the immediate vicinity of the Rogers Seam.
- **Ecological and Social Data.** Relevant ecological and social data were obtained for the Site and Study Area, including information on meteorologic and surface water characteristics, land use (zoning) and water use at the Study Area, endangered species, priority habitats, and sensitive areas. This information was obtained largely from readily available sources.

The results of these investigations are described below.

3.2 Source Characteristics

The RI approach focused the investigation on exposure pathways and risks from the Site and is considered protective of the public. Since the RI focused environmental sampling efforts on potential pathways of contaminants migrating from the Site, and not on wastes present within the trenches, what is known regarding the contents of the waste in the trenches is based on visual reconnaissance, records searches, and geophysical surveys. On the basis of these sources of information, previous waste disposal and any potential remaining wastes appear to be confined to the northern half of the trenches. Magnetic anomalies, which are indicative of buried ferrous metallic objects, which may include drums, were detected in these areas. Given that up to 4,500 drums were reportedly placed in the trenches and over one hundred were recovered during the ERA, it is reasonable to expect that wastes potentially remaining include a significant number of drums buried at some depth. Based on the condition of the drums observed during the ERA, the length of burial, physical damage during placement, reported fires, etc., the vast majority of drums were ruptured upon placement or have subsequently deteriorated. The amount of waste remaining at the Site is unknown, but a significant portion may have been burnt during historical fires, which occurred during placement.

3.3 Site Geology and Hydrogeology

3.3.1 Geology

Site stratigraphy consists of a thick sequence of folded Tertiary bedrock of the Puget Group mantled by glacial drift of the Vashon (and possibly Pre-Vashon) glacial stage. Puget Group strata dip steeply with dip angles of the Rogers Seam and adjacent strata near 90° on the north end of the Site and 63° at the south end of the mine. Figure 6 illustrates the map view for subsurface cross-sections. A typical cross-section through the Study Area and Rogers Seam is shown in Figure 7. Cross-sections along strike of the coal seam are depicted in Figures 8, 9, and 10.

The glacial drift materials at the Site are comprised primarily of till and recessional outwash. The till consists of a compact mixture of gravel in a clayey, silty sand matrix. Recessional outwash is comprised of a well-sorted mixture of sand and gravel. Till mantles the hillsides and recessional outwash generally fills in the lowlands. The total thickness of the glacial deposits ranges from less than a few inches thick

near the hilltops to possibly in excess of 100 feet in the lowland areas and stream channels. In most areas of the Site, the thickness of the drift is probably between 10 to 50 feet.

The Puget Group is composed of non-marine sandstones and siltstones with numerous carbonaceous shale and coal beds and minor amounts of claystone and conglomerate. All gradations between sandstone and siltstone are present, and most of the rocks are either silty sandstone or sandy siltstone. These materials are typically fine-grained, and, except for the coal, which is typically very weak and friable, are generally well cemented and strong. The thickness of the Puget Group rocks at the Site is not known but is probably at least several thousand feet.

A typical east-west section through the Rogers Seam is shown in Figure 7. On the east side of the seam is a massive sandstone bed and one foot thick layer of shale. The coal seam itself is approximately 10 to 12 feet wide, but the collapsed width of the Rogers Seam is about 15 to 16 feet in width. On the west side there is a four to seven foot thick carbonaceous shale, and massive sandstone. The thickness of individual beds varies from a few feet to many tens of feet.

The rocks in the Study Area have been displaced by numerous faults. Most noteworthy is an east-west striking fault in the northern portion of the mine. Approximately 75 feet of displacement (PCC 1992) required a 130 foot long rock tunnel to reconnect mining operations to the coal seam. The fault extends vertically through all four levels of the Rogers Seam to land surface where the unmined and hence uncollapsed rock pillar is used for a crossover roadway. Water inflows into the mine from this fault were not noted by mine personnel. A review of mine records found no evidence of fault gouge. In fact, reports by all interviewed personnel revealed that mining through fault zones did not result in increased mine water inflow.

3.3.2 Hydrogeology

The primary hydrogeologic system at the Site consists of a continuous to semi-continuous groundwater system comprised of the Puget Group bedrock materials and the surrounding glacial outwash aquifer. Minor occurrences of groundwater in till overlying the bedrock are likely perched and of secondary importance. The bedrock materials, which make up the hills within the Study Area, protrude up through and discharge groundwater to the glacial outwash, which fills the surrounding valleys and lower elevations around the perimeter of the Study Area.

Within the bedrock deposits, groundwater occurs at depths ranging from about 10 feet to in excess of about 200 feet below ground surface, depending on topographic position. Deeper groundwater occurs beneath the higher elevations of the Study Area and Site. For instance, depths to groundwater at wells LMW-1, LMW-7, and PW-6, located in the central portion of the Site (Figure 4), are about 140, 215 and 235 feet below ground surface (bgs), respectively. Groundwater occurs relatively close to the ground surface in wells located around the base of the Site hill. At wells LMW-2, -3, -4, -5, and -6, the depth to water is all generally less than 20 feet bgs.

Within the Site trenches, the depth to groundwater varies from about 150 feet in the central portion of the trenches to near zero at either end. The variability in depth to water is primarily a function of changes in topography and hydraulic gradient. This water occurs under water table or unconfined conditions as any potential confining layers are now absent due to mining. Bedrock groundwater elsewhere in the Study Area may occur locally under confined to semi-confined conditions due to the presence of till which mantles much of the area or from lower permeability lithologies lying over more permeable lithologies. LMW-10, located near the north end of the Site, is under artesian conditions and the static water level is above the top of the well.

The mined/backfilled Rogers Seam is a highly permeable conduit with hydraulic conductivities on the order of about 1 to 5 centimeters per second (cm/sec) as investigated and documented in the RI/FS (Golder 1996). The mine may be thought of as forming one relatively continuous, highly conductive zone. The fine-grained Puget Group sediments located to either side of the seam are at least several orders of magnitude less permeable than the mined out seam. Faults through the Rogers Seam appear tight and do not act as significant conduits, based on the regional state of stress, mine reports, miner interviews, water level measurements, and geochemical analyses. Groundwater flow in the mine therefore occurs horizontally and along strike through the highly permeable mined-out Rogers Seam. Groundwater flows in the lateral direction away from the mine (across bedding or via faults) are considered negligible. The trenches can therefore be thought of as highly conductive "slots." Groundwater within these "slots" moves longitudinally with very little movement laterally away from the trenches. Wells installed in Puget Group materials and located laterally away from the mine are hydraulically isolated from the mine workings. These include wells LMW-6 and -7, and private wells PW-5 through -8, and PW-14 and -15 (Figure 5).

Recharge of the Rogers Seam is primarily by direct infiltration. The trenches collect and concentrate rainfall and runoff from the surrounding area. This runoff readily infiltrates through the porous structure of the mined out seam. Due to the preference for longitudinal flow within the trenches and Site topography, and as evidenced by the discharge observed at portals #2 and 3, discharge from the mine appears to occur at either end. A groundwater divide appears to be present within the trenches. To the north of this divide, flow is to the north, and to the south of the divide, flow is to the south. There is some uncertainty with respect to the location of this divide; however, based on the high hydraulic conductivity of the trenches, topography, presence of ponded water in the southern portion of the trenches and hydraulic head of the mine water table and portal springs, the divide occurs within the southern portion of the Site. The majority of groundwater flow from the mine is therefore toward the north. All groundwater flow beneath the subsidence trenches that were utilized for waste disposal is toward the north.

3.4 Mine History and Condition

3.4.1 History

The Rogers Seam was mined from four different levels accessed from three portal declines as shown in Figure 7; a "water level" tunnel was also constructed to facilitate water removal from the upper level. The

seam was mined from 1959 until 1975 when all active mine openings were closed by blasting. During this time frame, approximately 490,000 tons of coal was extracted.

3.4.2 Mining Methods

Due to the vertical orientation of the coal seam, mining of the Rogers Seam utilized a system of coal extraction involving the development of "levels" with coal extracted by "booming" between underlying and overlying levels. This mining term simply refers to the process of blasting pillars of coal isolated between adjacent crosscuts/entries and chutes. The booming round was initially fired in the uppermost pillar to start the cave. Coal was then "pulled/drawn" through the first open chute and loaded into mine cars. Groundwater control was accomplished by grading the gangway at a slight incline with positive drainage back towards the bottom of the mine access slope. Water drained by gravity, via a shallow ditch dug in the footwall, to a small sump at the slope bottom and was pumped, from there, out of the mine.

3.4.3 Mine Stability

Trench Bottoms: Slabbing/failure of the sandstone footwall was reported by mine personnel. As coal was drawn down during mining operations, areas of the sandstone sidewall were observed to "slide" into the bottoms of the trenches. It is believed that these slabs could mask underlying voids. Voids may also remain at great depth due to the incomplete collapse of the workings, however, because of their greater depth these voids are of lower concern with regard to trench bottom stability. Using an approximate method of analysis, the overall volume of remaining voids was estimated to be less than 10%. Although it is likely that a majority of trench bottom subsidence has already occurred, it is prudent to allow for further subsidence when evaluating and designing any remedial measures.

Trench Sidewalls: The mapped sequence of strata forming the sidewalls of the trenches included interbedded sandstone, shale, and siltstone; no evidence of sidewall instability was observed. However, slabbing/failure, similar to that observed by retired PCC personnel, may occur if material is removed from the bottoms of the trenches or if further subsidence occurs.

Potential for Waste Movement after Dumping: A majority of the drummed waste was deposited in the trenches north of the rock bridge (major fault in northern part of mine). The last mining beneath this area was completed at the end of 1967 approximately one year prior to waste deposition. Fourth level mining beneath the trenches immediately to the south of the rock bridge began in September of 1970 and was completed in 1974. While there was some potential for movement of the barrels containing waste after deposition north of the rock bridge, it is considered unlikely that significant subsidence occurred. There is a modestly higher probability that waste barrels in the trenches to the south of the rock bridge have settled since deposition. Additional mine settlement below the waste barrels could result in debris moving deeper into the trenches.

3.5 Nature and Extent of Contamination

The air, soil, groundwater, and surface water analytical data collected as part of the RI, as well as other data collected during the preliminary investigations (the SHA and ERA), were evaluated in the RI to

assess the nature and extent of chemical constituents in environmental media at the Site. The primary purpose of this evaluation was to identify the chemical compounds potentially posing a human or environmental health risk and/or which exceed potential regulatory criteria, and which are the result of the prior waste disposal activities. Such compounds are termed mine waste contaminants. In order to accomplish this, the data were evaluated through a step-wise screening process which considered laboratory and field blank data, background concentrations (if available) and appropriate regulatory criteria (ARARs).

On the basis of the data screening performed, the following conclusions were drawn:

Air: Throughout nearly the entire length of the trenches, VOCs were not detected above background in air. Detectable levels of VOCs in air were comparable to background. The only detection of VOCs slightly above background was restricted to a small area within the trenches in the vicinity of a sludge pond in trench number 9 (see Figure 15). Air monitoring conducted during drilling did not detect levels of VOCs above background.

Groundwater: The Site, specifically the Rogers Seam, represents a unique hydrogeologic setting. The mine traverses a steep hillside that has prominent streams/rivers (Rock Creek to the south and the Cedar River to the north) on each side of the hill. The Rogers Seam is situated between these prominent surface water bodies and crosses their drainage divide. The data collected at the Site indicates that the groundwater divide between these surface water bodies also exists within the Rogers Seam. Therefore, groundwater in the southern portion of the mine flows and discharges to the south towards Rock Creek, while groundwater in the northern portion flows north toward the Cedar River.

A typical background study would monitor groundwater up-gradient of the area that could be affected by waste disposal to understand the groundwater quality before any impacts could occur. Because a groundwater divide exists within the Rogers Seam, this typical method for determining background groundwater quality cannot be made. Water quality within the mine cannot definitively represent natural groundwater quality because of the potential for impacts to have occurred from waste disposal within the trenches. Since wastes were disposed in the Rogers Seam during mining operations when the mine was dewatered, the groundwater impacts, if any, may have migrated south to or near the groundwater divide.

Interim groundwater monitoring of Site compliance wells (LMW-2 through LMW-11) was conducted periodically from 1994 to 2003, quarterly in 2004, and semi-annually from 2005 to the present. There have been no detections of contaminants that are attributable to contamination by waste materials during any of the interim groundwater monitoring events. Furthermore, the analytical results from the interim groundwater monitoring events over the years indicate no significant changes in groundwater conditions from those observed during the RI. The primary parameters detected in groundwater samples are metals that are naturally occurring. The MRLs and MDLs for all analytes are at or below acceptable concentrations under the MTCA, with the exception of some metals which have a natural background level that is in excess of MTCA due to the condition of the groundwater within the coal mine.

As indicated in Section 5.3.2.1 of the RI/FS, arsenic has been detected sporadically throughout the Study Area, while iron and manganese are very prevalent throughout the Study Area, including private wells and monitoring wells that are hydraulically separated from the wells completed in the mine workings. These are naturally occurring metals in most groundwater. The U.S. Environmental Protection Agency (USEPA) has established numeric secondary drinking water standards (Maximum Contaminant Levels (MCLs)) for iron and manganese. However, these secondary drinking water standards are based on aesthetics (taste, color, and odor) and are not enforceable standards. The USEPA has established a primary drinking water standard for arsenic, which is considered a human carcinogen. Detected concentrations of arsenic in the on-site monitoring wells have been below federal and State of Washington drinking water standards.

Iron, manganese, and arsenic are typically elevated in groundwater associated with coal mines. The RI/FS Report (Section 5.3.2.2) identified that the Site groundwater quality is similar to that of 100 abandoned coal mines in western Washington State studied by the U.S. Geological Survey (USGS; Fuste et al. 1983). Fuste and Meyer (1987) report that consistently higher concentrations of iron and manganese are present in streams receiving coal mine drainage water. Organic materials (i.e., coal) are identified by Hem (1985) as a common source of iron in groundwater and Fuste and Meyer (1987) suggest a dependence on oxidation potential (Eh) and dissolved oxygen for elevated dissolved iron and manganese levels in mine water. Because of the geochemical conditions near the bottom of the Rogers Seam (700 feet deep at MW-11), arsenic is slightly over the MTCA groundwater cleanup level (maximum concentration to date has been 0.012 mg/L in MW-11), which is based on typical shallow groundwater concentrations in the State of Washington, but is typically below the federal and State of Washington drinking water MCLs.

Although a few organic compounds were detected in wells sampled, all of the detected compounds were at very low concentrations and detections were inconsistent (not repeated in more than a single round). In addition, none of the organic compounds exceeded any established regulatory standards, except for one instance of bis(2-ethylhexyl)phthalate, a common laboratory contaminant, which occurred slightly above the MTCA Method B standard in a single privately-owned well, but was not detected in either of the other three monitoring periods from this well. Therefore, there is no indication of organic or metal contamination in groundwater at the Study Area.

The observed distribution of chemical constituents (iron, manganese, and arsenic) in groundwater around the Study Area indicate that waste disposal at the Site is not the source of these compounds. The levels of compounds observed in the groundwater are consistent with reports in the literature, which indicate that coal is a natural and well-known source for these chemical constituents. The levels observed fall within the range of reported values considered typical for coal mine drainages in the State of Washington. Therefore, although concentrations of iron and manganese exceeded the secondary MCLs and arsenic concentrations exceeded the MTCA Method A cleanup level in monitoring well LMW-11 (but were typically below the federal and State of Washington drinking water standards), the occurrence of these

compounds does not appear to be related to prior waste disposal activities at the Site, but rather to natural background levels that are typical of coal-bearing strata under reducing conditions. Therefore, based on groundwater sampling results, there are no contaminants in the groundwater directly attributable to waste disposed of in the trenches at the Site.

Surface Water: Arsenic in surface water at the Site does not exceed the MTCA Method A standard for water discharging at portals #2 and #3. No analytes were detected above MTCA Cleanup Levels. Arsenic concentrations in the surface water samples collected at the portals were consistent with concentrations detected in the groundwater sampled at the Site. As discussed above, the occurrence of arsenic in groundwater (and surface water) is a result of natural background conditions (i.e., the coal seam). Therefore, no contaminants detected in the surface water are directly attributable to waste disposed of in the trenches at the Site.

Soil: There are no contaminants of concern for soils outside of the trenches. Within the trenches, chromium, lead, PCBs, bis-(2-ethylhexyl)phthalate, methylene chloride, trichloroethylene (TCE) and total petroleum hydrocarbons (TPH) exceeded Method B standards during the early 1990s in an area confined to the northern portion of the trenches where waste disposal is thought to have occurred in the past. Soil testing confirmed that contamination was not identified outside the northern portion of the trenches. These compounds are designated as mine waste contaminants for soil inside the trenches. On the basis of trench sampling conducted to date, however, and in conjunction with historical information and geophysics, potential contamination is believed to be restricted to the northern portion of the trenches.

Therefore, apart from soils located within the subsidence trenches in the area of known prior waste disposal activities, soil, groundwater, and surface water media in the Study Area do not exhibit concentrations of chemical constituents above naturally occurring background levels. The contaminants identified in the RI are the seven compounds indicated below for soils inside the trenches:

- chromium and lead,
- PCBs,
- bis(2-ethylhexyl)phthalate,
- methylene chloride,
- TCE, and
- TPH.

3.6 Risks to Human Health and the Environment

As noted above, the only locations where chemicals were observed at concentrations above MTCA Method B are within the trenches in the vicinity of where waste disposal occurred in the past. MTCA Method B cleanup levels, which are the most restrictive regulatory limits under MTCA, were exceeded for several compounds in these trench soils. The northern portion of the Site containing the wastes disposed of in the trenches is currently fenced to prevent access. Therefore, no direct human exposures to these chemicals are occurring. Also, no chemicals (in concentrations exceeding federal or State of Washington

standards) are known to have migrated off the Site in air, surface water, or groundwater; nor has soil outside of the trenches been impacted. In summary, there are no operative exposure pathways from the Site for chemicals directly attributable to disposal of waste in the trenches. Given the absence of exposure pathways, the Site does not pose a significant risk to human health or the environment under current conditions.

3.7 Potential Contaminant Transport

No contaminant migration is occurring from the Site. However, as part of the RI, it was necessary to evaluate the potential future pathways for contaminant migration from the Site. The groundwater pathway represents the most significant potential pathway. Waste present in the trenches is believed to be confined to the northern half of the Site. Groundwater flow beneath this portion of the Site is to the north through the mined out and highly permeable Rogers Seam. Flow laterally away from the mine is negligible due to the tightness of faults and the vertical orientation and layering of low-permeability strata. The primary pathway for contaminants potentially migrating from the Site through the Rogers Seam is through the groundwater flowing to the north. Contaminant migration from the southern end of the trenches is unlikely given the direction of groundwater flow and the absence of waste or contaminated water in this portion of the mine; however, both the northern and southern ends of the Site will continue to be monitored in the future for the detection of potential releases.

Potential contaminants in the groundwater beneath the northern portion of the trenches would flow to the north and northeast towards the Cedar River, consistent with the local ground surface topography. This flow would occur within the Rogers Seam and within the glacial outwash materials, which overlie the coal. No drinking water wells are currently located along this primary pathway of groundwater flow. The two on-site monitoring wells (LMW-2 and -4) located along this pathway have not shown any evidence of contamination during the RI and similarly subsequent monitoring events. Sampling of monitoring well LMW-10 did not show any evidence of contamination either.

While the primary groundwater flow direction is to the north, towards the Cedar River, it is also possible that some flow may occur to the northwest within the glacial outwash deposits located to the north of the Site. If groundwater were to flow in this direction, potential receptor points would include the wells located to the northwest of Portal #2, along the Summit-Landsburg Road. Well PW-4 is the closest well and is approximately 1,500 feet away from Rogers Seam. It is not considered likely, however, that groundwater flow would occur to these wells given the strong topographic gradient towards the Cedar River.

At the southern end of the mine, potential receptors include the cluster of wells along the Kent-Kangley Road just southwest of Portal #3, and the Clark Springs facility. The Clark Springs facility is approximately 2,500 feet from Portal #3. It is not likely that these wells would be impacted; however, there is a slight potential for contaminant migration from the southern end of the trenches.

3.8 Ecological and Social Data

The Site qualifies for exclusion to a formal terrestrial ecological evaluation pursuant to WAC 173-340-7491(1)(a) because the remedial actions and residual impacts will be greater than 15 feet below the top surface of the cap cover with the selected remedial alternative. The following summarizes key ecological and social data and information for the Study Area.

3.8.1 Zoning and Sensitive Areas

The bulk of the Study Area, including much of the central portion of the Site and the former mine workings, has been assigned an RA-5, Rural Area residential zone classification. The western portion of the Study Area from the Site west to Four Corners in urban Maple Valley, has been designated RA-5 for rural residential use. In addition to these zoning classifications, the City of Kent and City of Seattle maintain municipal watershed lands along the southwestern and eastern boundaries of the Study Area, respectively, for the protection of drinking water supplies associated with Rock Creek and the Cedar River. Also, under the Shoreline Management Plan of King County, the Cedar River shoreline throughout the Study Area vicinity has been designated a "Conservancy" environment.

Sensitive areas as defined by the King County Sensitive Areas Ordinance (Ordinance 9614) include wetlands, areas prone to stream and flood hazards, erosion hazards, seismic hazards, and coal mine hazards. Development of land within identified sensitive areas requires special development standards as well as special studies to assess impacts and to propose adequate mitigation, maintenance, monitoring, and contingency plans for those areas.

There is one small wetland area within the southern Site boundary identified in the Ordinance 9614 map. This area is located over 1,000 feet from the trenches.

Streams are considered sensitive areas because of their aesthetic values, their ability to provide recreation, support wildlife, and potential for flooding and erosion. The Cedar River is identified as a Class I stream for its length from Landsburg to Renton. This indicates the river is inventoried as a Shoreline of the State of Washington under the King County Management Plan. Rock Creek, to the south of the Site, is a Class II stream that flows year-round during years of normal rainfall and is used by salmonids. Rock Creek is ephemeral to the east of where it crosses beneath the Kent-Kangley Road. Upper Georgetown Creek (a tributary of Rock Creek) is located over 1,000 feet east of the trenches.

No site-specific landslide or seismic hazard areas were identified. Two large areas of the Site are described as susceptible to erosion. The first of these areas is the steep northern slope along the Cedar River. The second is the steep hillside in the eastern portion of the Study Area between the trenches and the Study Area boundary. The portions of the Site where coal removal occurred or where coal mine waste rock is stockpiled are mapped as coal mine hazard areas. A Coal Mine Hazard Assessment report was prepared by SubTerra, Inc. in May 2005, was reviewed by geologists at King County Department of Development and Environmental Services in September 2005, and a Notice of Availability of that report was recorded on the title to the property under King County recording number 20051010000420.

3.8.2 Water Use

Surface Water: The City of Seattle has operated a large water diversion structure on the Cedar River upstream of the Site at Landsburg since 1901. The structure diverts approximately 150 million gallons per day (mgd) from the Cedar River. An infiltration gallery adjacent to Rock Creek has been used by the City of Kent since 1957 as a supplement to their municipal water sources. The existing diversion, referred to as the Clark Springs facility, located adjacent to Kent-Kangley Road, consists of a lateral gravity drainage collection system installed approximately 13 to 15 feet below ground surface in the creek alluvium. This facility was sampled as part of this RI and was referred to as well PW-13 (Figure 5).

Groundwater: Groundwater at the Study Area is used for domestic supply, small community water supply systems and for a municipal water supply (City of Kent). A survey of wells in the area identified a total of 56 wells within the Study Area at the time of the RI/FS (Figure 5, although at the time of the DCAP there were approximately 20 new water wells that have been installed since 1998), excluding the Clark Springs facility, which serves the City of Kent. These 76 wells serve approximately 130 homes in the Study Area and more than 200 people. At the time of the RI/FS, the available information indicated 46 of the wells were domestic service wells providing water to a single residence. Two wells provide water to two residences, and one services four homes (PW-2). Four of the wells service community water supply systems. These wells, New Arcadia (PW-1), Landsburg Estates (PW-4), Well 429641 (PW-3), and Bridal Trails South (PW-9) provide water to 37 homes around the Study Area. All of the community supply wells were sampled during the RI. Information on 23 wells was not available and is not known whether these wells still exist or are in use.

The wells range in depth from less than 20 feet to a maximum depth of about 400 feet. Many of the shallow wells were hand dug and range between 20 and 30 feet in depth. The City of Kent's Clark Springs well (PW-13) is a branched lateral gravity drainage system installed in the Rock Creek alluvium.

4.0 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

The laws and regulations to be adhered to under the Site cleanup are termed the applicable or relevant and appropriate requirements (ARARs). ARARs are determined by Ecology and include, among other items, soil and groundwater cleanup standards, design standards, and permitting and monitoring requirements. The following discussion focuses on the most significant ARARs. The full list of ARARs is presented in Tables A-1 and A-2 (Appendix A).

4.1 General

The most significant ARARs for the Site include the following:

- MTCA, RCW 70.105D, and MTCA Cleanup Regulations, WAC 173-340; and
- Minimum Functional Standards for Solid Waste Handling, WAC 174-304.

In addition, portions of the dangerous waste regulations (WAC 173-303 Dangerous Waste Regulations) are relevant and appropriate. These are discussed below.

MTCA, RCW 70.105D, and MTCA Cleanup Regulations, WAC 173-340. MTCA is the key governmental regulation governing the conduct of the overall investigation and cleanup process for the Site. MTCA describes the requirements for selecting cleanup actions, preferred technologies, policies for use of permanent solutions, the time frame for cleanup, and the process for making decisions.

RCW 70.105D.090 exempts remedial actions conducted pursuant to an Agreed Order or a Consent Decree from the procedural requirements of several state laws, although substantive compliance with these laws is still required. These include the State Clean Air Act (RCW 70.94), Solid Waste Management - Reduction and Recycling Act (RCW 70.95), Hazardous Waste Management Act (RCW 70.105), Water Pollution Control Law (RCW 90.48), Shoreline Management Act (RCW 90.58), and Construction Projects in State Waters (RCW 75.20). The exemption only applies to the procedural requirements of any laws requiring or authorizing local governmental permits or approval for the remedial action. Therefore, while substantive compliance is necessary, permits and approvals are not required for remedial actions at the Site. The Agreed Order or Consent Decree will specify the substantive compliance requirements to be achieved during the remedial actions.

WAC 173-340-700 establishes three cleanup levels for environmental media, including groundwater, soil, surface water and air: The three MTCA Cleanup Level categories are called: Method A (routine, using tables), Method B (standard), and Method C (conditional, primarily for industrial sites). These MTCA Cleanup Levels are discussed in detail below in Section 4.2.

Dangerous Waste Regulations - WAC 173-303. The Washington State Dangerous Waste Regulations (WAC 173-303) are the state equivalent of the federal hazardous waste (RCRA) regulations, and contain a series of rules relating to the generation, handling, storage, and disposal of "dangerous waste." In addition, RCW 70.105.035 provides a conditional exemption for state-only dangerous wastes generated

from a remedial action that is conducted pursuant to a Consent Decree under RCW 70.105D. The exemption is not applicable to material that is designated as a hazardous waste under RCRA.

The substantive requirements in WAC 173-303 pertaining to dangerous waste generation, handling, storage, and disposal will be applicable, if non-exempt dangerous waste is generated during remedial actions and transported off the Site during cleanup. However, because the remedy selected in this CAP consists of capping, it is not expected that any dangerous wastes will be generated. The following are applicable or relevant and appropriate to the Site WAC 173-303-610 Closure and Post-Closure, -645 Releases from Regulated Units, and -665 Landfills.

Minimum Functional Standards (MFS) for Solid Waste Handling - WAC 173-304. WAC 173-304-407 and -460 describe closure and post-closure standards and landfill standards, respectively. Under MTCA, MFS must always be used as the "minimum requirements" for landfill closure conducted as a MTCA cleanup action. On this basis, the MFS are applicable to this Site and must be met. WAC 173-304-460 capping requirements include a minimum 2 feet thick soil layer having a permeability of 1×10^{-6} or lower. Alternately, a synthetic liner material may be substituted for the soil layer. The MFS standards are the primary capping criteria for the Site.

State Environmental Policy Act (SEPA) WAC 197-11. SEPA is applicable to remedial actions at the Site. A SEPA environmental checklist and Ecology's declaration that the Site qualities for a Determination of Non-Significance (DNS) are included in Appendix B.

4.2 Cleanup Levels and Points of Compliance

Cleanup levels are numeric expressions of remedial action. A cleanup level is the maximum acceptable concentration of a constituent of concern to which the human or ecological receptors would be exposed via a specified exposure route (e.g., direct contact) under a specified exposure scenario (e.g., industrial land use). Cleanup levels are generally established for constituents of concern as the lower of a numeric chemical-specific ARAR or a risk-based cleanup concentration.

For the Site, the only contaminants identified are associated with soils in the trenches where wastes were disposed. No contaminants attributable to wastes disposed of in the trenches were identified in groundwater, surface water, or air.

Nevertheless, the general framework that will be used to determine cleanup levels for any potential contaminants identified in the future (and attributable to disposal of wastes in the trenches) can be established. Under MTCA (WAC 173-340-700), three methods are established for determining cleanup levels for environmental media, including groundwater, soil, and surface water. The three methods are Method A (routine, using tables), Method B (standard), and Method C (conditional, primarily for industrial sites). All three MTCA methods for determining cleanup levels require compliance with other federal or State ARARs, and consideration of cross-media contamination.

Method A is generally used for routine cleanups with relatively few contaminants. Since the cleanup at the Site is not considered routine, Method A is not applicable to this Site. Method C cleanup levels are used where Method A and B are not appropriate. Total excess cancer risk for Method C, and the risk associated with individual compounds, cannot exceed 1 in one hundred thousand (1×10^{-5}), and the total hazard index for substances with similar types of toxic response must be less than 1. Method C cleanups must comply with applicable State and federal laws, must use all practicable levels of treatment and must incorporate institutional controls as specified in WAC 173-340-740 and 720. To use Method C levels, one of the following must occur: Method A or B cleanup levels must be below area background concentrations; cleanup to Method A or B levels has the potential for creating greater overall threat to human health and the environment than Method C; cleanup to Method A or B is not technically possible; or the Site meets the definition of an industrial site. The requirements for qualification as a Method C industrial site are specified in WAC 173-340-740 and -745. Because the Site is in a mine subsidence hazard zone, residential land use is prohibited and Method C Cleanup levels may be appropriate for Site soils. Because groundwater at the Site may be used in the future, Method C Cleanup Levels for groundwater are not appropriate for the Site.

Method B is the standard method for determining cleanup levels and assumes a residential use scenario. Since the Site is also within a mine subsidence hazard zone, residential development is already prohibited and Method B Cleanup levels for soils may not be applicable. Again, because groundwater may be used in the future, Method B Cleanup Levels are appropriate for Site groundwater. Method B Cleanup Levels are determined using risk-based equations specified in MTCA regulations. For individual carcinogens, the cleanup levels are based on the upper bound of the excess lifetime cancer risk of one in one million (1×10^{-6}). Total excess cancer risk under Method B for multiple substances and pathways cannot exceed one in one hundred thousand (1×10^{-5}), and the total hazard index for substances with similar types of toxic response must be less than 1. In addition, Method B levels must comply with applicable State and federal regulations or criteria (MCLs, for instance). However, no cleanup level shall be more stringent than an established area background concentration for the Site.

For all three methods of establishing cleanup levels, a "point of compliance" is selected for determining whether the cleanup level has been met. The point of compliance is defined as the point or points throughout the Site where cleanup levels are established in accordance with the cleanup requirements for groundwater and soil. The point of compliance for soil cleanup levels based on the protection of groundwater is to be achieved in all soils throughout the Site. For soil cleanup levels based on human or terrestrial ecological exposure via direct contact, the point of compliance shall be established throughout the Site from the ground surface to a depth of 15 feet. These depths represent the extent that soils may be potentially excavated or disturbed as a result of Site development or terrestrial ecology. Where a cleanup action involves containment of soils with hazardous substance concentrations exceeding cleanup levels, under WAC 173-340-740(6)(f), the cleanup action may be determined to comply with cleanup standards, provided:

1. The selected remedy is permanent to the maximum extent practicable;
2. The cleanup action is protective of human health;
3. The cleanup action is protective of terrestrial receptors;
4. Institutional controls are put in place;
5. Compliance monitoring and periodic reviews are designed to ensure long-term integrity of the contaminant system;
6. The types, levels, and amount of hazardous substances remaining on-site and the measures to prevent migration and contact are specified in the CAP.

For groundwater, WAC 173-340-720(8)(c) and (d) provide that if it is not practicable to meet groundwater cleanup levels throughout the site within a reasonable time frame, Ecology may approve a conditional point of compliance for groundwater cleanup which shall be as close as practicable to the source of hazardous substances and not to exceed the property boundary.

Therefore, cleanup levels and points of compliance at the Site will consist of the following:

- It is anticipated that remedial actions will eliminate any concern for ambient air; therefore ambient air monitoring will not be conducted on a routine basis. However, if ambient air issues arise during health and safety monitoring during remedy construction, Method B cleanup levels will be used as the basis for evaluating compliance. Cleanup levels established under this section shall be attained in the ambient air throughout the Site.
- Since the selected cleanup action involves containment, soils cleanup levels may not be met at the standard points of compliance. The cleanup action involves containment, and the cleanup action is determined to comply with cleanup standards. Institutional controls specified in Section 5.5.6 and compliance monitoring and periodic reviews specified in Section 5.5.5 will ensure the long-term effectiveness of the containment remedy. If soil issues arise, soil cleanup levels will be based on Method B cleanup levels. Two points of compliance are established for soils at the Site: (1) one from 0-15 feet depth for the protection of humans, terrestrial ecology, and groundwater; and (2) a second for soils below 15 feet for the protection of groundwater.
- Groundwater and surface water cleanup levels will be Method B. Conditional points of compliance will be established for groundwater and surface water at the locations of groundwater and surface water discharge from the portals as defined in Figure 11. The entire conditional point of compliance boundaries are within property owned by PCC. Specifically, for the north end of the Site, the point of compliance will be the PCC property boundary north of monitoring wells LMW-2, LMW-4, and LMW-10 to the right-of-way of the Summit-Landsburg Road. For the south side of the Site, the point of compliance shall be the PCC property boundary south of monitoring wells LMW-3, LMW-5, and LMW-8 at the right-of-way of the Kent-Kangley Road. For the east and west conditional compliance boundary for groundwater, monitoring wells LMW-7 and LMW-6, respectively, will be used for compliance monitoring.
- Specific monitoring plans, the number and locations of wells, sampling frequencies, and data analysis and evaluation procedures will be defined in the Compliance Monitoring Plan (Exhibit E, Part A). The Compliance Monitoring Plan is reviewed and approved by Ecology.

5.0 LANDSBURG MINE SITE REMEDIAL ACTION

5.1 Summary of the FS Remedial Alternatives

The FS for the Site consisted of the following primary elements:

- **Development of remedial action objectives.** Remedial action objectives were established that provided the basis for developing and evaluating alternatives for remediation of the Site.
- **Identification and screening of remediation technologies.** Candidate technologies were screened to obtain a list of feasible technologies for use in assembling remediation alternatives.
- **Identification and screening of remediation alternatives.** Remediation technologies were assembled into a wide range of alternatives for remedial action at the Site. The alternatives were then screened to obtain a focused list of alternatives for further detailed consideration.
- **Development and evaluation of remediation alternatives.** Alternatives remaining after screening were further developed and subjected to detailed evaluation. Consideration of the evaluation resulted in a preferred alternative for the Site.

5.1.1 Remedial Action Objectives

Remedial action objectives (RAOs) are site-specific goals based on acceptable exposure levels that are protective of human health and the environment and consider ARARs. RAOs identify risk pathways that remedial actions should address, and identify acceptable exposure levels for residual constituents of concern. The RAOs identified for this Site are:

- Minimize the potential for future direct exposure of human or ecological receptors to any waste constituents that may remain at the Site.
- Reduce the potential for migration of any waste constituents from the trenches in groundwater, surface water, or airborne dust.

5.1.2 Identification and Screening of Remediation Technologies

Potentially applicable remediation technologies were identified for each of the following general response action categories:

- Institutional Controls including deed restriction and fencing,
- Groundwater monitoring,
- Containment,
- Removal,
- Ex-Situ Treatment (including reuse and recycling),
- In-Situ Treatment, and
- Disposal.

The technologies were screened based on effectiveness, implementability, and cost to obtain a set of technologies that could be applied at the Site.

5.1.3 Identification of Remediation Alternatives

Remediation technologies retained following the screening process were then assembled into remediation alternatives. The technologies were combined to create a wide range of alternatives that represent various approaches to achieving RAOs. Remediation alternatives were developed to meet the following MTCA requirements:

- Protect human health and the environment,
- Comply with cleanup standards,
- Comply with applicable laws and regulations,
- Provide for compliance monitoring,
- Use permanent solutions to the maximum extent practicable,
- Provide for a reasonable restoration time frame, and
- Address public concerns.

Consideration of public concerns is performed by Ecology after the FS is completed and is based on public comments on the DCAP. Public concerns may result in modifications to the remedial action proposed in the DCAP. Any modifications would be incorporated into the FCAP.

The following alternatives were developed for remediation of the Site:

Alternative 1: No Action. This alternative would leave the Site in its current state, assuming no restrictions on future Site use and no Site maintenance or monitoring. A "no action" alternative was eliminated from further consideration in the RI/FS because it does not meet threshold requirements of MTCA.

Alternative 2: Institutional Controls and Monitoring. Institutional controls include deed restrictions, fencing and warning signs, and groundwater use restrictions, as well as periodic Site inspections and maintenance of the physical components of the controls. Groundwater use restrictions would be employed to prevent human exposure to Site groundwater. Thus, if Site groundwater were to become affected by waste constituents, there would be no immediate exposure. Exposure could occur only following off-site migration to potable water sources. Routine, periodic monitoring would detect mine waste contaminants in groundwater were it to become affected. The institutional controls and monitoring alternative by itself does not meet threshold requirements of MTCA and was eliminated.

Alternative 3: Trench Backfill. This alternative would consist of filling the trenches in the area where waste disposal occurred, combined with grading to provide proper stormwater drainage and prevent stormwater collection in the trenches. Institutional controls and periodic maintenance and monitoring would also be included. This alternative would protect human health and the environment by providing long-term containment of any waste and affected soil in the trenches.

Alternative 4: Soil Cap. As with Alternative 3, the trenches would be filled only in the area where waste disposal occurred, combined with grading to provide proper stormwater drainage and prevent stormwater

collection in the trenches. The backfill would be covered by a soil cap to provide a vegetated surface for improved evapotranspiration and erosion control (see Figure 14). Institutional controls and periodic maintenance and monitoring would also be provided. This alternative would protect human health and the environment by providing reliable long-term containment of any waste and affected soil in the trenches.

Alternative 5: Low-Permeability Soil Cap. This alternative is very similar to Alternative 4, except that a low-permeability liner, constructed by compacting suitable soil, would be included in the cap design to decrease the amount of infiltration through the cap, thus decreasing the potential for affecting groundwater (see Figure 14). Institutional controls and periodic maintenance and monitoring would also be provided.

Alternative 6: FML Cap. This alternative is very similar to Alternative 5, except that the low-permeability liner would be constructed using a synthetic flexible membrane liner (FML) instead of compacted soil (see Figure 14). Institutional controls and periodic maintenance and monitoring would also be provided.

Alternative 7: FML/GCL Cap. This alternative is very similar to Alternative 6, except that a geosynthetic clay liner (GCL) would be added to provide two low-permeability liners instead of one. Two liners do not provide lower infiltration than a single liner, but provide additional reliability for long-term protection (see Figure 14). Institutional controls and periodic maintenance and monitoring would also be provided.

Alternative 8: Excavation and Off-Site Disposal of Surficial Affected Soil and Capping. This alternative would consist of removal of surficial soil in the trenches containing concentrations of mine waste contaminants above remediation goals followed by off-site disposal. The trenches would then be backfilled and graded for proper stormwater drainage. Because waste and affected soil would presumably remain buried in the trenches, a cap meeting minimum functional standards under WAC 173-304 would be placed over the trenches. Institutional controls and periodic maintenance and monitoring would also be provided.

Alternative 9: Excavation and Off-Site Disposal of All Waste and Affected Soil. In this alternative, all waste and affected soil would be removed from the trenches for off-site disposal. Appropriate disposal facilities would be used, depending on the waste designation (hazardous, dangerous, or non-hazardous). Institutional controls, maintenance, and monitoring would not be necessary for this alternative because all waste and affected soil would be removed from the Site.

5.2 Screening of Alternatives

Under MTCA, remediation alternatives must meet the following threshold requirements [WAC 173-340-360(2)(a)]:

- Protection of human health and the environment,
- Compliance with cleanup standards,
- Compliance with ARARs, and
- Provision for compliance monitoring.

Alternatives 1, 2, and 4 did not meet one or more of the MTCA threshold criteria for selection as the preferred alternative. The remaining alternatives meet the minimum requirements of the MTCA threshold criteria.

The remediation alternatives summarized above were then evaluated based on effectiveness, implementability, and cost. Alternatives 3 and 8 were eliminated during the screening evaluation. Alternative 3 provides less groundwater protection because rainfall infiltration through disposed wastes would be greater than infiltration occurring with the other alternatives. Alternative 8 would provide marginal benefits to groundwater protection with only surficial trench soils removed, but at a higher cost then several alternatives. Based on the screening evaluation, the following alternatives were retained for detailed development and evaluation:

- Alternative 5: Low-Permeability Soil Cap,
- Alternative 6: FML Cap,
- Alternative 7: FML/GCL Composite Cap, and
- Alternative 9: Excavation and Off-Site Disposal of All Waste and Affected Soil.

5.3 Evaluation of Remediation Alternatives

5.3.1 Evaluation Criteria

WAC 173-340-360(2)(b)(i) specifies that the remediation alternatives must use permanent solutions to the maximum extent practicable. Ecology recognizes that permanent solutions [defined at WAC 173-340-200] may not be practicable for all sites. When selecting a cleanup action, preference shall be given to permanent solutions to the maximum extent practicable. To determine if a cleanup action uses permanent solutions to the maximum extent practicable, a disproportionate cost analysis is used and compares the costs and benefits of the cleanup action alternatives identified in the feasibility study. The specified factors, or criteria, for the disproportionate cost analysis include:

- Overall protectiveness,
- Long-term effectiveness and reliability,
- Short-term risks,
- Permanence by reduction in toxicity, mobility, and volume,
- Technical and administrative implementability,

- Cost, and
- Community acceptance.

These criteria are defined in more detail in the sections below.

5.3.1.1 Overall Protectiveness

Overall protectiveness addresses the degree to which each alternative attains cleanup standards and is protective of human health and the environment, considering both long-term and short-term risks. This criterion is derived from the evaluation of the other criteria. It is not an independent criterion, but more of a summary of the overall evaluation. Therefore, the overall comparative evaluation (net benefit) of the other non-cost criteria is taken as the overall protectiveness of the alternative. In addition, overall protectiveness is evaluated as a threshold criterion.

5.3.1.2 Long-Term Effectiveness and Reliability

This criterion addresses risks remaining at the Site after the remediation alternative has been implemented, and the reliability of the alternative at reducing risks over an extended period of time. Risks during the implementation period are addressed under short-term effectiveness. Evaluation of long-term effectiveness involves estimation of the residual risk associated with each alternative in comparison to baseline risk, and can be measured by the degree to which remedial action objectives are met. Reliability involves estimating the longevity of the remedy, (e.g., the life span of institutional controls or containment) and the chances of remedy failure.

This criterion was evaluated using the two sub-criteria of long-term effectiveness and reliability. The overall score for this criterion was obtained by giving equal weight to the two sub-criteria.

5.3.1.3 Short-Term Risks

This criterion addresses short-term effects on human health and the environment while the alternative is being implemented. The evaluation included consideration of the following factors:

- Risk to Site workers,
- Risk to the community,
- Risk to the environment (short-term ecological risk), and
- Time needed to complete remedial action.

Short-term effectiveness was primarily scored based on evaluation of the degree of risk to Site workers. The primary risk to Site workers would be due to construction accidents. In addition, for cap alternatives, the relative complexity of the caps was a measure of the relative man-hours required, and therefore the relative worker risk.

Because remedial action would include controls as necessary to ensure that the remedy does not create an unacceptable risk to the community, risk to the community was not as significant in distinguishing between alternatives as worker risk. However, Alternative 9 (Excavation and Disposal) would create the

potential for human exposure to off-site release of excavated waste during remedial action, and this risk was considered in the evaluation. The considerations for ecological risk are very similar to those for community risk, in that Alternative 9 would create potential for ecological exposure to release of excavated waste during remedial action. The other alternatives do not involve these risks.

Time to complete the remedial action includes preparation of MTCA planning documents, remedial design, Ecology and public review, and implementation. Time estimates were from completion of the FCAP.

5.3.1.4 Reduction of Toxicity, Mobility, and Volume

This criterion addresses the degree to which a remediation alternative reduces the inherent toxicity, ability of contaminants to migrate in the environment, or the quantity of contaminated material. This criterion is also used to express the preference hierarchy for cleanup technologies under 173-340-360(4), and the use of recycling or treatment under WAC 173-340-360(5). Effectiveness and reliability of the treatment, which were addressed under long-term effectiveness and permanence, were not addressed under this criterion.

5.3.1.5 Implementability

This criterion addresses the degree of difficulty in implementing each alternative. Implementability issues are important because they address the potential for delays, cost overruns, and failure. Known implementation difficulties with quantifiable cost impacts were included in the cost estimates. The implementability criterion focuses on less quantifiable known and potential difficulties. Implementability was evaluated considering the following:

- **Technical Feasibility.** Technical feasibility addresses the potential for problems during implementation of the alternative and related uncertainties. The evaluation includes the likelihood of delays due to technical problems and the ease of modifying the alternative, if required.
- **Availability of Services and Materials.** The availability of experienced contractors and personnel, equipment, and materials needed to implement the alternative. Availability of disposal capacity is also included in the evaluation.
- **Administrative Feasibility.** The degree of difficulty anticipated due to regulatory constraints and the degree of coordination required between various agencies.
- **Scheduling.** The time required until remedial action would be complete, and any difficulties associated with scheduling.
- **Complexity and Size.** The more complex or larger a remedial action, the more difficult it is to construct or implement. In addition, the chance of failure that could affect remedy effectiveness increases with the complexity of the remedial action.
- **Other Considerations.** Monitoring requirements, access for construction and operation and maintenance, integration with existing operations and current or potential remedial action, and other factors were considered.

5.3.1.6 Cost

This criterion was used to consider the costs of performing each alternative, including capital, operation, and maintenance, and monitoring costs. Alternative costs were compared on a net present value basis.

Known implementation difficulties with quantifiable cost impacts were included in the cost estimates. Additional details on the cost comparison for alternatives are provided in the RI/FS.

5.3.1.7 Community Acceptance

After the FS was finalized in 1996, an alternative was selected as the proposed remedial action in this DCAP. Determination of community concerns is based on public comments on this DCAP. Ecology evaluates community acceptance after DCAP comments are received. The public comments will be addressed in the Responsiveness Summary (Appendix C). The proposed remedial action may be modified to address community concerns based on public comments and Responsiveness Summary on the DCAP.

5.3.2 Evaluation of Alternatives and Selection of a Site Remedy

Selection of a remediation alternative was based on a comparative evaluation of the alternatives (that satisfy the threshold criteria) using five of the permanence criteria: 1) long-term effectiveness and reliability, 2) short-term effectiveness, 3) reduction in toxicity, mobility, and volume, 4) implementability, and 5) cost. Overall protectiveness and community concerns were not included in the comparative evaluation as indicated in the definitions above.

Each alternative was scored relative to the other alternatives for the four non-cost permanence criteria. Because of the nature of the criteria and the uncertainties in the evaluation, the scores for these four criteria were expressions of relative qualitative or semi-quantitative professional judgments. A scale of 0 (worst) to 10 (best) was used. The alternative evaluation details and scores are presented in the FS and are summarized in Table 1.

The relative values of the non-cost criteria were then determined. The relative criteria values were expressions of what a scoring unit of one criterion is worth compared to a scoring unit of another criterion. The assigned relative values were converted to criteria weightings (i.e., percentage of the overall score). The scores for the four non-cost criteria were combined using the criteria weightings to give overall alternative scores. These scores express the net benefit of the alternatives. The net benefit, or overall non-cost scores, is given in Table 1. Using these scores, the preference ranking of the alternatives before consideration of cost is as follows (most to least preferred):

1. Alternative 5 (Low-Permeability Soil Cap)
2. Alternative 6 (FML Cap)
3. Alternative 7 (FML/GCL Cap)
4. Alternative 9 (Excavation and Disposal).

The selected Alternative 5 has the highest preference using non-cost criteria and is considered the most permanent cleanup action for the Site. Alternative 9 (Excavation and Disposal) is a permanent remedy, but had the overall lowest score for non-cost criteria and net-benefit. This ranking reflects the many problems associated with excavation and the uncertain benefit (i.e., lack of reliability). The lack of

reliability on Alternative 9 as a cleanup solution stems from the inability to actually remove all of the waste materials and the commingled impacted mine/bedrock materials. The removal of waste and mine collapse debris is not considered technically possible and is impracticable. The mine collapse debris was found to flow during the drilling of deeper wells (i.e., LMW-11). Because the mine debris would flow toward an excavation, mine debris removal/excavation would create a constant flow of mine debris to the excavation, rendering it either impossible or impracticable to extend the excavation deeper into the mine workings. In addition, the mine is not completely vertical, which makes excavation more difficult at depths. Furthermore, specific locations of the waste within the Rogers Seam are not well known and cannot feasibly be determined because detailed sampling cannot provide definitive locations of all impacted areas to allow reliable and complete removal. Total removal of all wastes could not be verified by observation or detailed confirmation sampling. As a result of the inability to confirm total waste removal, it is likely that another alternative would have to be implemented for protection. Alternative 9 (Excavation and Disposal) would be much more likely to cause actual harm to humans in the form of construction accidents for Site workers (difficult and dangerous excavations with potential mine subsidence) and traffic accidents in the community (truck traffic). Remediation workers would also be much more likely to be exposed to waste constituents during implementation of Alternative 9, than from the other alternatives. These known risks were balanced against the potential risks of the other alternatives and resulted in Alternative 9 not being recommended.

Alternatives 6 and 7 are also less preferred than Alternative 5 mainly because of the difficulty in compacting the trench fill materials and maintenance problems that would develop with continuing subsidence or compaction using an FML cover cap.

After the non-cost evaluation, a comparison of the cost and benefit of the alternatives was made. As shown in Table 1, Alternative 5 (Low-Permeability Soil Cap), which is the highest ranked alternative on non-cost criteria, is also the least expensive alternative. Alternative 9, which is the lowest ranked alternative on non-cost criteria, is the most expensive alternative. Alternatives 6 and 7, which are both ranked lower than Alternative 5 on non-cost criteria, are also both more expensive than Alternative 5. Accordingly, the cost of the various remedies does not change their ranking for purposes of remedy selection. Alternative 5 is the preferred alternative.

5.4 Reasonable Restoration Time Frame

The cleanup action alternatives shall be evaluated on whether the restoration time frame is reasonable. The factors to be considered include {WAC 173-340-360(4)(b)}:

1. Potential risks posed by the site;
2. Practicability of achieving a shorter restoration time frame;
3. Current use of the site, surrounding areas, and associated resources that are, or may be affected by releases from the site;
4. Potential future use of the site, surrounding areas, and associated resources that are, or may be affected by releases from the site;

5. Availability of alternative water supplies;
6. Likely effectiveness and reliability of institutional controls;
7. Ability to control and monitor migration of hazardous substances from the site; and
8. Toxicity of the hazardous substances at the site; and
9. Natural processes that reduce concentrations of hazardous substances at the site.

The evaluation of reasonable restoration time frame identifies that all cleanup alternatives have long restoration time frames because they include containment as a component of the cleanup alternative, except for Alternative 9 - Excavation and Off-Site Disposal of All Waste and Affected Soil, assuming it is successful. Alternative 9 was evaluated to not be a practicable cleanup action because of the mine site environment and difficulty of removing waste materials beneath the area of waste disposal. The mine site and mine workings are 750 feet deep with only about a 16 foot width. The mine and geologic bedding is nearly vertical in the area of waste disposal, but does dip at a small angle towards the west. It is therefore not practicable to ensure removal of all contamination and any effort to do so would pose considerable risks to workers both from potential hazardous substance exposure and to construction/mine hazards. Furthermore, there is no practicable manner to verify whether an effort to remove all hazardous substances is successful, resulting in a situation where an alternative such as Alternatives 5, 6, or 7 would need to be implemented anyway.

Alternatives 5, 6, and 7 all use containment as a remedial component; therefore, the restoration time frame is the same for these alternatives, extending into the foreseeable future. The selected remedy, Alternative 5, has a reasonable restoration time frame for the mine site conditions, because shorter restoration time frames are not technically practicable. The Site will have restrictions regarding land uses through institutional controls and will be monitored indefinitely to ensure protection of human health and the environment. If Site contaminants migrate to the conditional compliance boundaries at concentrations exceeding MTCA cleanup levels, a Contingent Groundwater Extraction and Treatment System will be operated to capture and contain contaminants for the protection of human health and the environment.

5.5 Proposed Cleanup Action Plan

The remedy proposed for the Site is Alternative 5 (low permeability soil cap). A conceptual design of this alternative is shown in Figure 14. This alternative provides a low-permeability soil cap over the backfill of the trenches. The permeability of this soil would be no higher than 10^{-6} cm/sec, and the cap would thus meet MFS specifications in WAC 173-304. The major steps in this alternative are:

1. Backfill the trenches as required for capping (as described below).
2. Allow the backfill to consolidate.
3. Place a low-permeability soil cap over the backfill of the trenches, including grading and surface water management (as described below).
4. Cap maintenance will continue until residual hazardous substance concentrations no longer exceed cleanup or remediation levels as described in the CAP resulting from either (1) the application of new remediation technologies currently unavailable or (2) other circumstances or conditions that affect residual

concentrations such that they no longer pose a risk to human health or the environment.

5. Implement and maintain institutional controls, groundwater monitoring and any instituted contingency plan (as described below) until residual hazardous substance concentrations no longer exceed cleanup or remediation levels as described in the CAP resulting from either (1) the application of new remediation technologies currently unavailable or (2) other circumstances or conditions that affect residual concentrations such that they no longer pose a risk to human health or the environment.

The areas that would be capped (areas 7, 8, and 9) are shown in Figure 15. This delineation is based on the areas of waste disposal identified in the RI/FS. The cap would extend slightly beyond the trenches on both sides to provide anchor zones and "overhang". Fill material may extend into area 6 if necessary and as appropriate to provide a buttress to the narrow pillar wall separating areas 6 and 7. Furthermore, it has been determined through the RI/FS and accompanying RI/FS Responsiveness Summary that capping and in-filling of the trenches (i.e. including the southern portion of the trenches in the proposed cleanup action) does not provide additional protection. Capping or in-filling the southern trenches do not provide beneficial protection from waste materials because:

- there is no indication that wastes were deposited in the southern trenches, therefore waste cannot be mobilized by infiltrating water in the southern trenches;
- groundwater quality in the mine, including the southern portion of the mine, is not currently impacted from waste disposal, therefore reducing the amount of groundwater infiltrating to the south half of the Rogers Seam has no benefit;
- the groundwater divide in the southern portion of the Rogers Seam keeps groundwater in the northern portion that is beneath the deposited waste materials from migrating toward the south and toward the City of Kent water supply watershed; and
- infiltration of rainwater into the open subsidence trenches in the south half of the mine ensures the permanency of the mine groundwater divide and the hydraulic isolation of the south half of the mine from the north half where waste were disposed.

These reasons provide the justification for only capping trenches in areas 7, 8, and 9.

Surface water runoff from the cap will be collected in drainage ditches and directed as appropriate. The cap will be sloped to optimize stability and encourage rainwater runoff to minimize rainwater infiltration to the maximum extent possible. The cap slope will include doming the centerline of the cap (option not shown in Figure 14) or sloping from one side of the trenches to the other where elevations differ (option shown in Figure 14).

The major benefit of capping will be to reduce rainfall from entering and infiltrating through any waste remaining on-site and reduce the amount of groundwater flowing through the Rogers Seam workings, and maintaining the groundwater divide located in the southern portion of the mine from shifting toward the north. Another common benefit of capping, prevention of direct contact and off-site migration in stormwater or dust, is provided by the backfill of the trenches.

The cap will need periodic inspection and maintenance and if damage did occur, repair of a soil cap would be relatively easy, requiring only removal of the vegetative soil and adding additional low-permeability soil.

The cap design is shown as Option B in Figure 14 and will include a top layer of vegetated soil to promote evapotranspiration and decrease the potential for erosion. While it is still to be determined during final design stage of the project, this material may be obtained from the area immediately adjacent to the trenches. No moisture conditioning is expected, and this soil would not be compacted, in order to provide a loose medium for establishing the vegetative cover. To establish vegetation, the topsoil would be seeded with grasses suitable for the local climate. The low-permeability soil cap consists of 24 inches of compacted low-permeability soil beneath 6 inches of vegetated topsoil. The suitability of potential sources of cap material, in terms of both quality and quantity, would need confirmation during final design. Final haul road location and source material specifications will be detailed in the final design.

Installation of this cap could be performed using standard earth-moving equipment. A large number of qualified contractors are available. Construction Quality Assurance (CQA) would primarily consist of verifying the soil cap meets the permeability specification, as well as verifying cap thickness and grading.

Because of its simplicity, little maintenance will be required for this alternative. Any settling after cap installation can be repaired by filling, compacting, and regrading in the same manner as initial installation. The thickness of the cap will provide long-term protection against erosion. The planted vegetative cover will be mowed as needed.

5.5.1 Trench Backfill

The selected alternative includes first filling the trenches to provide a surface for cap construction. The backfill would also provide a thick physical barrier that would greatly enhance the effectiveness and reliability of the cap.

The trenches also present physical hazards, which are the result of coal mining and not the result of waste disposal activities. Remediation at this Site is limited to environmental effects of waste disposal activities, therefore, removal of physical trench hazards is not a remedial action goal at this Site. The trenches would not require final backfilling to current grade, as long as good stormwater drainage is provided (see below). However, backfilling the trenches as part of environmental remediation will result in incidental reduction of physical hazards. Only trenches in areas 7, 8, and 9 (depicted in Figure 15) will be filled and capped, while a portion of area 6 may be backfilled as necessary and appropriate to buttress the narrow pillar wall between areas 6 and 7. Additional work to soften the slopes of the trench walls outside the described trench fill areas, may be performed in conjunction with the primary remedial activities. Outside the trenches, the ground surface would be cleared and grubbed to remove organic debris. The topsoil would be stockpiled for use in the vegetative cover layer of the cap. In the trenches, trees and large brush would be removed to prevent vertical transmissive zones through the backfill, when the trees eventually decay. This would also prevent excessive settlement of the backfill, which might

occur if backfill is placed on top of a "mat" of small trees. Suitable fill material would include any inert material capable of bearing overlying loads without excessive settlement. The most economical local source of suitable fill will be used; the selection of the source(s) of backfill for the trenches will be identified in the Engineering Design Report (EDR). On this basis, the backfill is assumed to consist of a silty sand and gravel (till), sand and gravel (outwash), and/or excavated carbonaceous shale / coal / rock fill (which would likely breakup into a silty granular fill).

Filling the trenches may induce settlement of the waste material, which must be accounted for in the design and installation of a cap. The existing waste materials in the trenches are expected to be moderately compressible due to their loose nature and inclusion of construction debris and organic materials. Backfilling is expected to induce compression of these materials, which may result in eventual surface settlement on the order of 6 inches to a foot. Settlement of the new fill depends on the type of fill used and the method of placement. End-dumped fill of poor quality could settle on the order of 2 to 6 feet. A better quality fill with moderate compaction effort might settle on the order of 3 to 9 inches.

About 75 percent of the settlement would be expected to occur soon after fill placement provided the cover restricts future infiltration of water. The remainder of the settlement will continue gradually for many years at a decreasing rate. The trenches could be over-filled by about 4 feet for a period of about three months or more to both add a small "surcharge" and to allow time for most of the settlement to occur. After the surcharge period, the backfill would be graded for cap placement.

A conceptual cross section of the backfilled trenches is shown in Figure 14 for the situation where the elevation differs from one side of the trenches to the other. If elevations are similar between the sides, the cap will be domed in the center to enhance rainwater run-off and minimize infiltration. The slope or dome grade will be determined in the final cap design with consideration of slope stability. The lower zone of the backfilled trenches may not be compacted because of the unacceptably high safety risk of sudden trench collapse caused by heavy vibrating equipment. The upper portion of the backfill would be compacted to reduce the settlement of the cap foundation.

There will be a tendency for differential settlement to occur at the location of the sidewalls of the trenches. In addition, the use of poor quality and variable fills can result in differential settlements away from the sidewalls. To limit abrupt differential settlement, over-excavation and backfill would be considered at the top of the sidewalls to create a transition zone, as shown as tie-in zones in Figure 14.

Filling will increase the load on the buried drums and thus create the potential for collapse of any intact drums that may be in the trenches. A period of one month of monitoring after completion of backfill has been included in the short-term (protection) groundwater monitoring program to address the possibility of intact drum collapse leading to significant release of chemicals to groundwater.

5.5.2 Grading and Surface Water Management

The area to be backfilled and capped (see Figure 15) would be graded to provide proper stormwater drainage. At the present time, some runoff from the area surrounding the subsidence trenches flows into the trenches. Thus, trench backfill, grading and stormwater diversion would decrease the stormwater flow into the northern trenches, thereby decreasing infiltration with or without a cap in place. However, stormwater runoff will be allowed to continue to flow into the southern trenches to maintain the southern groundwater divide.

As part of backfilled trenches, drainage ditches would be constructed at the margins of the cap to intercept surface runoff and convey it away from the capped trenches. Final ditch configurations, locations, and details would be determined using standard hydraulic design methods as part of final design.

5.5.3 Contingent Groundwater Infrastructure Components

Groundwater currently meets cleanup levels. Therefore, no groundwater containment or treatment is necessary. In the event that mine waste contaminants are detected in groundwater at the compliance boundary above remediation levels (one-half of MTCA Method B cleanup levels), a contingency groundwater treatment system will be implemented and will withdraw groundwater at a rate that will prevent the off-site migration of contaminants and will treat (as necessary) the groundwater prior to discharge to an existing Metro sewer. With this contingency for future groundwater treatment available if needed, institutional controls on groundwater use and long-term groundwater monitoring, risks from groundwater to public health and the environment are avoided. The contingency groundwater treatment system is presented in the Contingency Groundwater Treatment Plan (Exhibit E, Part C). Contingency groundwater extraction and treatment will continue until groundwater, at the points of compliance, meets cleanup levels. If the Contingent Groundwater Extraction and Treatment System is triggered and implemented, as discussed in Section 4.0 of the Contingency Groundwater Treatment Plan (Exhibit E, Part C), the compliance monitoring frequency of treatment system inflow and outflow will be determined by the Metro discharge permit.

5.5.3.1 North Portal Infrastructure

To speed installation of a contingent treatment system, some of the infrastructure was installed in 2008 near the north portal (Golder 2009b). The infrastructure that was selected for premature installation included the items that have a long lead or permitting phase that might slow the installation process. For example, a fenced gravel pad to support the extraction/treatment equipment was installed north of Portal #2. A discharge pipeline was installed from the treatment pad extending to the west end of the PCC property to be eventually tied into the local Metro POTW sewer. Additionally, an electrical transformer and control box for equipment hook-up has been installed. The area has lighting and is fenced for security. If mine waste contaminants are detected in groundwater from the north compliance boundary wells that exceed 50 percent of MTCA Cleanup Levels upon confirmation, the groundwater extraction well, necessary pumps, piping and storage (surge tanks) will be installed. However, groundwater extraction

will not begin unless MTCA Cleanup Levels are exceeded at a compliance well. If that occurs, the groundwater will either be directly discharged to the Metro POTW sewer (if groundwater COC concentrations meet POTW discharge limitations) or a groundwater treatment system will be installed that treats groundwater for the specific detected contaminants to levels acceptable as required for discharge to the Metro POTW sewer. The treated groundwater effluent will be temporarily trucked to the nearest Metro POTW sewer intake, until the existing buried pipeline can be connected directly to the Metro POTW sewer.

5.5.3.2 South Portal Infrastructure

Similar to the north portal, infrastructure to support a contingent groundwater extraction and treatment system will be installed during the remedial action near the south portal. The infrastructure that will be installed at the south portal will include a gravel pad to support a future groundwater extraction well, pumps and groundwater storage (surge) tanks, an electrical transformer, and an equipment control panel, gates, and fencing. The existing gravel roads at the south portal will be improved as needed for truck access. The groundwater extraction well, pumps and groundwater storage tanks will only be installed when and if Site groundwater exceeds a confirmed concentration of 0.5 MTCA Cleanup Levels at the south compliance boundary wells. Groundwater extraction will not begin until MTCA Cleanup Levels are exceeded at a compliance well. At such a time, a temporary pipeline leading from the south portal to the treatment system at the north portal will be used to transport contaminated groundwater to the north portal for treatment and disposal. The temporary pipeline could eventually be replaced with a buried permanent pipeline.

5.5.4 Sentinel Wells

Four additional sentinel wells will be installed prior to the completion of the remedial action. Two will be in the north and two in the south. These additional sentinel wells will supplement existing sentinel wells. Figures 12 and 13 illustrate the locations and approximate depth of the proposed additional sentinel wells.

5.5.4.1 South Sentinel Well System

Two additional sentinel wells will be added to the existing monitoring wells in the south (LMW-9 and LMW-11) for a total of four sentinel wells that will be used for the early detection of waste constituents. Both of these new sentinel wells will be installed to monitor the surface of the water table within the mine because the two flow paths with the highest potential for contaminants to migrate toward the south are along the surface of the water table and near the bottom of the mine. One new sentinel well will be located near LMW-11 (estimated to be about 150 feet deep). This sentinel well will be installed after the CAP is finalized and remedial actions are completed. The other new sentinel well will be placed just south of the capped waste disposal trenches (estimated depth of about 170 feet). This additional new sentinel well location will serve two purposes:

1. Early detection of any waste constituent migrating toward the south beyond the waste disposal area; and

2. Effectiveness monitoring of groundwater level changes resulting from remedial actions.

This dual purpose sentinel and effectiveness monitoring well will be a sufficient distance from the south monitoring wells so as to determine whether future groundwater is able to flow toward the south from the waste disposal area.

5.5.4.2 North Sentinel Well System

The north compliance boundary lacks early detection sentinel monitoring wells with the possible exception of LMW-10, which is about 150 feet south of the north compliance monitoring wells (LMW-2 and LMW-4). Figures 12 and 13 also show the location and approximate depth of the two additional north sentinel wells, which will be located adjacent to the north portal (Portal #2). These sentinel wells will be installed after the CAP is finalized and remedial action construction is complete. One sentinel well will monitor the shallow groundwater table (at less than 30 feet bgs) and the other sentinel well will monitor the groundwater at approximately the 200 foot depth within the mine. These two additional sentinel wells, together with monitoring of LMW-10 as a sentinel well, provide full vertical coverage of groundwater flowing within and away from the mine before reaching the north compliance boundary.

5.5.5 Monitoring

Separate groundwater monitoring programs will be used for protection during the remedial action and, over the long term for confirmation following completion of remediation. Detailed monitoring plans have been developed for the selected remedy and are presented in the Compliance Monitoring Plan (Exhibit E, Part A of the Consent Decree). In addition, the Compliance Monitoring Plan will contain a Contingency Groundwater Treatment Plan (Exhibit E, Part C of the Consent Decree) that will discuss procedures for capture and treatment of groundwater in the unlikely event that groundwater contamination is detected at the Site.

A Remedial Action Health and Safety Plan (HASP) will be submitted to Ecology before construction activities begin at the Site. This HASP is also for protection monitoring during construction and will include air monitoring requirements for ensuring that the workers and off-site public are not exposed to potential Site contaminants.

Performance Monitoring will include CQA monitoring of the backfill and cap installation and surface diversion systems during remedial actions. A CQA plan will be established and submitted to Ecology before construction activities begin at the Site.

5.5.5.1 Protection Monitoring

Protection monitoring is conducted during remediation to ensure that there are no adverse effects to human health or the environment from remediation activities.. Health and safety monitoring will also be performed to ensure that Site workers are not exposed to undue or unexpected risks. Protection monitoring includes short-term groundwater monitoring, as discussed in the Compliance Monitoring Plan

(Exhibit E, Part A of the Consent Decree), specifically in the Health and Safety Plan (Appendix HASP of Part A).

5.5.5.2 Performance Monitoring

Performance monitoring is to confirm that the cleanup action has attained cleanup standards or remediation levels or other performance standards such as construction quality control or demonstrate compliance with permits. Performance monitoring for the Site will involve construction quality assurance that the cleanup action design is achieved by the materials used and the construction methods are in accordance with acceptable standards of care. Performance monitoring will demonstrate that the constructed remedy is in compliance with any required permits or with the substantive requirements of MTCA exempted permits. The construction quality assurance plan will be prepared with the EDR, since its details are dependent with the final design of the remedy.

5.5.5.3 Confirmational Monitoring

Confirmational monitoring will be conducted for the following purposes: 1) to verify that the remedy performs as expected over time, and 2) to allow timely maintenance of a cap and other physical components of Alternative 5 in the FS. Periodic Site inspections and surveys will be sufficient for determining maintenance needs and monitoring cap performance. Cap performance is also monitored by groundwater monitoring. Long-term confirmational groundwater monitoring and Site inspections and maintenance will continue until residual hazardous substance concentrations no longer exceed cleanup or remediation levels as described in the CAP resulting from either (1) the application of new remediation technologies currently unavailable or (2) other circumstances or conditions that affect residual concentrations such that they no longer pose a risk to human health or the environment.

Cap Monitoring: Cap monitoring will consist primarily of visual inspections for damage and subsidence. The cap will be periodically examined for the presence of offsets, scarps, low-points, ponded water, odd changes in grade, excessive erosion, and the condition of the vegetative layer. For the first year, such inspections may be performed on a quarterly basis and would eventually be reduced to once a year for the post-closure period. It is expected that the vegetated cover will be maintained including as needed mowing to prevent the establishment of deep rooted trees or bushes.

In the event of an earthquake of Intensity IV or greater (Modified Mercalli Intensity Scale) in the area, the cap will be inspected for damage and repaired accordingly. The north and south portal areas will be inspected for ground ruptures, fractures, earth displacements, or similar damage to original (pre-earthquake) landscape. If portal water surfaces due to the earthquake event, it will be inspected for signs of anomalous water quality (color, turbidity, odor, etc.). Ecology will be notified of site conditions within seven (7) days and a decision will be made between the property owner and Ecology on taking groundwater samples from site wells in accordance with the sampling network, protocols, and analytical methods of the Compliance Monitoring Plan in the Consent Decree (Exhibit E). Contingency actions will be implemented in accordance with this plan.

Groundwater Monitoring: Groundwater monitoring would include periodic groundwater sampling and analysis as described in the CMP at selected key locations throughout the Site to confirm that concentrations of constituents of concern from prior waste disposal activities do not exceed acceptable limits at the conditional points of compliance. Site groundwater currently meets remediation goals, so the monitoring program will be designed for early detection of a release to Site groundwater of potential contaminants attributable to the disposal of waste in the trenches, should it occur. Because groundwater from the trenches is channeled by the sidewalls with near vertically sloping rock strata, which provide a natural containment structure, monitoring where the groundwater exits the trenches (i.e., the north and south portals) is considered sufficient to detect any potential release. Groundwater monitoring would focus on detecting potential releases at the northern end (i.e., LMW-2, LMW-4, and LMW-10), at the southern end (i.e., LMW-3, LMW-5, and LMW-8) and within the Frasier and Landsburg Seams (i.e., LMW-6 and LMW-7, respectively), and the groundwater located at the bottom of the mine will also be monitored (i.e., LMW-11). Additionally, four sentinel wells will be installed before the remedial action is complete, which will also be included in the long-term monitoring program. In the event that a release is detected, the migration of impacted groundwater would be evaluated, groundwater monitoring would be increased, and additional wells would be sampled and analyzed as necessary to determine the fate and transport of the contaminants and to evaluate associated risk.

5.5.5.4 Groundwater Monitoring Program Summary

If a release were to occur, it is more likely to occur during or immediately after the trenches are backfilled. Based upon the reported handling of drums during placement in the trenches, and given the length of time since placement, most drums are probably already breached. The additional load of the backfill, however, may further collapse the drums, increasing the potential for a release. Impacted soil could also be compressed, potentially leading to migration of contaminants. After backfilling and compaction of the trenches, the stresses will equilibrate and the potential for a release will be lessened. Considering the travel time of a release to existing monitoring wells, frequent monitoring of existing wells is appropriate during backfill placement. Therefore, the groundwater sampling program will have two components: 1) Protection Monitoring; [WAC 173-340-410 (1)(a)] during backfilling of the trenches; and 2) Confirmational Monitoring for the post-closure care period [WAC 173-340-410 (1)(c)].

Details of the groundwater monitoring are presented in the Compliance Monitoring Plan (Exhibit E, Part A). The groundwater monitoring program will include the following elements:

- Monitoring will be performed using the existing monitoring wells, at the north and south portals (e.g., existing wells LMW-2, LMW-3, LMW-4, LMW-5, LMW-8, LMW-9, LMW-10, and LMW-11) and within the Frasier and Landsburg Seams (e.g., existing wells LMW-6 and LMW-7, respectively) for confirmational monitoring. Because the hydraulic conductivity within the mine is much greater than laterally through the adjacent bedrock, monitoring these two locations would detect a release of contaminants directly attributable to disposal of waste in the trenches. If constituents were detected at levels of concern in these monitoring wells, then additional wells could be sampled and analyzed to determine the extent of contaminant migration. However, if contaminants are not detected in above-listed monitoring wells, then it is probable that no other wells would be impacted by contaminants, and monitoring additional wells would not be conducted.

- Frequent monitoring of these 10 existing monitoring wells will be performed during the backfilling of the trenches and cap construction, which is estimated to take approximately 16 to 20 weeks. Samples will be obtained every two weeks from these wells and analyzed for pH, specific conductance (as an indicator for metals and other inorganic compounds), and dissolved oxygen. If there is a dramatic change in any of these groundwater parameters, we will consider analyzing samples for potential contaminants. On a monthly basis, the samples would also be screened for total petroleum hydrocarbons and VOCs. A VOC screening analysis would be capable of detecting a wide range of potential VOCs that are mobile. Any detections or anomalies in the screening analyses would be subject to more laboratory analysis for confirmation of the detection. If the detection is confirmed, then samples from the effected well(s) would also be analyzed for priority pollutant metals and organic compounds using United States Environmental Protection Agency (EPA) methods 8270 and 8081. At the completion of the remedial action construction, sampling will extend for an additional month following the same sampling program.
- Confirmational monitoring would initially (after remedial construction is completed) consist of annual and screening-level monitoring. Annual monitoring would provide comprehensive monitoring for specific contaminants of potential concern, and would include VOCs, SVOCs, total petroleum hydrocarbons, PCBs, pesticides, and trace metals. Selected general water quality parameters (pH, specific conductance, dissolved oxygen, turbidity, and total dissolved solids) would also be included. Screening-level monitoring would be conducted when the monitoring is more frequent than annual (i.e., quarterly or semi-annually), and would include analysis for VOCs (EPA Method 8260), trace metals, pH, specific conductivity, dissolved oxygen, and turbidity. More in-depth analysis would then be performed if screening analysis indicated that constituents may be present in the groundwater at levels of concern (at least 50 percent of the respective MTCA Cleanup Level.

  Sentinel wells will also be included in the confirmational monitoring program. Sentinel wells will be used as an early warning for impacted groundwater migration. Four new sentinel wells will be installed prior to the completion of the remedial action. LMW-9 and LMW-11 are also considered sentinel wells.

  Confirmational monitoring would start at the completion of the remedial action in sentinel and compliance wells. The confirmational monitoring frequency would be quarterly for the first year, semi-annual for the next four years, and annual for the next five years. After 10 years, the confirmational monitoring will decrease in frequency again, but the frequency will be analyte- and well location dependent, as follows:

  - LMW-2, LMW-4, LMW-10, Deep North Sentinel Well (yet to be installed), Shallow North Sentinel Well (yet to be installed), LMW-6, and LMW-7 will have a monitoring frequency of 2.5 years for VOCs and TPH; and every 5 years for metals, SVOCs, PCBs, and chlorinated pesticides.
  - LMW-3, LMW-5, LMW-8, LMW-9, MWL-11, South Shallow Sentinel Well (yet to be installed), Dual South Sentinel/Cap Effectiveness Well (yet to be installed) will have a monitoring frequency of 5 years for VOCs and TPH; and every 10 years for metals, SVOCs, PCBs, and chlorinated pesticides.

  These frequencies were based on the evaluation of BIOSCREEN modeling, the results of which were summarized by Golder in a report (2009a) and approved by Ecology in their letter dated January 21, 2010.

5.5.5.5 Response If Remediation Levels Are Exceeded

A response action will depend on information obtained from groundwater monitoring and cap inspections. In the event that a contaminant (that could be directly attributable to the disposal of waste in the trenches through an "alternative source evaluation") is detected and confirmed within groundwater from a sentinel

well or compliance well at specific concentrations, remedial actions are triggered. Remedial actions are summarized below, but additional details are provided in Exhibit E - Part A Compliance Monitoring Plan:

Sentinel Well Detections:

- If following validation of a laboratory detection greater than 0.5 times the MTCA Cleanup Level at a sentinel well, the Group will inform Ecology and confirm the detection by re-sampling the compliance well and will analyze for the analyte that was detected over 0.5 times the MTCA Cleanup Level. If the detection in a sentinel well is confirmed by re-sampling, the Group will notify Ecology and will conduct an "alternative source evaluation" to understand if the detection is caused by another source other than the waste disposed in the Roger's mine trenches. The detection at a sentinel well does not trigger a remedial response action other than to evaluate whether the detection could be from a source other than the waste disposed in the Roger's subsidence trenches. The sequence of steps for detections at sentinel wells is shown in Figure A-8 in Exhibit E – Part A.

Compliance Well Detections Over 0.25 MTCA Cleanup Levels:

- If following validation of the laboratory data (QA/QC) the detection at a compliance well is over 0.25 of the MTCA Cleanup Level, the Group will inform Ecology within seven (7) days and then confirm the detection by re-sampling the compliance well. The sample will be analyzed for the analyte that was detected over 0.25 MTCA Cleanup Level.
- If the analytical validation and confirmation re-sampling results confirms that the analyte is present within groundwater from the compliance well at a concentration that is 0.25 of the MTCA Cleanup Level, the Group will notify Ecology within seven (7) days and then conduct an "alternative source evaluation" to evaluate if the detection is caused by another source other than the waste disposed in the Roger's mine trenches.
- If an alternative source of the detected analyte is not identified, the Group will then commit to increasing the monitoring frequency as per Table A-3. The increased monitoring will only be for groundwater at the particular compliance well and for the particular analyte having a validated and confirmed detection above 0.25 of the MTCA Cleanup Level. This sequence of steps for detections at compliance wells is shown in Figure A-9 in Exhibit E – Part A.

Compliance Well Detections above 0.5 MTCA Cleanup Level:

- If following validation of the laboratory data (QA/QC), the detection is determined valid and the detected concentration is over 0.5 of the MTCA Cleanup Level at a compliance well, the Group will inform Ecology of the detection within seven (7) days and then confirm the detection by re-sampling the compliance well and analyzing for the analyte that was detected over 0.5 MTCA Cleanup Level.
- If confirmation re-sampling does not confirm the contaminant at a concentration above 0.5 of the MTCA Cleanup Level, then the confirmational monitoring cycle will continue without the implementation of corrective remedial action to install the Contingent Groundwater Treatment System (see Figure A-9 in Exhibit E – Part A).
- If the confirmation re-sampling confirms the concentration of the contaminant above 0.5 of the MTCA Cleanup Level in a compliance well, Ecology will be informed within seven (7) days and then the Contingent Groundwater Treatment System presented in Exhibit E – Part C will be implemented and installed as the corrective remedial action for containment and treatment of impacted groundwater. The anticipated time frames for the installation of the Contingent Groundwater Treatment System are presented in Exhibit C – Part C.
- Groundwater containment (pumping and treatment) will not be initiated unless groundwater concentrations of contaminants exceed MTCA Cleanup Levels at a

compliance boundary well(s). Treated groundwater will be discharged to the local POTW sewer (see Exhibit E - Part C for more details).

Because a detection at a compliance well may never increase to the MTCA Cleanup Level, the increased frequency of groundwater monitoring at specific compliance well(s) (as specified in Table A-3 in Exhibit E – Part A) can end and return to the regular long-term monitoring schedule in accordance with Table A-2 in Exhibit E – Part A under any of the following conditions:

- If the validated and confirmed detection becomes non-detect at the same laboratory Method Detection Level (MDL) for three consecutive monitoring periods.
- If the trend analysis (using a minimum of eight monitoring events for statistical representativeness) shows a steady or decreasing trend; or
- If the trend analysis indicates a rate of increase would not result in concentrations reaching the MTCA Cleanup Level in a time period that is less than the routine long-term monitoring specified in the CMP (Table A-2 in Exhibit E – Part A).

Groundwater Monitoring During Operation of the Contingent Groundwater Treatment System:

- During the contingent groundwater treatment system operation, compliance wells at the compliance boundary where the exceedance of MTCA Cleanup Levels occurred will be monitored quarterly only for the analytes that were in exceedance. All other wells will be monitored as per the long-term monitoring program.
- Contingency groundwater extraction and treatment will continue until groundwater at the points of compliance and the pumped effluent are below MTCA Cleanup Levels for four consecutive monitoring periods or a minimum of one (year). When the contingency groundwater extraction and treatment system is implemented, the compliance monitoring frequency of treatment system inflow and outflow will be determined by the Metro discharge permit.

5.5.6 Institutional Controls

Under the selected remedy, any contaminated material (i.e., subsurface waste, including drums) will remain on-site and, as such, institutional controls are required [WAC 173-340-440(1)(a)] for the disposal areas. Institutional controls are a key component of the alternatives for maintaining long-term effectiveness.

Deed restrictions will be instituted to ensure that Site use restrictions remain in force regardless of the property owner, and to notify any prospective purchasers of the Site that there is the presence of subsurface waste. Site use restrictions will prohibit using the Site for purposes incompatible with a waste Site. For the selected remedy, these restrictions will prohibit penetrating the cap and any Site use that could damage the cap or significantly reduce its effectiveness. Any structures or buildings (such as maintenance equipment sheds) will not be allowable in the cap area, unless they are part of the remedial action. Warning signs will be posted to provide notice of the presence of a waste site to trespassers and recreational visitors. Site deed restrictions will include the waste filled subsidence trenches and a buffer zone around the installed remedial system cap and components. Such restrictions shall also include limitations on development in specified areas located near Portals #2 and #3 which have been designated for installation of the Contingency Groundwater Treatment Systems, should such systems become

necessary and to the extent such development would be inconsistent with the installation and operation of such systems. Site use restrictions will remain in force indefinitely.

A locked fence surrounds the northern portion of the Site (see Figure 4) that contains waste materials, to prevent people from coming in contact with waste materials during allowed recreational uses around the Site. This locked fence will remain in place for a period of five years following the remedial action to ensure that the cap is secured and ground cover is well established. Fencing may not be needed for capping alternatives (after five years) because the trench backfill will provide an effective barrier from the waste material, such that incidental trespass (which fencing is designed to prevent) or limited utilization of the Site would not present a health risk or jeopardize the cap integrity. After five years, the fencing could be removed with Ecology's approval.

During construction of the remedial action, means of restricting access to the waters discharging from Portal's #2 and #3 will be engineered, in a manner acceptable to Ecology, to prevent exposure to those waters by humans. The engineered restriction will keep Portals #2 and #3 groundwater discharge from surfacing, thereby eliminating access and direct contact by humans. These access restrictions shall remain in force indefinitely.

Periodic Site inspections and maintenance of the cap, fencing, warning signs, and any other physical components of the institutional controls will be included in the deed restrictions. Financial assurances will be established, as appropriate, in the Agreed Order or Consent Decree for potential future remedial actions at the Site.

Groundwater use restrictions and engineered access restrictions on the use of and exposure to surface waters from Portals #2 and #3 will be implemented to prevent exposure to groundwater and portal surface water near the Site and within the compliance boundary shown in Figure 11. After these restrictions are employed at the Site, exposure of humans to potentially contaminated groundwater from the Site could happen only if off-site migration occurred. Routine, periodic monitoring of groundwater will be used to detect contaminants on-site specifically attributable to the disposal of waste in the trenches before off-site migration can occur.

Groundwater at the Site's points of compliance currently meets remediation goals. Therefore, no groundwater containment or treatment is currently necessary. In the event that groundwater were to become impacted by contaminants specifically attributable to the disposal of waste in the trenches, groundwater containment treatment (if necessary) and discharge to the Metro POTW sewer would be readily implemented.

5.6 Evaluation of Cleanup Action With Respect to MTCA Criteria

Alternative 5 meets all threshold criteria specified in WAC 173-340-360(2) (protection of human health and the environment, compliance with cleanup standards, compliance with ARARs, and provision for compliance monitoring). It provides the best combination of long-term effectiveness and reliability, short-

term effectiveness, implementability, and reduction of toxicity, mobility, and volume. In addition, this alternative provides good cost-effectiveness [WAC 173-340-360(3)(e)].

Alternative 5 relies on containment of hazardous substances, which has a low preference under MTCA. Site conditions at the Landsburg Mine make higher preference remedial actions less desirable. Remedial actions involving in-situ treatment are less reliable and would be unverifiable. Remedial actions involving ex-situ treatment or off-site disposal would require excavation of the waste materials, which represents a significant potential safety concern with the Site conditions and is considered impracticable. In addition, waste materials could be below the water table within the mine workings and waste removal effectiveness is uncertain.

WAC 173-340-380(1)(a)(ix) requires specification of the types, levels, and amounts of hazardous substances remaining on Site for containment alternatives. Based on available information, the northern trenches (areas 7, 8, and 9 in Figure 15) were used in the late 1960s to the late 1970s for disposal of various industrial waste materials, construction materials, and land-clearing debris. Materials were disposed of in those trenches from the access road shown in Figure 4 of the CAP, attached as Exhibit B. Industrial wastes were contained in drums or dumped directly from tanker trucks. Based on invoice and dumping records from Palmer Coking Coal Company, an estimated 4,500 drums of waste and about 200,000 gallons of oily wastewater and sludge were disposed into the trenches. Available documented interviews with waste haulers and truck drivers indicate that wastes included paint wastes, solvents, metal sludges, and oily water and sludge (Ecology 1990). It is expected that many of the drums were only partially full. The amount of waste remaining at the Site is unknown, but a portion may have been burnt during historical fires, which occurred during placement.

Although the amount of waste remaining at the Site within the Roger Seam trenches is uncertain, Alternative 5 provides a substantial surficial physical barrier (backfilling the trenches where waste was disposed in the northern trenches (areas 7, 8, and 9 in Figure 15) and reduces surface water infiltration, which will reduce the potential for mobilization of waste to the water table. Institutional controls will limit land uses at the Site and, therefore, reduce the risk associated with both mine subsidence and contaminant exposure.

Compliance monitoring will ensure that waste materials remain contained and that the integrity of the Alternative 5 cap is maintained. The conditional points of compliance for groundwater and surface water will be where waters discharge from the Site boundaries, as shown in Figure 11. Cleanup levels for groundwater, if needed, will be MCTA Method B cleanup levels. Cleanup levels are appropriate for the highest beneficial use of groundwater as a potential drinking water source.

In order to protect groundwater, the point of compliance for soils is throughout the Site, as provided in WAC 173-340-740(6)(b). Ecology recognizes that the cleanup action involves containment of hazardous substances. This cleanup action, once implemented, will comply with cleanup standards so long as: (1) all hazardous substances remain contained in the subsidence trenches of the Rogers Seam and covered

by the trench backfill and the low-permeability soil cap, (2) the compliance monitoring program ensures the long-term integrity of the containment system by providing for soil cap maintenance and repair and for groundwater monitoring, and (3) requirements for containment technologies in WAC 173-340-740(6)(f) are met, which are:

1. The remedy is permanent to the maximum extent practicable as evaluated in the Feasibility Study and summarized in Section 5.3 of this DCAP;
2. The remedy is protective of human health from direct contact exposures to hazardous substances, since all wastes will be buried deeper than 15 feet with clean backfill material;
3. The remedy is protective of terrestrial ecological receptors from direct contact exposures to hazardous substances, since all wastes will be buried deeper than 15 feet with clean backfill material;
4. Institutional controls will be in place. Site deed will have land use restrictions that prohibit activities that could interfere with long-term integrity of the containment system;
5. Long-term compliance maintenance monitoring will be conducted for the foreseeable future that inspect and maintain the long-term integrity of the containment system; and
6. The long-term groundwater confirmational monitoring will be used to evaluate the potential for hazardous substances to migrate from the Site and the contingent groundwater treatment system will ensure that contamination remains on-site and prevents contact with contaminated groundwater.

Ecology is establishing a point of compliance for ambient air throughout the Site. Ambient air impacts were low and only observed within trench within area 9 (Figure 15) above exposed wastes. Since the trenches that had wastes disposed (northern subsidence trenches in areas 7, 8, and 9 shown in Figure 15) will be backfilled with the implementation of Alternative 5, Ecology does not believe ambient air impacts to be of concern for the Site after remedial actions are completed. Confirmational ambient air monitoring will not be necessary for the Site unless the additional site safety monitoring information during cleanup actions warrants a concern.

Ecology is establishing the point of compliance for surface water as the point or points at which hazardous substances are released to surface waters of the State of Washington, pursuant to WAC 173-340-730(6). Since the discharge of hazardous substances from the Site to surface waters can only occur where groundwater discharges to surface water, such as at the portals, groundwater compliance monitoring at the designated confirmational groundwater monitoring wells will be appropriate for confirmation and attainment of surface water compliance at the portals. In the event an exceedance of surface water standards is identified during the compliance monitoring program, confirmation sampling of groundwater at a point of groundwater discharge to surface water (the portals) may be undertaken to verify the exceedance of surface water standards.

6.0 IMPLEMENTATION SCHEDULE

The preliminary CAP implementation schedule is in Exhibit C to the Consent Decree. The final implementation schedule will be defined in the Final Consent Decree between Ecology and the Site PLP Group.

7.0 REFERENCES

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TABLE

TABLE 1
SUMMARY OF REMEDIATION ALTERNATIVE EVALUATION

Criteria [a]			Alternative Scores [c]			
	Relative Value of Criterion [b]	Calculated Criteria Weights	5 Low-P Cap	6 FML Cap	7 FML/GCL Cap	9 Excavate
Long-Term Effectiveness and Reliability						
Effectiveness (50% of criterion)		50%	8.3	9	9.5	10
Reliability (50% of criterion)		50%	9.5	9	8.5	4
Overall criterion score	1	53%	8.9	9	9	7
Short-Term Effectiveness	0.4	21%	6.8	6.6	6.4	0
Reduction in Toxicity, Mobility, and Volume	0.1	5%	2	2	2	5
Implementability	0.4	21%	6.8	6.4	6	0
Net Benefit		100%	**7.7**	7.6	7.5	3.9
Cost (present value, millions)			$1.00	$1.18	$1.34	$24
Benefit : Cost (i.e., cost-effectiveness)			7.6	6.4	5.6	0.2

[a] See text for criteria definitions.

[b] The numeric value of one scoring unit of the criterion relative to one scoring unit of the long-term effectiveness and reliability criterion.

[c] See text for score basis.

FIGURES

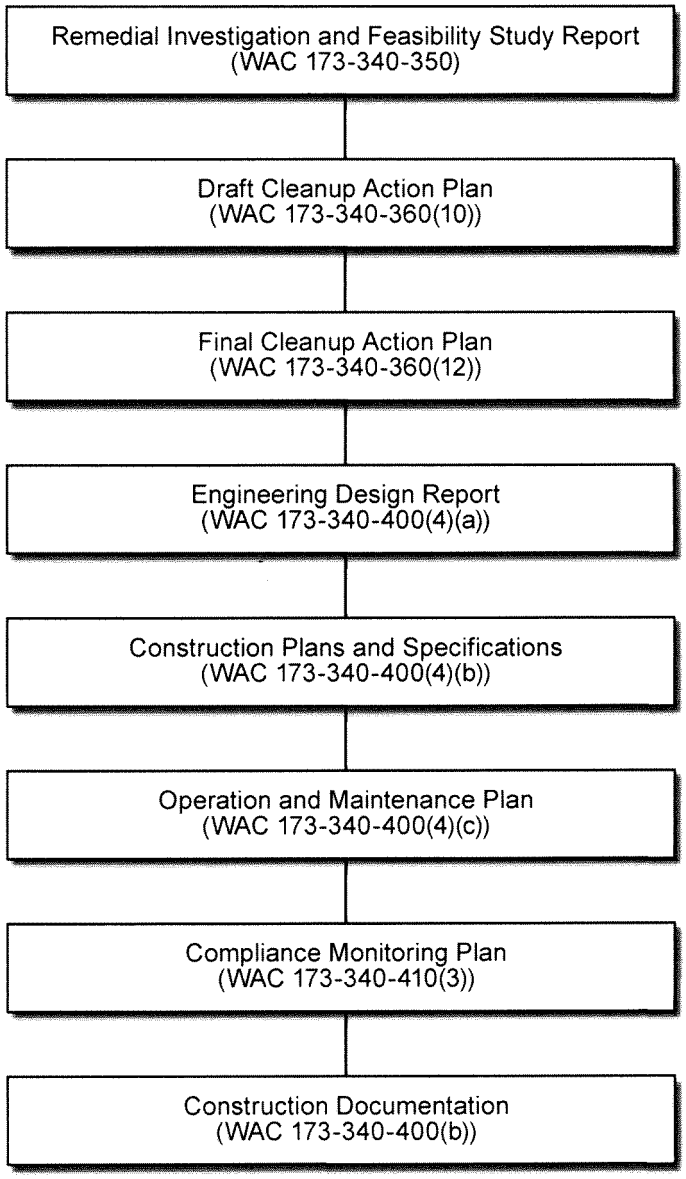

FIGURE **1**
DOCUMENTS REQUIRED UNDER MTCA (CHAPTER 173-340 WAC)
PALMER/LANDSBURG MINE/WA

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Golder Associates

Source: USGS 1:250,000 Sheets, Seattle and Wenatchee

FIGURE 2
SITE LOCATION
PALMER/LANDSBURG MINE/WA

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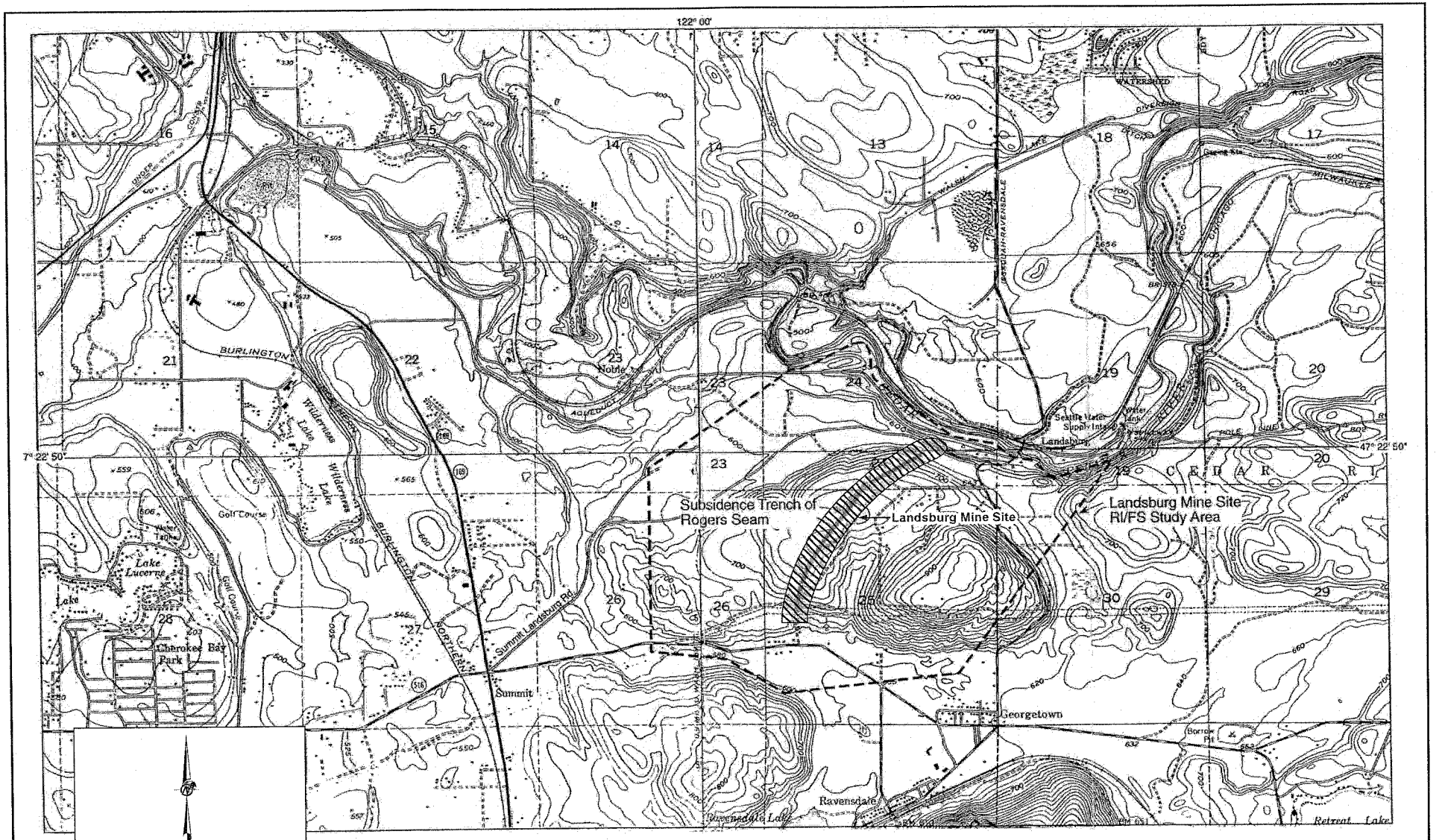

Base map from USGS 7.5' topographic quadrangles "Cumberland" and "Hobart".

FIGURE 3
STUDY AREA BOUNDARY
PALMER/LANDSBURG MINE/WA

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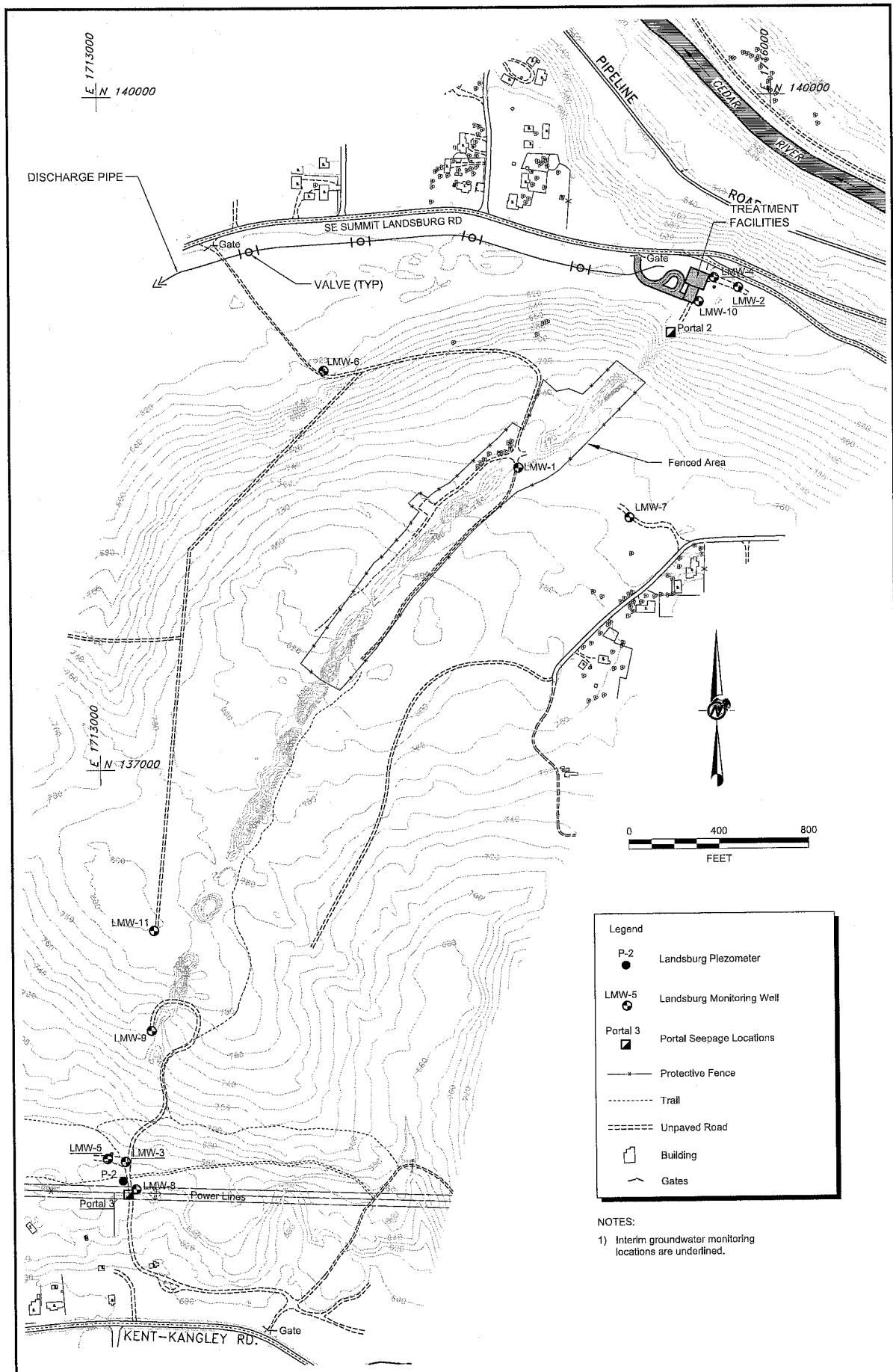

FIGURE **4**

SITE FEATURES AND TOPOGRAPHY

PALMER/LANDSBURG MINE/WA

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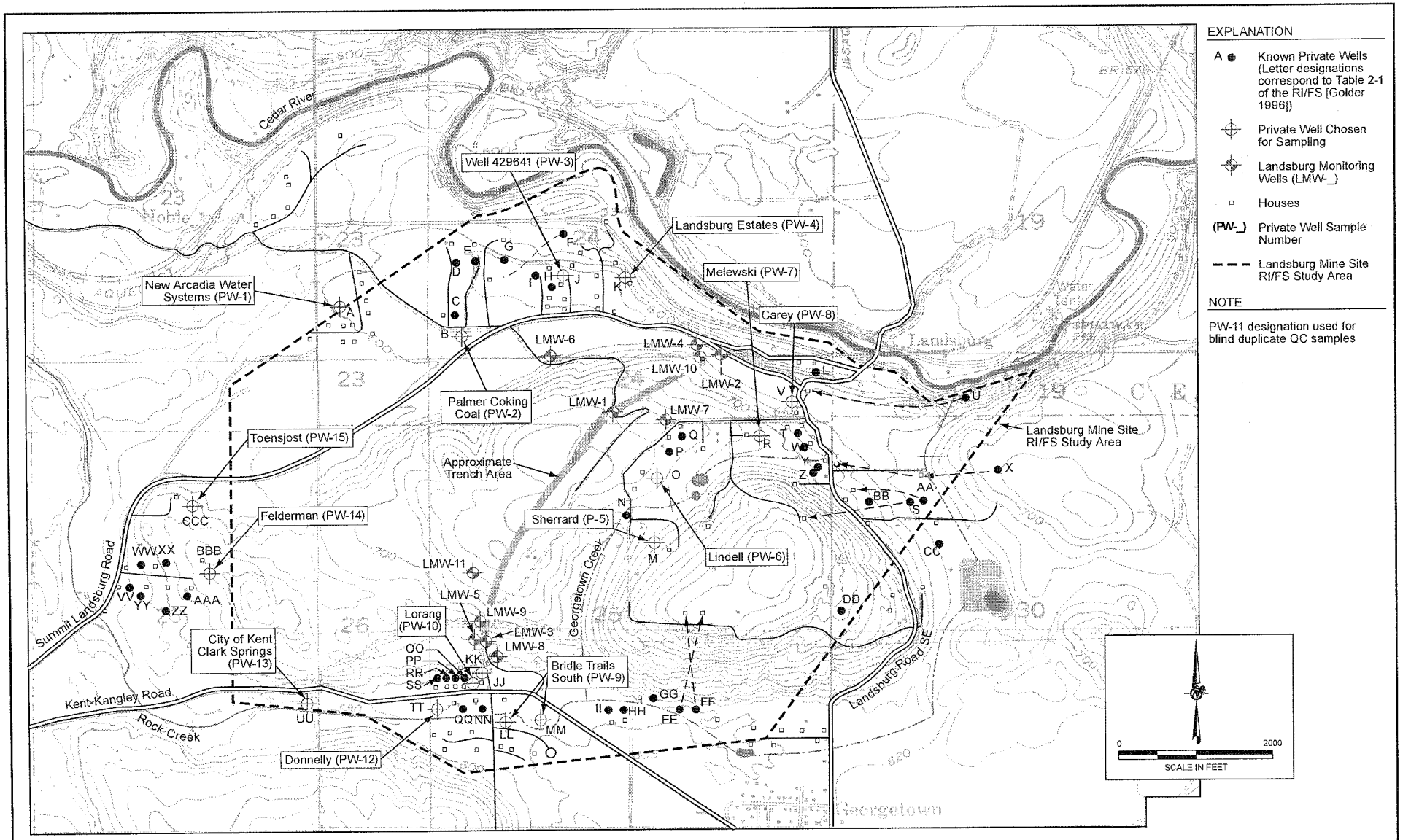

EXPLANATION

- A ● Known Private Wells (Letter designations correspond to Table 2-1 of the RI/FS [Golder 1996])
- Private Well Chosen for Sampling
- Landsburg Monitoring Wells (LMW-_)
- Houses
- (PW-_) Private Well Sample Number
- Landsburg Mine Site RI/FS Study Area

NOTE

PW-11 designation used for blind duplicate QC samples

FIGURE **5**
WELL LOCATIONS
PALMER/LANDSBURG MINE/WA

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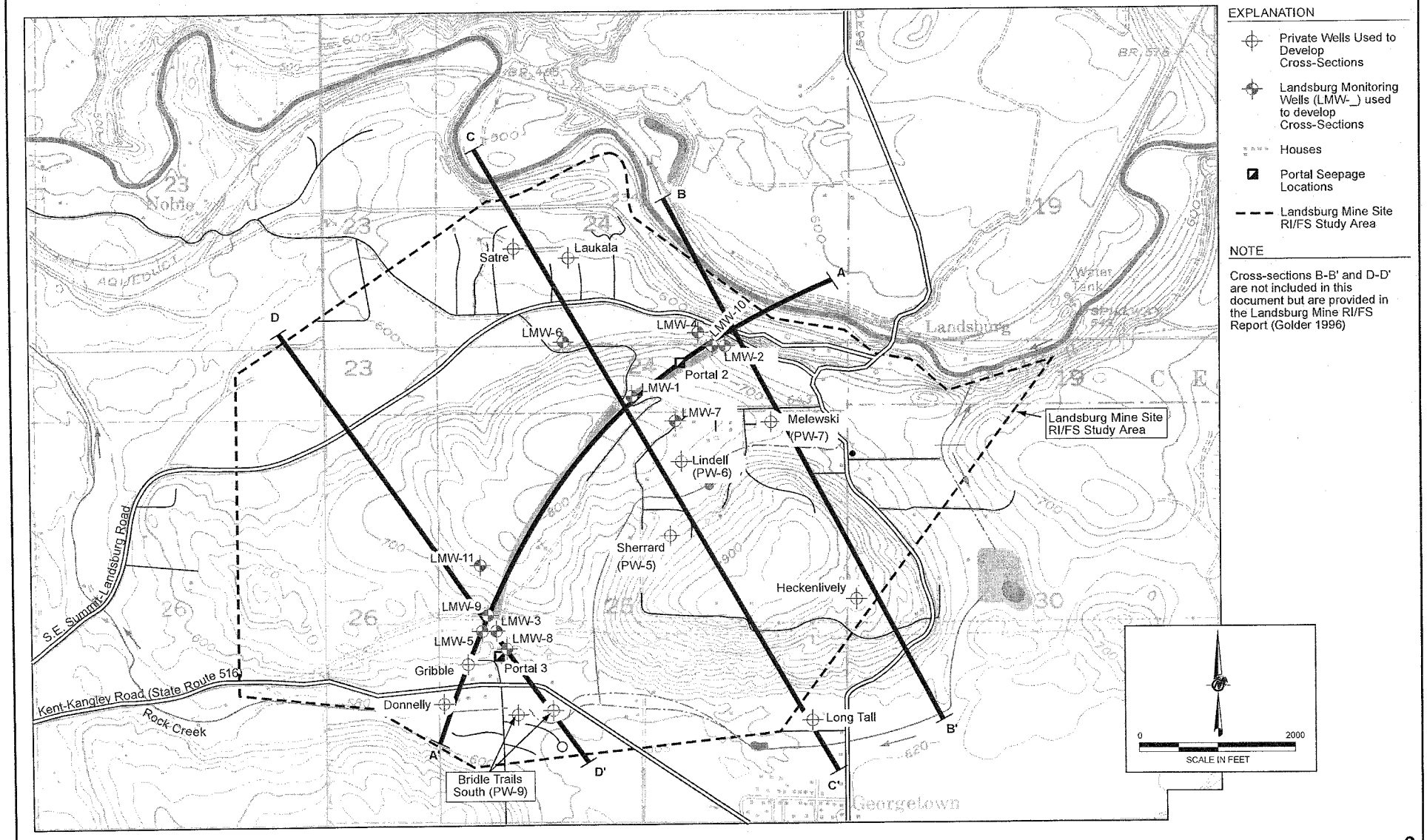

Base map from USGS 7.5' topographic quadrangles "Cumberland" and "Hobart".

FIGURE 6
MAP VIEW FOR LANDSBURG CROSS-SECTIONS
PALMER/LANDSBURG MINE/WA

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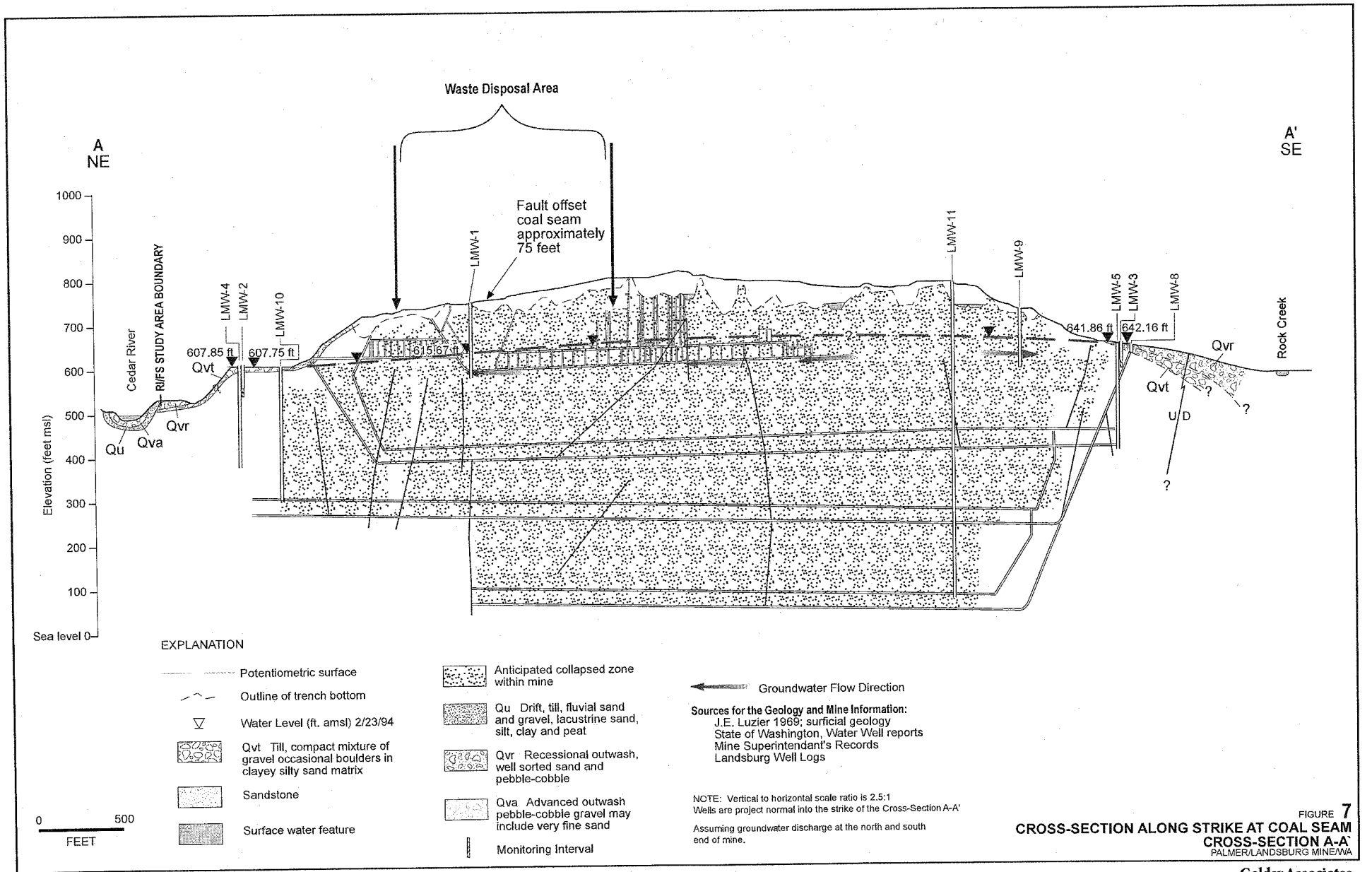

FIGURE 7
CROSS-SECTION ALONG STRIKE AT COAL SEAM
CROSS-SECTION A-A`
PALMER/LANDSBURG MINE/WA

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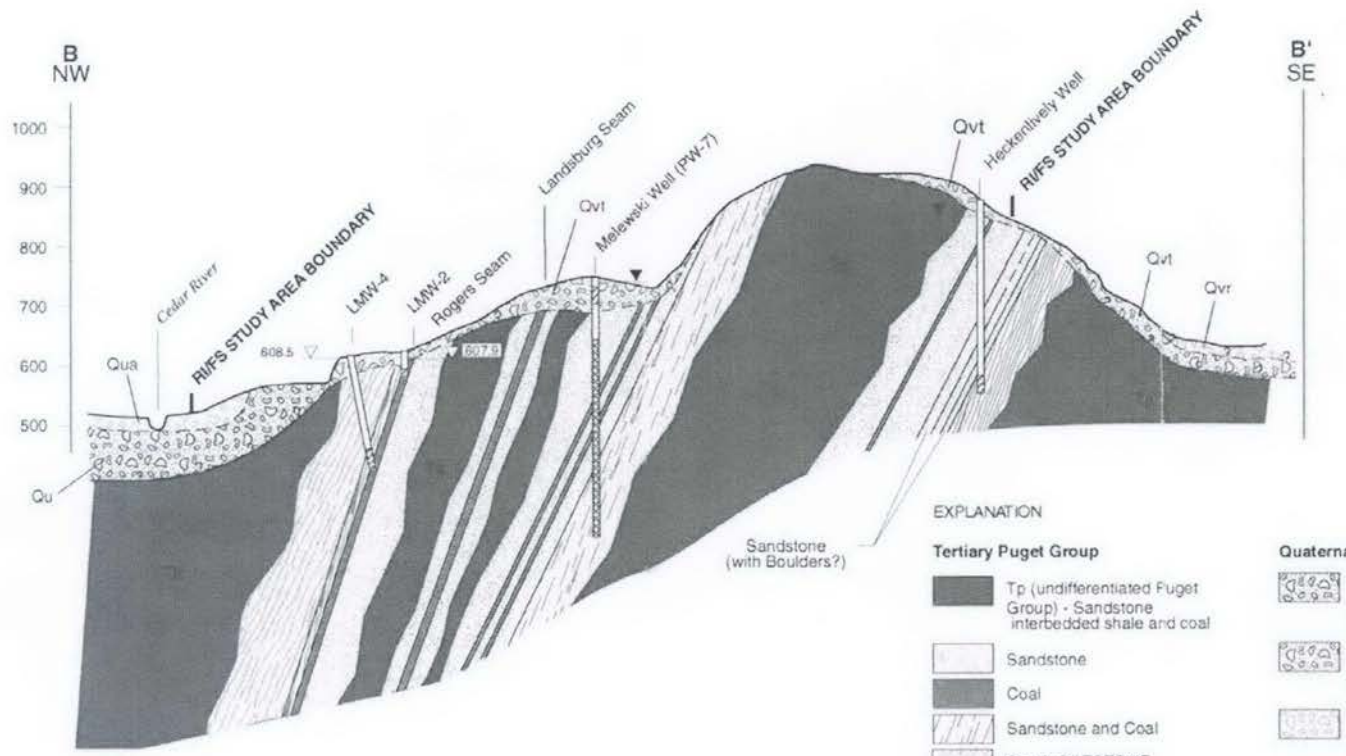

EXPLANATION

Tertiary Puget Group

- Tp (undifferentiated Puget Group) - Sandstone interbedded shale and coal
- Sandstone
- Coal
- Sandstone and Coal
- Sandy SILTSTONE
- Shale
- Shaley Coal and Shale

Quaternary Deposits

- Qu (Pre-Vashon Drift) - till, fluvial sand and gravel, lacustrine sand, silt, clay and peat
- Qvt (Till) - compact mixture of gravel, occasional boulders in clayey silty sand matrix
- Qvr (Recessional outwash) - well sorted sand and pebble-cobble
- Qua (Undifferentiated alluvium) - pebble-cobble gravel and sand

- Grouted Closed
- Monitoring Interval
- ▼ Approximate Water Level
- 608.5 ▽ Water Level (ft amsl) 2/23/94

Sources for the Geology and Mine Information:

- J.E. Luzier 1969; surficial geology
- State of Washington, Water Well reports
- Mine Superintendant's Records
- Landsburg Well Logs

0 2000
SCALE IN FEET

NOTE: Vertical to Horizontal scale ratio is 3.6:1.
Wells are projected normal into the strike of the Cross-Section B-B'.
Cross-sections are inferred from limited data and should be considered approximate.

FIGURE 8
CROSS SECTION B-B'
PALMER/LANDSBURG MINE/WA

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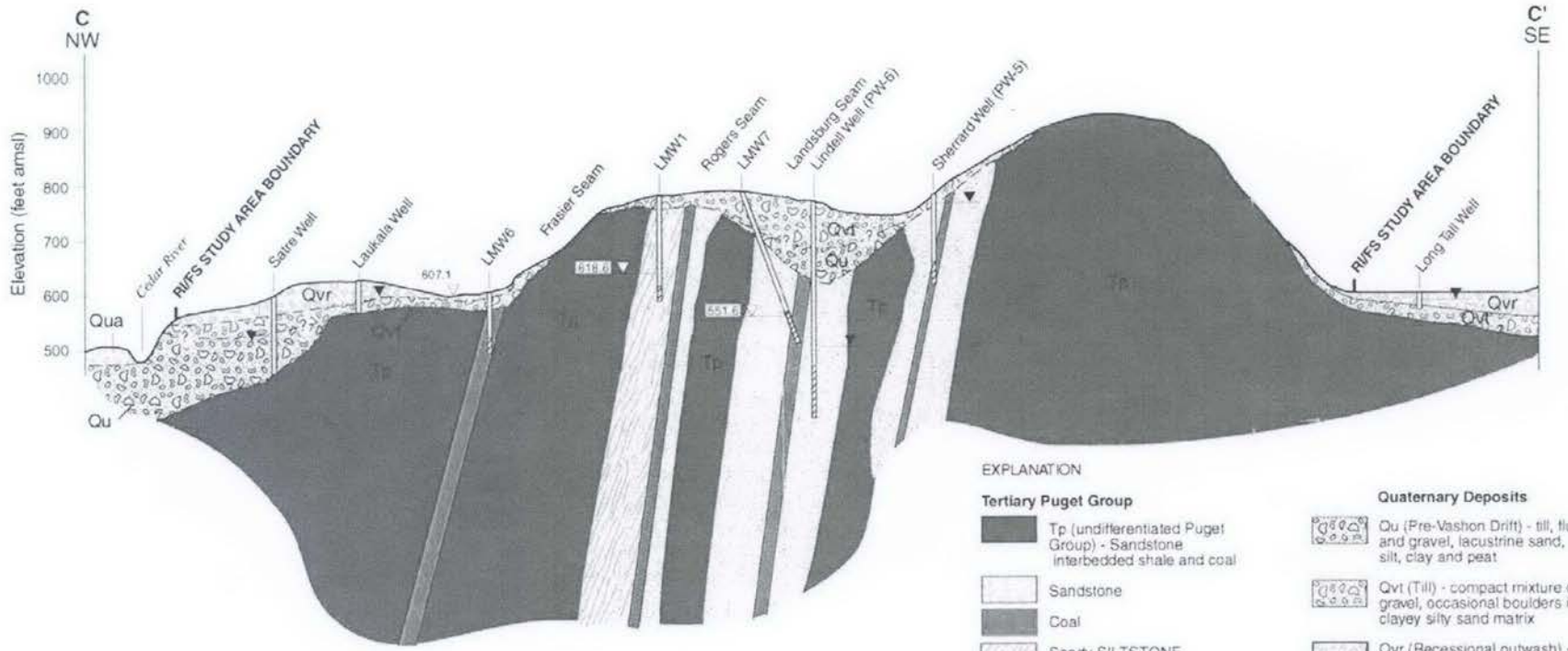

Sources for the Geology and Mine Information:

- J.E. Luzier 1969; surficial geology
- State of Washington, Water Well reports
- Mine Superintendant's Records
- Landsburg Well Logs

NOTE: Vertical to Horizontal scale ratio is 3.6:1.
Wells are projected normal into the strike of the Cross-Section C-C'.
Cross-sections are inferred from limited data and should be considered approximate.

FIGURE 9
CROSS SECTION C-C'
PALMER/LANDSBURG MINE/WA

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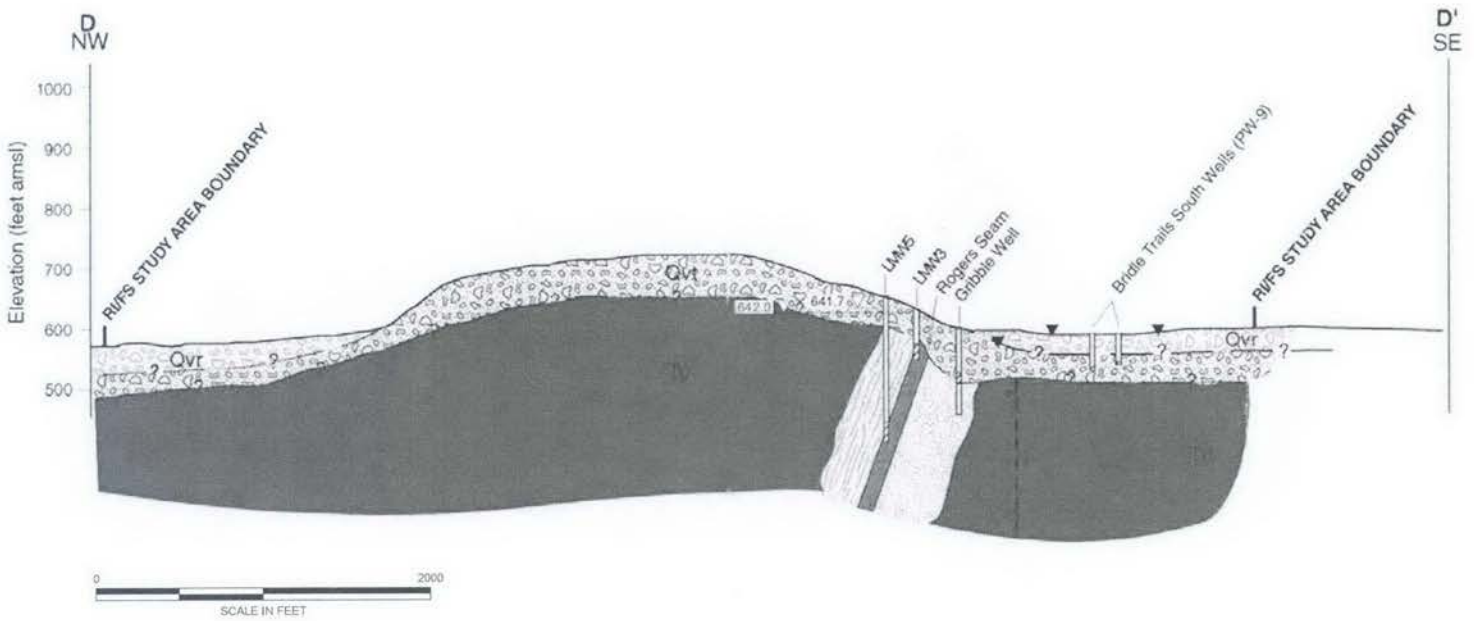

EXPLANATION

Tertiary Puget Group

- Tp (undifferentiated Puget Group) - Sandstone interbedded shale and coal
- Sandstone
- Coal
- Sandy SILTSTONE

Quaternary Deposits

- Qvt (Till) - compact mixture of gravel, occasional boulders in clayey silty sand matrix
- Qvr (Recessional outwash) - well sorted sand and pebble-cobble

- Monitoring Interval
- Approximate Water Level
- 606.5 Water Level (ft amsl) 2/23/94
- Fault, dashed where inferred, queried where uncertain

Sources for the Geology and Mine Information:

- J.E. Luzier 1969; surficial geology
- State of Washington, Water Well reports
- Mine Superintendant's Records
- Landsburg Well Logs

NOTE: Vertical to Horizontal scale ratio is 3.6:1.
Wells are projected normal into the strike of the Cross-Section D-D'.
Cross-sections are inferred from limited data and should be considered approximate.

FIGURE 10
CROSS SECTION D-D'
PALMER/LANDSBURG MINE/WA

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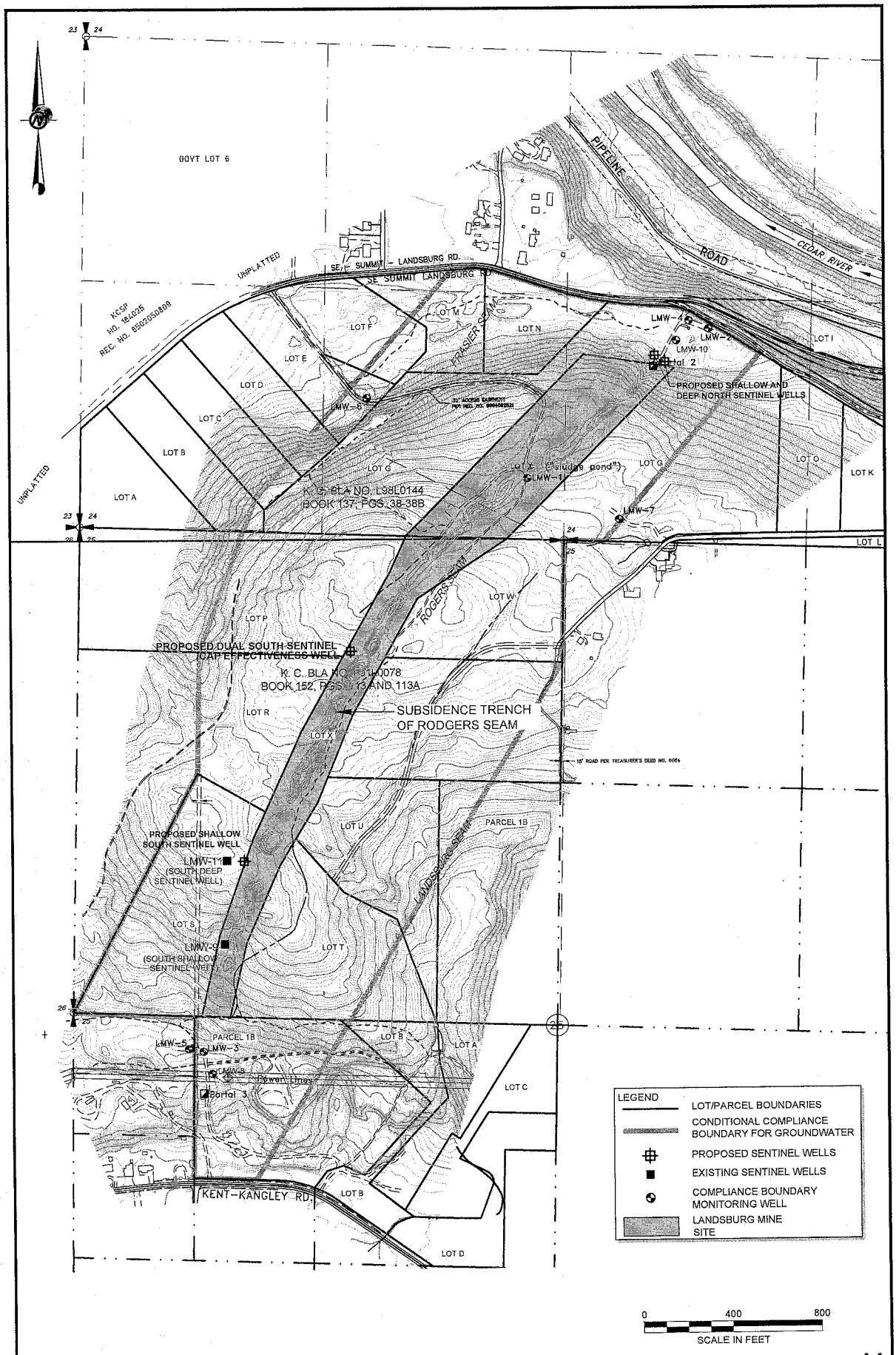

FINAL DRAFT

FIGURE **11**

LOCATION FOR CONDITIONAL POINTS OF COMPLIANCE FOR GROUNDWATER

PALMER/LANDSBURG MINE/WA

NOTE:
1. LETTERS AT LOT X PROPERTY CORNERS CORRESPOND TO THE COORDINATES IN TABLE 1

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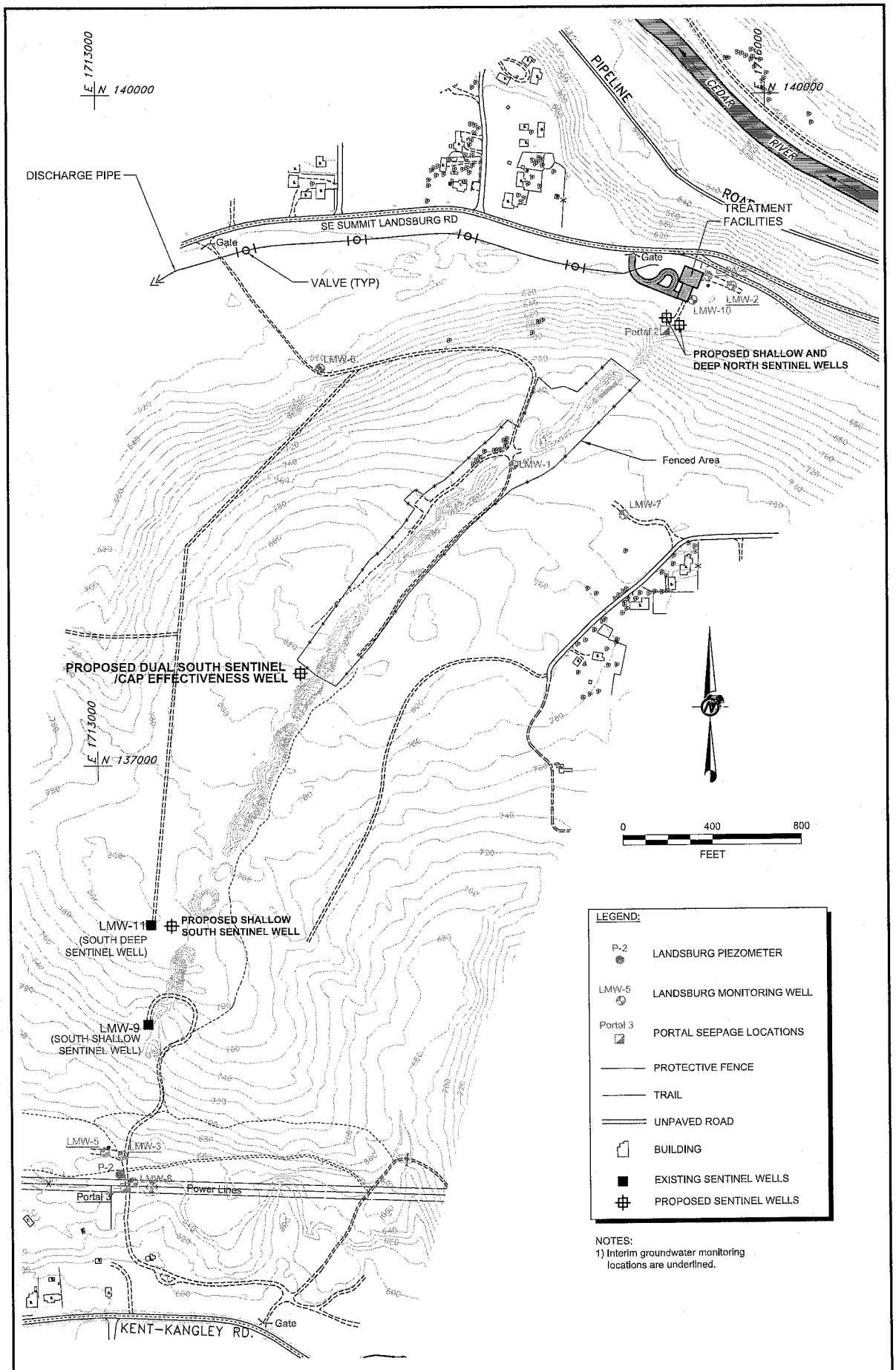

FIGURE **12**

PROPOSED SENTINEL WELL LOCATIONS

PALMER/LANDSBURG MINE/WA

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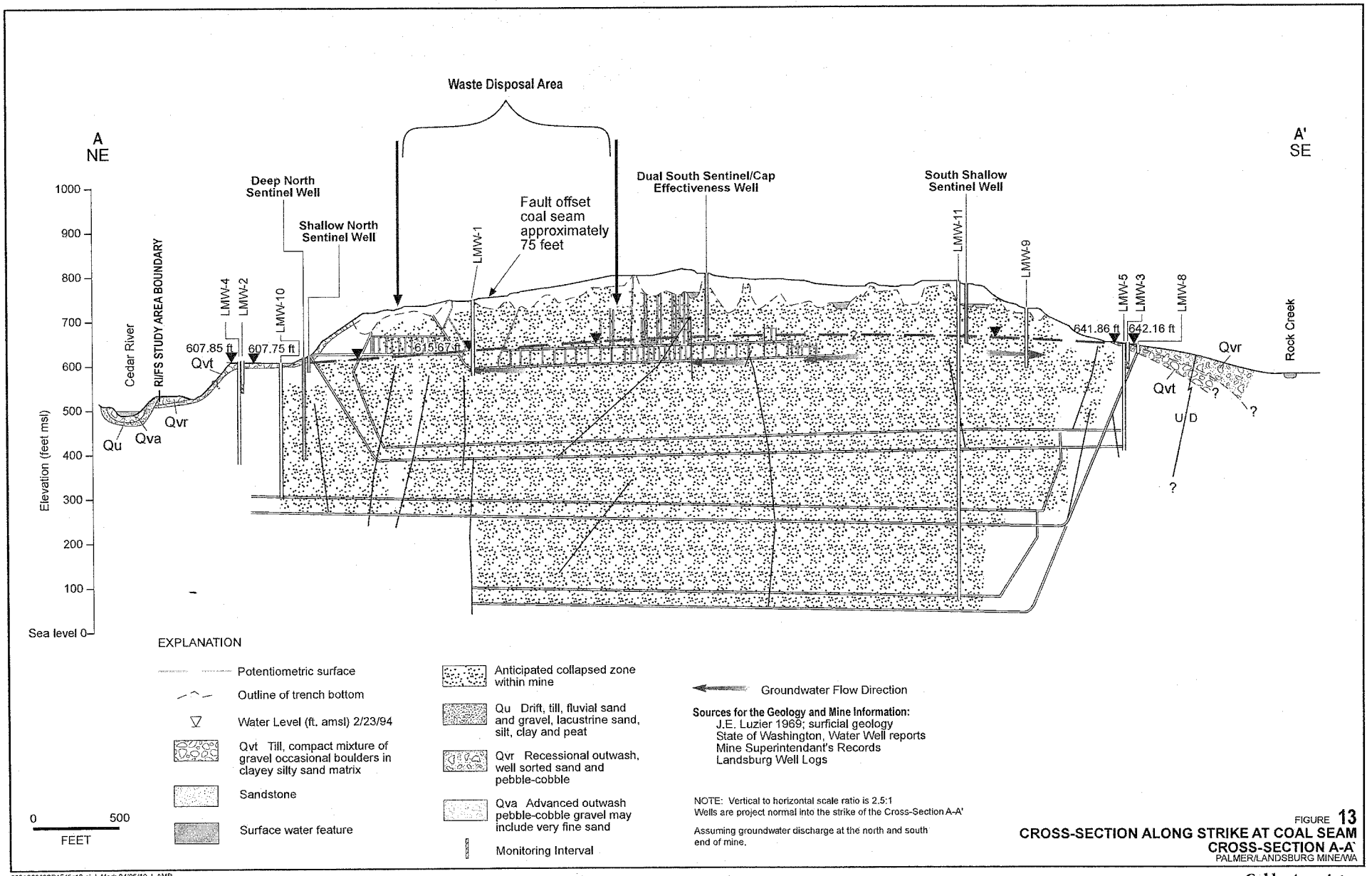

FIGURE 13
CROSS-SECTION ALONG STRIKE AT COAL SEAM
CROSS-SECTION A-A'
PALMER/LANDSBURG MINE/WA

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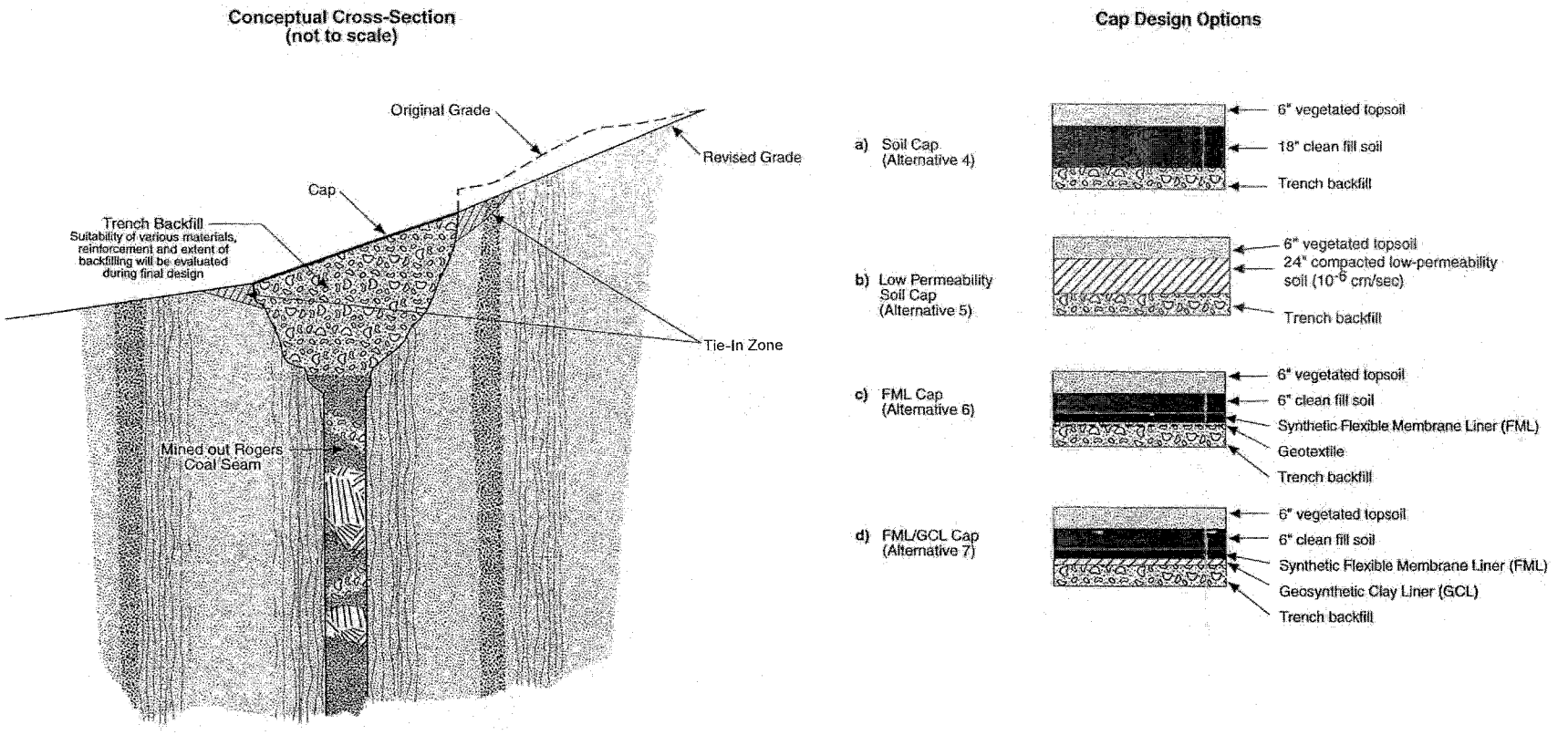

FIGURE **14**
CAP DESIGNS
PALMER/LANDSBURG MINE/WA

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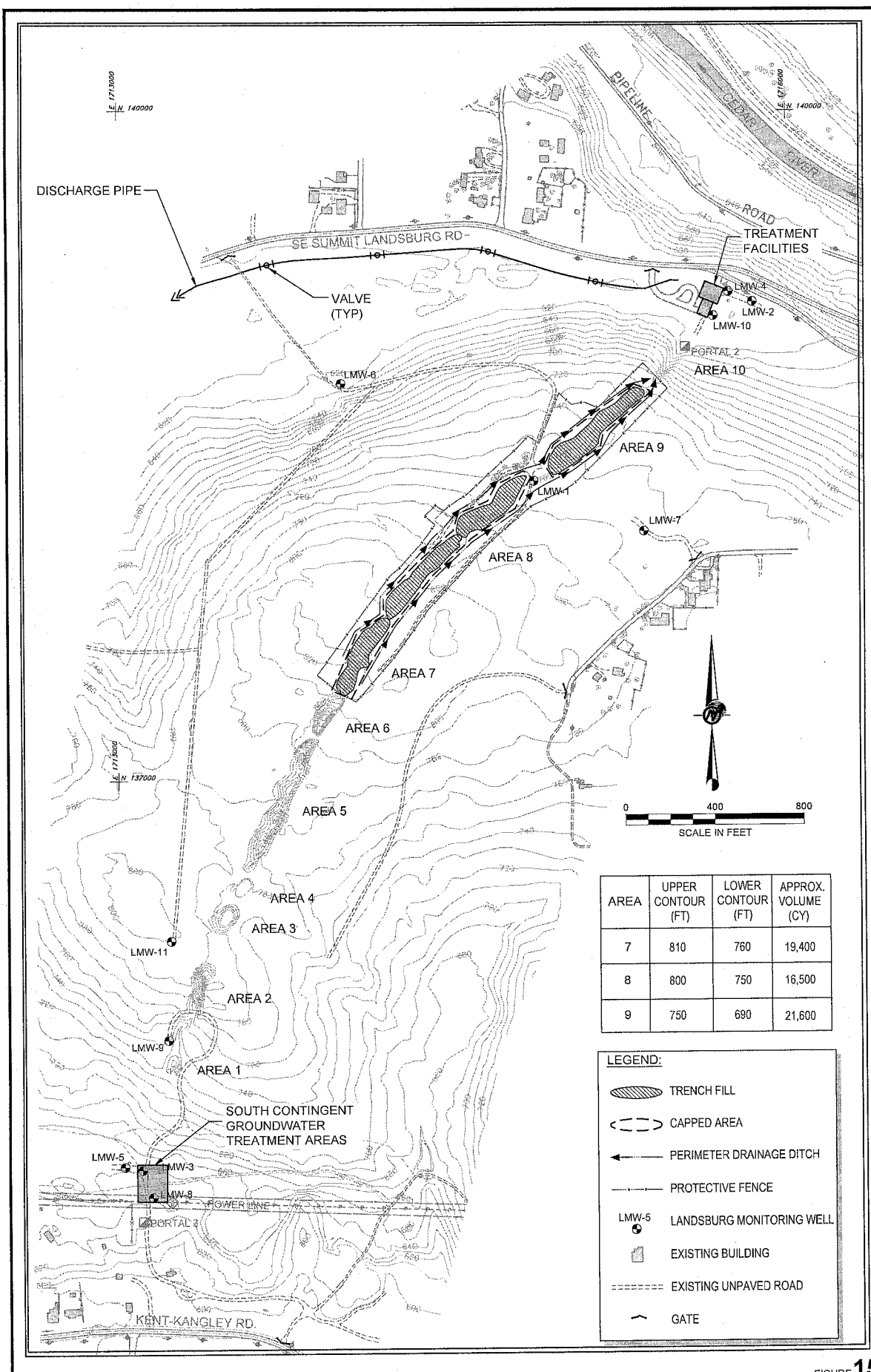

AREA	UPPER CONTOUR (FT)	LOWER CONTOUR (FT)	APPROX. VOLUME (CY)
7	810	760	19,400
8	800	750	16,500
9	750	690	21,600

LEGEND:

- TRENCH FILL
- CAPPED AREA
- PERIMETER DRAINAGE DITCH
- PROTECTIVE FENCE
- LMW-5 LANDSBURG MONITORING WELL
- EXISTING BUILDING
- EXISTING UNPAVED ROAD
- GATE

NOTES:

1. TOPOGRAPHY IN VICINITY OF TRENCHES WILL BE MODIFIED AS NECESSARY TO ACCOMMODATE CAP AND DITCHES.
2. ONLY TRENCH AREAS 7,8, AND 9 WILL BE BACKFILLED AND CAPPED.

FINAL DRAFT

FIGURE **15**
CAPPED AREA AND DRAINAGE DITCHES
PALMER/LANDSBURG MINE/WA

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APPENDIX A
LANDSBURG MINE SITE ARARS

TABLE A-1
IDENTIFICATION OF FEDERAL ARARS FOR THE LANDSBURG MINE SITE

Requirements	Applicable or Relevant & Appropriate	Comment (informal and not legal opinion)
Archeological and Historic Preservation Act Title 16 USC 469a	Applicable	This act requires that actions conducted at the site must not cause the loss of any archeological and historic data. This act mandates preservation of the data and does not require protection of the actual facility. The requirements of this Act are potentially applicable based on a determination of whether such archaeological data occur on site.
Clean Air Act of 1977, as amended Title 42 USC 7401 et seq.	Applicable	The Clean Air Act (CAA) regulates emission of hazardous pollutants to the air. Controls for emissions are implemented through federal, state, and local programs. Pursuant to the CAA, EPA has promulgated National Ambient Air Quality Standards, National Emission Standards for Hazardous Air Pollutants, and New Source Performance Standards. The Clean Air Act is implemented in the State of Washington through the Washington Clean Air Act. Washington Clean Air Act criteria which are potentially ARAR for the Landsburg Mine site are presented in Table 4-2 under the State ARAR discussions.
Clean Water Act of 1977 Title 33 USC 1251, as amended		The Clean Water Act establishes the guidelines and standards to control discharge of pollutants to waters of the U.S. Selected sections are discussed below.
Water Quality Standards 40 CFR 131	Applicable	40 CFR 131 establishes the requirements and procedures for states to develop and adopt water quality standards based on federal water quality criteria that are at least as stringent as the federal standards. Washington State has received EPA approval and has adopted more stringent water quality criteria under WAC 173-201A. These criteria are presented in detail as state ARARs, and are listed in Table 4-4.
Section 404 40 CFR 230.10	Applicable	These sections of the Clean Water Act and associated regulations prohibit discharge of dredge or fill material to wetlands as defined by the U.S. Army Corps of Engineers. The Section 404 requirements are potentially applicable based on a determination of the occurrence of wetlands on the Mine site.
National Pollutant Discharge Elimination System (NPDES) 40 CFR 122 to 125	Applicable	The NPDES program controls release of toxic pollutants through monitoring requirements and implementation of a best management practices program. The substantive requirements of the program would be required if discharge of treated waste water were to occur as part of remediation; however, a permit would not be required due to a MTCA exemption.
Endangered Species Act of 1973 Title 16 USC 1531 et seq.	Applicable	The Endangered Species Act of 1973 establishes requirements for the protection of threatened and endangered species. The requirements of this act are potentially applicable based on a determination of whether such species occur on the Mine site or could be impacted by site remedial activities.

TABLE A-1
IDENTIFICATION OF FEDERAL ARARS FOR THE LANDSBURG MINE SITE

Requirements	Applicable or Relevant & Appropriate	Comment (informal and not legal opinion)
Executive Order 11990	Applicable	Executive Order 11990 requires the protection of wetlands from destruction and specifies that construction activities in the area of wetlands be minimized. The federal agencies are to implement these considerations through existing federal requirements, such as the National Environmental Policy Act. The Executive Order is potentially applicable based on a determination of the whether wetlands are present on the Mine site or could be affected by site remedial activities.
Hazardous Materials Transportation Act 49 USC 1801, et seq		
Hazardous Materials Regulation 49 CFR 171	Applicable	No person may offer to accept hazardous material for transportation in commerce unless the material is properly classed, described, packaged, marked, labeled, and in condition for shipment. These requirements are applicable to hazardous material generated during remedial activities that would be sent offsite for disposal.
Hazardous Materials Tables, Hazardous Materials Communications Requirements, and Emergency Response Information Requirements 49 CFR 172	Applicable	These requirements are applicable if hazardous waste is generated during remediation and is transported offsite. Tables are used to identify requirements for labeling, packaging, and transportation based on categories of waste types. Specific performance requirements are established for packages used for shipping and transport of hazardous materials.
National Historic Preservation Act of 1966 Title 16 USC 470	Applicable	The National Historic Preservation Act requires that historically significant properties be protected. The National Register of Historic Places is a list of sites, buildings or other resources identified as significant to United States history. An eligibility determination provides a site the same level of protection as a site listed on the National Register of Historic Places. The requirements of this federal law are potentially applicable based on a determination of whether such properties occur on the Mine site.
National Oil and Hazardous Substances Contingency Plan (NCP) 40 CFR 300	Relevant & Appropriate	Since the Landsburg Mine site is not on the NPL, the NCP is not applicable to this RI/FS. Sections of the NCP may be relevant and appropriate, however, depending on site conditions.
Resource Conservation and Recovery Act Title 42 USC 6901 et seq	Portions Applicable	The Resource Conservation and Recovery Act (RCRA) consists of standards and criteria controlling the treatment, storage and disposal of hazardous wastes. The EPA has granted the State of Washington the authority to implement RCRA through the Department of Ecology's dangerous waste program (WAC 173-303). Therefore, to avoid redundancy, RCRA criteria which are potentially ARAR for the Landsburg Mine site are not detailed here. The State of Washington equivalent criteria are presented in the state ARAR discussions and in Table 4-2.

TABLE A-1
IDENTIFICATION OF FEDERAL ARARS FOR THE LANDSBURG MINE SITE

Requirements	Applicable or Relevant & Appropriate	Comment (informal and not legal opinion)
Safe Drinking Water Act of 1974 Title 42 USC 300, et seq.		
National Primary and Secondary Drinking Water Standards 40 CFR 141, 143	Applicable	MTCA requires that groundwater cleanup levels be at least as stringent as maximum contaminant levels (MCLs), and non-carcinogen maximum contaminant level goals (MCLGs) established under the Safe Drinking Water Act where groundwater is a current or potential future source of drinking water.
Surface Mining, Control and Reclamation Act of 1977 30 USC 1201 et seq.		
Underground Mining General Performance Standards 30 CFR 717	Not ARAR	This regulation provides general operational performance standards for underground mines, including reclamation activities. Since the Mine activities had ceased prior to the effective date of this law, these regulations are not applicable.
Abandoned Mine Land Reclamation-General Reclamation Requirements 30 CFR 874	Applicabl e	These rules describe the eligibility of coal lands for reclamation with money from the Abandoned Mine Reclamation Fund. Coal lands are eligible for reclamation activities if they were mined for coal prior to August 3, 1977, and were left or abandoned in either an unreclaimed or inadequately reclaimed condition. Potentially, this may be applicable to the mine site remedial activities. Funds could be available from the fund to remediate physical hazards posed by the mine and not for any hazards posed by chemical contamination being addressed by Ecology.
Toxic Substance Control Act (TSCA) Title 15 USC 2601 et seq.		
Regulation of PCBs 40 CFR 761	Applicable	TSCA requires that material contaminated with PCBs at concentrations of 50 ppm or greater be disposed of in an incinerator or by an alternate method that achieves an equivalent level of performance. Liquids at concentrations between 50 and 500 ppm and soils above 50 ppm may also be disposed in a chemical waste landfill. TSCA requirements do not apply, however, to PCBs at concentrations less than 50 ppm. TSCA requirements are potentially applicable to remedial actions at the site if PCBs are detected above this level in excavated soils. To date, however, PCBs have not been detected above this concentration at the site.

Requirements	Applicable or Relevant & Appropriate	Comment (informal and not legal opinion)
STATE ARARs		
Model Toxics Control Act Ch. 70.105D RCW	Applicable	MTCA is the key governmental regulation governing the conduct of the overall investigation and cleanup process for the site and is therefore applicable. MTCA describes the requirements for selecting cleanup actions, preferred technologies, policies for use of permanent solutions, the time frame for cleanup, and the process for making decisions. The regulation specifies that all cleanup actions be protective of human health, comply with all applicable state and federal regulations, and provide for appropriate compliance monitoring. Specific criteria for the various cleanup methods are presented in the MTCA regulations. The MTCA regulations specify that cleanup actions utilize permanent solutions to the maximum extent practicable. Although MTCA identifies a hierarchy of preferred technologies that should be evaluated for use in the cleanup action, cost may also be a factor in determining points of compliance and selection of cleanup actions. For example, if the cost of cleanup action is substantial and disproportionate to the incremental increase in protection compared to a lesser preferred cleanup action, the less preferred action may be selected. Generally, technologies that recycle or re-use materials are preferred most, followed by methods that destroy or detoxify hazardous substances, and cleanup methods that may leave contaminants on-site. Recent amendments to MTCA (RCW 70.105D.090) exempt remedial actions conducted pursuant to an Agreed Order or a Consent Decree from the procedural requirements of several state laws. These include the State Clean Air Act (RCW 70.94), Solid Waste Management - Reduction and Recycling Act (RCW 70.95), Hazardous Waste Management Act (RCW 70.105), Water Pollution Control Law (RCW 90.48), Shoreline Management Act (RCW 90.58), and Construction Projects in State Waters (RCW 75.20). In addition, the exemption also applies to the procedural requirements of any laws requiring or authorizing local governmental permits or approval for the remedial action. Therefore, while substantive compliance is necessary, permits and approvals are not required for remedial actions at the site.
Model Toxics Control Act Cleanup Regulations WAC 173-340	**Applicable**	WAC 173-340, which implement the requirements of MTCA, contains the primary regulations under which the Landsburg Mine site RI/FS process is being conducted and are therefore applicable. These regulations establish administrative processes and standards to identify, investigate and cleanup facilities where hazardous substances have been released.
Department of Natural Resources WAC Forest Practices Permit WAC 222	Applicable	The State Department of Natural Resources (DNR) requires a Forest Practices Permit whenever more than 5,000 board feet of marketable timber is harvested from an area or property. If remedial actions at the Landsburg Mine site will remove trees having greater than 5,000 board feet of marketable timber, the substantive requirements of this rule would be applicable. Remedial actions under a Consent Decree are exempt from procedural and permitting requirements under MTCA; however a Forest Practices Permit is still required in this case.

Requirements	Applicable or Relevant & Appropriate	Comment (informal and not legal opinion)
Regulation of Public Groundwater Ch. 90.44 RCW Water Quality Standards for Groundwater WAC 173-200	Not ARAR	The rule establishes groundwater quality standards to provide for the protection of public health and existing/future beneficial uses. This standard specifically exempts CERCLA and MTCA cleanup actions, and provides for groundwater cleanup standards at such sites to be developed under WAC 173-340-720. Therefore, WAC 173-200 is neither applicable nor relevant and appropriate to the Landsburg Mine site.
Department of Health Standards for Public Water Supplies WAC 246-290	Applicable	The rule established under WAC 246-290 defines the regulatory requirements necessary to protect consumers using public drinking water supplies. The rules are intended to conform with the federal Safe Drinking Water Act (SDWA), as amended. WAC 246-290-310 establishes maximum contaminant levels (MCLs) which define the water quality requirements for public water supplies. WAC 246-290-310 establishes both primary and secondary MCLs and identifies that enforcement of the primary standards is the Department of Health's first priority. The standards set under WAC 246-290-310 are set at the levels established under the federal SDWA. These levels are shown in Table 4-3.
Department of Game Procedures WAC 212-12	Applicable	This standard defines the requirements that the Department of Game must take to protect endangered or threatened wildlife. These requirements may be applicable if endangered or threatened wildlife are identified at the site or within Department of Natural Resources records searches.
Shoreline Management Act Guidelines WAC 173-16	Applicable	The act provides guidelines for the development of master programs regulating the use of shorelines. The substantive requirements of the Act are potentially applicable to the Landsburg Mine site if remedial activities occur within 200 ft of the Cedar River shoreline area.

Requirements	Applicable or Relevant & Appropriate	Comment (informal and not legal opinion)
State Environmental Policy Act (SEPA) Ch. 43-21C RCW SEPA Rules WAC 197-11 SEPA Procedures WAC 173-802	Applicable	SEPA is applicable to remedial actions at the Landsburg Mine site. Ecology is the lead agency for MTCA remedial actions performed under a Consent Decree or an Agreed Order pursuant to WAC 197-11-253. The SEPA process is triggered when a governmental action is taken on a public or private proposal. According to WAC 197-11-784, a proposal includes both regulatory decisions of agencies and actions proposed by applicants. If the proposal is not "exempt", Ecology will require the submission of a SEPA checklist which solicits information regarding how the proposal will affect elements of the environment, such as air, water, etc. If the proposal is determined by Ecology to have a "probable significant adverse environmental impact", an environmental impact statement (EIS) will be required which examines potential environmental problems that would be caused by the proposal and options for mitigation. If in Ecology's opinion, there will be no significant adverse environmental impact, a Determination of Nonsignificance (DNS) will be issued and the SEPA process is completed without preparation of an EIS. Any public comment period required under SEPA must be combined with any comment period associated with the MTCA process in order to expedite and streamline public input. According to WAC 197-11-259, if Ecology makes a determination that the proposal will not have a probable significant adverse environmental impact, the DNS can be issued with the draft Cleanup Action Plan prepared pursuant to MTCA.
Hazardous Waste Management Act 70.105 RCW	Portions Applicable	Recent amendments to MTCA (RCW 70.105D.090) exempt cleanup actions conducted pursuant to a Consent Decree or Agreed Order from the procedural requirements of this law, but still requires substantive compliance with MTCA. The exemption does not apply to the substantive provisions, however, which still may apply depending on site conditions. Also, recent amendments to RCW 70.105 provide a conditional exemption to state-only dangerous wastes generated during a cleanup action conducted under a Consent Decree. Therefore, substantive provisions of this Act may be applicable if non-exempt dangerous wastes are generated during cleanup.

Requirements	Applicable or Relevant & Appropriate	Comment (informal and not legal opinion)
Dangerous Waste Regulations WAC 173-303		A partial list of potentially applicable sections of the Dangerous Waste Regulations are included below.
Designation of Waste WAC 173-303-070	Applicable	These requirements establish the methods and procedures to determine if solid waste requires management as dangerous waste. The substantive requirements of this section may be applicable if remedial activities involve the generation of waste.
Requirements for Generators of Dangerous Waste WAC 173-303-170	Applicable	Substantive requirements for generators of dangerous waste established under this chapter may be applicable to remedial actions performed at the site if dangerous waste is generated.
Closure and Post Closure WAC 173-303-610	Potentially relevant and appropriate	This section describes closure and postclosure performance standards for dangerous waste units, including requirements for plan preparation, maintenance and monitoring of waste containment systems, groundwater monitoring, deed notices, etc. Because the Landsburg Mine site stopped receiving waste materials prior to the effective date of this regulation and does not meet the definition of a regulated facility, these requirements of WAC 173-303 are not legally applicable to the site. Most of the requirements of this section are procedural, and not relevant because of the MTCA exemption for procedural requirements. Subsection 610(2), "Closure performance standard", corresponds to threshold requirements under MTCA. Therefore, the remedy selected by Ecology will satisfy this closure performance standard by definition. Some of these regulations may be relevant and appropriate, however. The most relevant portion of Section 610 is subsection (7), "Postclosure care and use of property". This subsection addresses post-closure maintenance and monitoring, including groundwater monitoring. Section (10) requires a notice in the property deed. The relevant requirements of Section 610(7) and (10) may be appropriate for the Landsburg Mine site.
Releases from Regulated Units WAC 173-303-645	Potentially relevant and appropriate	WAC 173-303-645 regulates releases from regulated units. Although the Landsburg Mine site does not meet the definition of a regulated dangerous waste unit, the requirements of this section are relevant. Portions of this section may be appropriate, such as: Groundwater protection standard, 645(3) Compliance period, 645(7) General groundwater monitoring requirements, 645(8) Detection monitoring program, 645(9) Compliance monitoring program, 645(10). The relevance and appropriateness of these sections will be considered in the

Requirements	Applicable or Relevant & Appropriate	Comment (informal and not legal opinion)
Landfills WAC 173-303-665	Potentially relevant and appropriate	Design standards specific to dangerous waste landfills are found in WAC 173-303-665. Of these, liner and operating standards are not relevant to closure of the Landsburg Mine site. Potential leachate will be addressed by groundwater monitoring pursuant to the approved MTCA Compliance Monitoring Program. Section 665(6) addresses closure and post-closure care, which is relevant to this site. The design standard for the final cover, which may or may not be appropriate for this site, consists of the following [WAC 173-303-665(6)(a)]: "(i) Provide for long-term minimization of migration of liquids through the closed landfill (ii) Function with minimum maintenance; (iii) Promote drainage and minimize erosion or abrasion of the cover; (iv) Accommodate settling and subsidence so that the cover's integrity is maintained; and (v) Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present."
Solid Waste Management, Recovery, and Recycling Act Ch. 70.95 RCW Minimum Functional Standards (MFS) for Solid Waste Handling WAC 173-304	Applicable	Recent amendments to MTCA (RCW 70.105D.090) exempt cleanup actions conducted pursuant to a Consent Decree or Agreed Order from the procedural requirements of this law. The exemption does not apply to the substantive provisions, however, which still may apply depending on site conditions. MTCA regulations [WAC 173-340-710(b)(c)] specify that WAC 173-304 contains the "minimum requirements" for landfill closure conducted as a MTCA cleanup action.
General Closure and Post-Closure Requirements, Landfilling Standards WAC 173-304-407, -460 Criteria for Municipal Solid Waste Landfills(MSWLF) WAC 173-351	Applicable Not ARAR	WAC 173-304-460 capping requirements include a minimum 2 ft. thick clay layer having a permeability of 1×10^{-6} or lower. Alternately, a synthetic liner material may be substituted for the soil layer. The MFS represent the primary capping criteria to consider in this FS. The purpose of the regulation is to establish minimum state-wide standards for all municipal solid waste landfill (MSWLF) units. This regulation implements rulemaking by the EPA under the authority of Subtitle D of RCRA, as amended in 1984. The criteria apply only to new and existing MSWLF. MSWLF units that stopped receiving waste prior to October 9, 1991 are subject to closure and post-closure rules under chapter 173-304. Because the Landsburg Mine site is not a MSWLF and stopped receiving waste prior to the applicable date, these rules are not ARAR to the site. All other solid waste disposal facilities that are not regulated under Subtitle C of RCRA (and the State of Washington equivalent - WAC 173-303) are subject to the criteria under WAC 173-304 "Minimum Functional Standards for Solid Waste Handling."

Requirements	Applicable or Relevant & Appropriate	Comment (informal and not legal opinion)
Water Well Construction CH. 18.104 RCW Minimum Standards for Construction and Maintenance of Water Wells WAC 173-160	Applicable	These requirements are applicable to remedial actions that include construction of wells used for groundwater extraction, monitoring, or injection of treated groundwater or wastes. These requirements also include standards for well abandonment.
Water Pollution Control/Water Resources Act Ch. 90.48 RCW/Ch. 90.54 RCW Surface Water Quality Standards WAC 173-201A	Applicable	Recent amendments to MTCA (RCW 70.105D.090) exempt cleanup actions conducted pursuant to a Consent Decree or Agreed Order from the procedural requirements of this law. The exemption does not apply to the substantive provisions, however, which still may apply depending on site conditions. Since water quality standards are set at levels protective of aquatic life, these standards are only applicable to surface waters at the site which either support or have the potential to support aquatic life. Groundwater beneath the site may discharge to the Cedar River, therefore surface water quality criteria established under this chapter may potentially be applicable to the groundwater at the point of discharge to the river. Ecology has announced anticipated rule development for the purpose of adopting risk-based numeric limits for protection of public health as required by the federal CWA (WSR-18-095). Other proposed changes to the standard were also announced in WSR-94-16-056. Table 4-4 lists criteria for selected compounds.
State Waste Discharge Program WAC 173-216 National Pollution Discharge Elimination System Permit Program WAC 173-220	Applicable Applicable	Requirements of this program may be applicable to remedial actions that include discharges to the ground. The chapter implements a permit system applicable to industrial and commercial operations that discharge to the groundwater, surface waters, or municipal sewerage systems. Specific discharges prohibited under the program are identified. Cleanup actions conducted under a Consent Decree or Agreed Order are exempt, however, from procedural requirement (permits). Establishes a state permit program pursuant to the national NPDES system. Substantive sections of the regulation may be applicable to remedial alternatives that involves discharges to surface waters. Discharges may include site run-off, spillage, leaks, sludge, or treated waste disposal.
Washington Clean Air Act Ch. 70.94 RCW and Ch. 43.21A RCW		Recent amendments to MTCA (RCW 70.105D.090) exempt cleanup actions conducted pursuant to a Consent Decree or Agreed Order from the procedural requirements of this law. The exemption does not apply to the substantive provisions, however, which still may apply depending on site conditions.

Requirements	Applicable or Relevant & Appropriate	Comment (informal and not legal opinion)
General Regulations for Air Pollution Sources WAC 173-400	Applicable	Substantive standards established for the control and prevention of air pollution under this regulation may be applicable to remedial actions proposed for the operable unit. The regulation requires that all sources of air contaminants meet emission standards for visible, particulate, fugitive, odors, and hazardous air emissions. The Puget Sound Clean Air Agency (PSCAA) enforces and administers these requirements in the greater Puget Sound Area. Refer to discussion under PSCAA.
Controls for New Sources of Air Pollution WAC 173-460	Applicable	This standard requires that new sources of air emissions provide emission estimates for toxic air contaminants listed in the regulation. The standard requires that emissions be quantified and used in risk modeling to evaluate ambient impacts and establish acceptable source impact levels. These standards are applicable since the regulation specifically lists sites subject to MTCA actions.
Puget Sound Clean Air Agency (PSCAA)		PSCAA, activated under the Washington State Clean Air Act (RCW 70.94) has jurisdiction over regulation and control of the emission of air contaminants and the requirements of state and federal Clean Air Acts from all sources in the King, Pierce, Snohomish and Kitsap county areas.
Regulation 1	Applicable	Regulation 1 establishes the general requirements and programs the agency uses to administer its regulatory program. Substantive aspects of this regulation may be applicable to the mine site if remediation activities may result in the emission of air contaminants regulated by the agency. Specific requirements of the program concern: registration of sources, new source review, emission standards and ambient air quality standards and control methods required.
Regulation 2	Not ARAR	Regulation 2 provides for the control of photochemically reactive volatile organic compounds (VOCs), precursors to low atmospheric ozone formation, in order to meet National Ambient Air Quality Standards (NAAQS) for Ozone. The regulation identifies specific source categories regulated under the standard. Regulation 2 is not ARAR since the Landsburg Mine site does not meet the definition of any of the sources regulated nor are VOCs anticipated to be released in quantities significant for the standard to be considered relevant and appropriate.
Regulation 3	Applicable	Regulation 3 controls the emission of toxic air contaminants, sources of, and development of strategies to protect public health and the environment from impacts of toxic air contaminants and may be applicable if toxic air contaminants are emitted. Ambient air concentrations for toxic air contaminants are established by PSCAA for the Puget Sound Region. Best Available Control Technology (BACT) is required for sources that emit toxic air contaminants. Toxic air contaminants are listed in Appendix A of Regulation 3 or listed in Subpart D, 40 CFR 372. Appendix A also identifies Acceptable Source Impact Levels (ASILs) for toxic air contaminants. Specific procedures for asbestos emission control are also addressed under Regulation 3.

Requirements	Applicable or Relevant & Appropriate	Comment (informal and not legal opinion)
Surface Mined-Land Reclamation Act Ch. 78.44 RCW Surface Mined-Land Reclamation WAC 332-18	Not ARAR	These regulations specify reclamation requirements for surface mines in the State of Washington. However, since the Landsburg Mine is an underground Mine, and involved coal mining, which is specifically exempted in the Act, the requirements of these regulations are not applicable or relevant and appropriate to closure activities conducted at the site. Primacy for regulation of coal mining in the State of Washington rests with the federal Office of Surface Mining.
LOCAL ARARs[a]		
King Co. Zoning Code Title 21 KCC	Applicable	Substantive requirements of the County zoning ordinance are applicable to remedial actions at the Landsburg Mine site. However, remedial actions are exempt from permitting and procedural requirements under MTCA.
Special Control Areas and Flood Hazard Areas Ch. 21.54 KCC Sensitive Areas Ordinance and Rules Ordinance 9614	Applicable	Sensitive Areas in King County are defined and regulated by the Sensitive Areas Ordinance, King County Code Chapter 21.54, and its administrative rules. The locations of sensitive areas are identified in the Sensitive Areas Map folio for wetlands, streams, flood hazards, erosion hazards, landslide hazards, seismic hazards, and coal mine hazards. The Sensitive Areas Rules set forth procedures and standards to be followed when a development proposal involves a sensitive area. The main portion of the Mine site is identified in the folio as a coal mine hazard area. Other portions of the site are mapped as erosion hazard areas. Since the Mine site is included in a sensitive area, the substantive requirements of the Sensitive Areas Ordinance are applicable to remedial action at this site. However, remedial actions are exempt from procedural and permitting requirements under MTCA.
Isolated Wetland Disturbance and Mitigation King County 21A.24.330 KCC	Applicable	King County Wetland ordinance sets forth standards and procedures to be followed when a proposed project will impact a wetland. The MTCA Consent Decree will require the filling of two wetlands, totaling approximately 0.09 acres. Substantive requirements of the County ordinance are applicable at the Landsburg Mine site; however, remedial actions under a Consent Decree are exempt from the procedural and permitting requirements under MTCA. These wetlands are isolated and are not hydrologically connected to any navigable waterway. In regards to the isolated wetlands, alteration of these systems is permitted as follows: "on sites twenty acres or greater in size, up to three isolated wetlands may be altered by combining their functions into one or more replacement wetlands on the site pursuant to an approved mitigation plan; and whenever an isolated wetland is altered pursuant to this subsection, the replacement wetland shall include enhancement for wildlife."

Requirements	Applicable or Relevant & Appropriate	Comment (informal and not legal opinion)
		Therefore, a mitigation site with a wildlife component will be required on-site or as close to the site as possible. The required mitigation of Class 3 wetlands is 1:1, with an additional 25-footbuffer to surround the mitigation site. Additional acreage will most likely be considered as part of wildlife enhancement, although activities such as the installation of waterfowl nesting boxes or bat roosting boxes is also appropriate.
Clearing and Grading	Applicable	A Clearing Permit is required for any removal of trees and vegetation in a sensitive area or special district area. A grading Permit is required for any amount of grading around a sensitive area, or for a proposed project that will disturb 100 cubic yards or greater. Substantive requirements of the County ordinance are applicable at the Landsburg Mine site; however, remedial actions under a Consent Decree are exempt from the procedural and permitting requirements under MTCA.
[a]Under RCW 70.105D.090, cleanup actions conducted under Consent Decrees or Agreed Orders are exempt from the procedural requirements of any laws requiring or authorizing local government permits or approvals for the remedial action, but must meet the substantive requirements of the permits.		

King County Grading Requirements

EXHIBIT C

SCHEDULE

Exhibit C –Schedule

Deliverable	Due Date	Comment
Submit to Ecology Draft Engineering Design Report (EDR), which will include a detailed schedule for construction activities; Construction Plans & Specifications (CPS); Construction Health and Safety Plan (HSP); and Construction Quality Assurance (CQA) Plan	Within 150 Days of the Consent Decree Effective Date	
Submit to Ecology Final EDR, including CPS, HSP and CQA	Within 30 days after Ecology approval of the Draft EDR	
Start construction phase of Cleanup Action Plan (CAP) according to EDR, CPS, HSP and CQA	Within 1.25 years of Ecology approval of the Final EDR, CPS, HSP and CQA, and all in accordance with the detailed schedule contained in Ecology-Approved EDR	Construction of the cleanup action will require two full construction seasons to complete. The construction season runs from approximately May 1 to November 1.
Submit As-built Drawings and Draft Cleanup Action Report to Ecology	Within 120 days of completion of construction, as provided in detailed schedule in EDR.	
Submit Final Cleanup Action Report to Ecology	Within 60 days of receiving Ecology's approval of the Draft Cleanup Action Report.	
Record Environmental Covenant (Exhibit F to the Consent Decree)	Within 10 days of Ecology's approval of As-Built Drawings	

Exhibit C –Schedule

Conduct Confirmational Groundwater Monitoring	To begin within 90 days of Ecology's approval of As-Built Drawings, and to be conducted in accordance with the schedule in the Compliance Monitoring Plan (Exhibit E - Part A to the Consent Decree)	
Conduct Inspection and Maintenance of the Cap and Stormwater Facilities	To begin within 180 days of Ecology's approval of As-Built Drawings, and to be conducted in accordance with the schedule in the Operation and Maintenance Plan (Exhibit E – Part B to the Consent Decree)	
Install and operate Contingent Groundwater Extraction and Treatment System (Exhibit E – Part C to the Consent Decree)	If contingent treatment system is deemed necessary under Compliance Monitoring Plan (Exhibit E – Part A to Consent Decree), then design, installation and operation of contingent treatment system will follow Ecology-approved schedule to be included in contingent treatment system design submittal	Contingent treatment system will only to be installed and or operated if and as required under Compliance Monitoring Plan (Exhibit E – Part A to the Consent Decree)
Progress Reports	As provided in Section XI of Consent Decree (monthly during construction, then as provided in Exhibit E, Part A (Compliance Monitoring Program)	

EXHIBIT D

(PUBLIC PARTICIPATION PLAN)

[NOT INCLUDED HERE]

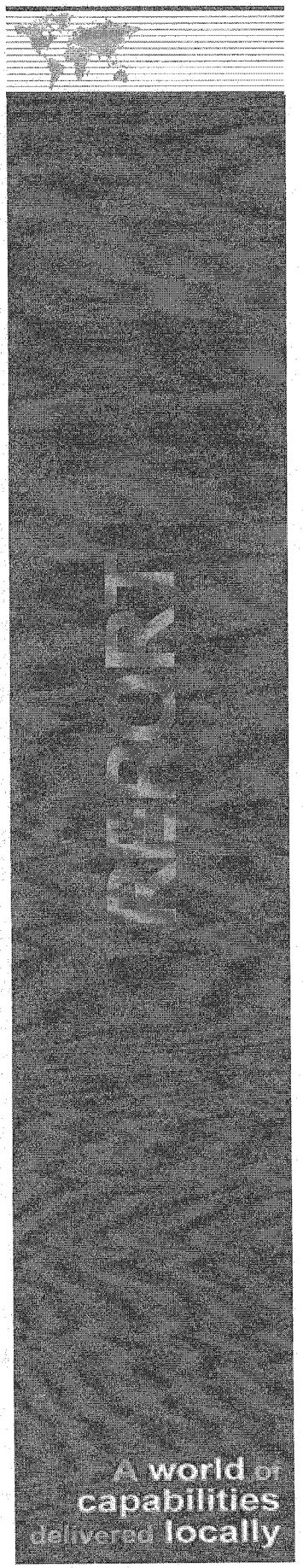
EXHIBIT E

INTRODUCTION

Part A – COMPLIANCE MONITORING PLAN

Part B – OPERATION AND MAINTENANCE PLAN

Part C – CONTINGENT GROUNDWATER EXTRACTION AND TREATMENT SYSTEM PLAN



FINAL DRAFT

COMPLIANCE MONITORING PLAN

OPERATION AND MAINTENANCE PLAN

CONTINGENCY GROUNDWATER EXTRACTION AND TREATMENT PLAN

Landsburg Mine Site
MTCA Remediation Project
Ravensdale, Washington

Submitted To: Washington Department of Ecology
3190 – 160th Avenue SE
Bellevue, WA 98008

Submitted By: Golder Associates Inc.
18300 NE Union Hill Road, Suite 200
Redmond, WA 98052 USA

Submitted On Behalf Of: The Landsburg Mine Site PLP Group

July 31, 2013

Project No. 923-1000-002.R154

Golder Associates

Exhibit E-Intro_07-31-2013.doc

Table of Contents

LIST OF FIGURES

PART A - COMPLIANCE MONITORING PLAN

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

PART B – OPERATION AND MAINTENANCE PLAN

LIST OF FIGURES

PART C - CONTINGENT GROUNDWATER EXTRACTION AND TREATMENT SYSTEM PLAN

LIST OF FIGURES

1.0 INTRODUCTION

1.1 Purpose and Scope

This document presents a set of plans, which provide guidance for routine operation, maintenance, monitoring and for mitigation of emergency situations. This document presents three plans: Part A, the Compliance Monitoring Plan; Part B, the Operation and Maintenance (O&M Plan); and Part C, the Contingency Groundwater Extraction and Treatment System Plan for the Landsburg Mine Site located near Ravensdale, Washington. These plans are required as part of the site cleanup and monitoring process under the Model Toxic Control Act (MTCA) as established by the regulations set forth in Chapter 173-340 of the Washington Administrative Code (WAC) and under consultations with the Washington Department of Ecology and the City of Kent.

This introduction includes a brief site description and history, summary of the nature and extent of contamination at the site, and an overview of the selected remedy. The Compliance Monitoring Plan is presented in Part A. The Sampling and Analysis Plan, Quality Assurance Project Plan (QAPP), Data Management Plan (DMP), and the Health and Safety Plan (HSP) associated with the Compliance Monitoring Plan are also presented in this section. The cleanup action O&M Plan is presented in Part B. The Contingency Groundwater Extraction and Treatment System Plan is presented in Part C.

1.1.1 Compliance Monitoring Plan

The purpose of the Compliance Monitoring Plan (Part A) for the Landsburg Mine Site is to describe the environmental monitoring to be performed during remedial action (protection monitoring and performance monitoring) and following completion of the cleanup action (confirmational monitoring). Protection monitoring includes: human remedial worker health & safety monitoring, and groundwater monitoring during actual remedial construction activities. Performance monitoring is construction quality assurance (CQA) inspections, monitoring, and testing to verify that the cleanup action has been constructed in accordance with design and specifications. Confirmational monitoring under the Compliance Monitoring Plan consists of long-term groundwater monitoring and maintenance of the constructed remedy components. Long-term inspections, monitoring and maintenance of the cap and drainage system is described in the O&M Plan (Part B).

Under WAC 173-340-410, compliance monitoring consists of protection monitoring, performance monitoring, and confirmational monitoring, as described below. Figure 1 illustrates these three aspects of compliance monitoring and the required plans and activities.

1.1.1.1 Protection Monitoring

Protection monitoring is conducted to confirm that human health and the environment are adequately protected during construction of the cleanup action as described in the Health and Safety Plan [see WAC 173-340-410(1)(a)]. Monitoring for protection of human health will be addressed in the site Construction

Health and Safety Plan, which will be prepared following development of engineering designs and specifications, but before construction begins. Monitoring for protection of the environment will be provided by short-term groundwater monitoring, as described in Part A of this document. .

1.1.1.2 Performance Monitoring

Performance monitoring confirms that the cleanup standards or other performance standards have been attained during the construction of the cleanup action [see WAC 173-340-410(1)(b)]. Because removal is not part of the selected remedy, and no media are exposed above cleanup levels, performance monitoring will consist of CQA for the cap and associated drainage features. A more detailed CQA Plan based on these measures will be provided in conjunction with the Engineering Design Report and the Construction Plans and Specifications, which will be submitted to Ecology as part of the detailed design process.

1.1.1.3 Confirmational Monitoring

Confirmational monitoring is performed to confirm the long-term effectiveness of the remedy, following completion of remedial action [see WAC 173-340-410(c)]. Long-term maintenance and monitoring of the cap and associated cleanup action components are provided and described in the O&M Plan (Part B). The Compliance Monitoring Plan (Part A) describes long-term confirmational monitoring of groundwater. In the event of future groundwater contamination, an additional plan, the Contingency Groundwater Extraction and Treatment System Plan (Part C) has been prepared to facilitate rapid installations.

1.1.2 Operation and Maintenance Plan

The purpose of the Operation and Maintenance (O&M) Plan (Part B) is to provide technical guidance and procedures to ensure effective long-term operation and maintenance of the completed remediation project under both normal and emergency conditions. For the remedy selected for the Landsburg Mine Site, Low-Permeability Soil Cap (see Section 1.4), O&M will consist primarily of routine inspection of the cap and associated drainage features, along with any necessary repairs. A geodetic database will also be maintained of the cap elevations for detection of settlement or other abnormal conditions. A state licensed surveyor will install benchmarks to be used to measure settlement of the cap for compliance monitoring purposes.

1.1.3 Contingent Groundwater Extraction and Treatment System Plan

In the event that groundwater contamination is detected at the compliance boundary at the remediation levels (half of applicable MTCA Method B cleanup levels) and confirmed pursuant to the Compliance Monitoring Program, a contingent groundwater extraction and treatment system will be installed. A Contingent Groundwater Extraction and Treatment System Plan (Part C) has been prepared to facilitate rapid installation of the temporary system for groundwater containment and treatment. If the Contingent Groundwater Treatment System is installed, the existing O&M Plan will be revised to include the O&M

requirements for the contingent system that will include inspections, maintenance activities and effluent monitoring.

1.2 Site Summary

The Landsburg Mine Site contains a former underground coal mine located approximately 1.5 miles northwest of Ravensdale in a rural area of southeast King County, Washington. The site is situated directly south and east of S.E. Summit-Landsburg Road and north of S.E. Kent-Kangley Road. Downtown Seattle is approximately 20 miles to the northwest. The Cedar River passes within approximately 700 ft of the site to the north. The location of the site is shown in Figures 2 and 3. The topography of the site and general site features are shown in Figure 4. The mine site occupies property owned by Palmer Coking Coal Company, LLP (PCC) and is located within Sections 24 and 25, Township 22 N., Range 6 E.

Several gravel roads access the property from public thoroughfares and trails run parallel to the east and west sides of the trench. The primary access road begins near S.E. Summit-Landsburg Road and follows along the northern portion of the trench. Another access road begins near where S.E. 256th Street bends to the south and eventually to the mine trenches where waste was disposed. A third gravel road begins across the street from the Tahoma Junior High School along S.E. Summit-Landsburg Road and provides access to LMW-11. A fourth existing access road begins at Kent-Kangley Road and allows access to neighboring houses and to the Portal #3 mine site area. Locked gates secure the site at the access road entrances, and the portion of the trench where disposal occurred is currently enclosed by a 6 ft tall chain link security fence. Dense vegetation covers the site. Electrical transmission lines and a Bonneville Power Administration property easement cross the southern portion of the site in an east-west direction.

There are approximately 130 residences in the vicinity of the site. The nearest residences to the site are to the southwest approximately 800 ft from the trench. Drinking water for area residences is supplied by groundwater, either through private wells or small community water supply systems.

The Landsburg Mine consisted of two adjacent coal seams: the Landsburg Seam and the Rogers Seam. The two seams are separated by about 600 ft. In addition to these two seams, mining has also been conducted at the nearby Frasier seam. This seam, located some 800 ft northwest of the Rogers Seam, was mined intermittently from the late 1800s to the mid-1940s. The mined section of the Rogers coal seam has a near vertical dip and consists of coal and interbedded shale approximately 16 ft wide. The mined section is about a mile in length and up to 750 feet deep.

As a result of underground mining of the Rogers Seam, a subsidence trench developed on the land surface above the mine workings. The dimensions of the trench vary, from about 60 to 100 feet wide, between 20 to 60 feet in depth and about 3/4 mile in length. The trench is not continuous along its whole

length but is comprised of a series of separate subsided segments. Each trench section is separated by a pillar wall.

Disposal activities were conducted at the site in the northern portion of the trench in the late 1960s to the late 1970s. Disposed materials included various industrial wastes, construction materials, and land-clearing debris. Industrial wastes were contained in drums or dumped directly from tanker trunks. Wastes apparently included paint wastes, solvents, metal sludges and oily water and sludge (WDOE 1990). Based on invoice records from Palmer Coking Coal Company (PCC), an estimated 4,500 drums and 200,000 gallons of oily wastewater and sludges were disposed in the trench. Disposal of land clearing debris continued until the early 1980's.

In 1991, four of the Potentially Liable Parties (PLPs) implemented an Expedited Response Action (ERA) involving the removal of the most accessible drums from the trench and construction of a fence to restrict access to the site. The ERA involved the removal of over 100 55-gallon drums (Landsburg PLP Steering Committee 1991).

Following the removal of the drums, Ecology and the PLPs negotiated and entered into an Agreed Order with the Washington Department of Ecology (Ecology) (WDOE 1993) which directed the PLPs to conduct an RI/FS to evaluate the need for remedial action. The PLPs for the Landsburg Site consist of Palmer Coking Coal Company, LLP; PACCAR Inc; Plum Creek Timberlands Company, L.P.; Browning-Ferris Industries of Illinois, Inc.; TOC Holdings Co.; and the BNSF Railway Company. The scope of work for the RI was outlined in the *Landsburg Phase I Remedial Investigation/ Feasibility Study (RI/FS) Work Plan* (Golder 1992) which was incorporated by reference into an Agreed Order. The RI/FS, which consisted of a comprehensive investigation of site environmental conditions and evaluations of potential remedial alternatives for site cleanup, was conducted by the PLP Group over the period of mid-1993 to early 1996. Results of the RI/FS were presented in the *Remedial Investigation/ Feasibility Study for the Landsburg Mine Site* (Golder 1996).

1.3 Nature and Extent of Contamination

The conclusions of the Remedial Investigation (Golder 1996) regarding the nature and extent of contamination are summarized in this Section. In general, apart from soils located within the subsidence trench in the area of known prior waste disposal activities, soil, groundwater, and surface water media in the Site area do not exhibit concentrations of chemical constituents above naturally occurring background levels. The only known constituents of concern are seven (7)compounds detected in soils inside the trench, which include chromium, lead, polychlorinated biphenyls (PCBs), bis-(2-ethylhexyl)phthalate, methylene chloride (MC), trichloroethene (TCE) and total petroleum hydrocarbons (TPH) that exceed Method B standards (see Section 1.3.4 for additional information).

1.3.1 Air

Throughout the majority of the trench area, volatile organic compounds were not detected above background in air. Detectable levels of volatile organic compounds in air were very low and restricted to only a small area within the Trench 9 in the vicinity of the sludge pond. Air monitoring conducted during drilling did not detect significant levels of volatile organic compounds.

1.3.2 Groundwater

The overall conclusion of the RI is that there are no constituents of concern for groundwater emanating from the Landsburg Mine Site. Groundwater has been monitored at that Site for 15 years and no contaminants have been detected above background levels or above MTCA levels from monitoring wells.

The results of groundwater sampling indicate that no federal primary drinking water standards (Maximum Contaminant Levels [MCL]) are being exceeded at the site itself or amongst any of the private wells sampled in the vicinity of the site, except for the MCL for arsenic in LMW-11, which is sampled at a depth of 700 feet below ground surface within the mine and represents naturally occurring background conditions. Arsenic has been detected in LMW-11 at concentrations meeting the federal MCL (10 µg/L). The MTCA Method A standard for arsenic (5 µg/L) was exceeded at LMW-11 and three private wells. Secondary MCLs (SMCLs), which are aesthetic standards only and not health-based standards, were exceeded for aluminum, iron, manganese, total dissolved solids and pH at a number of wells located throughout the area, including both private wells and monitoring wells. SMCLs were exceeded at every monitoring well. Of the 14 private wells sampled, seven of the wells had at least one exceedance of a SMCL over the initial four rounds of sampling. Iron is the most prevalent compound exceeding an SMCL. MTCA Method B standard for manganese (50 µg/L) was exceeded at 5 monitoring wells and 3 private wells. The observed distribution of chemical constituents in groundwater around the site area indicates that waste disposal activities at the Landsburg Mine are not the source of these compounds. Maximum levels of some compounds occur in wells, which are hydraulically isolated from the Mine, with no apparent pathway for chemical migration. Also, the levels observed at the Mine are consistent with reports in the literature, which indicate that coal is a natural and well-known source for these natural chemical constituents (Hem 1985; Fuste and Mayer 1987). The levels observed fall within the range of reported values considered typical for coalmine drainages in the State.

Arsenic, iron, and manganese are naturally occurring and can be elevated in coal bed aquifers. Arsenic was not a contaminant of concern at the Landsburg Mine Site (only the 700 foot deep LMW-11 well has arsenic above MTCA cleanup levels, but below State drinking water standards). Manganese and iron are a common groundwater constituent from coal deposits. Although, these private wells are not penetrating any of the Landsburg site mined coal beds (Rogers, Frasier, or Landsburg coal seams), most of the private wells in the area have penetrated and appear to receive water from or are influenced by other coal beds that are not connected to mined coal beds at the Landsburg site. In the region, the Puget Group

bedrock has numerous coal seams, most of which are not currently an economically recoverable resource.

1.3.3 Surface Water

Arsenic exceeded the MTCA Method B standard for surface water at portals #2 and #3. The levels of arsenic observed are consistent with groundwater arsenic concentration levels measured at the mine site. The occurrence of arsenic in groundwater (and therefore surface water) is a result of natural background conditions. There are, therefore, no Contaminants of Concern for surface water at the Landsburg Mine Site.

1.3.4 Soil

There are no identified contaminants of concern for soils outside of the trench. Within the trench, chromium, lead, PCBs, bis-(2-ethylhexyl) phthalate, methylene chloride, TCE and TPH exceed Method B standards in an area confined to the northern portion of the trench where waste disposal is thought to have occurred in the past. Soil testing confirmed that contamination was not identified outside the northern portion of the trenches. These compounds were designated as constituents of concern for soil inside the trench. On the basis of trench sampling conducted to date, however, and in conjunction with historical information and geophysics, potential contamination is believed to be restricted to the northern portion of the trench.

1.4 Summary of Cleanup Action Plan

The remedy selected for the Landsburg Mine Site is Alternative 5, which will place a low-permeability soil cap over backfill in the northern portion of the trench as shown in Figure 5. This part of the trench has been determined to contain the dumped waste, based on historical information, sampling, and geophysical investigations. The trench would be backfilled to grade prior to capping. A conceptual cross-section of the trench backfill and cap is shown in Figure 6.

The major steps in the remedy are:

1. Backfill the trench as required for capping.
2. Allow the backfill to consolidate.
3. Place a low-permeability soil cap over the trench backfill, including grading and surface water management.
4. Maintain the cap during the long-term confirmational period.
5. Implement and maintain institutional controls, groundwater monitoring and any instituted contingency plan.

Backfilling the trench will induce settlement, which must be accounted for in the design and installation of a cap. The existing materials in the trench are expected to be moderately compressible due to their loose nature and inclusion of construction debris and organic materials. Backfilling is expected to induce minor

compression of these materials, which will result in surface settlement on the order of 6 inches to a foot. Settlement of the new fill depends on the type of fill used and the method of placement. The remainder of the settlement will continue gradually for many years at a decreasing rate.

The lower zone of the trench backfill will not be compacted because of the unacceptably high safety risk of sudden trench collapse caused by heavy vibrating equipment. Instead, the trench will be backfilled and the material allowed to consolidate at least three months. The upper portion of the backfill will be compacted to reduce the settlement of the cap foundation. The trench will be over-filled to add a small "surcharge." The backfill will then be allowed to settle and consolidate prior to cap placement.

The low-permeability soil cap consists of 24 inches of compacted low-permeability soil beneath 6 inches of vegetated topsoil. The permeability of the low-permeability soil cap will be less than 10^{-6} cm/sec, meeting Minimum Function Standards (MFS) specifications for landfill caps (WAC 173-304). The topsoil will not be compacted, in order to provide a loose medium for establishing the vegetative cover. To establish vegetation, the topsoil will be seeded with grasses suitable for the local climate.

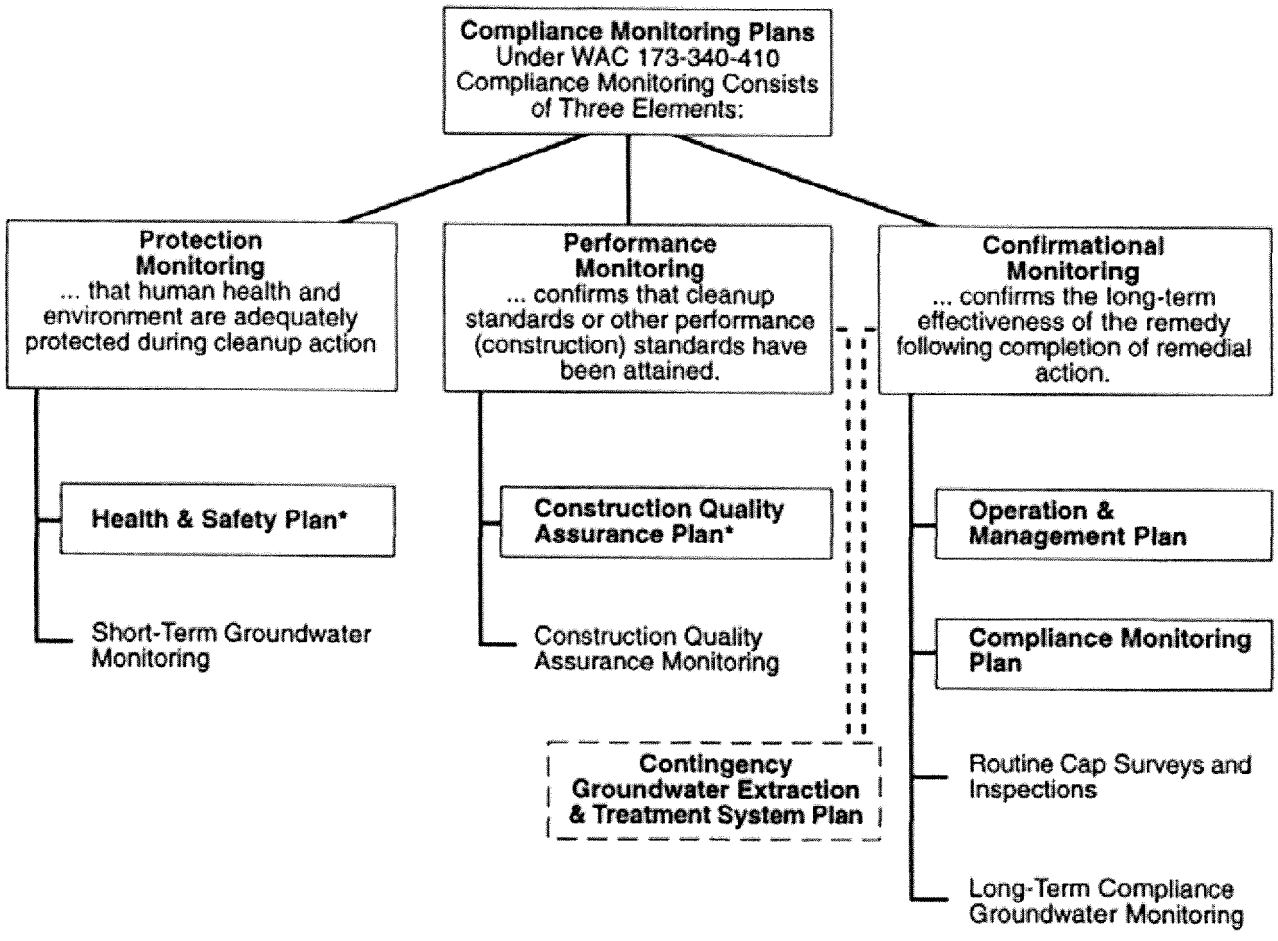
The cap and surrounding area will be graded to provide proper stormwater drainage. Drainage ditches will be constructed at the margins of the cap or along the access roads to intercept surface runoff and convey it away from the backfilled trenches, as shown on Figure 5. Final design of the drainage ditches will be provided in the Engineering Design Report and the Construction Plans and Specifications.

Site use restrictions will prohibit using the site for any purpose incompatible with a waste disposal site. Groundwater use restrictions will be employed to prevent exposure to site groundwater. Restrictions will prohibit penetrating the cap and any site use that could damage the cap or significantly reduce its effectiveness. Deed restrictions will be instituted to ensure that site use restrictions remain in force regardless of the property owner, and to notify any prospective purchasers of the presence of subsurface waste.

Warning signs will provide notice of the presence of a waste site. A 6 foot tall chain link security fence will be maintained around the low permeability cap (Trenches 7, 8, and 9) for five years after the remedial action to keep visitors and trespassers off of the cap to ensure that the cap is secured and groundcover is well established. Fencing is not needed for capping alternatives (after five years) because the trench backfill will provide a very thick barrier against contact with any waste material, such that incidental trespass (which fencing is designed to prevent) or limited utilization of the site would not present a health risk. The fence will also prevent access that might result in damage to the low permeability cap. At the end of five years, when the vegetative cover should have had sufficient time to become established and protect the low permeability cap, the fence may be removed with approval from Ecology. Groundwater at the compliance boundaries currently meets cleanup levels, therefore, no groundwater containment or treatment is necessary. In the unlikely event that mine waste contaminants are detected in groundwater

at the compliance boundary above remediation levels (one-half of MTCA Method B cleanup levels), a groundwater extraction and treatment system will be installed. With this contingency available, institutional controls and monitoring address the possibility of future groundwater concerns. A Contingent Groundwater Extraction and Treatment System Plan has been prepared (see Part C of this document) which could be installed quickly if needed. To speed up the installation of a contingent treatment system, some of the infrastructure was installed in 2008. The infrastructure that was selected for premature installation were the items that have a long lead or permitting phase that might slow the installation process. For example, a fenced gravel pad area to support the extraction/treatment equipment was installed north of LMW-2 and adjacent to the S.E. Summit-Landsburg Road. A discharge pipeline was installed from the treatment pad extending to the west end of the PCC property where it could be tied into the local Metro POTW sewer line serving Tahoma junior high. Additionally, an electrical transformer and control box for equipment hook-up has been installed. The area has lighting and is fenced for security.

FIGURES



*The Health and Safety Plan and the Construction Quality Assurance Plan are both directly related to the final design of the remedial construction activities and will be provided with the Engineering Design and Specifications.

FIGURE 1
ASPECT OF COMPLIANCE MONITORING, REQUIRED PLANS AND ACTIVITIES
PALMER/LANDSBURG MINE/WA

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Golder Associates

FIGURE **2**
SITE LOCATION
PALMER/LANDSBURG MINE/WA

Source: USGS 1:250,000 Sheets,Seattle and Wenatchee

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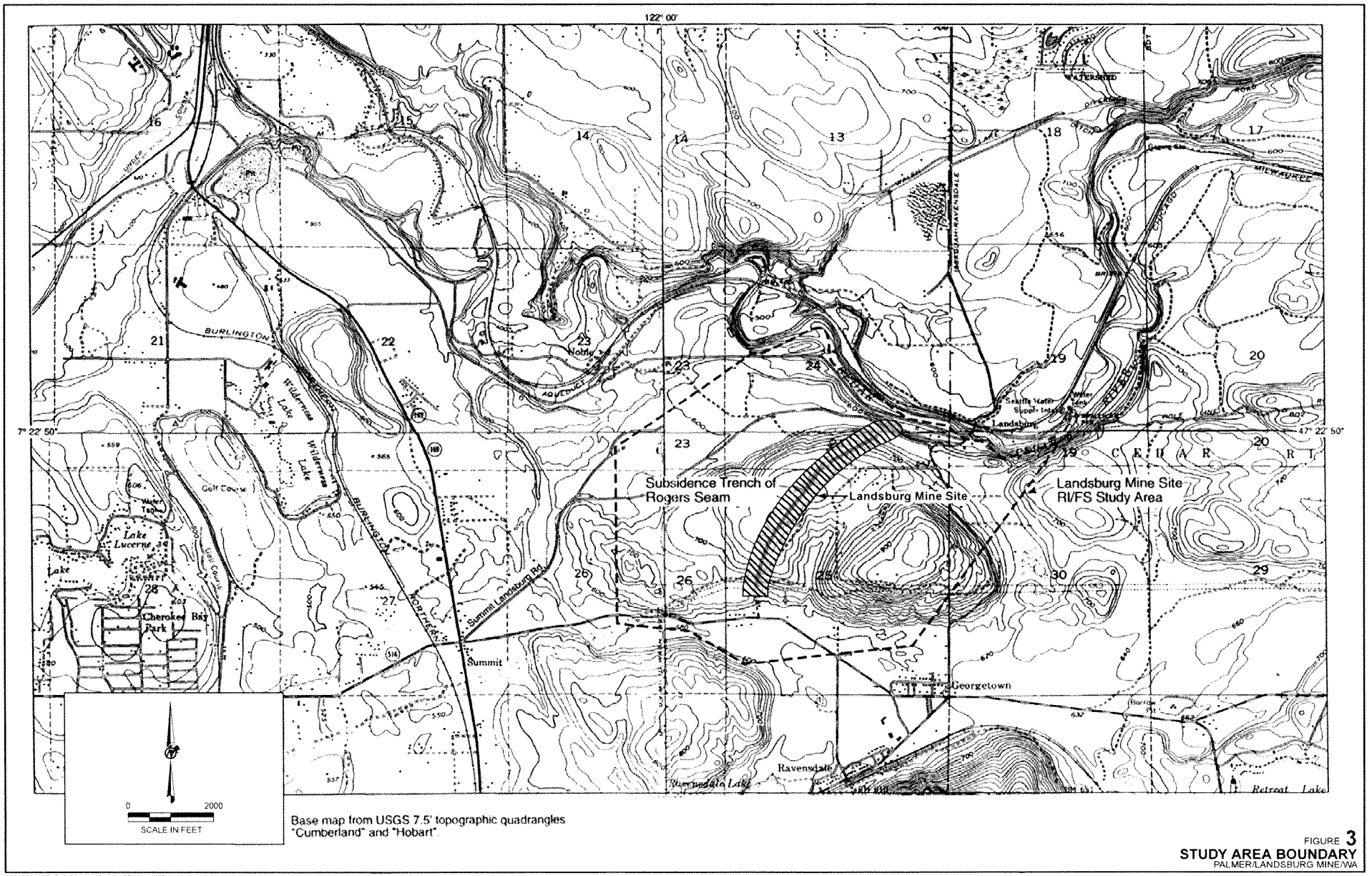

FIGURE 3
STUDY AREA BOUNDARY
PALMER/LANDSBURG MINE/WA

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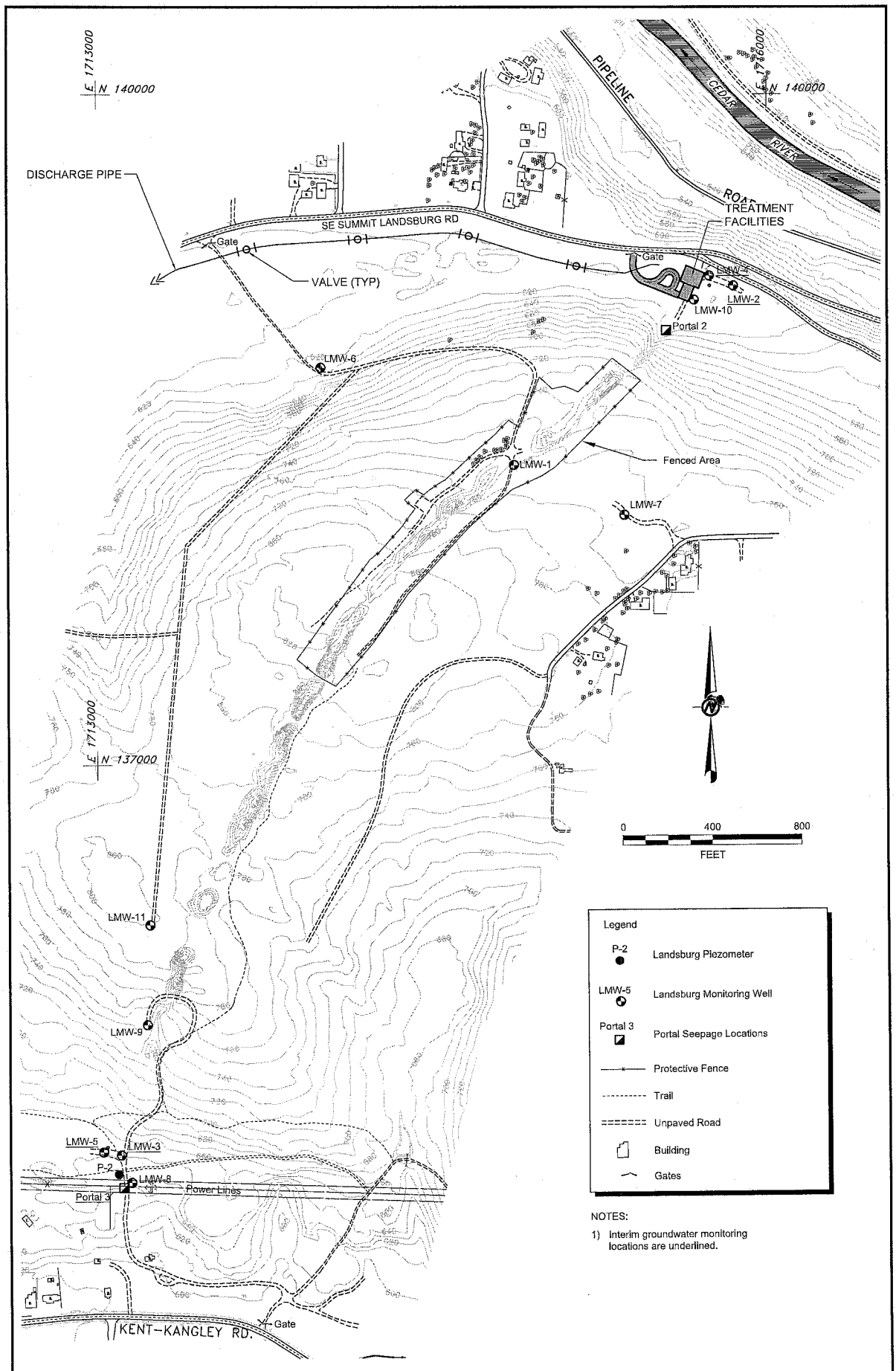

FIGURE **4**

SITE FEATURES AND TOPOGRAPHY

PALMER/LANDSBURG MINE/WA

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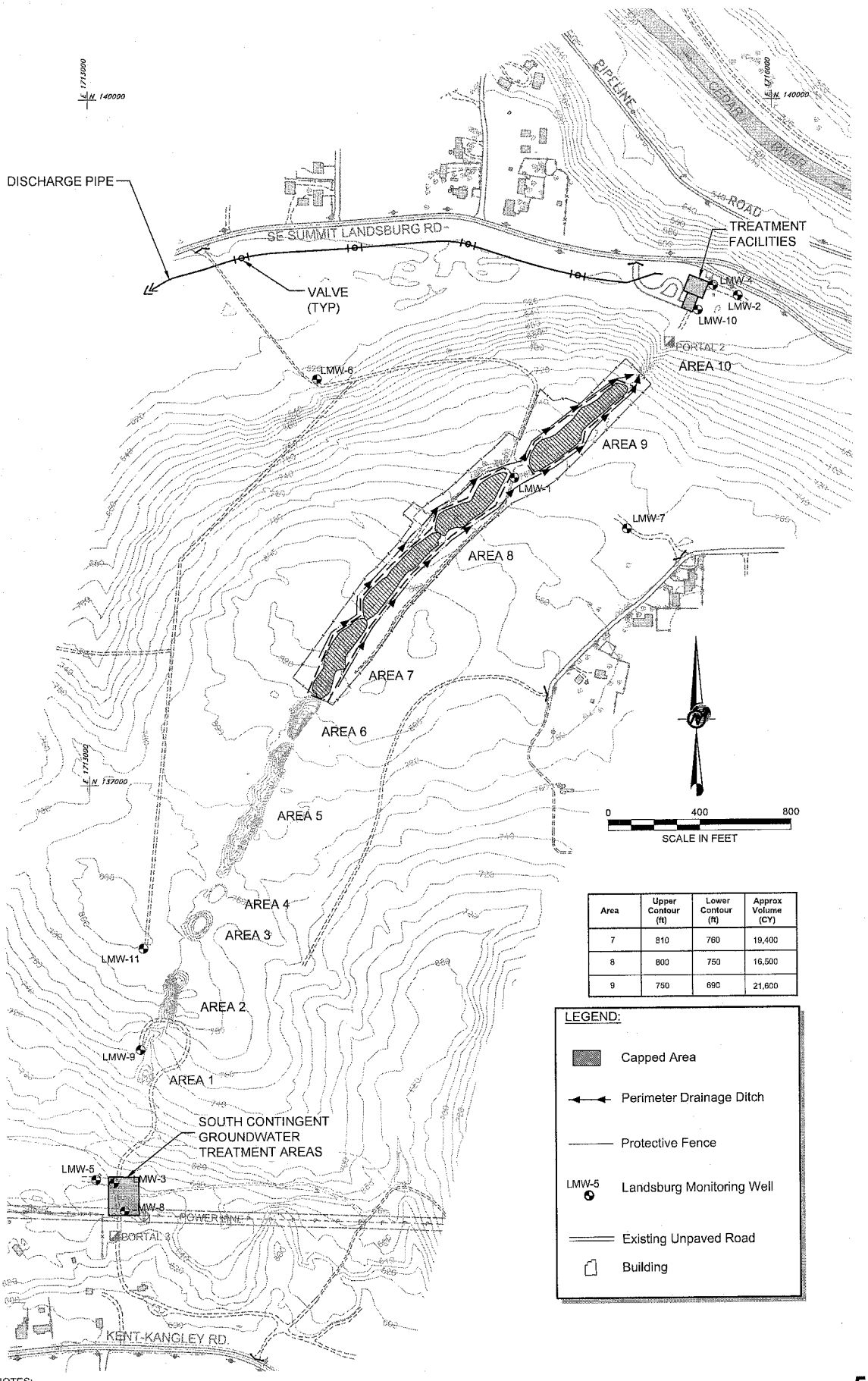

Area	Upper Contour (ft)	Lower Contour (ft)	Approx Volume (CY)
7	810	760	19,400
8	800	750	16,500
9	750	690	21,600

LEGEND:

- Capped Area
- Perimeter Drainage Ditch
- Protective Fence
- LMW-5 Landsburg Monitoring Well
- Existing Unpaved Road
- Building

NOTES:
1. TOPOGRAPHY IN VICINITY OF TRENCHES WILL BE MODIFIED AS NECESSARY TO ACCOMMODATE CAP AND DITCHES.
2. ONLY TRENCH AREAS 7,8, AND 9 WILL BE BACKFILLED AND CAPPED

FIGURE **5**
CAPPED AREA AND DRAINAGE DITCHES
PALMER/LANDSBURG MINE/WA

K:\CAD\Projects\1992\231000x002\R154\Exhibit E Introduction\923_1000_002_R154_F5r3.dwg | Fig 5 Capped Area and Drainage Ditches | Mod: 07/31/2013, 13:37 | Plotted: 07/31/2013, 14:25 | sforcier

Golder Associates

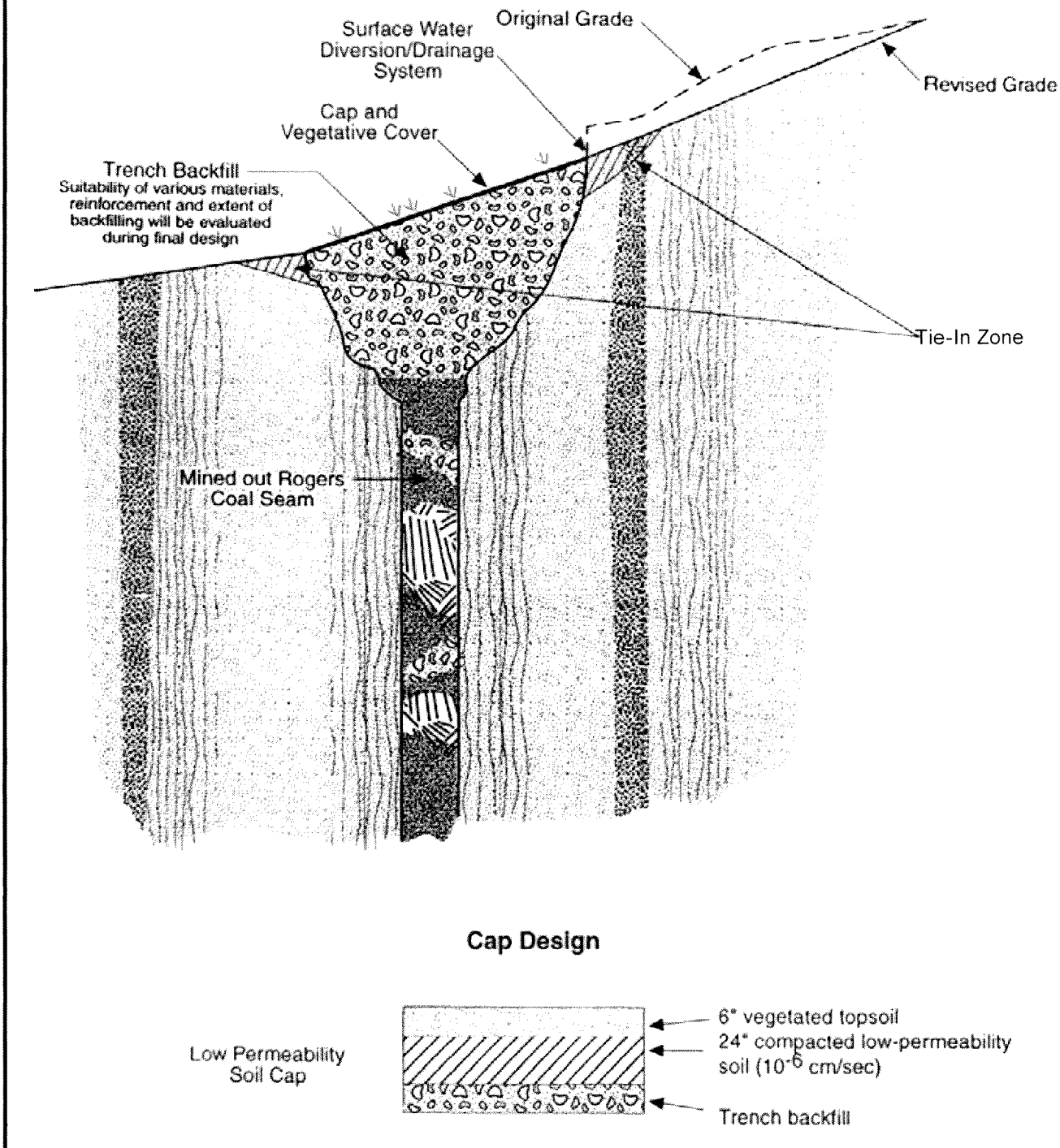

FIGURE **6**
CAP DESIGN
PALMER/LANDSBURG MINE/WA

Part A

COMPLIANCE MONITORING PLAN

REPORT

A world of capabilities delivered locally

FINAL DRAFT

PART A

COMPLIANCE MONITORING PLAN

Landsburg Mine Site
MTCA Remediation Project
Ravensdale, Washington

Submitted To: Washington Department of Ecology
3190 – 160th Avenue SE
Bellevue, WA 98008

Submitted By: Golder Associates Inc.
18300 NE Union Hill Road, Suite 200
Redmond, WA 98052 USA

Submitted On Behalf Of: The Landsburg Mine Site PLP Group

July 31, 2013

Project No. 923-1000-002.R154

Golder Associates

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